California Fish and Game Commission
Meeting Binder

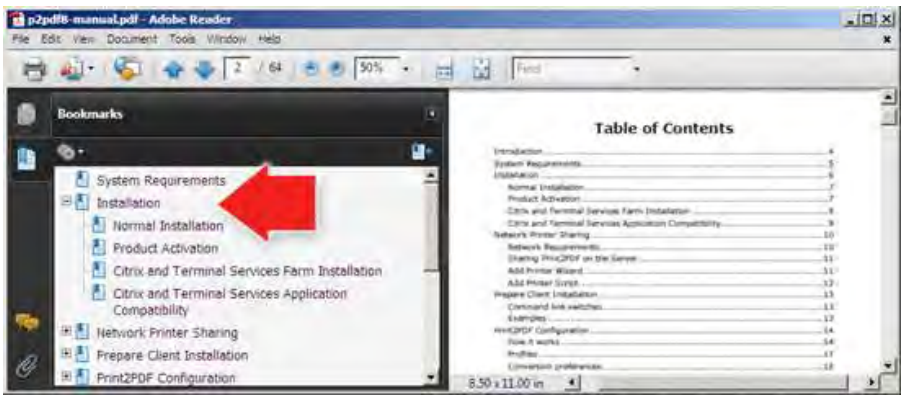
August 19-20, 2020
Webinar/Teleconference

EASY GUIDE TO USING THE BINDER

1. Download and open the binder document using your Adobe Acrobat program/app.

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 FISH AND GAME COMMISSION TELECONFERENCE MEETING

- This year marks the beginning of the 150th year of operation of the California Fish and Game 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. These meetings are vital in achieving that goal. In that spirit, we provide the following information to be as effective and efficient toward that end. Welcome and please let us know if you have any questions.

- 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.

- The amount of time for each agenda item may be adjusted based on time available and the number of speakers.

- 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. Disruptions from the audience 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, and sign up for our electronic mailing lists.

- All petitions for regulation change must be submitted in writing on the authorized petition form, FGC 1, Petition to the California Fish and Game Commission for Regulation Change, available on the Commission's website.

- **Reminder!** Please silence your mobile devices and computers to avoid interruptions.

INTRODUCTIONS FOR FISH AND GAME COMMISSION MEETINGS

Fish and Game Commission

Eric Sklar	President (Saint Helena)
Samantha Murray	Vice President (Del Mar)
Jacque Hostler-Carmesin	Member (McKinleyville)
Russell Burns	Member (Napa)
Peter Silva	Member (Jamul)

Commission Staff

Melissa Miller-Henson	Executive Director
Rachel Ballanti	Deputy Executive Director
Mike Yaun	Legal Counsel
Susan Ashcraft	Marine Advisor
Ari Cornman	Wildlife Advisor
Sherrie Fonbuena	Analyst
Cynthia McKeith	Analyst

California Department of Fish and Wildlife

Chuck Bonham	Director
Wendy Bogdan	General Counsel
David Bess	Deputy Director and Chief, Law Enforcement Division
Stafford Lehr	Deputy Director, Wildlife and Fisheries Division
Clark Blanchard	Assistant Deputy Director, Office of Communications, Education and Outreach
Scott Gardner	Chief, Wildlife Branch
Kevin Shaffer	Chief, Fisheries Branch
Craig Shuman	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
Eric Sklar, President
Saint Helena
Samantha Murray, Vice President
Del Mar
Jacque Hostler-Carmesin, Member
McKinleyville
Russell E. Burns, Member
Napa
Peter S. Silva, Member
Jamul

STATE OF CALIFORNIA
Gavin Newsom, Governor

Fish and Game Commission

Celebrating 150 Years of
Wildlife Heritage and Conservation!

Melissa Miller-Henson
Executive Director
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fgc@fgc.ca.gov

www.fgc.ca.gov

MEETING AGENDA
August 19-20, 2020

Webinar and Teleconference

The California Fish and Game Commission is conducting this meeting by webinar and teleconference to avoid a public gathering and protect public health during the COVID-19 pandemic, consistent with Executive Order N-33-20.

Pursuant to Executive Order N-29-20, commissioners may participate in meetings remotely. The public may provide public comment during the public comment periods, and otherwise observe remotely consistent with the Bagley-Keene Open Meeting Act.

The meeting will be live streamed; visit www.fgc.ca.gov the day of the meeting. To provide public comment during the meeting, please join via Zoom Webinar or by telephone. Please click here for instructions on how to join the meeting.

Note: See important meeting deadlines and procedures, including written public comment deadlines, starting on page 8. Unless otherwise indicated, the California Department of Fish and Wildlife is identified as Department.

DAY 1 – August 19, 2020, 10:00 AM

Call to order/roll call to establish quorum

1. Consider approving agenda and order of items

2. General public comment for items not on agenda
Receive public comment regarding topics within the Commission's authority that are not included on the 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).

3. Executive director's report
Receive updates from the executive director.

CONSENT ITEMS

4. Recreational purple sea urchin emergency (90-day extension)
Consider adopting a 90-day extension of the emergency regulations concerning recreational take of purple sea urchin at Caspar Cove, Mendocino County emergency regulations.
(Amend Section 29.06, Title 14, CCR)

5. White Seabass Fishery Management Plan
Receive the Department's White Seabass Fishery Management Plan 2018-2019 annual review.
(Pursuant to Section 5.9, White Seabass Fishery Management Plan)

6. Department informational items (marine)
The Department will highlight marine items of note since the last Commission meeting.

(A) Director's report
(B) Marine Region
  I. Marine Species Portal
(C) Law Enforcement Division

7. Annual tribal planning meeting
Report on the annual tribal planning meeting held pursuant to the Commission's Tribal Consultation Policy.

8. Tribal Committee
Receive summary and consider approving recommendations from August 18, 2020 committee meeting. Discuss referred topics and consider revisions to topics and timing.

(A) Previous committee meeting report
(B) Committee work plan

9. Marine Resources Committee
Receive summary and consider approving recommendation from July 29, 2020 committee meeting. Discuss referred topics and consider revisions to topics and timing.

(A) Previous committee meeting report
(B) Committee work plan

10. Recreational red abalone
Consider authorizing publication of notice of intent to amend the recreational take of red abalone fishery closure sunset date regulation.
(Amend Section 29.15, Title 14, CCR)

11. Recreational Dungeness crab
Consider authorizing publication of notice of intent to amend recreational take of Dungeness crab regulations intended to provide additional whale and turtle protections in the trap fishery.
(Amend sections 29.80, 29.85, and 701, Title 14, CCR)

Note: The Department is expected to propose that the regulations apply to all crab species.

12. Recreational and commercial groundfish

Discuss proposed changes to regulations for the recreational and commercial take of federal groundfish and associated species.
(Amend sections 27.30, 27.35, 27.45, 28.27, 28.28, 28.54, 28.55, 28.65, and 150.16, Title 14, CCR)

13. Pacific leatherback sea turtle

Consider and potentially act on the petition, the Department's evaluation report, and comments received, to determine whether listing Pacific leatherback sea turtle (*Dermochelys coriacea*) as a threatened or endangered species under the California Endangered Species Act (CESA) may be warranted.
(Pursuant to sections 2074 and 2074.2, Fish and Game Code)

Note: if the Commission determines listing may be warranted, a one-year status review will commence before the final decision on listing is made.

14. Marine petitions for regulation change

Consider requests submitted by members of the public to adopt, amend, or repeal a regulation. (Pursuant to Section 662, Title 14, CCR)

(A) Action on current petitions – *None scheduled at this time*

(B) Action on pending regulation petitions referred to staff or the Department for review

I. Petition #2020-001: Emergency regulation for increased take of purple sea urchin in select sites in Monterey

II. Petition #2018-013(b): Commercial ridgeback prawn fishing hours

15. Marine non-regulatory requests from previous meetings

Consider non-regulatory requests submitted by members of the public at previous meetings.

(A) Action on non-regulatory requests

(B) Action on pending non-regulatory requests referred to staff or the Department for review – *None scheduled at this time*

16. Recreational sea urchin

Consider authorizing publication of notice of intent to amend regulations concerning recreational take of sea urchin at Caspar Cove, Mendocino County and Tanker's Reef, Monterey County.
(Amend sections 29.05 and 29.06, Title 14, CCR)

Recess

DAY 2 – August 20, 2020, 8:30 AM

Call to order/roll call to establish quorum

17. General public comment for items not on agenda

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

CONSENT ITEMS

18. Kenwood marsh checkerbloom

Receive Department's five-year status review for Kenwood marsh checkerbloom (*Sidalcea oregana ssp. valida*), which is listed as an endangered species under CESA. (Pursuant to Section 2077, Fish and Game Code)

19. Quino checkerspot butterfly

(A) Receive a petition to list Quino checkerspot butterfly (*Euphydryas editha quino*) as a threatened or endangered species under CESA.
(Pursuant to Section 2073.3, Fish and Game Code, and subsection 670.1(c), Title 14, CCR)

(B) Consider approving the Department's request for a 30-day extension to review the petition.
(Pursuant to Section 2073.5, Fish and Game Code)

20. Mohave desert tortoise

Receive the Department's 90-day evaluation report for the petition to change the status of the Mohave desert tortoise (also known as Agassiz's desert tortoise) (*Gopherus agassizii*) from a threatened species to an endangered species under CESA.
(Pursuant to Section 2073.5, Fish and Game Code)

21. Department informational items (wildlife and inland fisheries)

The Department will highlight wildlife and inland fisheries items of note since the last Commission meeting.

(A) Director's report
(B) Wildlife and Fisheries Division, and Ecosystem Conservation Division
  I. Bacterial outbreak at fish hatcheries
(C) Law Enforcement Division

22. Wildlife Resources Committee

Discuss referred topics and consider revisions to topics and timing. Consider approving draft agenda topics for next committee meeting.

(A) Committee work plan
(B) Next committee meeting

23. Simplification of statewide inland sport fishing

Discuss proposed changes to inland sport fishing regulations.
(Add sections 5.84, 5.89, 7.40, and amend sections 3.00, 4.00, 5.00, 5.41, 5.85, 7.00, 7.50, and 8.10, Title 14, CCR)

24. Owens pupfish

Receive overview of the Department's five-year status review of Owens pupfish (*Cyprinodon radiosus*), which is listed as an endangered species under CESA.
(Pursuant to Section 2077, Fish and Game Code)

25. Western Joshua tree

Consider and potentially act on the petition, the Department's evaluation report, and comments received to determine whether listing Western Joshua tree (*Yucca brevifolia*) as a threatened or endangered species under CESA may be warranted.
(Pursuant to sections 2074 and 2074.2, Fish and Game Code)

Note: if the Commission determines listing may be warranted, a one-year status review will commence before the final decision on listing is made.

26. Wildlife and inland fisheries items of interest from previous meetings

These items are generally updates on topics recently heard before the Commission.

(A) Discuss urban coyote issues

27. Wildlife and inland fisheries petitions for regulation change

Consider requests submitted by members of the public to adopt, amend, or repeal a regulation. (Pursuant to Section 662, Title 14, CCR)

(A) Action on current petitions
  I. Petition #2020-008: Elk hunting suspension

(B) Action on pending regulation petitions referred to staff or the Department for review – *None scheduled at this time*

28. Wildlife and inland fisheries non-regulatory requests from previous meetings

Consider non-regulatory requests submitted by members of the public at previous meetings.

(A) Action on non-regulatory requests

(B) Action on pending non-regulatory requests referred to staff or the Department for review – *None scheduled at this time*

29. Proposed meeting dates and locations for 2021

Discuss and consider adopting proposed meeting dates and locations of Commission meetings for January through December 2021.
(Pursuant to Section 110, Fish and Game Code)

30. Commission administrative items

(A) Next meeting – October 14-15, 2020; webinar/teleconference

(B) Rulemaking timetable updates

(C) New business

Adjourn

EXECUTIVE SESSION

(Not Open to Public)

At a convenient time during the regular agenda of the meeting listed above, 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. Dennis Sturgell v. California Department of Fish and Wildlife, and California Fish and Game Commission (revocation of Dungeness crab vessel permit No. CT0544-T1)

II. Aaron Lance Newman v. California Fish and Game Commission (revocation of hunting and sport fishing privileges)

III. Almond Alliance of California et al. v. California Fish and Game Commission and California Department of Fish and Wildlife (bumble bees California Endangered Species Act determination)

(B) Possible litigation involving the Commission

(C) Staffing

(D) Deliberation and action on license and permit items

I. Consider the proposed decision in Agency Case No. 19ALJ17-FGC, the accusation filed against Van Than regarding the revocation of his sport fishing license.

California Fish and Game Commission
2020 Meeting Schedule

Note: As meeting dates and locations can change, please visit www.fgc.ca.gov for the most current list of meeting dates and locations.

Meeting Date	Commission Meeting	Committee Meeting
September 17		**Wildlife Resources** Webinar/teleconference
October 14 - 15	Webinar/teleconference	
November 9		**Tribal** Webinar/teleconference
November 10		**Marine Resources** Webinar/teleconference
December 9 - 10	Webinar/teleconference	

Other 2020 Meetings of Interest

Association of Fish and Wildlife Agencies
- September 13-16, virtual meeting

Pacific Fishery Management Council
- September 10-17, Spokane, WA
- November 13-20, Garden Grove, CA

Pacific Flyway Council
- August 28, virtual meeting

Wildlife Conservation Board
- August 26, Sacramento, CA
- November 18, Sacramento, CA

Important Commission Meeting Procedures and Deadlines Information

Welcome to a Meeting of the California Fish and Game Commission
This year marks the beginning of the 151st 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. In that spirit, we provide the following 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 Equal Employment Opportunity (EEO) Office at (916) 653-9089 or EEO@wildlife.ca.gov. Accommodation requests for facility and/or meeting accessibility and requests for American Sign Language (ASL) 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 EEO Office immediately.

Stay Informed
To receive meeting agendas and regulatory notices about subjects of interest to you, please visit the Commission's website, www.fgc.ca.gov, to sign up on our electronic mailing lists.

Submitting Comments on Agenda Items
The public is encouraged to comment on any agenda item. Verbal comments are only accepted during meetings. Written comments may be submitted by one of the following methods: E-mail to fgc@fgc.ca.gov; mail to California Fish and Game Commission, P.O. Box 944209, Sacramento, CA 94244-2090; or deliver to California Fish and Game Commission, 1416 Ninth Street, Suite 1320, Sacramento, CA 95814. Materials provided to the Commission may be made available to the general public.

Written Comment Deadlines
The ***Comment Deadline*** for this meeting is **5:00 p.m. on August 6, 2020**. 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 August 14, 2020**. Written comments received by this deadline will be made available to Commissioners at the meeting.

Petitions for Regulation Change
Any person requesting that the Commission adopt, amend, or repeal a regulation must complete and submit form FGC 1, titled, "Petition to the California Fish and Game Commission for Regulation Change" (as required by Section 662, Title 14, CCR). The form is available at https://fgc.ca.gov/Regulations/Petition-for-Regulation-Change. To be received by the Commission at this meeting, petition forms must have been delivered by the ***Supplemental Comment Deadline***. Petitions received at this meeting will be scheduled for consideration at the next 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 will 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 business meeting.

Speaking at the Meeting
To speak on an agenda item, 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. Speakers will be called one at a time; please pay attention to when your name is called.
2. When addressing the Commission, 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, please 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 the following exceptions:
    a. Individuals may receive advance approval for additional time to speak if requests for additional time to speak 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.
    b. An individual requiring an interpreter is entitled to at least twice the allotted time pursuant to Government Code Section 11125.7(c).
    c. An individual may receive additional time to speak to an agenda item at the request of any 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.
2. All electronic formats must be Windows PC compatible.

2. GENERAL PUBLIC COMMENT (DAY 1)

Today's Item **Information ☒** **Action ☐**

Receive public comment regarding topics within FGC authority that are not included on the agenda.

Summary of Previous/Future Actions

- **Today receive requests and comments** **Aug 19-20, 2020; Webinar/Teleconference**
- Consider granting, denying, or referring Oct 14-15, 2020; Webinar/Teleconference

Background

This item is to provide the public an opportunity to address FGC 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 written comment deadline), or as supplemental comments at the meeting (if received by the supplemental comment deadline).

Public comments are generally categorized into three types under general public comment: (1) petitions for regulation change; (2) requests for non-regulatory action; and (3) informational-only comments. Under the Bagley-Keene Open Meeting Act, FGC 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, petitions for regulation change and non-regulatory requests generally follow a two-meeting cycle (receipt and direction); FGC will determine the outcome of the petitions for regulation change and non-regulatory requests received at today's meeting at the next regular FGC meeting, following staff evaluation (currently Oct 14-15, 2020).

As required by the Administrative Procedure Act, petitions for regulation change will be either denied or granted and notice made of that determination. Action on petitions received at previous meetings is scheduled under a separate agenda item titled "Petitions for regulation change." Action on non-regulatory requests received at previous meetings is scheduled under a separate agenda item titled "Non-regulatory requests."

Significant Public Comments

1. New petitions for regulation change are summarized in Exhibit 1, and the original petitions are provided as exhibits 3-5.
2. A request for non-regulatory action is summarized in Exhibit 2, and the original requests are provided in exhibits 6-7.
3. Informational comments are provided as exhibits 8-14.

Recommendation

FGC staff: Consider whether any future agenda items are needed to address issues that are raised during public comment.

Exhibits

1. Summary of new petitions for regulation change received by Aug 6, 2020 at 5:00 p.m.
2. Summary of requests for non-regulatory action received by Aug 6, 2020 at 5:00 p.m.
3. Petition #2020-007 AM 1: Authorize surfboard fishing at South La Jolla State Marine Reserve, received Jul 10, 2020
4. Petition #2020-009: Require reporting of mammals taken for nuisance wildlife control (with exceptions) on annual trapping reports, received Jun 25, 2020
5. Petition #2020-010: Reduce wild rainbow and brown trout limits at Stanislaus River and Beaver Creek to zero, received Jul 28, 2020
6. Email from Ashley Eagle-Gibbs with attached letter from Morgan Patton, West Marin Environmental Action Committee, regarding increased consumptive activity in the Duxbury Reef State Marine Conservation Area, received Aug 6, 2020
7. Letter from Jake Elzenga requesting trout planting in astretch of the Merced River, received Aug 6, 2020
8. Letter from Dennis Fox concerning a fee-to-trust acquisition proposal in Kern County, received Jun 22, 2020
9. Email from Linea Carlson suggesting that fishing is cruel and people should stop fishing, received Jul 1, 2020
10. Email from Eric Mills in remembrance of former State Resources Secretary Huey Johnson, received Jul 14, 2020
11. Email and letter from Mitchell Fox, Center for a Humane Economy, to Director Chuck Bonham concerning enforcement of California Penal Code Section 6530 (related to kangaroo parts), received Jul 22, 2020
12. Email from Pheobe Lenhart, received Aug 4, 2020, and response from Shawn Fresz, received Aug 5, 2020, concerning the size of the Roosevelt elk population in Del Norte County and DFW's data gathering methods
13. Email from Jonnel Covault outlining concerns about Roosevelt elk hunting and treponome-associated hoof disease (TAHD), received Aug 5, 2020
14. Email from Janet Gilbert outlining concerns about Roosevelt elk tag allotments and TAHD, received Aug 5, 2020

Motion/Direction (N/A)

3. EXECUTIVE DIRECTOR'S REPORT

Today's Item **Information ☒** **Action ☐**

Receive the executive director's report, including an update on staffing, COVID-19 pandemic response, an initial discussion on equity and inclusion, legislation, and FGC-delegated actions.

Summary of Previous/Future Actions (N/A)

Background

Staffing

In response to Governor Newsom's request for state agencies to provide at least five percent of their workforce to assist with contact tracing, FGC analyst Craig Castleton volunteered for the full-time assignment. He completed training and received his assignment to Los Angeles County through at least Dec 2020 and potentially longer. His absence represents a 10 percent reduction in FGC staff positions. Compounded with mandatory leave reduction plans for several staff and across-the-board salary reductions with associated leave days, FGC staff capacity is reduced by approximately 20 percent at this time. In partial response, FGC staff will recruit a part-time seasonal clerk in the next couple of months. Additional details on staffing and the kinds of activities in which staff is engaged are included in Exhibit 1, *Staff Report on Time Allocation and Activities.*

COVID-19 Pandemic Response

Your team of staff continues to show its adaptability and resolve in responding to the challenges of the pandemic and new ways of doing business. The majority of staff continue to work remotely, though we have two staff in the office most days to advance the essential office work and to keep our doors open during normal business hours.

Following guidance from the California Department of Public Health, FGC continues to implement all recommended office safety measures. Staff is also following the guidance in the *Worksite COVID-19 Prevention Plan* for the Natural Resources Building. Safety measures include self-health checks for staff prior to coming into the office, use of face coverings, physical distancing, occupancy limits for individual rooms, and signage installed throughout the office. We are also installing plexi-glass barriers at our public counters. Implementing and monitoring these and other measures to keep staff and visitors safe is a top priority.

In addition to the described safety measures, your staff has been divided into two groups, each capapable of handling most tasks required to keep FGC functioning. Members of one group are not allowed in the office at the same time as members of the other group; this division is intended to help ensure that if anyone becomes infected with COVID-19 and exposes others in their group, the virus is not transmitted to the alternate group and business can continue.

Diversity and Inclusion in Our Next 150 Years

The world is evolving in response to the social unrest and demands for greater racial equity, diversity and inclusion, and FGC is no exception as we plan the future of the organization.

Following the positive and strong calls for change from Vice President Murray and Commissioner Silva in statements made at the Jun 2020 FGC meeting (exhibits 2 and 3), executive staff has initiated weekly learning sessions to expand our understanding of equity, diversity and inclusion issues, one step in being better prepared to identify where we can and should make changes as an organization and as individuals. Staff is committed to investigating and developing a plan for approaches FGC can take to better promote diversity and inclusion. With direction from FGC today, staff will begin drafting a specific plan of action for FGC consideration. For example, alongside the leadership of DFW Director Bonham and his executive team, your staff will work with DFW to institute changes in areas like recruitment and hiring practices to address institutional bias.

In recognition of the changing times, while also acknowledging the 150-year history of our organizations, President Sklar and DFW Director Bonham recently authored a column for the upcoming issue of *Outdoor California.* See the magazine for the full column, but here's a tidbit to get you started:

> "*Historically, anniversaries are celebrated as a commemoration of achieving something special. A pause button against the flow of time—a recognized point in time to stop and praise a date, to make note of longevity…As important a milestone as this is for us, a surreal feeling attaches itself to the celebration as we find ourselves in…extraordinary times..."*

Legislative Matters

With a compromise reached on the state budget at the end of June, the California State Legislature has returned to focusing on other matters. DFW has provided a report on state bills it has identified as being of interest, including the current status of each (Exhibit 5). FGC staff has identified state legislation that may affect FGC's resources and workload or be of interest (see below), but currently relies heavily on colleagues at DFW to monitor and track legislation.

At any meeting, FGC may direct staff to provide information to or share concerns with bill authors or regulatory agencies. Today is an opportunity for FGC to provide direction to staff concerning proposed legislation.

Legislative Calendar Highlights

- Aug 17-31: Floor session only
- Aug 25: Last day to amend bills on the floor
- Aug 27: Last day to amend bills for chaptering purposes only
- Aug 31: Last day for each house to pass bills; final recess begins upon adjournment
- Sep 30: Last day for Governor Newsom to sign or veto bills

Bills Introduced during the 2019-2020 Session

A number of state assembly bills (AB) and senate bills (SB) identified in DFW's report may affect FGC's resources and workload or are potentially of interest. See Exhibit 5 for details about any of the listed bills.

- AB 235 (*Mayes*) *Endangered species: candidate species:petitions: takings* (introduced 1/18/19 related to electrical corporations, but amended 6/29/20 to the current bill)
- AB 1305 (*Obernolte*) *Junior hunting licenses: eligibility: age requirement*
- AB 1949 (*Boerner Horbath*) *Fisheries: California Ocean Resources Enhancement and Hatchery Program*
- AB 2028 (*Aguiar-Curry*) *State agencies: meetings*
- AB 3022 (*Obernolte*) *Junior hunting licenses: eligibility: age requirement*
- AB 3030 *(Kalra) Resource conservation: land and ocean conservation goals*
- SB 1046 *(Dahle) Fish and wildlife: catastrophic wildfires: Sierra Nevada region: reports*
- SB 1175 *(Stern) Animals: prohibitions on importation and possession of wild animals: live animal markets*
- SB 1208 *(Monning) Wildlife: dudleya: taking and possession*
- SB 1231 (*Monning*) Endangered species: take: Santa Cruz long-toed salamander
- SB 1235 *(Caballero) Administrative Procedure Act: adverse economic impact*

FGC Delegations

At its Jun 2020 meeting, FGC approved a number of delegations to its executive director (Exhibit 3). Regular reporting of significant actions under the delegations will be included in executive director reports; there are none to report through Aug 7, 2020.

Significant Public Comments

Concerns with AB 1175 related to a ban on importing or possessing certain African species (often referred to as trophy hunting) are shared through two recent articles from the *Sacramento Bee* and a series of photos taken in Tanzania showing the encroachment of development on hunting areas, loss of forest canapoy due to hardwood logging, and a poaching camp (Exhibit 6)

Recommendation (N/A)

Exhibits

1. *Staff Report on Staff Time Allocation and Activities*, dated Aug 11, 2020
2. Statement of FGC Vice President Samantha Murray on equity, diversity and inclusion, made Jun 24, 2020
3. Statement of Commissioner Peter Silva on social justice, made Jun 25, 2020
4. Approved delegations from FGC to its executive director, adopted Jun 24, 2020
5. DFW legislative report, dated Aug 10, 2020
6. Emails and attachments from Kathy Lynch, Lynch & Associates, received Jul 14, July 30 and Aug 3, 2020

Motion/Direction (N/A)

4. PURPLE SEA URCHIN EMERGENCY EXTENSION (CONSENT)

Today's Item **Information ☐** **Action ☒**

Discuss and consider adopting 90-day extension of emergency regulations concerning recreational take of purple sea urchin at Caspar Cove, Mendocino County.

Summary of Previous/Future Actions

- Adopted emergency regulations — Feb 21, 2020; Sacramento
- **Today's potential emergency re-adoption** — **Aug 19-20, 2020; Webinar/Teleconference**

Background

At its Feb 2020 meeting, FGC adopted an emergency regulation to temporarily remove the recreational bag limit for purple sea urchin taken by manually-operated hand-held tools inside Caspar Cove, Mendocino County. The action was taken in response to the poor condition of northern California kelp forests that have been slow to recover from the adverse conditions in the past several years due, in large part, to overgrazing by sea urchins, particularly purple urchins. FGC adopted the emergency regulation to explore and evaluate whether intensified removal of purple sea urchin may promote the recovery of kelp and the associated species that kelp supports.

The emergency regulation went into effect on Mar 17, 2020 for a period of 180 days (until Sep 14, 2020). DFW and partners had planned to monitor and evaluate the effectiveness of purple urchin removal by comparing ecosystem recovery in the area subject to the emergency regulation to similar nearby areas with commercial take and/or no purple urchin removal efforts; however, the COVID-19 pandemic has hampered efforts to initiate the study.

FGC staff is currently working with DFW to prepare a regular rulemaking package to remove the recreational daily bag limit for purple sea urchin within Caspar Cove for a period of up to three years. Extending the emergency regulation will help ensure that efforts in Caspar Cove that are needed to provide data to inform the state's response to the loss of the kelp forests within state waters are continuous while the regular rulemaking is underway.

Significant Public Comments (N/A)

Recommendation

FGC staff: Under a motion to adopt the consent calendar, determine, pursuant to Section 11346.1 of the Government Code and Section 399 of the Fish and Game Code, that the re-adoption of the regulation is necessary for the immediate conservation and protection of northern California kelp forests and re-adopt the emergency regulation as reflected in the statement of proposed emergency regulatory action in Exhibit 3.

DFW: Extend the emergency action to continue unlimited recreational take of purple sea urchin at Caspar Cove, Mendocino County.

Exhibits

1. Staff summary from Feb 21, 2020 FGC meeting (for background purposes only)
2. DFW memo requesting extension of emergency regulatory action, received Aug 5, 2020
3. Draft statement of proposed emergency regulatory action
4. Draft economic and fiscal impact statement (STD 399)

Motion/Direction

Moved by _____ and seconded by _____ that the Commission adopts the FGC staff recommendations for items 4-5 on the consent calendar.

5. WHITE SEA BASS FISHERY MANAGEMENT PLAN (CONSENT)

Today's Item **Information ☐** **Action ☒**

Receive DFW's *White Seabass Fishery Management Plan 2018-2019 Annual Review*.

Summary of Previous/Future Actions

• Adopted White Seabass Fishery Management Plan	2002
• Received annual reviews	2003-2019
• **Today receive 2018-2019 annual review**	**Aug 19-20, 2020; Webinar/Teleconference**

Background

White seabass is managed under a fishery management plan (FMP) adopted by FGC in 2002, which requires annual monitoring and review of the commercial and recreational fisheries and resource. The annual review includes fishery-dependent and fishery-independent data (if available), documented changes within the social and economic structure of industries that utilize the white seabass resource within California, information on the harvest of white seabass in Mexican waters, and other relevant data. The data is used to evaluate the status of the resource relative to criteria ("points of concern") adopted by FGC to help determine when management measures are needed to address resource issues.

As outlined in the annual review (Exhibit 2), commercial and recreational landings of white seabass have declined in the past ten years, reaching a low point in 2014-2015. However, the following two seasons showed increases in total catch. For the 2018-2019 season, commercial landings and recruitment indices declined slightly from the prior season, but an overfished condition did not exist. Additionally, there was a decrease in four out of five white seabass prey species assessed, but as white seabass are opportunistic feeders, it is understood that there are other prey items for them to feed upon. No other significant changes or new information were found.

The White Seabass Scientific and Constituent Advisory Panel (WSSCAP) was established to assist DFW and FGC with reviewing annual fishery assessments, management recommendations, and FMP amendments when needed. DFW and WSSCAP met on May 14, 2020, to review fishery information for the 2018-2019 fishery season (Sep 1 to Aug 31), and to consider whether current management measures provide adequate protection for the white seabass resource. DFW and WSSCAP reviewed the points of concern and concurred that none were met; therefore, no additional management measures were triggered in 2018-2019. As a result, DFW does not recommend any changes to the management of white seabass or to the White Seabass FMP at this time. FGC staff concurs with DFW's review and findings.

DFW has provided a memo and its annual review (exhibits 1-2) to support its recommendation for no change.

Significant Public Comments (N/A)

Recommendation

FGC staff: FGC conclude its review without any changes to white seabass fisheries management or to the FMP under a motion to adopt the consent calendar.

DFW: Make no changes to current recreational and commercial white seabass fisheries management or to the FMP.

Exhibits

1. DFW memo, received Aug 5, 2020
2. DFW report, *White Seabass Fishery Management Plan 2018-2019 Annual Review*, received Aug 5, 2020

Motion/Direction

Moved by _____ and seconded by _____ that the Commission adopts the staff recommendations for items 4-5 on the consent calendar.

6. DEPARTMENT INFORMATIONAL ITEMS

Today's Item **Information ☒** **Action ☐**

This is a standing agenda item to receive and discuss informational updates from DFW.

(A) Director's report

(B) Marine Region

I. Marine Species Portal

(C) Law Enforcement Division

Summary of Previous/Future Actions (N/A)

Background

Verbal reports are expected at the meeting for items (A) through (C). A DFW news release of interest is provided as Exhibit B.2.

Under Item (B), the Marine Region report will include:

I. An overview of the new Marine Species Portal (https://marinespecies.wildlife.ca.gov), a dynamic web-based tool that provides information on California marine species and is a key implementation step of the 2018 Marine Life Management Act master plan. The portal currently provides easy-to-navigate access to enhanced status reports for 30 finfish and invertebrate species (Exhibit B.1).

II. An update on the Coronavirus Aid, Relief, and Economic Security (CARES) Act, from which $300 million was appropriated to support states, tribes, and territories with coastal and marine fishery participants who have experienced negative economic impacts from COVID-19. Of the total amount, $18.3 million is designated for California fisheries (Exhibit B.2).

Significant Public Comments (N/A)

Recommendation (N/A)

Exhibits

B.1 DFW presentation: Marine Species Portal Homepage

B.2 DFW News release: *California Fisheries Relief Funding Soon to be Available for Select Sectors Affected by COVID-19*, dated Jul 30, 2020

Motion/Direction (N/A)

7. ANNUAL TRIBAL PLANNING MEETING

Today's Item **Information ☒** **Action ☐**

Report on the annual tribal planning meeting held pursuant to FGC's Tribal Consultation Policy.

Summary of Previous/Future Actions

- Third annual planning meeting with California tribes and tribal communities — Jul 15, 2020; Webinar/Teleconference
- **Today's report** — **Aug 19-20, 2020; Webinar/Teleconference**

Background

In Jun 2015, FGC adopted its Tribal Consultation Policy (Exhibit 1), with the purpose of creating a means by which tribes and FGC can effectively work together to realize sustainably-managed natural resources of mutual interest. The policy includes four implementation measures, one of which is FGC hosting an annual tribal planning meeting to coordinate upcoming regulatory and policy activities that are before FGC. The meeting is intended to provide a venue for sharing procedural information, identifying regulatory and policy needs, and developing collaborative interests. The third annual meeting was originally scheduled for Mar 2020 with a considerable list of agenda topics, but was postponed as the threats posed by COVID-19 became more apparent and everyone's attention was necessarily diverted.

Given the challenges faced by FGC, its tribal partners, and sister agencies, a more informal version of the annual tribal planning meeting was held on July 15, 2020 in a roundtable discussion format (see agenda in Exhibit 2). Commissioner Hostler-Carmesin, one of FGC's Tribal Committee co-chairs, chaired the meeting and was joined by Commissioner Burns for the meeting with representatives from approximately a dozen tribes and tribal communities.

The dialogue began with an acknowledgement of the challenge in adjusting and advancing priorities in the midst of a pandemic and social change, and that tribes have been especially impacted by the COVID-19 pandemic. The conversation then centered around traditional tribal gathering, access to traditional food sources, and food security, as well as implementing the co-management definition adopted earlier this year and incorporating and prioritizing traditional ecological knowledge in FGC decision-making. More detailed staff notes are in Exhibit 3.

Significant Public Comments (N/A)

Recommendation (N/A)

Exhibits

1. FGC's Tribal Consultation Policy
2. (Informal) annual tribal planning meeting agenda for Jul 15, 2020
3. Staff summary for Jul 15, 2020 meeting

Motion/Direction (N/A)

8. TRIBAL COMMITTEE (TC)

Today's Item **Information ☐** **Action ☒**

Receive summary and consider approving recommendations from Aug 18, 2020 TC meeting. Discuss referred topics and consider revisions to topics and timing.

Summary of Previous/Future Actions

• Most recent TC meeting	Aug 18, 2020; TC, Webinar/Teleconference
• **Today consider approving recommendations and revisions to topics and timing**	**Aug 19-20, 2020; Webinar/Teleconference**
• Next TC meeting	Nov 9, 2020; TC, Webinar/Teleconference

Background

TC Work Plan and Timeline

FGC directs the work of TC. The updated work plan in Exhibit 1 includes topics and timelines for items referred by FGC to TC.

Note that the work plan reflects two changes made during the Feb 21, 2020 FGC meeting: (1) Addition of topic "Co-management: Definition, implementation, and potential amendments" after FGC adopted the recommended co-management definition (Exhibit 2) and asked TC to consider and ultimately make a recommendation regarding proposed amendments to the adopted definition; and (2) continuation of the kelp and algae commercial harvest management regulations item to Aug 2020 for discussion, and to Nov 2020 for potential recommendation, to allow additional time for DFW vetting and refinement of the proposed regulation changes.

In addition to standing agenda items (agency updates, DFW management plan updates, cross-pollination with MRC and WRC, future meetings and agenda items), TC discussed the following topics during the Aug 18, 2020 meeting: (1) Annual tribal planning meeting outcomes, (2) implementation of the co-management definition and potential amendments, and (3) kelp and algae commercial harvest management regulations.

Agency updates covered: (1) West Coast Ocean Alliance Tribal Caucus, (2) studies of pinnipeds and California's fisheries, (3) red abalone fishery management plan and current fishery closure sunset date, (4) DFW's Marine Species Portal, and (5) Coastal Fishing Communities Project.

New TC Topics

No new topics were proposed at the time meeting materials were prepared.

Significant Public Comments (N/A)

Recommendation

Committee: If any, to be provided verbally during the FGC meeting.

Exhibits

1. TC work plan, updated Jun 26, 2020
2. Co-management vision and definition, dated Feb 2020

Motion/Direction

Moved by _____ and seconded by _____ that the Commission approves the recommendation(s) made by the Tribal Committee.

OR

Moved by _____ and seconded by _____ that the Commission approves the recommendation(s) made by the Tribal Committee, except_____ for which it approves_____.

9. MARINE RESOURCES COMMITTEE (MRC)

Today's Item **Information ☐** **Action ☒**

Receive summary and consider approving recommendations from Jul 29, 2020 MRC meeting. Discuss referred topics and consider revisions to topics and timing.

Summary of Previous/Future Actions

- Previous MRC meeting — Jul 29, 2020; MRC, Webinar/Teleconference
- **Today consider MRC recommendations** — **Aug 19-20, 2020; Webinar/Teleconference**
- Next MRC meeting — Nov 10, 2020; MRC, Webinar/Teleconference

Background

MRC works under FGC direction to set and accomplish its work plan (Exhibit B1).

(A) ***Previous Committee Meeting***

MRC met on Jul 29 via webinar and teleconference, and covered four discussion topics and four agency updates:

- Red abalone fishery management plan (FMP) development update and recommendation
- Red abalone recreational fishery closure and sunset date recommendation
- Experimental Fishing Permit (EFP) Program (phase II) development update and recommendation
- MLMA master plan implementation update, including new *California Marine Species Portal* website for California fisheries, and initial vetting of potential California grunion recreational fishing regulations
- Agency updates, including:
  - California Ocean Protection Council overview of funding related to topics of MRC interest
  - DFW overview of potential rulemaking authorizing operation, maintenance, and repair of existing artificial structures in marine protected areas (MPAs)
  - DFW update on recreational Dungeness crab rulemaking scheduled for notice in Aug to clarify that it applies to rock crab and other crab species
  - FGC staff update on California's Coastal Fishing Communities Project update and direction

A meeting summary is provided as Exhibit A1.

MRC Recommendations

Based on the meeting discussion, MRC developed three recommendations for FGC consideration:

I. Recreational red abalone FMP: Support DFW developing a draft FMP for further MRC and public review to include all FMP elements recommended in the [harvest control rule integration] administrative team report, with the following options selected:
    a. Harvest control rule. Use both spawning potential ratio and density metrics wherever possible.
    b. Fishing zones. Establish two fishing management zones, with a framework in the FMP for data needed to establish a third zone.
    c. Biological fishery. Include provision for biological fishery as a *de minimis* fishery option only, based on precaution and driven by scientific need.
    d. Explore a tribal allocation.

II. Recreational red abalone fishery closure:
    a. Extend the closure for five years, with a sunset date of Apr 1, 2026, through a rulemaking to commence in Aug 2020; and
    b. Request that DFW provide annual reports to FGC regarding the status of environmental and abalone stock conditions and recovery.

III. EFP Program (phase II): Advance to rulemaking the proposed phase II regulations to establish an EFP Program as proposed by DFW, including the proposed permit tiers, associated fee structure, and application cycle, on a timeline to be determined. Authorize FGC staff to work with DFW to explore possible additions to the stated fees associated with FGC staff administrative costs.

A fourth recommendation related to the MRC work plan is provided in section (B).

(B) *Committee Work Plan*

The MRC work plan (Exhibit B1) includes topics and timelines for items referred by FGC to MRC and is updated to reflect proposed changes.

MRC Recommendation

At the Jul 29 MRC meeting, the committee co-chairs reviewed referred topics in the current MRC work plan and discussed prioritization and timing. Based on the discussion, MRC developed three recommendations related to the MRC work plan for FGC consideration:

1. Remove *cowcod rockfish recovery* from the list of topics,
2. remove *recreational swordfish regulations* from the list of Nov 2020 MRC meeting topics, and
3. keep California grunion recreational fishing regulations on the Nov MRC meeting schedule, but discuss and provide direction on the potential timing for a California grunion rulemaking relative to other rulemakings.

New MRC Topics

No additional topics are proposed at this time.

Significant Public Comments

Related to the commercial kelp and algae regulation changes on the MRC work plan, an academic research biologist specializing in seaweed biology copied FGC on a letter to DFW, offering feedback following a DFW webinar on draft commercial seaweed harvesting regulations. The commenter highlights several long-term data sets from kelp forests and intertidal algae monitoring, and input related to the value of applying a regional approach to limits or closures, including seasonal considerations, and sustainable harvest methods (Exhibit B.2).

Recommendation

FGC staff: (A) Approve the MRC recommendations from Jul 29, and (B) approve the MRC-recommended changes to the MRC work plan.

(Note that additional guidance on timing for a California grunion rulemaking may be discussed under today's Agenda Item 30(C), *Commission administrative items - Rulemaking timetable updates*.)

Exhibits

A1. Summary of MRC meeting held Jul 29, 2020
B1. MRC work plan, updated Jul 30, 2020
B2. Email from Dr. Janet Kubler, Cal State University Northridge, to DFW, received Jul 21, 2020

Motion/Direction

Moved by _____ and seconded by _____ that the Commission approves the recommendations from the July 29, 2020 Marine Resources Committee meeting as recommended by staff. Further, the Commission approves the changes to the Marine Resources Committee work plan as recommended by the Committee and staff.

OR

Moved by _____ and seconded by _____ that the Commission approves the recommendations from the July 29, 2020 Marine Resources Committee meeting as recommended except for _____ for which it approves _____. Further, the Commission approves the changes to the Marine Resources Committee work plan as recommended by the Committee and staff, except _____.

10. RECREATIONAL RED ABALONE

Today's Item **Information ☐** **Action ☒**

Consider authorizing publication of notice of intent to amend the recreational take of red abalone fishery closure sunset date regulation.

Summary of Previous/Future Actions

• FGC adopted emergency regulation to close recreational red abalone fishery for one year	Dec 7, 2016, San Diego
• Adopted regular rulemaking to exend closure to 2021	Dec 12-13, 2018, Oceanside
• DFW presentation on fishery status	Jun 24-25, 2020; Webinar/Teleconference
• MRC vetting and recommendation	Jul 21, 2020; MRC, Webinar/Teleconference
• **Today's notice hearing**	**Aug 19-20, 2020; Webinar/Teleconference**
• Discussion hearing	Oct 14-15, 2020; Webinar/Teleconference
• Adoption hearing	Dec 9-10, 2020; Webinar/Teleconference

Background

Red abalone fishery management is currently guided by the Abalone Recovery and Management Plan (ARMP). In 2017, following dramatic environmental conditions leading to extensive loss of bull kelp beds and significant abalone die-off, FGC took action to close the recreational red abalone fishery. The closure is currently scheduled to sunset Apr 1, 2021 (see Exhibit 1 for additional background).

DFW recently confirmed that poor conditions continue to persist or worsen and advises that continuing the closure is necessary. The proposed regulation would extend the closure of the red abalone fishery another five years, until Apr 1, 2026, to facilitate recovery of the red abalone population while preparation of a red abalone fishery management plan is underway.

Significant Public Comments (N/A)

Recommendation

FGC staff: Authorize publication of a notice of intent to extend the closure of the recreational abalone fishery for five years to Apr 1, 2026 and request that DFW provide annual reports to FGC regarding the status of environmental and abalone stock conditions and recovery.

MRC: Support DFW recommendation to extend the recreational red abalone fishery closure for five years (for more details see staff summary for Agenda Item 9, MRC, this meeting).

DFW: Extend the sunset date for the closure of the recreational abalone fishery to Apr 1, 2026 to facilitate recovery of the red abalone population.

Exhibits

1. Staff summary from Aug 22-23, 2018 meeting, Agenda Item 12 (for background

purposes only)

2. DFW memo transmitting ISOR, received Aug 6, 2020
3. Draft ISOR
4. Draft economic and fiscal impact statement (STD 399)

Motion/Direction

Moved by _____ and seconded by _____ that the Commission authorizes publication of a notice of its intent to amend Section 29.15, related to recreational abalone fishing.

11. RECREATIONAL DUNGENESS CRAB*

Today's Item **Information ☐** **Action ☒**

Consider authorizing publication of notice of intent to amend recreational take of Dungeness crab regulations intended to provide additional whale and turtle protections in the trap fishery.

**Note that DFW is proposing the regulations apply to all crab species.*

Summary of Previous/Future Actions

• FGC/MRC considered management measures for the recreational fishery	April 2019 – Feb 2020; various locations
• MRC update and recommendation	Mar 17, 2020; MRC, Santa Rosa/ Webinar/Teleconference
• FGC approved MRC recommendations	Apr 15-16, 2020; Teleconference
• FGC direction on regulatory options and continuation of notice hearing to Aug 2020	Jun 24-25, 2020; Webinar/Teleconference
• MRC received DFW update regarding crab species for rulemaking	Jul 29, 2020; MRC, Webinar/Teleconference
• **Today's notice hearing**	**Aug 19-20, 2020; Webinar/Teleconference**
• Discussion hearing	Oct 14-15, 2020; Webinar/Teleconference
• Adoption hearing	Dec 11-12, 2019; Sacramento

Background

In early 2019, FGC initiated discussions about potential management measures for the recreational Dungeness crab fishery to minimize risks of whale entanglements in fishing gear. Management options developed by DFW were explored and refined at various FGC and MRC meetings in 2019 and 2020, culminating in FGC action in Apr 2020 to schedule a rulemaking to commence in Jun 2020.

In Apr 2020, FGC approved including MRC-recommended management measures in the proposed regulations and requested that DFW return to the Jun notice hearing with more specific criteria and considerations for four items (Exhibit 2). At its Jun 2020 meeting, FGC approved including three of the four measures in the proposed regulations and continued the notice hearing to its Aug 2020 meeting to allow time for DFW to integrate the direction into the proposal (see exhibits 1 and 2 for additional background information).

Update

At the Jul 2020 MRC meeting, DFW reported that its Law Enforcement Division had identified a potential regulatory loophole related to targeting other crab species, such as rock crab. Other crab species can co-occur and be harvested by trap when fishing for Dungeness crab. As a result, DFW will recommend to FGC today that the proposed regulation apply to all crab species to ensure effective enforcement of the new regulation. DFW will provide additional information during today's meeting.

Proposed Regulations

The proposed regulations in Exhibit 4 include several provisions:

- *Enhanced Gear Marking:* Require all recreational crab traps to be marked with a main buoy of 5 x 11 inches and a red marker buoy of 3 x 5 inches attached no more than three feet from the main buoy. Current regulations requiring buoy marking and, in the case of commercial passenger fishing vessels (CPFVs), trap marking, would be consolidated in this subsection.
- *Service Interval:* Establish a maximum trap service interval of 9 days, weather conditions at sea permitting, and prohibit abandoning crab traps in state waters.
- *Trap Limit:* Establish a trap limit of 10 traps per individual with a provision to allow an individual to service up to 10 additional traps if the individual possesses written permission from the operator(s) of the additional traps. Also, the current 60-trap limit for CPFVs targeting Dungeness crab would apply to CPFVs targeting any crab and be consolidated into the same subsection.
- *Director Authority*: Provide authority for the DFW director to delay the fishery opener or close the season early when the concentrations of Humpback whales, blue whales, or Pacific leatherback sea turtles exceed thresholds established in the DFW Risk Assessment and Mitigation Program (RAMP). Any delay or closure could apply statewide or by zone. Before implementing a delay or closure, DFW would provide at least five days' notice to the recreational crab trap fishery through a director's declaration on DFW's "Whale Safe Fisheries" webpage.
- *Trap Validation Program*: Establish a "Recreational Crab Trap Validation" program that would (1) require anyone who fishes for crab with recreational crab traps to purchase an annual validation and (2) establish a small fee of $2.25 for each validation.

Staff notes that during previous meetings, FGC and MRC discussed two additional criteria governing DFW director action to implement a delay or closure under the director authority provisions: (1) consulting with the FGC president prior to taking action to delay or close a season, and (2) notifying FGC at its next meeting of any action taken; however, the motion adopted by FGC in Jun 2020 did not specify these criteria. Staff requests clarification from FGC regarding inclusion of the provisions in the proposed regulations.

Significant Public Comments (N/A)

Recommendation

FGC staff: Determine whether to incorporate the provisions for consultation and notification to the DFW director authority provision as described above, apply proposed regulations to all crab species as recommended by DFW, and authorize publication of the notice as proposed.

DFW: Apply the proposed regulations to other crab species in addition to Dungeness crab, and authorize publication of a notice of intent to amend recreational crab fishing regulations, as described in the initial statement or reasons (ISOR) (Exhibit 4).

Exhibits

1. Staff summary from Mar 17, 2020 MRC meeting (for background purposes)
2. Staff summary from Jun 24-25, 2020 FGC meeting (for background purposes)
3. DFW memo, received Aug 12, 2020
4. Draft initial statement of reasons
5. Draft economic and fiscal impact statement (Std. 399)
6. DFW presentation

Motion/Direction

Moved by _____ and seconded by _____ that the Commission authorizes publication of a notice of its intent to amend sections 29.80, 29.85 and 701, related to recreational crab fishing regulations as proposed in the initial statement of reasons.

OR

Moved by _____ and seconded by _____ that the Commission authorizes publication of a notice of its intent to amend sections 29.80, 29.85 and 701, related to recreational crab fishing regulations as proposed in the initial statement of reasons with the addition of language:

(1) requiring the Department director to consult with the Commission president prior to taking action to implement a season delay or closure,

AND/OR

(2) requiring the Department director to notify the Commission of any actions taken under the director's authority at the next Commission meeting.

12. RECREATIONAL AND COMMERCIAL GROUNDFISH

Today's Item **Information ☒** **Action ☐**

Discuss proposed changes to regulations for the recreational and commercial take of federal groundfish and associated species.

Summary of Previous/Future Actions

- Notice hearing — Jun 24-25, 2020; Webinar/Teleconference
- **Today's discussion hearing** — **Aug 19-20, 2020; Webinar/Teleconference**
- Adoption hearing — Oct 14-15, 2020; Webinar/Teleconference

Background

FGC biennially adopts recreational and commercial fishing regulations for federal groundfish and associated species as necessary for consistency with federal rules that go into effect Jan 1 of odd-numbered years.

At its Jun 2020 meeting, the Pacific Fishery Management Council (PFMC) recommended recreational fishing regulations for federally-managed groundfish species for the 2021-2022 seasons, which are expected to go into effect Jan 1, 2021. DFW is proposing regulatory changes that would make recreational regulations for state waters consistent with federal regulations. In addition, DFW is proposing modifications to state-defined commercial trip limits for cabezon and greenling to stay within federally-established commercial harvest limits.

Proposed Amendments

FGC received a verbal report of the proposed regulatory changes at its Jun 2020 meeting; the detailed proposed changes are provided in the initial statement of reasons (ISOR) transmitted by DFW for today's discussion (exhibits 1 and 2). In general, the proposed changes include:

1. Increase allowable depths in the Mendocino, San Francisco and southern groundfish management areas.
2. Remove the sub-bag limits for canary rockfish, black rockfish, and cabezon within the 10-fish daily rockfish/cabezon/greenling (RCG) total bag limit.
3. Implement a 5-fish sub-bag limit for vermilion rockfish within the 10-fish RCG bag limit.
4. Update the method of take for California scorpionfish for consistency with method of take language for lingcod and groundfish species in federal and state regulations.
5. Specify a statewide recreational bag limit for lingcod of two fish.
6. Increase the bi-monthly commercial trip limits for cabezon and greenling to 1,000 and 500 pounds, respectively.

Today DFW will present highlights of the proposed regulation changes (Exhibit 4).

Significant Public Comments (N/A)

Recommendation (N/A)

Exhibits

1. DFW memo transmitting ISOR, received Jul 23, 2020
2. ISOR
3. Economic and fiscal impact statement (STD. 399)
4. DFW presentation

Motion/Direction (N/A)

13. PACIFIC LEATHERBACK SEA TURTLE

Today's Item **Information ☐** **Action ☒**

Consider and potentially act on the petition, DFW's evaluation report, and comments received, to determine whether listing Pacific leatherback sea turtle (*Dermochelys coriacea*) as a threatened or endangered species under the California Endangered Species Act (CESA) may be warranted.

Summary of Previous/Future Actions

• Received petition	Jan 23, 2020
• Transmitted petition to DFW	Feb 3, 2020
• Published notice of receipt of petition	Feb 14, 2020
• Public received petition and FGC approved DFW's 30-day extension request	Feb 21, 2020; Sacramento
• Received DFW's 90-day evaluation report	Jun 24-25, 2020; Webinar/Teleconference
• **Today determine if listing may be warranted**	**Aug 19-20, 2020; Webinar/Teleconference**

Background

A petition to list Pacific leatherback sea turtle as endangered under CESA was submitted to FGC by the Center for Biological Diversity and the Turtle Island Restoration Network on Jan 23, 2020 (Exhibit 1). On Feb 3, 2020, FGC staff transmitted the petition to DFW for review. A notice of receipt of petition was published in the California Regulatory Notice Register on Feb 14, 2020.

California Fish and Game Code Section 2073.5 requires that DFW evaluate the petition and submit a written evaluation with a recommendation, which was received at FGC's Jun 2020 meeting. The evaluation report (Exhibit 2) delineates each of the categories of information required for a petition, evaluates the sufficiency of the available scientific information for each of the required components, and incorporates additional relevant information that DFW possessed or received during the review period. Based on the information contained in the petition and other relevant information, DFW has determined that there is sufficient information to indicate the petitioned action may be warranted.

At today's meeting, FGC will receive a presentation (Exhibit 2) on DFW's petition evaluation and hold a public hearing to receive oral testimony. Today's hearing takes place more than 30 days after the public release of the evaluation report as required by Fish and Game Code section 2074. If FGC determines listing may be warranted pursuant to Section 2074.2 of the Fish and Game Code, DFW will undertake a one-year status review before FGC can make a final decision on listing.

CESA and FGC's regulations require that the petition contain specific scientific information related to the status of the species. CESA, and case law interpreting it, make clear that FGC must accept a petition when the petition contains sufficient information to lead a reasonable person to conclude that there is a substantial possibility the requested listing could occur; the requested listing is tied to the species' status, that is, whether the species' continued existence is in serious danger or is threatened by a number of factors, and does not relate to economic consequences that might result from listing.

If FGC determines that the petitioned action may be warranted, Pacific leatherback sea turtle becomes a candidate species pursuant to Section 2074.2. Candidate species are protected under CESA pursuant to Section 2085 during the remainder of the listing process.

Significant Public Comments

1. A commenter lists several key threats to the Pacific leatherback sea turtle, including nesting site loss, entanglement, and pollution (Exhibit 4).
2. Commenters sent 583 similar letters urging FGC to advance Pacific leatherback sea turtle to candidacy (see Exhibit 5 for an example).

Recommendation

FGC staff: Determine that listing may be warranted.

DFW: Accept the petition for further consideration under CESA.

Exhibits

1. CESA petition, received Jan 23, 2020
2. DFW transmittal memo and 90-day petition evaluation report, received Jun 2, 2020
3. DFW presentation
4. Email from Bill Modi, received Jul 12, 2020
5. Email from Carol Barrette, received Aug 6, 2020

Motion/Direction

Moved by _____ and seconded by _____ that the Commission, pursuant to Section 2074.2 of the California Fish and Game Code, finds the petition to list Pacific leatherback sea turtle as an endangered species under the California Endangered Species Act **does** provide sufficient information to indicate that the petitioned action **may be** warranted based on the information in the record before the Commission, and directs staff to issue a notice reflecting this finding and indicating that Pacific leatherback sea turtle is a candidate for threatened or endangered species status.

OR

Moved by _____ and seconded by _____ that the Commission, pursuant to Section 2074.2 of the Fish and Game Code, finds that the petition to list Pacific leatherback sea turtle as an endangered species under the California Endangered Species Act **does not** provide sufficient information to indicate that the petitioned action may be warranted based on the information in the record before the Commission.

14. PETITIONS FOR REGULATION CHANGE (MARINE)

Today's Item **Information ☐** **Action ☒**

This is a standing agenda item for FGC to act on regulation petitions from the public that concern marine resources. For this meeting:

(A) Action on petitions received at the Jun 2020 meeting – *None scheduled*

(B) Pending regulation petitions referred to staff or DFW for review

Summary of Previous/Future Actions

(B)

- FGC received petition #2018-013(b) — Oct 17, 2018; Fresno
- Petition #2018-013(b) referred to DFW — Dec 12, 2018; Oceanside
- FGC received petition #2020-001 — Apr 16, 2020; Webinar/Teleconference
- Petition #2020-001 referred to DFW — Jun 24-25, 2020; Webinar/Teleconference
- **Today's actions on petitions** — **Aug 19-20, 2020; Webinar/Teleconference**

Background

Pursuant to Title 14 Section 662, any request for FGC to adopt, amend, or repeal a regulation must be submitted on form FGC 1, "Petition to the California Fish and Game Commission for Regulation Change." Petitions received at an FGC meeting are scheduled for consideration at the next business meeting under (A), unless the petition is rejected under 10-day staff review as prescribed in subsection 662(b). A petition may be (1) denied, (2) granted, or (3) referred to a committee, staff or DFW for further evaluation or information-gathering. Referred petitions are scheduled for action under (B) once the evaluation is completed and a recommendation made.

(B) ***Pending regulation petitions.*** This is an opportunity for staff to provide recommendations on petitions previously referred by FGC to staff, DFW, or a committee for review.

Two petitions previously referred to DFW are scheduled for action today. DFW has completed its review and prepared recommendations for two petitions:

I. Petition #2020-001: *Emergency regulation for increased recreational take of purple sea urchin in select sites in Monterey* (Exhibit 2)

II. Petition #2018-013(b): C*ommercial ridgeback prawn trawl fishing hours* (Exhibit 3)

Staff recommendations and rationales are summarized in Exhibit 1. DFW's review and recommendations are provided in exhibits 4 and 5.

Significant Public Comments

1. Fourteen comments expressing support for Petition #2020-001 were received, thirteen of which were received after the supplemental comment deadline for the Jun 2020 FGC meeting (see example in Exhibit 6).

2. The petitioner for Petition #2020-001 provided a copy of the dive plan he prepared for the proposed project, with updates for COVID-19 diving conditions (Exhibit 7).
3. A commenter urges FGC to grant Petition #2020-001 for both proposed locations based on differences in habitat types, contending that Tanker's Reef is shale, whereas "99% of the rest of the region is granite bottom". He believes that evaluating urchin culling performance at Tanker's Reef alone will not be a good predictor of how the kelp system might respond to culling and restoration efforts on granite habitat, a type more favorable to long-term kelp persistance. He urges FGC to authorize both locations to allow a scientific comparison of effectiveness on the two different habitat types (Exhibit 8).

Recommendation

FGC staff: Adopt the staff recommendations as reflected in Exhibit 1, based on the evaluation and rationale provided by DFW in exhibits 4 and 5.

DFW: Grant petition #2020-001 in part, with modifications to allow unlimited sea urchin take at Tanker's Reef through a regular rulemaking for the reasons set forth in Exhibit 4, and schedule for notice under Agenda Item 16 (today's meeting); and deny petition #2018-013(b) for the reasons set forth in Exhibit 5.

Exhibits

1. Table of referred petitions for regulation change scheduled for action, updated Aug 7, 2020
2. Petition #2020-001, received Jan 20, 2020
3. Petition #2018-013(b), received Sep 9, 2018
4. DFW memo regarding Petition #2020-001, received Aug 5, 2020
5. DFW memo regarding Petition #2018-013(b), received Aug 5, 2020
6. Sample email from Johanna van de Woestijne, received Jun 22, 2020
7. *Dive Plan: Recreational Diver Urchin Culling and Kelp Restoration in Monterey, California* by Keith Rootsaert, petitioner for Petition #2020-001, dated Jun 19, 2020
8. Email from Doc Anes, received Aug 6, 2020

Motion/Direction

Moved by _____ and seconded by _____ that the Commission adopts the staff recommendations as reflected in Exhibit 1.

OR

Moved by _____ and seconded by _____ that the Commission adopts the staff recommendations as reflected in Exhibit 1, except for petition(s) #_____ for which the action is _____.

15. MARINE NON-REGULATORY REQUESTS

Today's Item **Information ☐** **Action ☒**

This is a standing agenda item for FGC to act on non-regulatory requests received from the public that are marine in nature.

Summary of Previous/Future Actions

- FGC received requests Jun 24-25, 2020; Webinar/Teleconference
- **Today's potential action on request** **Aug 19-20, 2020; Webinar/teleconference**

Background

FGC provides direction regarding requests from the public received by mail and email and during general public comment at the previous FGC meeting. Public requests for non-regulatory action follow a two-meeting cycle to ensure proper review and consideration.

(A) ***Non-regulatory requests.*** Non-regulatory requests scheduled for consideration today were received at the Jun 2020 meeting in one of three ways: (1) submitted by the comment deadline and published in a table in the meeting binder, (2) submitted by the supplemental comment deadline and delivered at the meeting, or (3) received during public comment at the meeting.

Today, one marine non-regulatory request is scheduled for action. Exhibit 1 summarizes the request and contains the staff recommendation.

(B) ***Pending non-regulatory requests***. This item is an opportunity for staff to provide an update or recommendation on non-regulatory requests that were scheduled for action at a previous meeting and referred by FGC to staff or DFW for further review.

A pending non-regulatory request was received in Dec 2020 and referred to DFW in Feb 2020 for review and recommendation. The request is a proposed five-year mechanical kelp harvesting plan for Sustainable Ocean Harvest, LLC; the company has submitted an updated proposed plan, which was revised based on input from DFW (Exhibit 2). DFW has received the updated plan and will review and develop its recommendation. No action is needed by FGC at this time.

Significant Public Comments (N/A)

Recommendation

FGC staff: Adopt the staff recommendation as reflected in Exhibit 1.

Exhibits

1. Summary of non-regulatory requests and staff recommendation for requests received through Aug 6, dated Aug 11, 2020
2. Revised five-year mechanical kelp harvest plan and transmittal email from Brandon Scott, Primary Ocean, on behalf of Sustainable Ocean Harvest, LLC.

Motion/Direction

Moved by _____ and seconded by _____ that the Commission adopts the staff recommendation for action on the August 2020 marine non-regulatory request.

OR

Moved by _____ and seconded by _____ that the Commission adopts the following action on the August 2020 marine non-regulatory request: _____.

16. RECREATIONAL SEA URCHIN

Today's Item **Information ☐** **Action ☒**

Consider authorizing publication of notice of intent to amend regulations concerning recreational take of sea urchin at Caspar Cove, Mendocino County and Tanker's Reef, Monterey County for a period of three years.

Summary of Previous/Future Actions

• Adopted emergency regulations to take purple sea urchin at Caspar Cove	Feb 21, 2020; Sacramento
• Consider 90-day extension of emergency regulations (Agenda Item 4, today)	Aug 19-20, 2020; Webinar/Teleconference
• **Today's notice hearing for Caspar Cove and Tanker's Reef**	**Aug 19-20, 2020; Webinar/Teleconference**
• Discussion hearing	Oct 14-15, 2020; Webinar/Teleconference
• Adoption hearing	Dec 9-10, 2020; Webinar/Teleconference

Background

Today's Agenda Item 4 (recreational purple sea urchin) recaps the background and environmental context that led FGC to take emergency action in Feb 2020 to temporarily remove the recreational bag limit for purple sea urchin inside Caspar Cove, Mendocino County (see Exhibit 1 for additional background). The staff summary for Agenda Item 4 also highlights the need to continue the provision authorizing urchin removal at Caspar Cove, in order for DFW and partners to initiate the planned study to monitor and evaluate removal efforts. The standard rulemaking proposed under this agenda item would continue the take provisions within Caspar Cove for a period of three years only, which would support data collection to inform the state's response to the loss of the kelp forests within state waters as was intended.

DFW additionally proposes adding a second location, Tanker's Reef in Monterey County, to the proposed regulations based on a public regulation petition (#2020-001) scheduled for action under Agenda Item 14 (this meeting; see exhibits 2 and 4 of Agenda Item 14 for the petition and DFW recommendations memo).

At its Jun 2020 meeting, FGC requested DFW work with the petitioner, Keith Rootsaert, to clarify alternative options that he verbally requested. DFW reviewed the petition and subsequent informal revisions; Mr. Rootsaert was responsive throughout the review process.. If FGC grants Petition 2020-001 as recommended by DFW (under Item 14), this proposed rulemaking will authorize take of red sea urchin as well as purple sea urchin at Tanker's Reef. DFW recommends that removal of the daily recreational bag limit for both red and purple urchins at Tanker's Reef may promote kelp recovery and will enable further evaluation of kelp restoration techniques. While red sea urchin is a commercial fishery in other regions, commercial harvest is minimal in the proposed area and the proposed activity is further bounded by a small geographic scope, the experimental nature, and the limited time frame for the authorization as a precaution.

In addition, Tanker's Reef requires a unique monitoring structure. In contrast to Caspar Cove, DFW and partners do not have capacity to also conduct the scientific monitoring and oversight they believe are necessary to support approval of such experimental efforts. DFW has worked closely with the California Ocean Protection Council (OPC) and the Marine Bay National Marine Sanctuary (MBNMS) to establish specific performance criteria to evaluate the efficacy of the proposed activity at Tanker's Reef, as well as to evaluate the impacts to the immediate environment. As indicated in significant public comments below, OPC and MBNMS conditionally do not oppose the effort.

DFW has prepared a memo outlining its request to go to notice (Exhibit 2). The initial statement of reasons for regulatory action (ISOR) is being prepared and the notice will be completed and published based on FGC action.

Significant Public Comments

DFW, OPC, and MBNMS provided a joint letter to convey conditional support for adding Tanker's Reef, provided that outcomes "explicitly inform future management" and that the petitioner (1) evaluate the efficacy of community led efforts in-water culling activities and report findings, and (2) evaluate the potential ecological impacts from such methods. Data collected from these activities are expected to be reported to DFW using specific criteria identified in the letter (Exhibit 3).

Recommendation

***FGC staff*:** Approve request to issue notice of regulatory action as recommended by DFW to (1) authorize unlimited recreational take of purple sea urchin at Caspar Cove, Mendocino County as proposed for a period of three years, and (2) authorize unlimited recreational take of purple sea urchin and red sea urchin at Tanker's Reef, Monterey County as proposed, for a period of three years with adherence to the interagency monitoring and reporting criteria specified in Exhibit 3.

DFW: Approve request to issue notice of regulatory action to initiate a regular rulemaking to allow unlimited take of purple sea urchin at Caspar Cove and purple and red sea urchin at Tanker's Reef for a period of three years.

Exhibits

1. Staff summary from Feb 21, 2020 FGC meeting (for background purposes only)
2. DFW memo requesting authorization for notice, received Aug 5, 2020
3. Joint letter from California Ocean Protection Council, DFW and Monterey Bay National Marine Sanctuary, Aug 5, 2020

Motion/Direction

Moved by _____ and seconded by _____ that the Commission authorizes publication of a notice of its intent to amend Section 29.06, Title 14, California Code of Regulations, related to the recreational take of purple sea urchin at Caspar Cove in Mendocino County for three years.

AND (next page)

Moved by _____ and seconded by _____ that the Commission authorizes publication of a notice of its intent to amend Section 29.06, Title 14, California Code of Regulations, related to the recreational take of purple and red sea urchin at Tanker's Reef in Monterey County for three years.

17. GENERAL PUBLIC COMMENT (DAY 2)

Today's Item **Information ☒** **Action ☐**

Receive public comments, petitions for regulation change, and requests for non-regulatory actions for items not on the agenda.

Summary of Previous/Future Actions

- **Today receive requests and comments** **Aug 19-20, 2020; Webinar/Teleconference**
- Consider granting, denying, or referring Oct 14-15, 2020; Webinar/Teleconference

Background

This agenda item is to provide the public an opportunity to address FGC 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 written comment deadline), or as supplemental comments at the meeting (if received by the supplemental comment deadline).

Public comments are generally categorized into three types under general public comment: (1) petitions for regulation change; (2) requests for non-regulatory action; and (3) informational-only comments. Under the Bagley-Keene Open Meeting Act, FGC 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, petitions for regulation change and non-regulatory requests generally follow a two-meeting cycle (receipt and direction); FGC will determine the outcome of the petitions for regulation change and non-regulatory requests received at today's meeting at the next regular FGC meeting following staff evaluation (currently Oct 14-15, 2020).

As required by the Administrative Procedure Act, petitions for regulation change will be either denied or granted and notice made of that determination. Action on petitions received at previous meetings is scheduled under a separate agenda item titled "Petitions for regulation change." Action on non-regulatory requests received at previous meetings is scheduled under a separate agenda item titled "Non-regulatory requests."

Significant Public Comments

All written comments are summarized and provided as exhibits under Agenda Item 2.

Recommendation

FGC staff: Consider whether any future agenda items are needed to address issues that are raised during public comment.

Exhibits

See exhibits for Agenda Item 2.

Motion/Direction (N/A)

18. KENWOOD MARSH CHECKERBLOOM (CONSENT)

Today's Item **Information ☐** **Action ☒**

Receive DFW's five-year status review report for Kenwood marsh checkerbloom (*Sidalcea oregana* ssp. *valida*), which is listed as an endangered species under the California Endangered Species Act (CESA).

Summary of Previous/Future Actions

• Determined listing Kenwood Marsh checkerbloom as endangered was warranted	Nov 5, 1981
• **Today receive five-year status review report**	**Aug 19-20, 2020; Webinar/teleconference**
• DFW presentation	Oct 14-15, 2020; Webinar/teleconference

Background

Kenwood Marsh checkerbloom is a long-lived perennial herb in the mallow family (*Sidalcea oregana* ssp. *valida*) that is restricted to eastern Sonoma County in Kenwood Marsh and Knights Valley. FGC listed Kenwood Marsh checkerbloom as an endangered species in 1981 pursuant to CESA, and it is currently included in FGC's list of endangered plants (Section 670.2).

Pursuant to California Fish and Game Code Section 2077, upon the allocation of specific funding, DFW must reevaluate threatened and endangered species every five years to determine whether the conditions that led to the original listing are still present and report in writing to the Commission the results of the five-year review for each listed species.

When species are listed under both the state and federal endangered species acts, DFW makes an effort to coordinate five-year reviews with the U.S. Fish and Wildlife Service. However, a status review for Kenwood Marsh checkerbloom was just completed in 2019 pursuant to the federal Endangered Species Act.

Today, DFW provides its written report on the 2020 status review of Kenwood Marsh checkerbloom in California, which updates descriptions, habitat requirements, threats, research needs, and other topics for this species (Exhibit 2). Kenwood Marsh checkerbloom faces ongoing threats, has an exceptionally limited range, and its overall status has remained largely unchanged since listing. DFW recommends retaining the status of this species as endangered (exhibits 1 and 2).

Significant Public Comments (N/A)

Recommendation

FGC staff: Receive DFW's written report under a motion to adopt the consent calendar and schedule a presentation and discussion for the Oct 14-15, 2020 FGC meeting.

DFW: Retain endangered species status for Kenwood Marsh checkerbloom.

Exhibits

1. DFW memo, received Jul 16, 2020
2. DFW five-year status review report, received Jul 16, 2020

Motion/Direction

Moved by _____ and seconded by _____ that the Commission adopts the staff recommendations for items 18-20 on the consent calendar.

19. QUINO CHECKERSPOT BUTTERFLY (CONSENT)

Today's Item **Information ☐** **Action ☒**

(A) Receive a petition to list Quino checkerspot butterfly (*Euphydryas editha quino*) as a threatened or endangered species under the California Endangered Species Act (CESA).

(B) Consider approving DFW's request for a 30-day extension to review the petition.

Summary of Previous/Future Actions

• Received petition	Jun 29, 2020
• FGC transmitted petition to DFW	Jul 8, 2020
• Published notice of receipt of petition	Jul 24, 2020
• **Today's public receipt of petition and action on DFW's request for a 30-day extension**	**Aug 19-20, 2020; Webinar/Teleconference**
• Receive DFW evaluation of petition	Dec 9-10, 2020; Webinar/Teleconference
• FGC determines if listing may be warranted	Feb 2021

Background

(A) On Jul 29, 2020, FGC received a petition (Exhibit 1) from the Center for Biological Diversity and the Endangered Species League to list Quino checkerspot butterfly as endangered under CESA. On Jul 8, 2020, FGC staff transmitted the petition to DFW for review. A notice of receipt of petition was published in the California Regulatory Notice Register on Jul 24, 2020.

(B) California Fish and Game Code Section 2073.5 requires that DFW evaluate the petition and submit a written evaluation report with a recommendation to FGC within 90 days of receiving the petition; under this code section, DFW may request an extension of up to 30 days to complete the evaluation. DFW has requested a 30-day extension (Exhibit 2) which would change the due date for DFW's evaluation from Oct 6 to Nov 5, 2020. Following FGC's receipt of DFW's evaluation report, FGC will schedule the petition for consideration and determine if listing the species may be warranted.

Significant Public Comments (N/A)

Recommendation

FGC staff: Receive the petition and approve DFW's request for an extension of 30 days to complete the evaluation under a motion to adopt the consent calendar.

DFW: Grant an extension of 30 days to allow additional time to analyze and evaluate the petition and complete the evaluation report.

Exhibits

1. Petition, received Jun 29, 2020
2. DFW memo, received Jul 23, 2020

Motion/Direction

Moved by _____ and seconded by _____ that the Commission adopts the staff recommendations for items 18-20 on the consent calendar.

20. MOHAVE DESERT TORTOISE (CONSENT)

Today's Item **Information ☒** **Action ☐**

Receive DFW's 90-day evaluation report for the petition to change the status of the Mohave desert tortoise (also known as Agassiz's desert tortoise) (*Gopherus agassizii*) from a threatened species to an endangered species under the California Endangered Species Act (CESA).

Summary of Previous/Future Actions

• Received petition	Mar 23, 2020
• Transmitted petition to DFW	Apr 13, 2020
• Published notice of receipt of petition	May 1, 2020
• **Today receive DFW 90-day evaluation report**	**Aug 19-20, 2020; Webinar/Teleconference**
• Determine if listing may be warranted	Oct 14-15, 2020; Webinar/Teleconference

Background

On Mar 23, 2020, FGC received a petition to change the status of Mohave desert tortoise from a threatened species to an endangered species under CESA. Pursuant to Section 2073 of the California Fish and Game Code, FGC referred the petition to DFW for its evaluation on Apr 13, 2020. A notice of receipt of petition was published in the California Regulatory Notice Register on May 1, 2020.

Fish and Game Code Section 2073.5 requires that DFW evaluate the petition and submit a written evaluation report with a recommendation to FGC. FGC received the evaluation and recommendation from DFW on Jul 23, 2020 (exhibits 1-2).

Based on the information contained within the petition and other relevant information provided, possessed, or received, DFW has determined that there is sufficient information to indicate the petitioned action may be warranted and recommends that the petition be accepted and considered.

FGC cannot consider the petition at this meeting. Fish and Game Code Section 2074 requires that consideration of the petition be scheduled no sooner than 30 days after receipt of the petition and public release of the evaluation report; however, under the Bagley-Keene Open Meeting Act, FGC must allow public comment on this item if requested.

FGC is scheduled to determine if listing may be warranted at its Oct 14-15, 2020 meeting. If FGC determines that listing may be warranted, DFW will review the status of the species and provide FGC a written, peer-reviewed report before FGC makes a final determination about whether to change the listing status of Mohave desert tortoise.

Significant Public Comments (N/A)

Recommendation

FGC staff: Receive the DFW petition evaluation under a motion to adopt the consent calendar.

DFW: Accept and consider the petition.

Exhibits

1. DFW memo, received Jul 23, 2020
2. DFW 90-day evaluation report, received Jul 23, 2020

Motion/Direction

Moved by _____ and seconded by _____ that the Commission adopts the staff recommendations for items 18-20 on the consent calendar.

21. DEPARTMENT INFORMATIONAL ITEMS

Today's Item **Information ☒** **Action ☐**

This is a standing agenda item to receive and discuss informational updates from DFW.

(A) Director's Report

(B) Wildlife and Fisheries Division, and Ecosystem Conservation Division
  I. Bacterial outbreak at fish hatcheries

(C) Law Enforcement Division

Summary of Previous/Future Actions (N/A)

Background

Verbal reports are expected at the meeting for items (A) through (C). DFW news releases of interest are provided as exhibits B1 and B2.

Under Item (B), the Wildlife and Fisheries Division, and Ecosystem Conservation Division report will include:

I. An update on a recent bacterial outbreak affecting DFW hatcheries in California. The outbreak of *Lactococcus garvieae* has caused DFW to euthanize fish at three hatcheries and temporarily halt its fish stocking program in Southern California. The bacterium has never before been detected in California (Exhibit B1).

During its update, DFW is expected to propose several new topics for referral to FGC's WRC.

Significant Public Comments (N/A)

Recommendation

FGC staff: Refer the topics proposed by DFW to the WRC, under Agenda Item 22.

Exhibits

B1. CDFW news release: *Bacterial Outbreak Forces Euthanization of Fish at Three Southern California Hatcheries*, dated Jul 20, 2020

B2. CDFW news release: *Disease Outbreak Strikes California Deer Herds*, dated Aug 3, 2020

Motion/Direction (N/A)

22. WILDLIFE RESOURCES COMMITTEE (WRC)

Today's Item **Information ☐** **Action ☒**

Discuss referred topics and consider revisions to topics and timing. Consider approving draft agenda topics for next WRC meeting.

Summary of Previous/Future Actions

- Previous WRC meeting — May 14, 2020; WRC Webinar/Teleconference
- **Today consider approving agenda topics** — **Aug 19-20, 2020; Webinar/Teleconference**
- Next WRC meeting — Sep 17, 2020; WRC, Webinar/Teleconference

Background

WRC works under FGC direction to set and accomplish its work plan (Exhibit A1).

(A) *Committee Work Plan*

Topics that have been referred from FGC to the WRC are displayed within a work plan to help with scheduling and tracking. During today's meeting under Agenda Item 21, DFW is expected to suggest several important topics for addition to the WRC work plan; the topics are timely to begin discussing at the Sep 17 WRC meeting to lay the foundation for potential rulemakings later next year when there may be greater regulatory staff capacity for both FGC and DFW.

(B) *Next Committee Meeting*

The next meeting is scheduled for Sep 17, 2020 as a webinar/teleconference. Three agenda topics are proposed:

- Initial vetting of resident upland game bird hunting regulation changes
- Discussion of and potential recommendations for periodic rulemakings, including mammal hunting, waterfowl hunting, inland sport fishing, Central Valley sport fishing, and Klamath River sport fishing
- Project update on bullfrog and non-native turtle stakeholder engagement process

Significant Public Comments

A commenter raises concerns about bullfrog predation on western pond turtles and questions why DFW, under its authority, has not taken action to cease issuing importation permits for non-native market frogs and turtles (Exhibit B1).

Recommendation

FGC staff: (A) Identify which, if any, new topics proposed by DFW under Agenda Item 21 FGC wishes to refer to WRC and add to its work plan, and (B) approve the draft WRC agenda topics as proposed or as modified under part (A).

Exhibits

A1. WRC work plan, updated Aug 11, 2020
B1. Email from Eric Mills, Action for Animals, received Aug 5, 2020

Motion/Direction (N/A)

Moved by _____ and seconded by _____ that the Commission approves the topics for the September 17, 2020 WRC meeting as discussed today.

23. SIMPLIFICATION OF STATEWIDE INLAND SPORT FISHING

Today's Item **Information ☒** **Action ☐**

Discuss proposed changes to inland sport fishing regulations.

Summary of Previous/Future Actions

• WRC vetting	Jan 16, 2020; WRC, Long Beach
• WRC vetting	Mar 5, 2020, WRC, Sacramento
• Notice hearing	Jun 24-25, 2020; Webinar/Teleconference
• **Today's discussion hearing**	**Aug 19-20, 2020; Webinar/Teleconference**
• Adoption hearing	Oct 14-15, 2020; Webinar/Teleconference

Background

For many years, anglers have expressed frustration with the complexity of freshwater sport fishing regulations. Some people are dissuaded from fishing due to actual or perceived difficulty in complying with the regulations.

To address the concerns FGC and DFW have heard over the years, DFW held a series of community meetings in 2018 and 2019 at locations across the state to publically indroduce and discuss proposed changes to simplify statewide inland sport fishing regulations. DFW and public recommendations were then vetted at the Jan 2020 and Mar 2020 WRC meetings, and FGC approved a notice of proposed rulemaking at its Jun 2020 meeting.

The goals of the proposed regulation changes are to increase regulatory consistency statewide, reduce complexity of inland sport fishing regulations, and remove regulations that are no longer biologically justifiable. The major proposed changes include:

- Separate the regulations for inland trout (non-anadromous waters) from those for steelhead and salmon (anadromous waters) to help provide greater clarity for anglers;
- replace the district regulations with statewide regulations separated for trout; and
- standardize and consolidate the "special fishing" regulations.

The proposed rulemaking (exhibits 1 through 4) includes two options for the Truckee River: one proposed by DFW and one proposed by a member of the public (Montna Farms) (see Exhibit 1). Since the notice hearing, DFW staff, FGC staff, and representatives of Montna Farms have met in an effort to identify a compromise between the two options that protects trout while also retaining opportunity; all support a zero bag limit from the confluence of Trout Creek downstream to the mouth of Prosser Creek and a two fish bag limit from the mouth of Prosser Creek downstream to the Nevada state line for part of the year, using particular artificial gear.

Pursuant to the California Environmental Quality Act, a negative declaration for the proposed changes to inland sport fishing regulations will be filed with the State Clearinghouse for a 30-day public review, and will be presented at the Oct 2020 meeting for FGC approval.

Significant Public Comments

1. Nevada County Supervisor-elect Hardy Bullock supports the option for the Truckee River introduced by Montna Farms. He believes the option promotes a healthy Truckee River ecosystem (Exhibit 5).
2. California Trout supports much of the overall proposal to simplify statewide inland fishing regulations. However, the organization expresses concerns with the DFW-proposed amendments regarding the Truckee River, requesting specific changes to support wild trout conservation; the Upper Sacramento River changes, suggesting a single regulation instead of three; and in the East Walker, Mokelumne and East Fork Carson rivers, advocating for catch and release regulations (Exhibit 6).
3. A fisherman opposes the use of "blanket rules" in the regulations. He provides the Merced River as an example, stating that essential protections would be removed from the fishery under the proposed changes (Exhibit 7).
4. A commenter opposes all "F1" proposals ("Saturday preceding Memorial Day through Sep 30" and "five trout, no gear restrictions"). As an avid fly fisherman, he believes that DFW's proposal to close over 50 miles of tributaries and trout streams around Lake Almanor is biased against stream fishing (Exhibit 8).
5. A fisherman is opposed to opening a portion of the Upper Sacramento River for harvest year-round given what he believes are significant opportunities for harvest along that section of river, requests that menu option A6 be adopted for section 156(C) of the proposed regulations, and suggests eliminating some harvest on the lower Sacramento River year-round to protect spawning fish and improve the fishery.

Recommendation (N/A)

Exhibits

1. Initial statement of reasons
2. Proposed regulatory language
3. *Appendix A: Title 14, Section 7.50(b), Alphabetical List of Trout Waters with Special Fishing Regulations; Decision Matrix*, DFW
4. *Appendix B: Simplification of Statewide Inland Sport Fishing Regulations Public Outreach Summary*, DFW
5. Letter from Hardy Bullock, Nevada County Supervisor-elect, received Jul 22, 2020
6. Letter from Patrick Samuel, California Trout, received Jun 22, 2020
7. Email from Bob Minor, received Aug 5, 2020
8. Email from Eric See, received Jul 30, 2020
9. Email from Jonathan Sloat, received Jul 10, 2020

Motion/Direction (N/A)

24. OWENS PUPFISH

Today's Item **Information ☒** **Action ☐**

Receive an overview of DFW's five-year status review of Owens pupfish (*Cyprinodon radiosus*), which is listed as an endangered species under the California Endangered Species Act (CESA).

Summary of Previous/Future Actions

- Determined listing Owens pupfish as endangered was warranted — May 21, 1971
- Received five-year status review report — Jun 24-25, 2020; Webinar/Teleconference
- **Today's DFW presentation** — **Aug 19-20, 2020; Webinar/Teleconference**

Background

Owens pupfish is a small, freshwater fish endemic to the Owens Basin in eastern California near Bishop. Owens pupfish was listed as an endangered species in California by FGC in 1971, pursuant to CESA and is included in FGC's list of endangered animals (Title 14, Section 670.5).

Pursuant to California Fish and Game Code Section 2077, DFW conducted a status review for Owens pupfish (Exhibit 2) to determine whether the conditions that led to the original listing are still present. FCG received the status review report at its Jun 25, 2020 meeting.

DFW finds there is sufficient scientific information to indicate that many of the conditions that led to the listing of Owens pupfish as endangered in 1971 have not changed. Owens pupfish faces ongoing threats, has an exceptionally limited range, and its overall status has remained largely unchanged since listing. DFW recommends retaining the status of this species as endangered (exhibits 1 and 2).

Significant Public Comments (N/A)

Recommendation

FGC staff: Retain endangered species status for Owens pupfish as recommended by DFW.
DFW: Retain endangered species status for Owens pupfish.

Exhibits

1. DFW memo, received Jun 8, 2020
2. DFW five-year status review report, received Jun 8, 2020
3. DFW presentation

Motion/Direction (N/A)

25. WESTERN JOSHUA TREE

Today's Item **Information ☐** **Action ☒**

Consider and potentially act on the petition, DFW's evaluation report, and comments received to determine whether listing western Joshua tree (*Yucca brevifolia*) as a threatened or endangered species under the California Endangered Species Act (CESA) may be warranted.

Summary of Previous/Future Actions

• Received petition	Oct 21, 2019
• Transmitted petition to DFW	Nov 1, 2019
• Published notice of receipt of petition	Nov 22, 2019
• Public received petition and FGC approved DFW's request for 30-day extension	Dec 11-12, 2019; Sacramento
• Received DFW's 90-day petition evaluation report	Apr 15-16, 2020; Teleconference
• Continued deliberations to Aug meeting	Jun 24-25, 2020; Webinar/Teleconference
• **Today determine if listing may be warranted**	**Aug 19-20, 2020; Webinar/Teleconference**

Background

On Oct 21, 2019, FGC received a petition from the Center for Biological Diversity to list the western Joshua tree as threatened under CESA (Exhibit 1). On Nov 1, 2019, FGC staff transmitted the petition to DFW for review. A notice of receipt of petition was published in the California Regulatory Notice Register on Nov 22, 2019.

California Fish and Game Code Section 2073.5 requires that DFW evaluate the petition and submit a written evaluation with a recommendation to FGC, which was received at FGC's Apr 2020 meeting (exhibits 2 and 3). The evaluation report delineates each of the categories of information required for a petition, evaluates the sufficiency of the available scientific information for each of the required components, and incorporates additional relevant information that DFW possessed or received during the review period. Based upon the information contained in the petition and other relevant information, DFW has determined that there is sufficient scientific information available to indicate that the petitioned action may be warranted.

FGC scheduled the public hearing on the petition for its Jun 2020 meeting following the public release and required minimum 30-day review period of the evaluation report, as required in Fish and Game Code sections 2074 and 2074.2. At the Jun meeting, FGC took public comment and continued the hearing to today's meeting. Today FGC will receive a presentation (Exhibit 4) on DFW's petition evaluation and continue the public hearing.

CESA and FGC's regulations require that the petition contain specific scientific information related to the status of the species. CESA, and case law interpreting it, make clear that FGC must accept a petition when the petition contains sufficient information to lead a reasonable

person to conclude that there is a substantial possibility the requested listing could occur; FGC must accept a petition when the requested listing is tied to the species' status, that is, whether the species' continued existence is in serious danger or is threatened by a number of factors. FGC's decision in no way relates to economic consequences that might result from listing.

If FGC determines listing may be warranted pursuant to Section 2074.2 of the Fish and Game Code, western Joshua tree will become a candidate species and DFW will undertake a one-year status review before FGC can make a final decision on listing. Candidate species are protected under CESA pursuant to Section 2085 during the remainder of the CESA listing process.

Significant Public Comments

Through 5:00 p.m. on Aug 6 (first public comment deadline), FGC received over 5,000 comments regarding the potential listing of western Joshua tree as a threatened or endangered species; the majority of comments are in support of the petition, with approximately 200 opposed (recognizing that about 25 of the opposed comments are from associations or organizations representing dozens of members). Staff has reviewed the letters and provides a summary, with example public comments that are representative of the issues and concerns raised.

1. U.S. House of Representatives Republican Leader Kevin McCarthy and Congressional members Paul Cook, Tom McClintock, Doug LaMalfa, Ken Calvert, and Devin Nunes jointly oppose listing, stating the species is not at imminent risk of extinction and is adequately protected by existing law, and raising concerns that listing would have negative impacts on housing, energy diversification, and civil infrastructure. State Senator Scott Wilk, Assembly members Vince Fong, Tom Lackey, Chad Mays and Jay Obernolte, San Bernardino County Supervisor Dawn Rowe and Kern County Board of Supervisors Chair Leticia Perez, all representing areas of the state within the western Joshua tree range, oppose listing for reasons including redundancy of existing protections, failure to provide evidence of species decline, the recent U.S. Fish and Wildlife decision against listing the tree as an endangered species, and the immediate impacts candidate species protections would have on local governments. In addition, Assembly Member Fong expresses concern that the listing could potentially impede military readiness and national protection. See Exhibit 5 for representative examples.
2. The Town of Yucca Valley, mayor of Palmdale, Hi-Desert Water District, Victor Valley Transit Authority, High Desert Joint Powers Authority, San Bernardino County, Mohave Desert Air Quality Management District, and QuadState Local Governments Authority oppose the petition stating the tree is not currently imperiled, existing protections are adequate, and listing would hamper construction of infrastructure, affordable housing, and alternative energy projects. Additionally, the Town of Yucca Valley and the Hi-Desert Water District are concerned that listing could halt progress on the district's wastewater collection and treatment infrastructure required by the California Regional Water Quality Control Board, Colorado River Basin Region. See Exhibit 6 for representative examples.
3. To support positions of opposition, third-party analyses of the petition were submitted by the County of San Bernardino and the Town of Yucca Valley; the Solar Energy Industries Association, Large-scale Solar Association, California Wind Energy Association, and American Wind Energy Association of California; and the Cal

Portland Company on behalf of a coalition of construction materials, housing, energy and labor companies (Exhibit 7).

4. A broad coalition of industry associations and the California Construction and Industrial Materials Association oppose the petition, citing an absence of sufficient information, estimated abundance, or direct threat to the species in the "foreseeable future." Others state that DFW did not adequately analyze the petition and that the 90-day evaluation does not support a "may be warranted decision." A construction company requests that, in the event of a candidacy listing, facilities that have previously undergone a science-based impact analysis and will operate under CEQA-approved mitigation measures be exempt from the effects of a candidate listing. (Exhibit 8)
5. A coalition of chambers of commerce, individual chambers of commerce, and representatives of three real estate companies state that the tree is already adequately protected and describe the economic challenges and housing shortages they believe would be faced by underserved, rural communities. The California State Council of Laborers, Association of Western Employers, and members of the public oppose the listing citing similar concerns and a lack of current imperilment; approximately 150 form letters express the same. Additionally, a real estate firm describes an environmentally-sensitive, affordable housing project already underway that includes efforts to protect the tree, and expresses concerns that listing would make projects like this one much more expensive. See examples in Exhibit 9.
6. The National Parks Conservation Association, California Wilderness Coalition, the Antelope Valley Conservancy, Morongo Basin Conservation Association, Mohave Desert Land Trust, Transition Habitat Conservancy, and the Hispanic Access Foundation support listing the western Joshua tree for reasons including the threats of development, climate change, drought, wildfire, and non-invasive species; the tree's importance to the overall ecosystem; inadequate or unenforced current protections; and the tree's iconic beauty. Additionally, the Hispanic Access Foundation is concerned that the loss of western Joshua trees could do severe harm to the tourism industry that generates needed jobs and government revenue. (Exhibit 10)
7. A number of scientists, including biologists, ecologists and horticulturalists, write in support of the petition. Stated reasons include: the important services the tree provides to other species that rely on it for protection, food, and reproduction; the importance of maintaining habitat connectivity; the challenges of successfully germinating and transplanting western Joshua tree; the inadequacy of current protections, noting that 40% of Joshua tree habitat is on private land; and the tree's intrinsic value. (See examples in Exhibit 11)
8. Multiple individuals state that, even with current protections, local governments are not providing adequate oversight or enforcement to protect the trees, landowners are not held responsible when a tree is destroyed, some landowners are purposefully killing trees, and local communities are disincentivized to protect the tree as it can lead to decreased tax revenues (see Exhibit 12 for examples).
9. Many individuals support the petition and express concern that the tree is in danger due to climate change, construction, and fires. Many describe their personal experiences

with the trees. One commenter provided a link to a video showing the impact of development. See Exhibit 13 for examples.

10. Nearly 5000 form letters were received in support for multiple reasons (see Exhibit 14 for samples).

Recommendation

FGC staff: Determine that listing may be warranted and direct staff to issue a notice reflecting this finding and indicating that western Joshua tree is a candidate for threatened or endangered species status.

DFW: Accept the petition for further consideration under CESA.

Exhibits

1. Petition, received Oct 21, 2019
2. DFW memo, received Mar 16, 2020
3. DFW 90-day evaluation report, received Mar 16, 2020
4. DFW presentation
5. Letters of opposition from elected officials
6. Letters from local and regional government agencies
7. Letters of opposition from organizations submitting third-party analyses of the petition
8. Letters of opposition from industry associations and construction interests
9. Letters of opposition from real estate interests, chambers of commerce and the general public
10. Letters of support from conservation organizations
11. Letters of support from scientists
12. Letters of support from those concerned with the adequacy of current protections
13. Letters of support from general public or other organizations
14. Letters of support as form letters
15. Center for Biological Diversity presentation, received Aug 6, 2020

Motion/Direction

Moved by _____ and seconded by _____ that the Commission, pursuant to Section 2074.2 of the California Fish and Game Code, finds that the petition to list western Joshua tree as a threatened species **does** provide sufficient information to indicate that the petitioned action **may be** warranted based on the information in the record before the Commission, and directs staff to issue a notice reflecting this finding and indicating that western Joshua tree is a candidate for threatened or endangered species status.

OR

Moved by _____ and seconded by _____ that the Commission, pursuant to Section 2074.2 of the Fish and Game Code, finds that the petition to list western Joshua tree as a threatened species **does not** provide sufficient information to indicate that the petitioned action may be warranted based on the information in the record before the Commission.

26. WILDLIFE AND INLAND FISHERIES ITEMS OF INTEREST FROM PREVIOUS MEETINGS

Today's Item **Information ☐** **Action ☒**

This is a standing agenda item to provide FGC with updates on items of interest from previous meetings. Today includes a discussion about urban coyote issues.

Summary of Previous/Future Actions

- WRC recommendation approved by FGC Feb 21, 2020; Sacramento
- **Today's discussion** **Jun 24-25, 2020; Webinar/Teleconference**

Background

Coyotes in California's urban areas have become a source of human-wildlife conflict that is primarily addressed by local government agencies. After several commenters brought forth concerns at WRC's Jan 16, 2020 meeting in Long Beach, similar to comments received at past WRC and FGC meetings, WRC recommended that FGC host a discussion with DFW and the public on steps that can be taken to address the conflicts. Such a discussion was scheduled for the Jun 2020 meeting based on its originally-planned location in southern California, but FGC subsequently postponed it to today.

Today, FGC will receive presentations from two academic scientists on coyote biology and behavior, and engage in a discussion with DFW and the public. Additionally, DFW and FGC staff believe that, following today's discussion, a public workshop jointly hosted by FGC and DFW could serve to further explore topics such as:

- Urban coyote research and additional needs
- Agency authorities and jurisdictions
- Options for developing coyote plans at the local municipality level
- Educational initiatives

Significant Public Comments (N/A)

Recommendation

FGC staff: Direct FGC staff to work with DFW to jointly host a workshop on urban coyote human-wildlife conflicts, in consultation with the WRC co-chairs.

Exhibits (N/A)

Motion/Direction

Moved by _____ and seconded by _____ that the Commission directs staff to work with the Department, in consultation with the co-chairs of the Wildlife Resources Committee, to host a workshop on urban coyote human-wildlife conflicts.

27. PETITIONS FOR REGULATION CHANGE (WILDLIFE AND INLAND FISHERIES)

Today's Item **Information ☐** **Action ☒**

This is a standing agenda item for FGC to act on regulation petitions from the public that concern wildlife or inland fisheries. For this meeting:

(A) Action on petitions received at the Jun 2020 meeting

(B) Pending regulation petitions referred to staff or DFW for review – *None scheduled*

Summary of Previous/Future Actions

- FGC received petitions — Jun 24-25, 2020; Webinar/Teleconference
- **Today's action on petitions** — **Aug 19-20, 2020; Webinar/Teleconference**

Background

Pursuant to Title14 Section 662, any request for FGC to adopt, amend, or repeal a regulation must be submitted on form FGC 1, "Petition to the California Fish and Game Commission for Regulation Change." Petitions received at an FGC meeting are scheduled for consideration at the next business meeting under (A), unless the petition is rejected under 10-day staff review as prescribed in subsection 662(b). A petition may be (1) denied, (2) granted, or (3) referred to a committee, staff or DFW for further evaluation or information-gathering. Referred petitions are scheduled for action under (B) once the evaluation is completed and a recommendation made.

(A) ***Petitions for regulation change.*** One petition received at the Apr 2020 meeting is scheduled for action:

I. Petition #2020-008: *Elk hunting suspension* (Exhibit A1). The petition requests an emergency regulation. FGC staff recommends FGC determine that an emergency situation does not exist and that the petition be referred to WRC for review.

Significant Public Comments (N/A)

Recommendation

FGC staff: Determine an emergency situation does not exist and refer the petition to WRC.

Exhibits

1. Petition #2020-008, Elk hunting suspension, received Jun 10, 2020

Motion/Direction

Moved by _____ and seconded by _____ that the Commission adopts the staff recommendation for Petition #2020-008.

OR

Moved by _____ and seconded by _____ that the Commission determines for Petition #2020-008 that the action is _____.

28. WILDLIFE AND INLAND FISHERIES NON-REGULATORY REQUESTS

Today's Item **Information ☐** **Action ☒**

This is a standing agenda item for FGC to act on non-regulatory requests from the public.

Summary of Previous/Future Actions

- FGC received requests Jun 24-25, 2020; Webinar/Teleconference
- **Today's potential action on requests Aug 19-20, 2020; Webinar/Teleconference**

Background

FGC provides direction regarding requests from the public received by mail and email and during general public comment at the previous FGC meeting. Public requests for non-regulatory action follow a two-meeting cycle to ensure proper review and consideration.

(A) ***Non-regulatory requests.*** Non-regulatory requests scheduled for consideration today were received at the Jun 2020 meeting in one of three ways: (1) submitted by the comment deadline and published as tables in the meeting binder, (2) submitted by the supplemental comment deadline and delivered at the meeting, or (3) received during public comment at the meeting.

Today, three non-regulatory requests received at the Jun 2020 meeting are scheduled for action. Exhibit 1 summarizes each request and provides staff recommendations.

(B) ***Pending non-regulatory requests***. This item is an opportunity for staff to provide a recommendation on non-regulatory requests that were scheduled for action at a previous meeting and referred by FGC to staff or DFW for further review – *None are scheduled for today.*

Significant Public Comments (N/A)

Recommendation

FGC staff: Adopt the staff recommendations as reflected in Exhibit A1.

Exhibits

1. List of non-regulatory requests and staff recommendations for requests received through Aug 6, dated Aug 11, 2020

Motion/Direction

Moved by _____ and seconded by _____ that the Commission adopts the staff recommendations for action on the August 2020 non-regulatory requests.

OR

Moved by and by _____ and seconded by _____ that the Commission adopts the staff recommendations for action on the August 2020 nonregulatory requests, except for the item(s)_____ for which the action is _____.

29. COMMISSION MEETING DATES AND LOCATIONS FOR 2021

Today's Item **Information ☐** **Action ☒**

Receive and discuss proposed meeting dates and locations of FGC and committee meetings for Jan through Dec of 2021.

Summary of Previous/Future Actions

- Discussed draft 2021 meeting dates and locations — Jun 24-25, 2020; Webinar/Teleconference
- **Consider approving 2021 meeting dates and locations** — **Aug 19-20, 2020; Webinar/Teleconference**

Background

FGC conducts its business at six two-day meetings (Feb, Apr, Jun, Aug, Oct and Dec) on a Wednesday and Thursday, plus teleconference meetings as needed. Committees each generally hold three (half-to-full day) meetings per year, either staggered between FGC business meetings (WRC, MRC), or the afternoon before the first day of three FGC meetings (TC). For 2021, non-marine items are recommended to be heard on the first day, and marine items are recommended for the second day of FGC meetings, consistent with the ongoing practice of alternating the two from one year to the next.

At the Jun 2020 FGC meeting, staff proposed potential meeting dates and locations for 2021 and FGC provided direction to:

- realign TC meetings with FGC meetings in Apr, Aug and Dec;
- schedule FGC meetings on Wednesdays and Thursdays;
- schedule TC, MRC and WRC meetings on Tuesdays; and
- consider holding initial in-person meetings in Sacramento.

Staff has prepared a revised list of proposed meeting dates and locations for 2021 (Table 1) for FGC approval today based on FGC direction and several additional considerations:

1. Due to the ongoing COVID-19 pandemic, in-person meetings cannot currently be conducted safely and likely not before mid-2021.
2. State restrictions on non-essential travel are expected to remain in place through the end of this fiscal year (Jun 30, 2021).
3. Once it is safe for in-person meetings again, the new Natural Resources Building in downtown Sacramento, and its auditorium with state-of-the-art audio and video capabilities, will be available to support meetings with a combination of in-person and remote participation.

Table 1: Proposed 2021 FGC and Committee Meeting Dates and Locations

Proposed Dates	Meeting Type	Proposed Location
Jan 12	WRC	Webinar/Teleconference
Feb 10-11	FGC	Webinar/Teleconference
Mar 16	MRC	Webinar/Teleconference
Apr 13	TC	Webinar/Teleconference
Apr 14-15	FGC	Webinar/Teleconference
May 11	WRC	Webinar/Teleconference
May 11	FGC	Webinar/Teleconference
Jun 16-17	FGC	Webinar/Teleconference
Jul 20	MRC	Sacramento
Aug 17	TC	Sacramento
Aug 18-19	FGC	Sacramento
* Sep 16	WRC	Sacramento
Oct 13-14	FGC	Sacramento
Nov 9	MRC	Sacramento
Dec 14	TC	Sacramento
Dec 15-16	FGC	Sacramento

* *Staff recommends the Sep 2021 WRC meeting be held on a Thursday to avoid a conflict with both the Association of Fish and Wildlife Agencies annual meeting and a Pacific Fisheries Management Council meeting.*

Other Relevant 2021 Meetings and Locations

The public meeting dates of several other organizations are taken into consideration when scheduling FGC meetings as decisions of those organizations directly affect potential FGC actions or FGC's president is a member or participant in those meetings.

- Association of Fish and Wildlife Agencies
  - Sep 12-15, Providence, RI
- Pacific Fishery Management Council
  - Mar 3-10, Seattle, WA

  - Apr 6-13, San Jose, CA
  - Jun 22-29, Vancouver, WA
  - Sep 8-15, Spokane, WA
  - Nov 15-22, Costa Mesa, CA
- Pacific Flyway Council – Dates unknown currently
- Western Association of Fish and Wildlife Agencies
  - Jan 7 - 10 Santa Ana Pueblo, NM
  - Jul 18 - 23, Santa Fe, NM
- Wildlife Conservation Board – Dates unknown at this time

Significant Public Comments (N/A)

Recommendation

FGC staff: Approve the proposed 2021 FGC and committee meeting dates and locations.

Exhibits (N/A)

Motion/Direction

Moved by _____ and seconded by _____ that the Commission approves the proposed meeting dates and location.

OR

Moved by _____ and seconded by _____ that the Commission approves the proposed meeting dates and location, except _____.

STAFF SUMMARY FOR AUGUST 19-20, 2020

30A. ADMINISTRATIVE ITEMS – NEXT MEETING

Today's Item **Information** ☐ **Action** ☒

This is a standing agenda item to review logistics and approve draft agenda items for the next FGC meeting and consider any changes to meeting dates or locations.

Summary of Previous/Future Actions (N/A)

Background

The next FGC meeting is currently scheduled for Oct 14-15. Because of ongoing health concerns related to COVID-19 and state travel restrictions, this meeting will be held by webinar/teleconference. Staff anticipates that FGC will need to meet remotely via webinar/teleconference through at least the remainder of the fiscal year (through June 2021), as discussed under Agenda Item 29, proposed meeting dates and locations.

Potential agenda items for the Oct meeting are provided in Exhibit 1 for consideration and potential FGC approval. The current list of items suggests to staff that it may be possible to complete the full agenda in a single day; in late September staff will confer with President Sklar on timing prior to posting the final Oct 2020 agenda.

Significant Public Comments (N/A)

Recommendation

FGC staff: Approve potential agenda items for the Oct 14-15 FGC meeting.

Exhibits

1. Potential agenda items for the Oct 14-15, 2020 meeting

Motion/Direction

Moved by _____ and seconded by _____ that the Commission approves the draft agenda items for the October 14-15, 2020 Commission meeting, as amended today.

30B. RULEMAKING TIMETABLE UPDATES

Today's Item **Information ☐** **Action ☒**

Review and potentially approve changes to the perpetual timetable for anticipated regulatory actions.

Summary of Previous/Future Actions

- FGC approved changes to rulemaking timetable — Jun 24-25, 2020; Webinar/Teleconference
- **Today consider approving changes to the rulemaking timetable** — **Aug 19-20, 2020; Webinar/Teleconference**

Background

This is a standing agenda item for FGC staff and DFW to request changes to the FGC regulatory timetable, or for FGC to make changes during the course of this meeting.

DFW requests two changes to FGC's 2020 regulatory timetable (exhibits 1 and 2):

- Extend the emergency regulation authorizing unlimited take of purple sea urchin by hand or with handheld tools at Caspar Cove, Mendocino, for 90 days. The extension is necessary to provide sufficient time to determine whether culling of purple sea urchin can help promote the recovery of kelp and the numerous species and ecosystem services that kelp supports, including red abalone. Extending the emergency also provides FGC additional time to pursue certification of a non-emergency rulemaking.
- Add a regular rulemaking for certification of the emergency provisions at Caspar Cove, Mendocino County, and extend the provision to a second geographic location at Tanker's Reef, Monterey County, for both purple and red sea urchin.

FGC staff requests that a rulemaking be added to the regulatory timetable:

- Amend regulations for recreational take of California grunion, consistent with FGC's Feb 2020 action to grant a regulation change petition (#2019-014) in concept. FGC referred the topic to MRC and requested that DFW develop specific proposed changes. MRC discussed DFW-developed options at the Jul 2020 MRC meeting, and supported scheduling a discussion of specific proposed changes at the Nov 2020 MRC meeting. However, MRC recognized the need to prioritize this rulemaking relative to those already scheduled or under development, and recommended that FGC discuss and provide direction regarding the priority and timing of this rulemaking in the context of other rulemakings and staff capacity (see Agenda Item 9(B), this meeting).

Significant Public Comments (N/A)

Recommendation

FGC staff: Add a rulemaking for recreational take of California grunion to the timetable as "TBD" and consider scheduling in the future as regulatory staff capacity allows. Adopt proposed

changes to the timetable for anticipated regulatory actions, including any rulemaking changes identified during the meeting.

Exhibits

1. DFW memo, received Aug 4, 2020
2. *Perpetual Timetable for Anticipated Regulatory Actions*, dated Aug 7, 2020

Motion/Direction

Moved by _____ and seconded by _____ that the Commission approves the proposed changes to the rulemaking timetable as recommended by staff and as discussed today.

STAFF SUMMARY FOR AUGUST 19-20, 2020

30C. ADMINISTRATIVE ITEMS - NEW BUSINESS

Today's Item **Information** ☒ **Action** ☐

This is a standing agenda item to allow Commissioners to bring new items of business to FGC.

Summary of Previous/Future Actions (N/A)

Background (N/A)

Significant Public Comments (N/A)

Recommendation (N/A)

Exhibits (N/A)

Motion/Direction (N/A)

EXECUTIVE SESSION

Today's Item **Information ☐** **Action ☒**

Executive session will include four standing topics:

(A) Pending litigation to which FGC is a party
(B) Possible litigation involving FGC
(C) Staffing
(D) Deliberation and action on license and permit items

Summary of Previous/Future Actions (N/A)

Background

During the public portion of its meeting, FGC will call a recess and reconvene in a closed session pursuant to the authority of Government Code subsections 11126(a)(1), (c)(3), and (e)(1), and Section 309 of the California Fish and Game Code. FGC will address four items in closed session:

(A) ***Pending litigation to which FGC is a party***

See agenda for a complete list of pending civil litigation to which FGC is a party, at the time the agenda was made public.

(B) ***Possible litigation involving FGC***

None to report at the time the meeting binder was prepared.

(C) ***Staffing***

For details about staffing, see the executive director's report under Agenda Item 3 for today's meeting.

(D) ***Deliberation and action on license and permit items***

I. *Thanh Van Accusation:* Consider the proposed decision in Agency Case No. 19ALJ17-FGC, the accusation filed against Thanh Van. On Nov 18, 2019, DFW filed an administrative accusation with FGC requesting the revocation of Mr. Van's sport fishing privileges.

Mr. Van filed a notice of defense asserting his right to a hearing. FGC referred the matter to the Office of Administrative Hearings (OAH) and, on Jun 25, 2020, OAH conducted a hearing. On Jul 23, 2020, OAH provided FGC a proposed decision, which found that DFW had demonstrated an adequate basis for action against Mr. Van and and proposed that FGC suspend Mr. Van's sport fishing license and privileges for two years (Exhibit D1).

Significant Public Comments (N/A)

Recommendation

FGC staff: Determine whether the proposed two-year suspension provides adequate protection for natural resources based on the facts articulated in the proposed decision and the record as a whole; based on that determination, either accept the proposed decision or reject the proposed decision to allow further proceedings before FGC.

Exhibits

D1. Proposed Decision for Case No 19ALJ17-FGC, OAH No 2020021121, received Jul 23, 2020.

Motion/Direction

(D) Moved by _____ and seconded by _____ that the Commission adopts the the proposed decision regarding the accusation against Thanh Van.

OR

Moved by _____ and seconded by _____ that the Commission rejects the proposed decision regarding the accusation against Thanh Van and directs staff to prepare the record to allow FGC to consider the matter at a future Commission meeting.

CALIFORNIA FISH AND GAME COMMISSION
RECEIPT LIST FOR PETITIONS FOR REGULATION CHANGE: RECEIVED BY 5:00 PM ON AUGUST 6, 2020
Revised 8/10/2020

Tracking No.	Date Received	Name of Petitioner	Subject of Request	Short Description	FGC Receipt Scheduled	FGC Action Scheduled
2020-007 AM 1	7/10/2020	Russell Goltz	Authorize surfboard fishing at South La Jolla State Marine Reserve	Amend marine protected area regulations to allow surfboard fishing at the South La Jolla State Marine Reserve.	8/19-20/2020	10/14-15/2020
2020-009	6/25/2020	Rebecca Dmytryk	Require reporting of mammals taken for nuisannce wildlife control on annual trapping reports.	Amend Section 467 to require licensed trappers to include all furbearing and nongame mammals (excluding non-native mice and rats, gophers, voles) taken through nuisance wildlife control operations in their annual submission of take, as per Section 467 Trapping Reports.	8/19-20/2020	10/14-15/2020
2020-010	7/28/2020	Shaun Reid	Reduce bag limit for wild rainbow and brown trout at Stanislaus River and Beaver Creek	Change the limit of wild rainbow and brown trout on the North Fork of the Stanislaus River and Beaver Creek to zero.	8/19-20/2020	10/14-15/2020

CALIFORNIA FISH AND GAME COMMISSION - NONREGULATORY REQUESTS - RECEIPT

Revised 8/10/2020

FGC: California Fish and Game Commission | DFW: California Department of Fish and Wildlife | WRC: Wildlife Resources Committee | MRC: Marine Resources Committee

Date Received	Subject	Short Description	Name/ Organization of Requestor	Category
8/6/2020	Consumptive activities at Duxbury Reef State Marine Conservation Area (SMCA)	Request increased enforcement patrols in the area of Duxbury Reef SMCA due to increased instances of consumptive activity and potential poaching. Want to ensure no-take restrictions are being enforced.	Morgan Patton, West Marin Environmental Action Committee	Marine
8/6/2020	Trout planting in the Merced River	Requests planting 50-75 trout in the Merced River west of Lake McClure. Concerned that fish cannot reach this stretch of river because water is diverted for irrigation and power generation.	Jake Elzenga	Wildlife

State of California – Fish and Game Commission

PETITION TO THE CALIFORNIA FISH AND GAME COMMISSION FOR REGULATION CHANGE

Tracking Number: (__2020-007 AM 1__)

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: Russell Goltz
   Address:
   Telephone number
   Email address

2. **Rulemaking Authority (Required) -** Reference to the statutory or constitutional authority of the Commission to take the action requested : **Rulemaking Authority:** Sections 200, 205(c), 265, 399, 1590, 1591, 2860, 2861 and 6750, Fish and Game Code; and Sections 36725(a) and 36725(e), Public Resources Code2020-007

3. **Overview (Required) -** Summarize the proposed changes to regulations – Please allow surfboard fishing at the South La Jolla State Marine Preserve. If we can get out there without using gas or electric, just arm power, it will limit the number of fishermen to a minimum amount. No Sport Fishing Boats. You can even make it a catch and release required, that would be fine. I just want to be able to again walk across the street and go fishing from my surfboard.

4. **Rationale (Required) -** Describe the problem and the reason for the proposed change – The problem is I have to drive 3 miles to be able to do my favorite thing in the world to do. I am 65 years old, and only have a few years left to be able to do this sport. The way I read the California Constitution, Article 1 Section 25, and since it's not a "Fishery", I should be able to fish there. But I understand the way of the world, all I want is for ME to be able to fish at Tourmaline Street in Pacific Beach.

SECTION II: Optional Information

5. Date of Petition 06-03-2020

6. Category of Proposed Change

X 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 Click here to enter text.
Or X 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 – As soon as possible!

10. Supporting documentation: Identify and attach to the petition any information supporting the proposal including data, reports and other documents – attached are a few documents for your reading pleasure.

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 -NONE

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: Click here to enter text.

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

Tracking Number: (2020-009)

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: Rebecca Dmytryk
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:Authority cited: Sections 200, 203, 265, 4009.5 and 4150, Fish and Game Code. Reference: Sections 110, 200, 201, 203, 203.1, 260, 265, 270, 275, 4000, 4002, 4003, 4004, 4005, 4006, 4007, 4008, 4009, 4009.5, 4010, 4011 and 4012, Fish and Game Code.

3. Overview (Required) - Summarize the proposed changes to regulations:

Petitioner seeks to have § 467 amended to Require licensed trappers to include all furbearing and nongame mammals (excluding non-native mice and rats, gophers, voles) taken through nuisance wildlife control operations in their annual submission of take as per § 467 Trapping Reports.

4. Rationale (Required) - Describe the problem and the reason for the proposed change:

Thousands of the State's wildlife is taken under nuisance wildlife control operations annually and never reported - never accounted for. It is the responsibility of this trustee agency to account for loss / take of natural resources, therefore such take should be documented.

SECTION II: Optional Information

5. Date of Petition:

6. Category of Proposed Change
- ☐ Sport Fishing
- ☐ Commercial Fishing
- ☐ Hunting
- ☒ Other, please specify: Use of Traps

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): § 467
   - ☐ Add New Title 14 Section(s):
   - ☐ Repeal Title 14 Section(s):

8. **If the proposal is related to a previously submitted petition that was rejected, specify the tracking number of the previously submitted petition**. 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: July 1, 2021

10. **Supporting documentation:** Identify and attach to the petition any information supporting the proposal including data, reports and other documents:

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:

12. **Forms:** If applicable, list any forms to be created, amended or repealed:

SECTION 3: FGC Staff Only

Date received:

FGC staff action:
- ☐ Accept - complete
- ☐ Reject - incomplete
- ☐ Reject - outside scope of FGC authority

Date petitioner was notified of receipt of petition and pending action: _____ (Tracking Number)

Meeting date for FGC consideration: _____

FGC action:
- ☐ Denied by FGC
- ☐ Denied - same as petition _____ (Tracking Number)
- ☐ Granted for consideration of regulation change

Tracking Number: (_2020-010_)

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: Shaun Reid.
   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: sections 200, 205, 265, 270, 275, 315, 316.5, 399, and 2084 of the Fish and Game Code

3. **Overview (Required) -** Summarize the proposed changes to regulations: Change the limit of wild rainbow and brown trout on the North Fork of the Stanislaus River and Beaver Creek to zero.

4. **Rationale (Required) -** Describe the problem and the reason for the proposed change: These waters are heavily pressured, but over the past couple of years, I have been catching more wild fish, both browns and rainbows. I'm really quite amazed at the fish I'm catching, particularly this season. This tells me that these waters have the ability to support wild fish populations, which makes for a great angling experience..

SECTION II: Optional Information

5. **Date of Petition:** July 28, 2020

6. **Category of Proposed Change**
   x 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 Click here to enter text.
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: for the 2021 season.

10. Supporting documentation: Identify and attach to the petition any information supporting the proposal including data, reports and other documents: Click here to enter text.

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: So long as fish continue to be planted, I see no reason that this would impact local businesses. In fact, should the fishery improve with bigger, wild fish, I suspect it could be a boost for the area.

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: Click here to enter text.

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

From: Ashley Eagle-Gibbs [redacted]
Sent: Thursday, August 6, 2020 4:56 PM
To: FGC <FGC@fgc.ca.gov>
Cc: Morgan Patton [redacted]
Subject: EAC Comment re. Agenda Item 2: General public comment, Duxbury Reef SMCA, Increased Consumptive Activities

Dear Commissioners,

Please find attached a comment letter for general public comment in advance of your August meeting. This letter is regarding Duxbury Reef State Marine Conservation Area and increased consumptive activities. Thank you for your consideration of EAC's comments.

Sincerely,
Ashley Eagle-Gibbs

Ashley Eagle-Gibbs, Esq. | Conservation Director
Environmental Action Committee of West Marin (EAC)
[redacted]

Keeping West Marin Wild Since 1971

Website | Facebook | Twitter | Instagram

* Please note I am typically out of the office on Fridays.

The information contained in this message may be privileged, confidential, and protected from disclosure. If the reader of this message is not the intended recipient, or an employee or agent responsible for delivering this message to the intended recipient, you are hereby notified that any dissemination, distribution or copying of this communication is strictly prohibited. If you have received this communication in error, please notify EAC immediately and delete this message from your computer. Thank you.

west marin environmental action committee

ESTABLISHED 1971

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August 6, 2020

California Fish and Game Commission
1416 Ninth Street, Suite 1320
Sacramento, CA 95814
Submitted electronically: fgc@fgc.ca.gov

RE: Agenda Item 2: General public comment
Duxbury Reef State Marine Conservation Area, Increased Consumptive Activities

Dear Fish and Game Commissioners,

The Environmental Action Committee of West Marin (EAC) is an environmental organization based on Point Reyes Station, California, working to protect and sustain the unique lands, waters, and biodiversity found in western Marin County.

Since 2014, EAC has administered a Marine Protected Area Watch (MPA Watch) community science program at Agate Beach / Duxbury Reef State Marine Conservation Area (SMCA). MPA Watch is a statewide program that trains volunteers to observe and collect data on human uses of coastal and marine resources both inside and outside MPAs. Our program is focused on MPAs in or near Marin County.

I am writing today to raise awareness with resource management agencies of the increased potential poaching activities occurring within the Duxbury SMCA and the need for enforcement response. We are currently in discussion with California Department of Fish and Wildlife enforcement, Point Reyes National Seashore, and Marin County Parks and Open Space concerning this issue.

EAC received reports from our volunteers last week concerned by the alarming increase in consumptive activities at Duxbury Reef SMCA beginning in May, June, and July 2020. A review of our data indicates a sharp increase in visitation and potential poaching Duxbury Reef SMCA in July 2020.

Our MPA Watch rate of on-shore consumptive activity (taking or collecting) from January 1 – July 29, 2020 compared to 2014-2019 has increased by 100% from a rate of 3.2 activities per survey mile to a rate of 6.4 activities per survey mile.

Our volunteers are observing dozens of people on the Reef outside of prior years' statistical high-visitation dates, and observing people in increased numbers with collecting materials. Some are collecting for personal consumption, while others are unintentionally collecting (placing organisms into buckets for observation or play), and they are totally unaware they are in an MPA.

We are requesting immediate attention from resource protection agencies with jurisdiction to protect the areas of Agate Beach and Duxbury Reef to increase enforcement patrols to ensure MPA compliance. Duxbury Reef is a SMCA where it is unlawful to injure, damage, take, or possess any living, geological, or cultural marine resource for recreational and/or commercial purposes, with the following specified exceptions: The recreational take of finfish from shore and abalone is allowed.[1]

Examples of likely poaching activities observed by MPA Watch volunteers in July 2020:

July 11, 2020: 3-foot tide, 2:00pm
On-Shore Consumption.
One group of 5 individuals was collecting Tegula funebralis. They were told that activity was not permitted. They returned to the intertidal the Tegula that they had collected.

July 19, 2020: 3-foot tide, 9:50am
Offshore Violation (reported to CDFW)
Violation was reported on DFW's website and by a separate email to DFW officer's email address (with photos attached).

July 24, 2020: 0.1-foot tide, 8:55am
On-Shore Consumption.
Elementary school class (grades 1-4) from Novato School District. Collecting done by class; spoke to them and it largely stopped their collecting. Spear fisherman is a "local", collected and took some invertebrates.

July 25, 2020: 0.1-foot tide, 9:30am
On-Shore Consumption.
4 people collecting for consumption: 1 bucket of Strongylocentrotus purpuratus (#36) and 1 bucket of Tegula funebralis (#100+). Male was carrying a metal pry bar. I observed 5 S.

[1] California Department of Fish and Wildlife, Duxbury State Marine Conservation Area, accessed at: *https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=91616&inline*

> purpuratus freshly crushed in pools along base of berm and fresh broken S. purpuratus habitat (i.e. destroyed urchin holes in rocky reef). Collectors stated that he learned of the site on iNaturalist. I returned both buckets into water, however, much mortality. Joe Mueller, College of Marin Professor, and his student research assistants witnessed this.

On July 17, 2020, the Los Angeles Times published an article that highlighted the excessive crowds removing sea creatures from San Pedro tide pools and quoted state game warden Doug Wall, "*I've never seen so many people combing these tide pools for food…over the past month, I've issued about 30 citations for infractions in Southern California's tide pools*."[2]

We are concerned Duxbury Reef SMCA may be on the same path as some of our Southern California intertidal areas and would like to prevent this before it is too late. Poaching at Duxbury Reef SMCA could severely harm this fragile ecosystem. Taking of any species (except for hook and line fishing for finfish) is prohibited and increased patrols are in need to ensure compliance as public visitation to the beach and reef are steadily increasing.

EAC, in partnership with Marin County Open Space, is currently designing a docent program that would train volunteers in the fall of 2020 launch at Duxbury Reef SMCA in the spring of 2021. Unfortunately, due to the pandemic, we are now witnessing the increases of human visitation at Duxbury Reef SMCA without adequate visitor support and resources to provide public education on the MPA and appropriate tide pool etiquette.

In order to provide public education and outreach, EAC is planning to ask our MPA Watch volunteers to assist with an ad-hoc docent team to provide California Department of Fish and Wildlife information and materials at the trailhead at the Agate Beach parking lot in the short-term. Our volunteers are not enforcement, but they can assist with interpretation and public education to assist with compliance with proper face coverings and social distancing.

In order to ensure compliance, it is imperative that patrols take place to begin to issue citations to poachers at Duxbury Reef SMCA as soon as possible.

If needed, EAC is willing to provide a general list of dates when we can anticipate the potential for increased visitation and potential for poaching based on the tide conditions and time of day. In general, we are witnessing crowds at any low or medium tide before 2pm on any day of the week. This is a dramatic shift in human visitation and potential poaching activities from what our program has observed

---

[2] Los Angeles Times, Excessive Crowds Removing Sea Creatures from San Pedro Tide Pools Put Delicate Ecosystems at Risk, accessed at: https://www.latimes.com/environment/story/2020-07-17/unprecedented-crowds-are-harvesting-sea-creatures-from-san-pedros-famous-tide-pools?fbclid=IwAR2LacqMiHUHEdz-zsUvWXSsen7Go3r8iXoVRYc5cDCsGUYcM3GBdUAlYt8

at Duxbury Reef SMCA since 2014. For reference, we have included an attachment to this letter copies of the charts and graphs of the MPA Watch data for reference and review.

We look forward to discussing this issue in the near future to ensure the protection of our coastal and marine resources. Thank you for your prompt attention to this matter.

Sincerely,

Morgan Patton
Executive Director

Attachment 1: Marin MPA Watch Data

Duxbury Reef State Marine Conservation Area

Activity Incidence: January 1 – July 29, 2020 / Compared to January 1 – July 29, 2014-2019

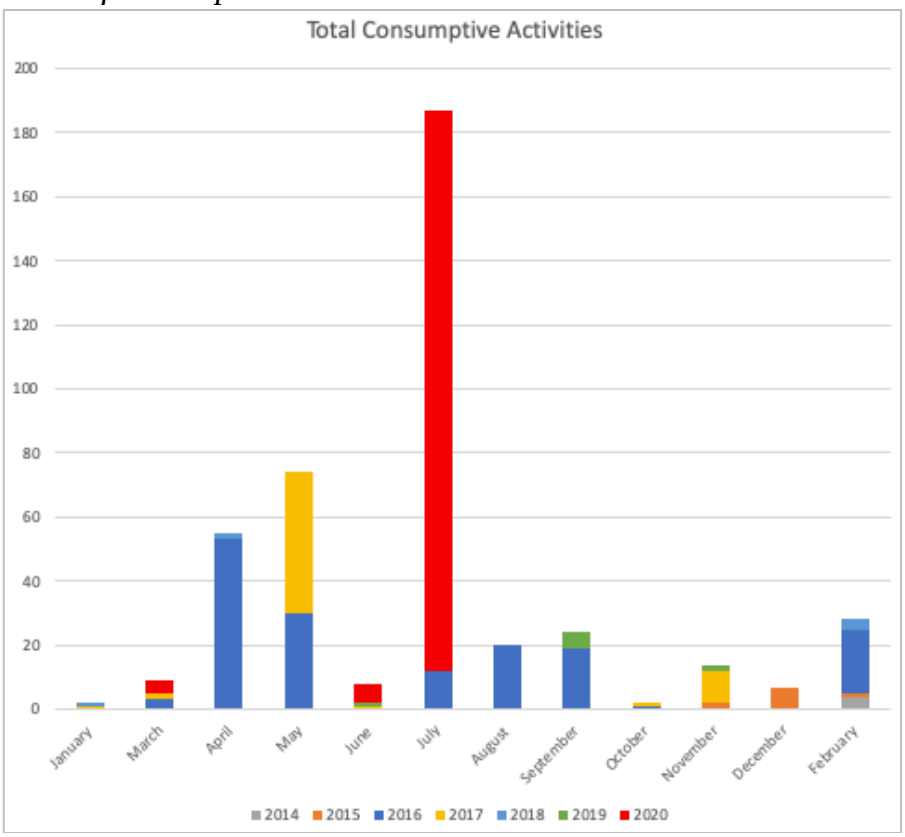
Number of activities recorded divided by total survey-miles to obtain incidence rate per mile.

On-Shore			
Non-Consumptive		Consumptive	
Jan 1		Jan 1	
Jul 29	Jan 1, 2020	Jul 29	Jan 1, 2020
All Years	Jul 29, 2020	All Years	Jul 29, 2020
68.65	47.46	3.20	6.37

Off-Shore			
Non-Consumptive		Consumptive	
Jan 1		Jan 1	
Jul 29	Jan 1, 2020	Jul 29	Jan 1, 2020
All Years	Jul 29, 2020	All Years	Jul 29, 2020
0.03	0.00	0.05	0.14

Total Consumptive Activities (collecting or taking): 2014-2020

Total number of consumptive activities recorded over time.



P.S I've been fishing 4 times this month and haven't seen one game warden to talk to.

RECEIVED
CALIFORNIA
FISH AND GAME

To Fish and Game Commission: I have been fishing on the merced river west of the McClure lake at the river. I started fishing their in June 2017 my name is Jake Elenga fishing licence # D0025666-33-1 dated 6-27-2017 at first their were no fish to be Caught then aprox one month later a fish hatchery truck showed up and planted aprox 50 to 60 rainbow trout then the fishing picked up. and people started fishing their again. last year 2019 Calif. licence # D-0025397868-8 the fishing started to taper off not many fish being Caught so we asked the game warden did they plant the river aprox 1½ mile at the hiway 59 bridge to the irrigation and Generator dam he said yes but the fishing never picked up last year and its the same this year 2020 fishing licence # D-0029765171-8 the only way fish Can get into this streach of river is when the water goes over the top the emergency spillway, last year it did run some not this year they spill in the river through the gates and they are not generating power as of fire dangers PG&E and the Merced Irrigation dist. operates the spill gates ect. they have 3 generators or more on the C. McClure, McSwain, Merced River and they divert water for irrigation so I am asking you people to help us spoil fisherman of California for 50 to 75 hatchery trout rainbow or? Thank you for your Consideration once the fish are planted they Can only get out if they are Caught.

Jake Elenga - second generation Californian

[redacted]

CALIFORNIA
FISH AND GAME
COMMISSION
2020 JUN -2 AM 7:47

DEPARTMENT OF THE INTERIOR

Bureau of Indian Affairs

Notice of Availability of a Draft Environmental Impact Statement and Draft Conformity Determination for the Tejon Indian Tribe's Proposed Fee-to-Trust Acquisition and Casino Resort Project, Kern County, California

AGENCY: Bureau of Indian Affairs, Interior.

ACTION: Notice of availability.

SUMMARY: This notice advises the public that the Bureau of Indian Affairs (BIA), as lead agency, with the Tejon Indian Tribe (Tribe), Kern County (County), National Indian Gaming Commission (NIGC), and the United States Environmental Protection Agency (EPA) serving as cooperating agencies, has filed a Draft Environmental Impact Statement (DEIS) with the EPA in connection with the Tribe's application for acquisition in trust by the United States of approximately 306 acres for gaming and other purposes to be located west of the Town of Mettler, Kern County, California. At the request of the Tribe, this EIS has been prepared to comply with the expected requirements of a tribal environmental ordinance, which may require a Tribal Environmental Impact Report (TEIR). To reduce paperwork and eliminate redundancy, the EIS and the TEIR have been prepared in coordination, resulting in a joint EIS/TEIR, hereinafter referred to as an EIS. This notice also announces that the DEIS is now available for public review and that a public hearing will be held to receive comments on the DEIS. In accordance with Section 176 of the Clean Air Act 42 U.S.C. 7506, and the U.S. EPA's general conformity regulations 40 C.F.R. Part 93, Subpart B, a Draft Conformity Determination (DCD) has been prepared for the proposed project. The DCD is contained within Appendix N of the DEIS.

DATES: Comments on the DEIS or DCD must arrive no later than July 27, 2020, which is 45 days after publication of Notice of Availability by the USEPA in the *Federal Register* on June 12, 2020. A virtual public hearing will be held on July 8, 2020, starting at 6:00 p.m, and will run until the last public comment is received. Please go to https://www.tejoneis.com/ for information on how to attend the virtual public hearing.

COMMENT SUBMITTAL: You may mail or hand-deliver written comments to Amy Dutschke, Regional Director, Bureau of Indian Affairs, Pacific Region, 2800 Cottage Way, Sacramento, California 95825. Please include your name, return address, and "DEIS Comments, Tejon Indian Tribe Casino Project" on the first page of your written comments. You may also submit comments through email to Chad Broussard, Environmental Protection Specialist, Bureau of Indian Affairs, at chad.broussard@bia.gov. If emailing comments, please use "DEIS Comments, Tejon Indian Tribe Casino Project" as the subject of your email. Additionally, you may submit verbal comments (up to three minutes) by calling 916-755-0181 and following the prompts.

FOR FURTHER INFORMATION CONTACT: Chad Broussard, Environmental Protection Specialist, Bureau of Indian Affairs, Pacific Regional Office, 2800 Cottage Way, Room W–2820, Sacramento, California 95825; telephone: (916) 978–6165; e-mail: chad.broussard@bia.gov. Information is also available online at https://www.tejoneis.com/.

SUPPLEMENTARY INFORMATION: Public review of the DEIS is part of the administrative process for the evaluation of the Tribe's application to the BIA for the placement of approximately 306 acres of fee land in trust in Kern County, California. The Tribe proposes to construct a casino resort on the trust property.

Background: The Tribe's proposed project consists of the following components: 1) the Department's transfer of the approximately 306-acre fee property into trust status; 2) issuance of a determination by the Secretary of the Interior pursuant to the Indian Gaming Regulatory Act 25 USC 2701 et seq.; 3) the

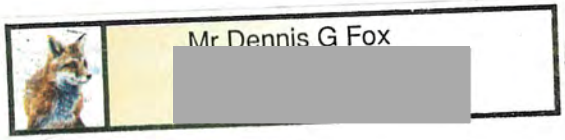
approval of a management contract by the Chairman of the National Indian Gaming Commission under 25 USC § 2711; and 4) the Tribe's proposed development of the trust parcel and the off-site improvement areas. The proposed casino-resort would include a hotel, convention center, multipurpose event space, several restaurant facilities, parking facilities, a recreational vehicle (RV) park, fire, and sheriff stations and associated facilities.

The following alternatives are considered in the DEIS: (1) Proposed Project; (2) Reduced Casino Resort; (3) Organic Farm; (4) Alternate Site for the Proposed Project; and (5) No Action Alternative. Environmental issues addressed in the DEIS include geology and soils, water resources, air quality, biological resources, cultural and paleontological resources, socioeconomic conditions (including environmental justice), transportation and circulation, land use, public services, noise, hazardous materials, aesthetics, cumulative effects, and indirect and growth inducing effects. The Clean Air Act requires federal agencies to ensure that their actions conform to applicable implementation plans for achieving and maintaining the National Ambient Air Quality Standards for criteria air pollutants. The BIA has prepared a DCD for the proposed action/project described above. The DCD is included in Appendix N of the DEIS.

Locations where the DEIS is Available for Review: The DEIS is available for review at the BIA Pacific Regional Office by appointment by contacting Chad Broussard, Bureau of Indian Affairs, Pacific Regional Office (see contact information listed in the FOR FURTHER INFORMATION CONTACT section of this notice). Additionally, the DEIS can be reviewed by appointment at the Kern County Planning and Natural Resources Department, 2700 M Street Ste 100, Bakersfield , CA 93301, by emailing Dennis McNamara, Division Chief for Permitting at mcnamarad@kerncounty.com or calling 661-862-8624. The DEIS is also available online at https://www.tejoneis.com/. To obtain an electronic copy of the DEIS on compact disc (CD) or flash drive, please provide your name and address in writing or by phone to Chad Broussard, Bureau of Indian Affairs, Pacific Regional Office. Individual paper copies of the DEIS will be provided upon payment of applicable printing expenses by the requestor for the number of copies requested.

PUBLIC COMMENT AVAILABILITY: Comments, including names and addresses of respondents, will be available for public review at the BIA address shown in the ADDRESSES section, during regular business hours, 8 a.m. to 4:30 p.m., Monday through Friday, except holidays. Before including your address, telephone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment - including your personal identifying information - may be made publicly available at any time. While you can ask in your comment that your personal identifying information be withheld from public review, the BIA cannot guarantee that this will occur.

AUTHORITY: This notice is published pursuant to Sec. 1503.1 of the Council of Environmental Quality Regulations (40 CFR parts 1500 through 1508) and Sec. 46.305 of the Department of the Interior Regulations (43 CFR part 46), implementing the procedural requirements of the NEPA of 1969, as amended (42 USC 4371, et seq.), and is in the exercise of authority delegated to the Assistant Secretary – Indian Affairs by 209 DM 8. This notice is also published in accordance with 40 CFR 93.155, which provides reporting requirements for conformity determinations.



SANTA CLARITA CA 913

RECEIVED
CALIFORNIA
FISH AND GAME
COMMISSION

29 JUN 2020 PM 2L

2020 JUN 02 AM 7:47

California Fish & Game Commission
1416 Ninth Street
Room 1320
Sacramento, Ca
95814

Attn: Jacque Ostter-Carmesin

95814-551545

From: LInea Carlson [redacted]
Sent: Wednesday, July 1, 2020 8:02 AM
To: FGC <FGC@fgc.ca.gov>
Subject: Don't fish

DON'T FISH, it just a god awful thing to do. when you think about how bad it is to place food on the end of a hook. Seriously. Fishing is a deceitful, cruel and a horrible thing to do. To be cosidered gameing is sick. Just imagine sitting down with the people you love to have dinner and you take a bite of your salad and you immediately get yanked out of your seat, out of your home away from the people you love choking to death on a hook as you are wiggling on an end of a line . Never to be heard from again. THATS what you do when you fish. NO MORE FISHING. SEEMS HARMLESS BUT NOT SO! Could you imagine how traumatic for the other fish. And they get hungry but yet they are too scared to eat from what they've witnessed. Just terrible. People go out and buy more alluring colorful. bait. NOW think about how cruel it is as well for the LIVE BAIT. NO STOP at BAITING a hook, it's just a terrible act. You treat everybody everyTHING the way you want to be treated. YOU Definately want to pass this test. ANIMALS don't talk to US for a reason. You should know better. Well now you do.. TREAT ALL LIFE EVERYTHING THE WAY YOU WANT AND EXPECT TO BE TREATED.. THE VERY BEST! And alls good. DON'T FISH.

Thank you,
Linea Carlson

From: afa@mcn.org <afa@mcn.org>
Sent: Tuesday, July 14, 2020 11:35 AM
To: Office of the Secretary CNRA <secretary@resources.ca.gov>; FGC <FGC@fgc.ca.gov>; Wildlife DIRECTOR <DIRECTOR@wildlife.ca.gov>; Cornman, Ari@FGC <Ari.Cornman@FGC.ca.gov>
Subject: HUEY JOHNSON - R.I.P.

Another giant fallen - R.I.P.

Former State Resources Secretary Johnson wrote the Fish & Game Commission TWICE in support of our efforts to stop the non-native frog/turtle imports for the live animal food markets. A good man, he, right up there with His hero Aldo Leopold, and John Muir and David Brower, IMO.

x
Eric Mills, coordinator
ACTION FOR ANIMALS
Oakland

Original Message ----------
Subject: HUEY JOHNSON - R.I.P.
From: afa@mcn.org
Date: Tue, July 14, 2020 11:06 am
To: afa@mcn.org
---

https://gcc01.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.sfchronicle.com%2Fenvironment%2Farticle%2FHuey-Johnson-longtime-environmental-savior-from-15405475.php&data=02%7C01%7Cfgc%40fgc.ca.gov%7C6b2281993737405583370 8d82824ac9d%7C4b633c25efbf40069f1507442ba7aa0b%7C0%7C0%7C637303485288552871&sdata=TTxBn%2B6ycAHzyT4t6xdGZn2Qb4DU95zxOZR76IPsbbk%3D&reserved=0

From: Mitchell Fox <mfox@centerforahumaneeconomy.org>
Sent: Wednesday, July 22, 2020 3:27 PM
To: FGC <FGC@fgc.ca.gov>
Subject: Report on Statute 653o -- kangaroo parts ban

Greetings, I am hoping to get these couple of documents to the California Fish & Game Commission.

Thank you,

Mitchell

Mitchell Fox
Director of Advocacy
Center for a Humane Economy
mfox@centerforahumaneeconomy.org

July 22, 2022

Charlton Bonham
Director
California Department of Fish and Wildlife
1416 9th Street, 12th Floor
Sacramento, CA 95814

Mr. Bonham:

Over the past several months, the Center for a Humane Economy has methodically examined whether retailers in the athletic shoe industry are adhering to California Penal Code § 653o, specifically as it applies to kangaroo skin soccer shoes (cleats) imported into and sold in the state. That law has been in effect since 2016. This Report offers a detailed and comprehensive picture of broad non-compliance with the ban on selling kangaroo parts. It is apparent that California officials are not enforcing the law and even failing to notify retailers about the law.

If the Department were to communicate with store owners and athletic shoe companies, we are confident that most would follow the law. Many of the big-name brands in the athletic shoe industry - which sell direct to the public through outlet stores and their own online channels, as well as distributors and store owners - are publicly traded companies, with legal compliance mandates and capacity. They have more to lose than to gain in profits from continuing to sell contraband that constitute just a small percentage of their total sales.

Our investigation has identified the specific businesses responsible for the import and sale of tens of thousands of kangaroo skin soccer shoes In California in violation of California Penal Code § 653o. These businesses include:

* 9 manufacturers wholesaling into the state
* 7 manufacturers selling online and shipping to California addresses
* 71 reputable e-commerce websites selling and shipping into California
* 78 soccer stores selling to the public
* 1 national sporting goods chain selling to the public

We have attached our report for your review. We urge you to communicate directly with companies knowingly violating the law and to direct them to stop. This report provides contact information for each violator: names, addresses, phone numbers, email and websites, to the extent that they are discoverable.

For the past four years, the Department appears to have failed to fulfill its responsibility on behalf of California citizens to enforce this law. Enforcement action, in this case, does not require extensive undercover sting operations or expensive laboratory testing equipment. These sales, by their nature, occur out in the open and the use of kangaroo leather in products is celebrated by the perpetrators. Department personnel can simply conduct an elementary screening of on-line and in-store shopping to gauge industry

adherence.

Millions of acres of habitat and a billion animals including uncounted kangaroos perished in wildfires six months ago, making a reduction in mass commercial killing an even more exigent circumstance. It is the sale of kangaroo leather soccer shoes that drives the commercial killing of wild kangaroos in Australia. As the largest soccer market in the nation, California's enforcement agencies can fulfill the California's Legislature's legal stricture to stop contributing to the trafficking of kangaroo parts.

In addition to this report, we would like to give the Department access to our database and other research materials with critical information on manufacturers, retailers and websites that are continuing to conduct illegal activity. We are eager to provide whatever assistance we can to the Department to help in enforcing the law. Here is a link https://tinyurl.com/yyh5lcl3 to our Report.

Thank you,

Wayne Pacelle
President
Center for a Humane Economy

Mitchell Fox
Director of Advocacy
Center for a Humane Economy

SKIN IN THE GAME

AN INVESTIGATION INTO THE ILLEGAL TRADE OF KANGAROO PARTS IN CALIFORNIA

Published by the Center for a Humane Economy, July 22, 2020

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Table of Contents

> Part of the reason you see companies use the phrase "k-leather" is that they don't like advertising the fact that kangaroo leather comes from the hide of a kangaroo. The use of kangaroo leather is very controversial, with the sale of kangaroo leather products being banned in California, so the abbreviation helps hide the cleat's contentious origins.
>
> **The18.com**
> ***Looking At Different Cleat Materials: Which Ones Are Popular And Who Wears What?***

For context	3
Executive summary	4
Introduction	7
California's ban on Kangaroo products	8
Manufacturers of kangaroo leather soccer shoes	11
Retailers of kangaroo leather soccer shoes	17
E-commerce website selling kangaroo leather soccer shoes	31
Discussion	38
Conclusion	41
More on the commercial kangaroo industry in Australia	44

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SKIN IN THE GAME

AN INVESTIGATION INTO THE ILLEGAL TRADE OF KANGAROO PARTS IN CALIFORNIA

For Context

Commercial shooters kill some two million wild kangaroos a year in their native Australian habitat to profit f om the trade in their skins, a toll that includes 400,000 joeys bludgeoned to death or left behind to starve after their mothers are slain. Recognizing the inhumanity of the industry, California's legislature re-imposed a ban on the sale of kangaroo products in 2016.

An investigation by the Center for a Humane Economy found that enforcement of the ban has been non-existent, and kangaroo skin soccer shoes from Nike, adidas, Puma and six other major manufacturers remain available at sporting goods and specialty soccer stores throughout the state.

The government of Australia continues to allow this commercial slaughter even after cataclysmic fi es scorched Australia just months ago, killing more than a billion animals, including uncounted kangaroos. Scientists predict climate change will continue to alter habitats and make it more difficult or kangaroos to survive at their pre-existing population levels. Today kangaroos face a perilous future from these dual human impacts – commercial slaughter of native wildlife on a massive scale, and climate-change-induced fi es of unprecedented intensity.

Australia's fi es triggered an outpouring of compassion from the global community, with people from around the world sending aid and volunteering to help. One of their tasks was to feed and care for orphaned and injured joeys. Now, six months after the round-the-clock efforts to nurse these traumatized animals back to health, the kangaroos may be released into their native habitats only to be shot for soccer shoes in the largest commercial killing of wildlife in the world.

Halting the sale of kangaroo leather soccer shoes in California – the largest soccer market in the country – would have a major impact on the survival of kangaroos. It is the market for skins that drives the commercial kangaroo industry, with 70 percent of all skins sold for soccer shoes.

Neither soccer players nor soccer stores in California will be set back without kangaroo skin shoes. The high-performance choice of top players today are shoes made of synthetics, mesh, knits, and artificial kangaroo skin. These are by far the top-selling soccer cleats throughout the state.

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Executive Summary

Nine athletic shoe manufacturers, including global brands Nike and adidas, sell over 70 models of soccer cleats made of kangaroo skin. While legal in 49 states, the trade in kangaroo parts is prohibited in California, with 40 million consumers.

California Penal Code § 653o ("§ 653o"), prohibiting the commercial import or sale of kangaroo parts in the state, became law in 1971. Each individual violation is punishable by a fine of $1,000 o $5,000 and/or six months in county jail. From 2007 to 2016, at the urging of Australia's commercial kangaroo industry, the California Legislature suspended the ban, but it has been in effect for the past four years.
An investigation by the Center for a Humane Economy revealed the law to have minimal impact on curtailing the sale of kangaroo leather (widely known as "k-leather") soccer shoes into and within the state. Due to lack of enforcement by authorities, compliance with the law is largely voluntary, driven by the ethics of manufacturers and retailers.

The demand for "old school boots" made of kangaroo leather is being met despite the state law. Numerous store owners point out that California's failure to enforce the law leaves violators free to engage in an unfair business practice. Authorities should not allow honest retailers to be undercut by competitors knowingly breaking the law by trading in kangaroo parts.

Today, kangaroo leather cleats are readily obtained in California, with more brick-and-mortar and online retailers breaking the law than adhering to it. The Center's findings a e intended to highlight the need for California authorities, including multiple law enforcement agencies, to take necessary steps to ensure compliance with § 653o so that, as the legislature intended, California is not contributing to the commercial killing of kangaroos in Australia.

In examining nine soccer cleat manufacturers, 117 independent soccer stores, eight national chains with 460 locations in California, and 76 online retailers, the Center has found:

• Nine major athletic footwear manufacturers, with headquarters in Germany, Italy, Japan and the U.S., violate the law by supplying California retailers with tens of thousands of kangaroo leather soccer cleats. Nike, adidas, and Puma sell the most "k-leather" shoes into the state.

• Six of those nine manufacturers violate the law by selling kangaroo leather soccer cleats directly to California residents from their websites. Earlier this spring, Nike appeared to have halted the practice after repeated notices from the Center for a Humane Economy, but has resumed illegal sales.

• Illegal Kangaroo leather soccer shoes can be purchased at 70 percent of the 117 soccer specialty retailers in the state, ranging from Chula Vista to Redding.

• Of soccer stores in the Los Angeles area, 45 violate the law, 12 do not. Of soccer stores in the San Francisco area, 21 violate the law, 11 do not.

• Of the four national sporting goods chains, collectively operating 370 stores in the state, only Dick's Sporting Goods violates the law. Some, but not all, of Dick's 58 locations sell kangaroo leather cleats.

• Of the 76 dominant e-commerce websites selling kangaroo leather cleats, 84 percent do not appear to take any measures preventing the illegal sale of kangaroo leather soccer cleats to California customers, including eBay and Eastbay; eight percent acknowledge the California law but violate it, like Zappos and Dick's Sporting Goods; eight percent block orders and prevent violations, like Amazon and Soccer.com.

• Of California businesses selling kangaroo leather soccer cleats, the largest violators include Azteca, The Coliseum, Nicky's, Pro Soccer, Soccer Garage, Soccer Plus, Soccer Post, Soccer Wearhouse, Sports Page Soccer Wearhouse and Xtreme Soccer.

Over several months, the Center has investigated compliance with California Penal Code § 653o, the statute banning the import and sale of kangaroo leather in California. We directly contacted every major athletic shoe manufacturer and retailer selling in the state, examined their websites for inventory and offerings, made numerous in-person visits to soccer stores, searched law enforcement records, and engaged in a wide range of other activities to understand the athletic wear industry's level of compliance with the law.

This Report identifies key pl yers in the soccer cleat industry who fail to comply with the ban, recommends best practices to achieve compliance, and strongly urges California authorities to enforce the kangaroo products prohibition.

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The Center for a Humane Economy, a nonprofit o ganization promoting a more humane economy through corporate engagement and advocacy, works with companies to decrease or eliminate adverse impacts on animals in their production practices, supply chains, and research and development activities.

Who is breaking the law?

Manufacturers when they:

Sell kangaroo leather cleats to stores in California

Sell kangaroo leather cleats and ship to a California address

California stores when they:

Buy kangaroo leather cleats to sell

Sell kangaroo leather cleats to shoppers

Sell kangaroo leather cleats and ship to a California address

Websites when they:

Sell kangaroo leather cleats and ship to a California address

Introduction

The world first ook notice of soccer cleats made from kangaroo skin at the 1970 World Cup where Pele famously delayed the start of Brazil's quarterfinal m tch with Peru to tie the shoes of his new, exotically sourced Puma Kings. For so publicly cinching and putting a bow on his new signature cleats, Pele was reportedly paid $120,000 by Puma. That U.S. trade was interrupted with several species of kangaroos listed as threatened or endangered in the Endangered Species Act, passed by Congress in 1973. But cleats made from kangaroo skins had landed on the world stage and athletic shoe companies persisted with their use as a core material in their shoes.

Kangaroos were removed from the list of endangered species in the U.S. in 1995, clearing the way for wider use. But it was not without controversy and animal activists in Britain soon started a multi-year campaign to encourage David Beckham – the biggest soccer star of his era – to take a stand against kangaroo leather cleats. Reportedly after seeing the killing of kangaroos in their native habitat, Beckham obliged, trading in kangaroo leather for high-tech synthetic materials in his signature adidas Predators. Beckham brought his new kangaroo-free boots to California to play for LA Galaxy of Major League Soccer in 2007. It might have seemed the perfect fi , since kangaroo leather was illegal in California. But fans who wanted to emulate the greats in their footwear had other choices: Californians were still buying Pele's kangaroo leather Puma Kings and the adidas answer to it, the popular Copa Mundial, highlighted in the 1982 World Cup. "For unknown reasons, California Fish and Game haven't been enforcing the law," said a California Senate staff member th t year. "They're being sold all over the place."

An animal advocacy group tried to enforce the law itself, arguing that adidas had engaged in an unfair business practice by not complying with the law. The group prevailed in the California Supreme Court, and the door seemed open to more citizen enforcement if necessary. Adidas promptly took the fig t to the California Assembly and with support from LA Galaxy and the Australian government, succeeded in freezing the ban on kangaroo products for four years, followed by a second extension for fi e years and a failed third attempt. The on-again, off-again, unde -enforced kangaroo parts ban has been in effect since 2016.

What has it meant for kangaroo leather cleats four years later, in the state the Australian government calls "the largest soccer market in the world?" The Center undertook this investigation with the three-fold goal to 1) define the uni erse of businesses selling soccer cleats in California, 2) determine compliance with the kangaroo products law, and 3) understand enforcement efforts as applied to this restriction on the trade in wildlife parts.

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California's ban on kangaroo products

Recognizing the need to protect animals becoming threatened and endangered in other parts of the world, California legislators passed § 653o in 1970. The statute forbade importing and selling products made from the body parts of fi teen animals. By prohibiting legal sales in the state, California legislators were doing what they could to lower the demand for killing these imperiled animals. A year later, kangaroos were added to the statute.

CALIFORNIA PENAL CODE § 653o

(a) ***It is unlawful to import into this state for commercial purposes, to possess with intent to sell, or to sell within the state, the dead body, or a part or product thereof, of*** *a polar bear, leopard, ocelot, tiger, cheetah, jaguar, sable antelope, wolf (Canis lupus), zebra, whale, cobra, python, sea turtle, colobus monkey, kangaroo, vicuna, sea otter, free-roaming feral horse, dolphin or porpoise (Delphinidae), Spanish lynx, or elephant.*

(d) A person who violates this section is guilty of a misdemeanor and shall be subject to a fine of not less than one thousand dollars ($1,000) and not to exceed five thousand dollars ($5,000) or imprisonment in the county jail not to exceed six months, or both that fine and imprisonment, for each violation.

Passage, suspension, resumption

California passed § 653o three years before Congress passed the Endangered Species Act ("ESA") in 1973, including kangaroos on the federal endangered species list. Congress considered § 653o when drafting the ESA, carving out the power to regulate trade of animal skins and products to the states (with a few exceptions concerning the licensing scheme created by the ESA).

The top three commercially hunted species of kangaroos were on the federal endangered species list until 1995 when the U.S. Fish and Wildlife Service classified the th ee species as "abundant" and removed them. This delisting action meant that California's law against the trade in kangaroo skins was the primary barrier to trade for the athletic shoe companies. It turned out, however, that California did not enforce the ban and kangaroo cleats remained on store shelves.

In 2005, the animal advocacy organization VIVA! USA sued adidas for gaining an unfair business advantage by violating § 653o. The California Supreme Court ruled in favor of VIVA! and dismissed adidas' arguments that § 653o was unconstitutional because regulation of kangaroo skins trade was the federal

government's job. (An elephant, python and kangaroo skin boot maker had made the same argument years earlier, but he too failed.) While this set a precedent for § 653o, the victory was short-lived, with kangaroo-using businesses seeking a different channel to allow their commerce to flou ish.
Months after the Supreme Court ruling in 2007, the California legislature passed legislation supported by adidas, the Australian government and LA Galaxy, suspending the ban on kangaroo products. The prime sponsor of SB 880 and SB 1345, the bills creating a nine-year moratorium on the kangaroo parts ban, was Senator Ron Calderon. When lobbying groups attempted a third time to extend the moratorium, with Calderon no longer in the Senate (he was serving a 42-month sentence in federal prison for corruption), Assemblyman Mike Gipson took over as the legislative lead. Although a bill had been much anticipated but not introduced, in the final d ys of the session Gipson used the "gut and amend" technique to enable a vote on the kangaroo moratorium. The effort failed after being labeled as unscrupulous by the media and good government and animal protection groups. Among the proponents of the moratorium, the Australian government was found by the California Fair Political Practices Commission to have violated the Foreign Agents Registration Act.

The kangaroo parts ban came back into force on January 1, 2016. The courts had determined that restricting trade in wildlife parts was a proper exercise of state authority and that the wording of the statute was "plain and unambiguous." The law has not been challenged meaningfully in the courts or in the Legislature by promoters of kangaroo skins since 2016. The singular issue now is enforcement.

Enforcement responsibility

Formed in part to regulate the traffi ing of wildlife fortheir parts, the California Department of Fish and Wildlife is in the best position to take primary responsibility for enforcing § 653o. According to former California AG Bill Lockyer, "The Department is the state agency with primary authority to enforce the Fish and Game Code and Penal Code section 653o." A § 653o fact sheet on the Law Enforcement Division's page of the Department's website aids the public in understanding the law and says, "The Department discourages the sale or commercial importation of any items containing these species except upon advice of a person licensed to practice law in California."

Since the ban was reinstated in 2016, the Department has not prosecuted a single individual or business for illegally importing or selling kangaroo products, including kangaroo leather soccer shoes. When contacted by the Center earlier this year, Captain Chris Stoots of the Department's Law Enforcement Division was unaware of any Department program to investigate the sale of kangaroo leather soccer cleats. A set of questions drafted by the Center and circulated by Captain Stoots to Department attorneys and field i vestigators did not provide additional information.

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Captain Adrian Foss, of Delta Bay Enhanced Enforcement Program and Special Operations Unit, explained the Department receives very little information or reports on kangaroo products being sold in California. He wrote, "without very specific citi en reports, it is difficult o begin an investigation; we do not have inspection authority to randomly enter businesses and start seizing items based upon a hunch they might contain kangaroo. If they are out there, they would be very difficult o discern from other types of leather products without extensive laboratory examination (which our laboratory does not presently have capacities for, nor training in)." His response reinforces: (1) citizens' tips are critical to kickstart investigations, and (2) the Department is not taking advantage of explicit declaration in manufacturers' statements, retailers' marketing, and, in many cases, labels on the shoe's box and tongue revealing that illegal trade is occurring.

Although the Department has primary responsibility to enforce § 653o, enforcement authority is not limited to the Department. Because the statute is part of California's general criminal code, any law enforcement officer can investigate a potential violation in their jurisdiction. California city police officers, county sheriffs, or state troopers can investigate stores that may be selling kangaroo skin soccer shoes and file a c ime report that is actionable by prosecutors. Citizens therefore can provide tips on violations to any law enforcement authority but follow up is at the discretion of the specific agen y.

The manufacturers of kangaroo leather soccer shoes

Kangaroo leather cleats sold in California are produced by large multinational corporations offering branded athletic footwear, apparel, and accessories. Most are publicly traded companies. Some operate factories in their home country, while others own or contract with factories overseas for production of kangaroo leather soccer cleats.

Table 1: Manufacturers of Kangaroo Leather Soccer Shoes Sold in California

Manufacturer	Website	Country	Type	Founded	Phone	Email
Adidas	adidas.com	Germany	Public	1949	(931) 234-2300	care@adidas.com
Diadora	diadora.com	Italy	Private	1948	39-0423-6581	customercare@diadora.com
Lotto Sport Italia	lotto.it/us/	Italy	Private	1973	39-0423-6181	customercare@lotto.it
Mizuno	mizunousa.com	Japan	Public	1924	81-6-6614-8465	direct.support@mizunousa.com
New Balance	newbalance.com	USA	Public	1906	(617) 783-4000	customercare@newbalance.com
Nike	nike.com	USA	Public	1964	(503) 671-6453	media.relations@nike.com
Pantofola d'Oro	pantofoladoro.com	Italy	Private	1886	39-0289-0960	info@pantofoladoro.com
Puma	us.puma.com	Germany	Public	1948	(978) 698-1000	customerservice.us@puma.com
Umbro	umbro.com	England	Public*	1924	44-161-492-2000	tactics@umbro.com

Manufacturers Mailing Addresses

adidas, 55055 N Greeley Ave, Portland, OR 97217*

Diadora, Frazione Villa S. Antonio c/o CIT, 31031 Caerano di San Marco (TV), Italy

Lotto, Via Montebelluna 5/7, 31040 Trevignano (TV), Italy

Mizuno, 1-12-35 Nanko Kita, Suminoe-ku,Osaka 559-8510, Japan

New Balance, 100 guest St, Boston, MA 02135

Nike, One Bowerman Dr, Beaverton, OR 97005

Pantofoloa d'Oro, Via Vidacillo 6, 63100 Ascoli Piceno (AP), Italy

Puma,10 Lyberty Way, Westford, MA 01886*

Umbro, Umbro House 5000 Lakeside, Cheadle, Manchester, SK8-#GQ, England

**address for U.S. division headquarters*

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Manufacturers, or those in their supply chain, purchase kangaroo skins directly from licensed skin dealers in Australia. The skin can be obtained semi-raw (fresh, salted, limed, pickled or otherwise preserved, for $5 each) or already tanned (leather, for $56 each). In 2016, the last year for which records are available, 1.3 million semi-raw skins were sold for $6.4 million and shipped primarily to tanneries in Pakistan, Italy, Turkey, and Germany. Some 250,000 leather skins were sold for $14 million, primarily going to factories in Vietnam, Indonesia, Japan, Germany, and Italy (in that order). These are the countries where most of the shoe production takes place.

Approximately 70 percent of all kangaroo skins sold are used for soccer cleats, making the production of soccer shoes the driver behind the commercial kangaroo industry in Australia. Adidas is the world leader in purchasing kangaroo skin.

Of the manufacturers, five publicize policies that directly or indirectly apply to using kangaroo skin:

Adidas: "We trust the Australian Government's assurances and expertise in this matter." "Our policies prohibit using leathers from animals that have been inhumanely treated, whether animals are wild or farmed. It is to be stressed that all leather used are by-products of meat production."

Diadora: A 2019 press release announced, "the total abolition of kangaroo skin from all its products by the end of 2020."

New Balance: "New Balance seeks to minimize usage of kangaroo leather and restricts the sourcing of kangaroo leather to that which is harvested lawfully under Australia national and state law, the U.S. Federal Endangered Species Act, and applicable international conventions."

Nike: "Kangaroos - If wild caught, must be sourced from actively managed populations with government agency oversight."

Puma: "Sustainability Rulebook, Target 2025: Zero use of exotic skins or hides."
Besides wholesaling soccer shoes to retailers, all nine manufacturers sell directly to the public through their websites. Selling kangaroo leather soccer shoes to California residents from their websites is a violation of the statute. Four of the nine manufacturers also operate brick-and mortar factory stores in California.

The Center began its multi-step investigation by identifying which models of soccer cleats use kangaroo leather, compiling a list of 72 models from nine manufacturers. This is the first omprehensive listing of all shoe models made from kangaroos.

Table 2: 72 Models of Kangaroo Leather Soccer Cleats

Copa 19+**
Copa 19.1**
Copa 20+
Copa 20.1
Copa Kapitan
Copa Mundial
Mundial Goal
Mundial Team
Predator 20+ Dragon
Predator Accelerator Remake ZZ*
Predator Archive*
Predator Mania 19.1 ADV*
Predator Mania 19+ ADV*
Predator Mania Remakes (2018 onward)
Predator Precision Remake DB*
World Cup

Baggio 03 Italy OG
Brasil Classic
Brasil Italy OG
Brasil K-Leather
Brasil Made in Italy K-Leather Pro
Golden Boy TF
Maracana 18

Stadio 100 II
Stadio 300 II TF
Stadio Made in Italy

Morelia KL (and IN)
Morelia Japa
Morelia II Japan
Morelia Neo II (and TF)
Morelia Neo III Beta MIJ*
Morelia Neo II K-Leather
Morelia Neo III Japan (and Indonesia)
Morelia Zero Japan
Rebula 2 Japan
Rebula 3 Japan
Rebula 3 Elite
Rebula 3 Pro
Rebula Cup
Wave Cup*Predator Mania Remakes
Predator Precision Remake DB*
World Cup

442 Pro
Audazo V4 K-Leather IN
Furon V5 Pro Leather**
Furon V6 Pro Leather
Tekela V1 Pro Leather**
Tekela V2 Pro Leather

Medusæ III Elite
Medusæ III Pro
Speciali 98 pro

Lazzarini Made in Italy
Lazzarini Tongue Made in Italy
Superleggera**
Superleggera 2.0

King Platinum
King Platinum Laser Touch
King Pro
King Pro TT
King Top
One 5.1**
One 19.1 Leather**
One 20.1

Lunar Legend VII Elite 10R IC**
Mercurial Vapor 13 Elite Tech Craft*
Phantom Venom Elite Tech Craft*
Premier II
Tiempo Legend 7 Elite**
Tiempo Legend 8 Elite

* Special or limited edition
** Older model but currently available

Diadora announced it will stop using
k-leather in soccer shoes by the end of 2020

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Several investigators in California then attempted to purchase kangaroo leather cleats from manufacturers' websites to assess compliance with the ban. They used their home addresses in the Los Angeles area.

Of the nine manufacturers' websites, seven violate the law by selling and delivering kangaroo cleats to California addresses. Of the three dominant brands of soccer shoes – adidas, Nike and Puma – only adidas blocked the sale. Nike, the world's largest athletic apparel manufacture with annual revenue of $34 billion, violated the California law despite being the only manufacturer to directly address the matter on its website. From the Nike.com Help section:

> ## WHY ARE SOME SOCCER CLEATS NOT AVAILABLE FOR SHIPMENT TO CALIFORNIA?
>
> The California Penal Code prohibits the sale of products made from, among other materials, kangaroo leather. Nike uses kangaroo leather in a limited number of our Premier and Tiempo soccer cleats. We will cancel all orders placed for these products with a California shipping address. Nike Mercurial, Hypervenom, Phantom Vision, and Magista soccer cleats can be shipped to California since they do not include kangaroo leather.

On January 16, 2020, the Center wrote to Nike CEO John Donahoe, trying to engage in a conversation to phase out kangaroo leather use in Nike's shoes.

On February 2, a Center investigator ordered a pair of Nike Tiempo Legend 8 Elite soccer shoes that were delivered to her California address, demonstrating that www.nike.com was not complying with the law. The sale was documented and the shoes were returned (as in all cases).

On February 26, the Center spoke with Nike's Shelly Hubbard of the Investor Relations team and Alex Hausman, Sustainable Reporting and Disclosure Director, alerting them to Nike's noncompliance with the California ban. Ms. Hubbard said she would discuss with Nike's legal team and reconnect with the Center.

On March 20, Center investigator Robert Ferber, former animal cruelty prosecutor for City of Los Angeles, ordered a pair of Tiempo Legend 8 Elite that was delivered. On May 5, he ordered a different kangaroo leather model, the Mercurial Vapor 13 Elite Tech Craft, that was also delivered.

On May 24, the Center attempted to reengage with Shelly Hubbard and Alex Hausman. There has been no response, but when Robert Ferber repeatedly attempted to purchase Tiempo Legend 8 Elite cleats

over the next several days, his orders were blocked.

On July 14, Robert Ferber ordered a pair of Tiempo Legend 8 Elite from the Nike website. The soccer cleats arrived at his Los Angeles residence on July 21. Nike's compliance with state law was short-lived.

Table 3: Manufacturers Violating the Law From Their Websites

Brand	Law Violation	Model	Purchased From	Result
Adidas	No	Copa 19.1	adidas.com	Blocked 2/20
Diadora	Yes	Brasil Italy K-Pro	diadora.com	Delivered 5/20
Lotto	Yes	Stadio 300	lotto.it/us	Delivered 2/28
Mizuno	No	Neo KL MD	mizunousa.com	Blocked 3/13
New Balance	Yes	Furon V5 Pro	newbalance.com	Delivered 6/16
Nike	Yes*	Tiempo Legend 8 Elite	nike.com	Delivered 2/2, 3/20, 5/5, 7/20
Pantotola d'Oro	Yes	Superleggera 2.0	pantofoladoro.com	Delivered 3/18
Puma	Yes	King Pro	puma.com	Delivered 2/27
Umbro	Yes	Speciali Pro	umbropremier.com	Delivered 3/7

*For a period this spring, Nike.com suspended direct sales of kangaroo leather soccer shoes to California consumers. Orders for Tiempo Legend 8 Elite were delivered to Center investigators in February, March and early May of this year. In late May, the Center's orders were blocked. By July, Nike resumed illegal direct sales into California.

In addition to Nike, six other manufacturers violated the law by fulfilling o ders placed by the Center's California investigators: Diadora, Lotto, New Balance, Pantofola d 'Oro, Puma and Umbro. The Center has written to these manufacturers.

The Center found almost perfect compliance by manufacturers' stores in California
Four manufacturers operate factory stores throughout the state, often located in outlet malls. Featuring discounted and "value" merchandise, these stores do not appear to be a consistent channel for the brands' more expensive kangaroo leather models. Store personnel at Nike and Puma said online returns to the store can explain the occasional presence of kangaroo leather cleats on their shelves (investigators found a single pair of kangaroo leather cleats at the Valencia Nike Factory Store).

When the Center investigated in the spring, the downtown San Francisco Nike Store sold kangaroo leather cleats. On a June 26 phone call, a store employee informed the Center that kangaroo leather cleats were no longer available and were being "returned to Nike HQ."

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Table 4: Manufacturers' Factory Stores Near Perfect Compliance

Company	# of Locations	Sells Cleats	Sell Kangaroo
adidas	29	Yes	No
Nike	36	Yes	No*
New Balance	15	Yes	No
Puma	15	Yes	No*

*Online returns account for the occasional kangaroo leather soccer shoe available at these factory stores

The retailers of kangaroo leather soccer shoes

Profile of retailers

Using online search, maps, Yelp, social media, company websites, directories, phone calls and industry consultants, the Center identified etailers in California selling soccer cleats. They were grouped into two categories: Soccer Stores and National Chains.

Soccer Stores are independently owned brick-and-mortar specialty retailers that cater to soccer players with footwear, apparel, and equipment. Often located in suburban strip malls or secondary business districts, they can range from a single small "ma and pa" location to large, highly designed locations with elaborate signage and marketing. Some stores may have a Facebook Page or an e-commerce platform on their websites. Though independently owned, a dozen soccer stores in the state have a loose affil tion with a national franchisor like One Hundred Percent Soccer, Soccer City, Soccer Post or Soccer Store.

National Chains are large sporting goods corporations, often publicly traded, with locations throughout the country providing outfitting and equipme t for a variety of sports. We include only the Sporting Goods chains that have enough of a selection to attract soccer shoe shoppers. (Factory outlet stores are considered above.)

Table 5: National Chains in California Selling Soccer Cleats - 370 Locations

Company	Stores	Law Violation	Website	Type	Founded	Phone
Big Five Sporting Goods	224	Yes	big5sportinggoods.com	Public	1997	(310) 536-0611
Dick's Sporting Goods	58	No	dickssportinggoods.com	Public	1996	(724) 273-3400
Hibbett Sports	15	No	hibbett.com	Public	2007	(205) 942-4292
WSS	73	No	shopwss.com	Private	1985	(310) 532-6652

National Chains Mailing Addresses

Big Five Sporting Goods, 2525 El Segudo Blvd, El Segundo, CA 90245

Dick's Sporting Goods, 345 Court Street, Coraopolis, PA 15109

Hibbett Sports, 2700 Milan Court, Birmingham, AL 35211

WSS, 879 West 190 Street #1200, Gardena, CA 90248

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Four chains in California selling soccer cleats

Big Five Sporting Goods is by far the largest sporting presence in California and does not sell kangaroo skin soccer cleats in its stores or online. Like the factory outlet stores mentioned earlier, Big Five inventory emphasizes affordable, entry and mid-level models of athletic shoes, including soccer cleats. While it sells numerous brands, Big Five does not stock the top tier of soccer shoes, which is typically where kangaroo models are positioned.

Dick's Sporting Goods has an uneven approach to following the law. The Center found nearly a dozen California stores with kangaroo leather soccer shoes on their shelves. (In fact, a Center investigator purchased a pair of adidas Copa 20.1 at the Long Beach location in mid-July.) Yet the Center phoned a dozen other Dick's stores to be told by associates and managers Dick's does not stock kangaroo leather cleats, some referencing the California law. Because no one at the store level could reference a company policy, the Center made repeated attempts to reach California district managers and the corporate headquarters in Pennsylvania. The Center was contacted by a Dick's supply chain consultant who said the news was "surprising," but added he could not speak for the company.

Dick's Sporting Goods sells kangaroo leather cleats at some but not all of its 58 California locations.

Hibbett Sport does not carry kangaroo leather soccer shoes in the state, though it offers a small selection online. The few Hibbett managers the Center spoke with were not familiar with the law prohibiting kangaroo products.

WSS has in the past sold kangaroo soccer cleats in its California stores and online, but today they cannot be found in either place.

Table 6: Soccer Stores in California - 117 Locations

Soccer Stores (117 Locations)		
100 Percent Soccer (2)	Leon Soccer Shop	Soccer Nation & Faby's Fashion
A-1 Soccer Warehouse	Mary & Joe's Sporting Goods	Soccer One
Aggressive Soccer (2)	Merced Soccer Shop Montclair	Soccer Plus
All Season Soccer	Sports	Soccer Post (2)
Arza Soccer	My Soccer Store	Soccer Pro
Asby Sports	My Sport	Soccer Santiago
Azteca Soccer (2)	Newport Soccer Store	Soccer Shop USA (3)
BK Sports	Niky's Sports (8)	Soccer Shot Chula Vista
Central Valley Soccer Store	Pacific occer	Soccer Store
Century Soccer Commerce	Planet Soccer	Soccer Stores*(3)
Classic Soccer Plus	Pro Soccer	Soccer USA
Classic Soccer Shop	Pro Soccer Inc.	Soccer Wearhouse (4)
Corona Sports	Redlands Soccer Store	Soccer World
Dayak's Den Soccer	Salinas Futbol Central	Soccerkraze (4)
Deportes Azteca	Sami's Sports	Soccerloco (3)
Deportes Rabadan	Soccer Action USA	Solo Soccer Shop
Deportes Salazar	Soccer and Sport	South Bay Soccer Shop
El Fanta Sports	Soccer Center	Sports Page Soccer Wearhouse
Elite Sport Soccer (2)	Soccer City* (5)	Sportsland
Extreme Soccer & Rugby	Soccer City La Puente	Sunset Soccer Supply
Fanaticos	Soccer Express	The Coliseum (3)
Futbol Fanatics	Soccer Express Inc.	The Willow Soccer
Glory Trading	Soccer Garage	Todo Deportes Soccer Store (2)
Goetz Bros	Soccer Junction	Upland Soccer Store
Kombat Soccer (2)	Soccer Mart	Valley Sport
L 3 Soccer Store	Soccer Mexico	Xtreme Soccer (6)
Leon Leather and Soccer Shop	Soccer Mexico Enterprise	

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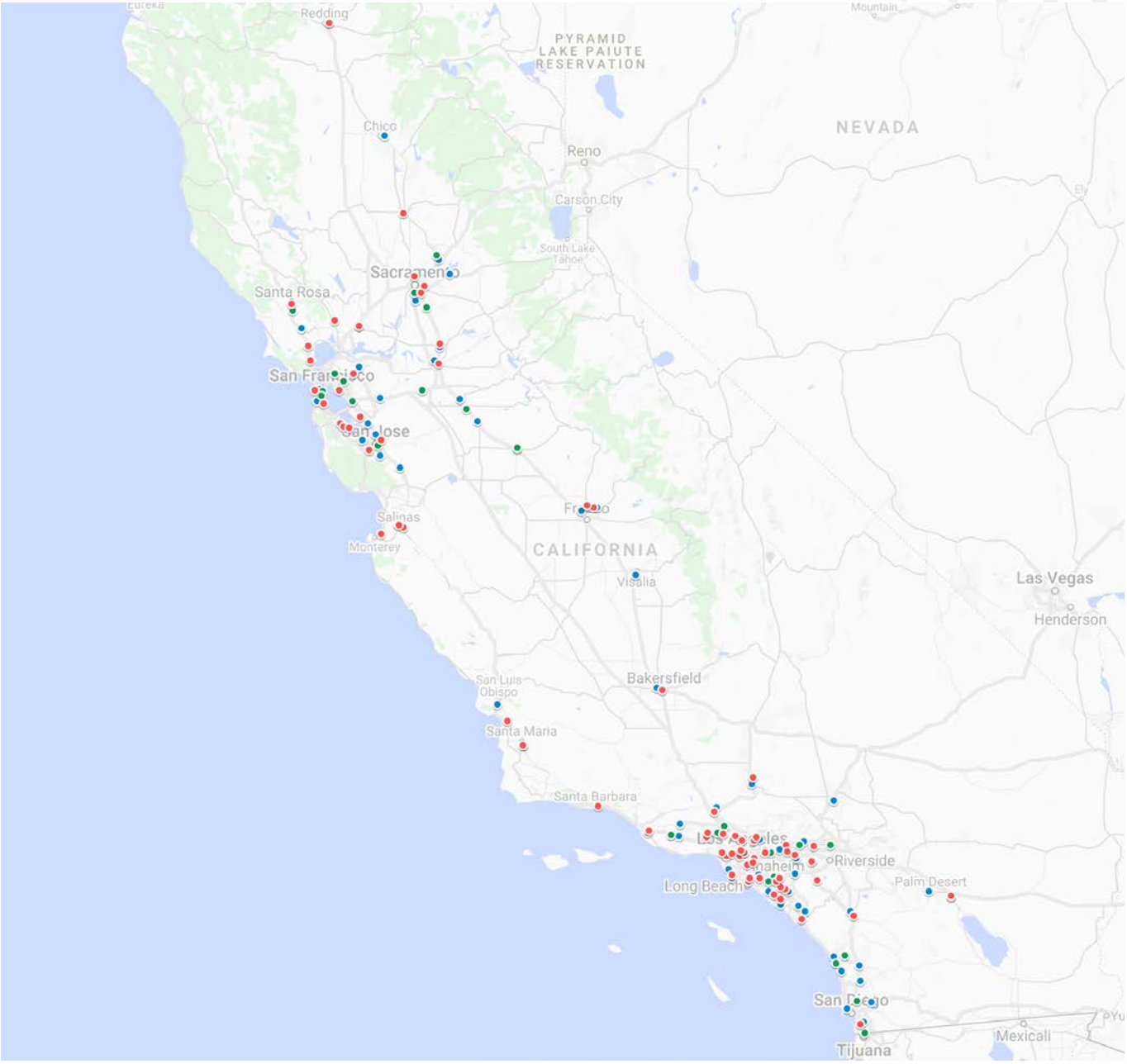
- There are 117 soccer stores in the state, owned by 85 businesses
- 20% of those businesses have at least one additional store
- 5% of the soccer stores in the state have not reopened after closing for the pandemic
- 49% of soccer stores are in the Los Angeles area
- 32% of soccer stores are in the San Francisco area
- 19% of soccer stores are scattered throughout the state, from Chula Vista to Redding

Soccer Stores in the Los Angeles and San Francisco areas, catching 81% of the state's soccer stores



Identifying sellers of kangaroo cleats

The Center used store visits (before and after stores closed for the pandemic), phone calls, websites, and other means to determine if a store is violating the law by selling kangaroo skin soccer shoes. A determination could be made for 111 of the 117 soccer stores in the state. Six stores have not reopened after closing for COVID-19.

To assist in the process of determining a store's status, the Center mailed a letter to all soccer stores in the state, asking if they carried kangaroo leather cleats. Code 653 Do you need the symbol and little o here? was covered in the letter. The Center asked store owners to complete a survey at www.cleatsurvey.com. While few surveys were submitted, we received some instructive responses from owners eager to see the law enforced and "a more level playing fiel ."

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Table 7: 33 Soccer Stores Comply with the Law

Name	Website	Phone	Email
Aggressive Soccer	Facebook only	(209) 577-1744	centralvalleysoccer1@gmail.com
Aggressive Soccer	aggressive-soccer.com	(805) 963-4919	aggressivesoccer@aol.com
Arza Soccer	aggressive-soccer.com	(805) 351-0479	aggressivesoccer@aol.com
BK Sports	Facebook only	(626) 337 3057	designzava@hotmail.com
Central Valley Soccer Store	bksports.com	(805) 499-4244	contact via website
Classic Soccer Plus	Facebook only	(831) 770-0122	classicsoccerplus@sbcglobal.net
Corona Sports	No website or FB	(818) 686-8089	contact via facebook
Deportes Rabadan	Facebook only	(714) 776-6544	deportes-rabadan@att.net
Elite Sport Soccer	elitesportsoccer.com	(415).742.0803	info@elitesportsoccer.com
Elite Sport Soccer	elitesportsoccer.com	(415) 648-6007	elitesportssoccer@gmail.com
Kombat Soccer	kombatsoccer.com	(916) 391-3788	sales@kombatsoccer.com
Kombat Soccer	kombatsoccer.com	(916) 865-6469	customerservice@kombatsoccer.com
Leon Leather and Soccer Shop	Facebook only	(408) 564-8195	none found
Mary & Joe's Sporting Goods	Facebook only	(510) 525-1597	contact via facebook
Merced Soccer Shop	Facebook only	(209) 455-3244	mercedsoccershop@gmail.com
Montclair Sports	montclairsportsoakland.com	(510)-339-9313	montclairsports@sbcglobal.net
Pacific occer	Facebook only	(909) 877-9439	npacificso cer@gmail.com
Soccer and Sport	soccerandsports.com	(707) 523-0991	victoria@soccerand sports.com
Soccer City	soccercityteam.com	(916) 685-8837	info@soccercityteam.com
Soccer City La Puente	Facebook only	(626) 917-6508	goalkeeper@soccercitylp.com
Soccer Express	Facebook only	(209) 724-0414	soccerexpressmerced@yahoo.com
Soccer Mexico	Facebook only	(760) 414-1187	contact via facebook
Soccer Nation & Faby's Fashion	soccernationsl.com	(510) 258-0729	soccer.nation@sbcglobal.net
Soccer Santiago	soccersantiago.com	(714) 234-8234	info@soccersantiago.com
Soccer Store	No website or FB	(415) 571-7740	heclobo@aol.com
Soccer Stores	No website or FB	(818) 832-1100	none found
Soccer USA	soccerusa.net	(619) 282-8322	none found
Soccerloco	soccerloco.com	(858) 715-6800	info@soccerloco.com
Soccerloco	soccerloco.com	(619) 735-7770	info@soccerloco.com
Soccerloco	soccerloco.com	(760) 579-7587	info@soccerloco.com
Sportsland	No website or FB	(323) 804-0372	none found
Upland Soccer Store	Facebook only	(909) 949-2999	none found
Valley Sport	Facebook only	(760) 398-8664	valleysport104@gmail.com

Table 8: 78 Soccer Stores Disregard the Law

Name	Website (or Facebook)	Phone	Email
100 Percent Soccer	ohpsoccer.com	(909) 599-9050	db100soccer@aol.com
100 Percent Soccer	ohpsoccer.com	(909) 980-2423	db100soccer@aol.com
A-1 Soccer Warehouse	Only Facebook	(213) 617-0233	none found
All Season Soccer	allseasonsoccer.com	(415) 408-5550	sales@allseasonsoccer.com
Asby Sports	asby.com	(408) 259-6770	asby@pacbell.net
Azteca Soccer	aztecasoccer.com	(909) 598-4798	support@aztecasoccer.com
Azteca Soccer	aztecasoccer.com	(626) 444-1608	support@aztecasoccer.com
Century Soccer Commerce	century-sport.com	(323) 887 0016	Centurysport@gmail.com
Classic Soccer Shop	theclassicsoccer.com	(209) 365-9896	none found
Deportes Salazar	Facebook only	(714) 543-9416	none found
El Fanta Sports	elfantasports.com	(760) 393-0600	contact via website
Extreme Soccer & Rugby	extremesoccerstore.com	(916) 973-1751	contact via website
Fanaticos	Facebook only	(310) 699-9796	fanatico12@yahoo.com
Futbol Fanatics	futbolfanatics.com	(562) 745-4193	futbolfanaticlb@gmail.com
Glory Trading	No website of FB	(213) 621-7736	none found
Goetz Bros	goetzsports.com	(650) 249-4470	brent@goetzsports.com
L 3 Soccer Store	l3soccer.store	(707) 218-1437	info@L3soccerstore.com
My Soccer Store	mysoccerstore.com	(818) 859-7544	sales@mysoccerstore.com
My Sport	Facebook only	(714) 731-7766	none found
Newport Soccer Store	Facebook only	(949) 476-2244	mqadiri@2bluesky.com
Niky's Sports	nikys-sports.com	(323) 249-5445	cs@nikys-sports.com
Niky's Sports	nikys-sports.com	(562) 928-4300	cs@nikys-sports.com
Niky's Sports	nikys-sports.com	(661) 947-1188	cs@nikys-sports.com
Niky's Sports	nikys-sports.com	(310) 445-6570	cs@nikys-sports.com
Niky's Sports	nikys-sports.com	(213) 483-4154	cs@nikys-sports.com
Niky's Sports	nikys-sports.com	(747)-888-3299	cs@nikys-sports.com
Niky's Sports	nikys-sports.com	(323) 735-2181	cs@nikys-sports.com
Niky's Sports	nikys-sports.com	(562) 726-1956	cs@nikys-sports.com
Planet Soccer	planetsoccerstore.com	(661) 253-1800	planetsoccerstore@yahoo.com
Pro Soccer	prosoccer.com	(626) 403-9921	customerservice@prosoccer.com
Pro Soccer Inc.	prosoccerinc.com	(559) 299-5363	prosoccerfresno@gmail.com
Salinas Futbol Central	salinasfutbolcentral.com	(831) 751-9063	salinasfutbolcentral@yahoo.com
Sami's Sports	Facebook only	(323) 965-8093	samissports1@aol.com

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Table 8: 78 Soccer Stores Disregard the Law (Continued)

Name	Website (or Facebook)	Phone	Email
Soccer Action USA	ohpsoccer.com	(805) 614-4350	customerservice@socceractionusa.com
Soccer City	ohpsoccer.com	(831) 443-9422	none found
Soccer City	Only Facebook	(916) 414-8660	info@soccercityteam.com
Soccer City	allseasonsoccer.com	(209) 937-0390	none found
Soccer City	asby.com	(530) 751-2161	soccercitystore@aol.com
Soccer Express Inc.	aztecasoccer.com	(559 432-7511	soccerexpressinc@gmail.com
Soccer Garage	aztecasoccer.com	(800) 301-9042	customerservice@soccergarage.com
Soccer Junction	century-sport.com	(909) 590-5111	none found
Soccer Mart	theclassicsoccer.com	(805) 473-8226	none found
Soccer Mexico Enterprise	Facebook only	(916) 454-5786	none found
Soccer One	elfantasports.com	(800) 297-6386	customerservice@soccerone.com
Soccer Plus	extremesoccerstore.com	(626) 798-3783	mail@soccerplus.net
Soccer Post	Facebook only	(510) 523-5700	contact@soccerpost.shop
Soccer Post	futbolfanatics.com	(925) 299-8800	contact@soccerpost.shop
Soccer Pro	No website of FB	(650) 365-8282	none found
Soccer Shop USA	goetzsports.com	(213) 749-0015	info@soccershopusa.com
Soccer Shop USA	l3soccer.store	(213) 680-2500	info@soccershopusa.com
Soccer Shop USA	mysoccerstore.com	(818) 376-1500	info@soccershopusa.com
Soccer Shot Chula Vista	Facebook only	(619) 271-5252	soccershotcv@gmail.com
Soccer Stores	Facebook only	(818) 243-7790	none found
Soccer Stores	nikys-sports.com	(714) 542-7133	none found
Soccer Wearhouse	nikys-sports.com	(951) 898-7622	support@soccerwearhouse.com
Soccer Wearhouse	nikys-sports.com	(951) 603-3099	support@soccerwearhouse.com
Soccer Wearhouse	nikys-sports.com	(714) 860-4277	support@soccerwearhouse.com
Soccer Wearhouse	nikys-sports.com	(951) 719-1155	support@soccerwearhouse.com
Soccer World	nikys-sports.com	(626) 652-9224	tecknoal@yahoo.com
Soccerkraze	nikys-sports.com	(530) 221-1515	skr@soccerkraze.com
Soccerkraze	nikys-sports.com	(510) 494-9910	skn@soccerkraze.com
Soccerkraze	planetsoccerstore.com	(408) 871-1744	skc@soccerkraze.com
Soccerkraze	prosoccer.com	(831) 583-9094	skm@soccerkraze.com
Solo Soccer Shop	prosoccerinc.com	(650) 872-6716	solosoccershop@gmail.com
Sports Page Soccer Wearhouse	salinasfutbolcentral.com	(714) 754-6760	elias.sportspage@gmail.com
Sunset Soccer Supply	Facebook only	(415) 753-2666	info@sunsetsoccer.com

Table 8: 78 Soccer Stores Disregard the Law (Continued)

Name	Website (or Facebook)	Phone	Email
The Coliseum	nvsoccer.com	(707) 226-7069	customerservice@nvsoccer.com
The Coliseum	nvsoccer.com	(415) 521-5273	customerservice@nvsoccer.com
The Coliseum	nvsoccer.com	(707) 422-7702	customerservice@nvsoccer.com
The Willow Soccer	No website or FB	(650) 326-6935	none found
Todo Deportes Soccer Store	Facebook only	(213) 480-8807	none found
Todo Deportes Soccer Store	Facebook only	(213) 321-1155	none found
Xtreme Soccer	xtremesocceronline.com	(562) 421-2292	online@xtremesoccer.net
Xtreme Soccer	xtremesocceronline.com	(310) 921-3609	online@xtremesoccer.net
Xtreme Soccer	xtremesocceronline.com	(714) 223-1490	online@xtremesoccer.net
Xtreme Soccer	xtremesocceronline.com	(805) 604-4707	online@xtremesoccer.net
Xtreme Soccer	xtremesocceronline.com	(661) 836-1116	online@xtremesoccer.net
Xtreme Soccer	xtremesocceronline.com	(805) 882-9231	online@xtremesoccer.net

Table 9: 6 Soccer Stores Have Not Reopened

Name	Website (or Facebook)	Phone	Email
Dayak's Den Soccer	dayaksdensports.com	(209) 833-8488	dayaksden@sbcglobal.net
Deportes Azteca	Facebook only	(916) 205-6081	contact via facebook
Leon Soccer Shop	Facebook only	(510) 568-5731	none found
Redlands Soccer Store	Facebook only	(909) 793-3987	lclsoccer@hotmail.com
Soccer Center	soccercenter.com	(888) 697-6223	info@soccercenter.com
South Bay Soccer Shop	Facebook only	(424) 456-7392	contact via yelp

Observations

Of the six largest and best-known soccer businesses in the state, only Soccerloco follows the law. The others -- Niky's Sports (no relation to Nike), Soccer Wearhouse, SoccerKraze, The Coliseum and Xtreme Soccer -- are among the stores offering the greatest number of brands and models of kangaroo skin soccer shoes.

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The Center was told that one of the brands was temporarily not selling their kangaroo leather soccer shoes into California, asking retailers to pick them up across the border in Nevada or Oregon. Similarly, Soccer Wearhouse advertises on its website for kangaroo leather shoes: "This cleat ships out from our Nevada Warehouse." It is illegal to obtain kangaroo leather cleats from another state and sell them in California or to ship kangaroo leather cleats from out of state to California addresses.

Table 10: All California Retailers of Soccer Shoes

Name	Comply	Violate	Number of Stores	Companies
National Chains	85%	15%	370	Big 5, Dick's, Hibbett, WSS
Factory Stores	100%	0%	90	adidas, New Balance, Nike, Puma
Soccer Stores	30%	70%	117	80 local businesses

Addresses for all 117 Independent Soccer Stores in California

Name	Address	City	Zip
100 Percent Soccer	538 W Bonita Ave.	San Dimas	91773
100 Percent Soccer	119545 Jack Benny Dr,	Rancho Cucamonga	91739
A-1 Soccer Warehouse	458 South Alameda St	Los Angeles	90013
Aggressive Soccer	1411 Crows Landing Rd	Modesto	95351
Aggressive Soccer	835 N Milpas St #A	Santa Barbara	93103
All Season Soccer	857 B Grant Ave	Novato	94945
Arza Soccer	804 N Ventura Roaad	Oxnard	93030
Asby Sports	392 North Capitol Ave	San Jose	95133
Azteca Soccer	3580 W Temple Ave	Pomona	91768
Azteca Soccer	11853 Valley Blvd	El Monte	91732
BK Sports	316 Boyd St	Los Angeles	90013
Central Valley Soccer Store	3773 Old Conejo Rd	Newbury Park	91320
Century Soccer Commerce	6400 E Washington Blvd	Los Angeles	90040
Classic Soccer Plus	176 E Laurel Drive	Salinas	93906
Classic Soccer Shop	920 S Cherokee Ln	Lodi	95240
Corona Sports	13687 Van Nuys Blvd	Pacoima	91331
Dayak's Den Soccer	320 W Larch Rd, #11	Tracy	95304
Deportes Azteca	6171 Stockton Blvd	Sacramento	95824
Deportes Rabadan	842 N Euclid St	Anaheim	92801
Deportes Salazar	1235 W 1st St SuiteB2	Santa Ana	92703
El Fanta Sports	49271 Grapefruit Blvd # 3	Coachella	92236
Elite Sport Soccer	1773 Haight St	San Francisco	94117
Elite Sport Soccer	2637 Mission St	San Francisco	94110
Extreme Soccer & Rugby	535 Fulton Ave	Sacramento	95825
Fanaticos	10907 Venice Blvd	Los Angeles	90034
Futbol Fanatics	2481 Pacidfic ve #A	Long Beach	90806
Glory Trading	325 S San Pedro St	Los Angeles	90013
Goetz Bros	1125 Industrial Rd	San Carlos	94070
Kombat Soccer	5958 S Land Park Dr	Sacramento	95822
Kombat Soccer	1230 Sunset Blvd, #300	Rocklin	95765
L 3 Soccer Store	77 West 3ER St	Santa Rosa	95401
Leon Leather & Soccer Shop	325 Keyes St	San Jose	95112
Leon Soccer Shop	577 E 14th St	San Leandro	94577

Addresses for all 117 Independent Soccer Stores in California (Continued)

Name	Address	City	Zip
Mary & Joe's Sporting Goods	911 San Pablo Ave	Albany	94706
Merced Soccer Shop	946 W Main St	Merced	95340
Montclair Sports	1970 Mountain Blvd	Oakland	94611
My Soccer Store	916 W Burbank Blvd, #K	Burbank	91506
My Sport	696 El Camino Real	Tustin	92780
Newport Soccer Store	3400 Irvine Ave, #102	Newport Beach	92660
Niky's Sports	3537 Tweedy Blvd	South Gate	90280
Niky's Sports	6365 Florence Ave	Bell Gardens	90201
Niky's Sports	830 W Avenue L, #105	Lancaster	93534
Niky's Sports	11807 Santa Monica Blvd	Los Angeles	90025
Niky's Sports	1536 W 7th St	Los Angeles	90017
Niky's Sports	22105 Ventura Blvd	Woodland Hills	91364
Niky's Sports	2743 W Pico Blvd	Los Angeles	90006
Niky's Sports	4310 Atlantic Ave	Long Beach	90807
Pacific Soccer	200 W Foothill Blvd	Rialto	92376
Planet Soccer	24331 Main St	Newhall	91321
Pro Soccer	82 N Los Robles Ave	Pasadena	91101
Pro Soccer Inc.	6929 N Willow Ave	Fresno	93710
Redlands Soccer Store	914 Orange St	Redlands	92374
Salinas Futbol Central	7 Williams Rd	Salinas	93905
Sami's Sports	5215 1/2 W Adams Blvd	Los Angeles	90016
Soccer Action USA	338 E Betteravia Rd	Santa Maria	93454
Soccer and Sport	3774 Santa Rosa Ave	Santa Rosa	95407
Soccer Center	259 E Redlands Blvd	San Bernardino	92408
Soccer City	9663 E Stockton Blvd	Elk Grove	95624
Soccer City	1032 N Davis Rd	Salinas	93907
Soccer City	4391 Gateway Park Blvd	Sacramento	95834
Soccer City	1120 Waterloo Rd #1	Stockton	95205
Soccer City	635 Plumas St	Yuba City	95991
Soccer City La Puente	14316 Amar Rd, #C	La Puente	91744
Soccer Express	1033 W Main St	Merced	95340
Soccer Express Inc.	7975 N Blackstone Ave	Freson	93720
Soccer Garage	31894 Plaza Drive, #B1	San Juan Capistrano	92675

Addresses for all 117 Independent Soccer Stores in California (Continued)

Name	Address	City	Zip
Soccer Junction	12425 Mills Ave, #A4	Chino	91710
Soccer Mart	620 E Grand Ave	Arroyo Grande	93420
Soccer Mexico	948 S Santa Fe Ave	Vista	92084
Soccer Mexico Enterprise	5248 Fruitridge Rd	Sacramento	95820
Soccer Nation/Faby's Fashion	17279 Hesperian Blvd	San Lorenzo	94580
Soccer One	7349 Canoga Avenue	Canoga Park	91303
Soccer Plus	1640 E Washington Blvd	Pasadena	91104
Soccer Post	2203 S Shore Center	Alameda	94501
Soccer Post	3400 Mt Diablo Blvd	Lafayette	94549
Soccer Pro	2737 El Camino Real	Redwood City	94061
Soccer Santiago	10450 Beach Blvd, #113	Stanton	90680
Soccer Shop USA	3974 1/2 S Figueroa St	Los Angeles	90037
Soccer Shop USA	458 S Alameda St	Los Angeles	90013
Soccer Shop USA	7068 Van Nuys Blvd	Van Nuys	91405
Soccer Shot Chula Vista	713 Broadway, #H	Chula Vista	91910
Soccer Store	1189 Geneva Ave	San Francisco	94112
Soccer Stores	7600 Balboa Blvd #111	Lake Balboa	91406
Soccer Stores	520 S Brand Blvd	Glendale	91204
Soccer Stores	623 W 17th St	Santa Ana	92706
Soccer USA	6612 Mission Gorge Rd #A	San Diego	92120
Soccer Wearhouse	12762 Limonite Ave	Eastvale	92880
Soccer Wearhouse	2795 Cabot Dr Space 6-150	Corona	92883
Soccer Wearhouse	400 W Disney Way #149	Anaheim	92802
Soccer Wearhouse	41377 Margarita Rd	Temecula	92591
Soccer World	2146 Durfee Ave	South El Monte	91733
Soccerkraze	1374 Hilltop Dr	Redding	96003
Soccerkraze	5825 Jarvis Ave	Newark	94560
Soccerkraze	797 W Hamilton Ave	Campbell	95008
Soccerkraze	1121 Military Ave	Monterey	93955
Soccerloco	3755 Murphy Canyon Rd #L	San Diego	92123
Soccerloco	4430 Camino De La Plaza	San Ysidro	92173
Soccerloco	5617 Paseo Del Norte	Carlsbad	92008
Solo Soccer Shop	238 Grand Ave South	San Francisco	94080

Addresses for all 117 Independent Soccer Stores in California (Continued)

Name	Address	City	Zip
South Bay Soccer Shop	4327 W 147th St	Lawndale	90260
Sportspage Soccer Warehouse	18170 Euclid St	Fountain Valley	92708
Sportsland	730 S Alvarado St	Los Angeles	90057
Sunset Soccer Supply	3401 Irving St	San Francisco	94122
The Coliseum	2532 Jefferson St	Napa	94559
The Coliseum	3815 Redwood Hwy	San Rafael	94903
The Coliseum	1595 Holiday Ln, #B2	Fairfiel	94534
The Willow Soccer	728 Willow Rd #B	Menlo Park	94025
Todo Deportes Soccer Store	2725 W 6th St	Los Angeles	90057
Todo Deportes Soccer Store	1816 W 6th St	Los Angeles	90057
Upland Soccer Store	1651 W Foothill Blvd #J	Upland	91786
Valley Sport	51335 Harrison St #104	Coachella	92236
Xtreme Soccer	12017 E Carson St	Hawaiian Gardens	90716
Xtreme Soccer	19019 Hawthorne Blvd	Torrance	90503
Xtreme Soccer	2142 E Lincoln Ave	Anaheim	92806
Xtreme Soccer	2377 N Oxnard Blvd	Oxnard	93036
Xtreme Soccer	3900 California Ave #300	Bakersfiel	93309
Xtreme Soccer	401 N Milpas St	Santa Barbara	93103

E-commerce websites selling kangaroo leather soccer shoes

American shoppers rang up $601 billion in online sales for 2019, a 15% increase from the year before. Since then, online shopping and website traffic ve increased dramatically. Considering 16% of all retail sales happens online, retailers are increasing their focus on e-commerce. This includes soccer shoe sellers.

Depending on their compliance with the California statute, online retailers could account for a considerable amount of kangaroo leather being sold into the state. The Center set out to identify online retailers that a shopper in California would most readily encounter when searching for soccer cleats and to determine if these websites take steps to avoid breaking the law.

To assemble the list of the predominant sellers of kangaroo leather soccer cleats, the Center utilized the search and shopping feature of several search engines and platforms; examined website traffic, ranking and comparison data; tracked paid placements; visited athlete and fan gathering places; and consulted with soccer retailers and devotees.

E-retailers selling kangaroo leather soccer cleats included soccer portals that exist only online (Soccer.Com, ProDirect Soccer), big box stores and sporting good chains (Walmart and Dick's), on-line behemoths (Amazon and Zappos), and local soccer stores that have parlayed brick-and-mortar locations into strong e-commerce sites (We Got Soccer, The Soccer Factory, Soccerloco).

To meet the criteria for inclusion, the e-tailer needed to offer kangaroo leather cleats and shipping to California. One of America's largest websites for soccer shoes, Academy Sports, will not ship to California due to the state's stringent hazardous materials disclosure requirements. A leading Canadian sporting goods website, Sport Chek, won't ship south. For websites outside of the US, we ensured a California shopper would not have problems with payment or shipping, hence the inclusion of websites from Canada, the UK, Spain and Australia.

We eliminated peer-to-peer marketplaces like Bonanza, eBay, Facebook Marketplace, Goat, Mercari, Poshmark, and Swap, since the inventory isn't stable, transactions are infrequent, violators are individuals likely unfamiliar with California law rather than businesses with higher expectations. Websites of manufacturers like adidas and Nike were examined in greater detail and are addressed separately.

In assembling the list, investigators captured contact information and links to specific angaroo leather shoes. They looked for any type of warning or disclaimer regarding the California law on product pages, in the Terms of Service, or at check-out. Finally, to test for address blocking they used a California shipping address and tried purchasing the shoes, going to the point of entering a credit card.

Ultimately, the Center compiled a list of 76 online retailers. These websites were divided into two groups: those that appear to make no effort to comply with the law, and those that acknowledge the law in some manner.

Table 11: 65 Online Retailers That Do Not Acknowledge the California Law (Continued)

Name	Website (or Facebook)	Phone	Email
Soccer Corner	soccercorner.com	(800) 814-4916	contactus@soccercorner.com
Soccer X	soccerx.com	(866) 942-6605	sxretail@soccerx.com
Soccer Garage	soccergarage.com	(800) 301-9042	customerservice@soccergarage.com
Soccer Internationale	soccerinternationale.net	(402) 330-9862	form on website
Soccer Locker	soccerlocker.com	(866) 957-6223	customerservice@soccerlocker.com
Soccer Master	soccermaster.com	(636) 386-8000	csr@soccermaster.com
Soccer One	soccerone.com	(800) 297-6386	customerservice@soccerone.com
Soccer Plus USA	soccerplususa.com	(844) 842-3827	orders@soccerplususa.com
Soccer Post	soccerpost.com	(732) 935-0990	contact@soccerpost.shop
Soccer Premier	thesoccerstore.com	(972) 484-8282	suppot@thesoccerstore.com
Soccer Shop USA	soccershopusa.com	(213) 617-0233	form on website
Soccer Unlimited USA	soccerunlimitedusa.com	(518) 458-8236	cs@soccerunlimitedusa.com
Soccer Village	soccervillage.com	(800) 483-2690	sales@soccervillage.com
Soccer Wearhouse	soccerwearhouse.com	(800) 892-6979	support@soccerwearhouse.com
Soccer Zone Vegas	soccerzonevegas.com	(702) 456-4625	john@soccerzonevegas.com
Soccer4All	soccer4all.com	(281) 499-6665	sales@soccer4all.com
SoccerEvolution	soccerevolution.com	(800) 949-4625	support@soccerevolution.com
Stefans Soccer	stefanssoccer.com	(262) 789-7800	craig@stefanssoccer.com
Suley's Soccer	suleyssoccer.com	(603) 668-7227	suleyssoccer@aol.com
Training Rack	trainingrack.com	(770) 458-7815	customerservice@trainingrack.com
Tursi Soccer	tursissoccer.com	(503) 297-2241	form on website
u90 Soccer	u90soccer.com	(516) 450-3817	form on website
Unisport	unisportstore.com	(453) 325-4040	support@unisportstore.com
VSAthletics	vsathletics.com	(800) 676-7463	doug@vsathletics.com
Walmart	walmart.com	(479) 273-4000	form on website
We Got Soccer	wegotsoccer.com	(800) 974-4625	info@wegotsoccer.com
Every Sport for Less	everysportforless.com	(800) 282-8438	support@everysportforless.com
Play Soccer	playsoccerinc.com	(866) 755-2361	playsoccer@ameritech.net
Third Coast Soccer	thirdcoastsoccer.net	(844) 811-6010	weborders@thirdcoastsoccer.net
Euromex Sports	euromexsports.com	(718) 439-5105	sales@euromexsports.com
Avon Sports	avonsportsapparel.com	(317) 272-3831	avon.sports@avonsportsapparel.com

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Table 12: 12 Online Retailers That Acknowledge the California Law

Name	Website (or Facebook)	Phone	Email
6pm.com	6pm.com	(888) 676-2660	primary@amazon.com or chat via website
Amazon	amazon.com	(888) 280-4331	investoris@dcsg.com
Dicks Sporting Goods	dickssportinggoods.com	(877) 846-9997	form on website
Hibbett Sports	hibbett.com	(205) 942-4292	orders@revupsports.com
Rev Up Sports	revupsports.com	(855) 812-1854	buy@soccermagicdiscounts.com
Soccer Magic	soccermagicdiscounts.com	(610) 443-2300	info@soccerpro.com
Soccer Pro	soccerpro.com	(877) 762-7776	custserv@sportsendeavors.com; president.
Soccer.com	soccer.com	(800) 950-1994	office@sportsendeavors.com
The Soccer Factory	thesoccerfactory.com	(800) 987-6223	form on website
Ultimate Soccer Store	ultimatesoccerstore.com	(561) 757-3465	soccer@ultimatesoccerstore.com
World Soccer Shop	worldsoccershop.com	(800) 277-7255	info@365sport.com
Zappos	zappos.com	(800) 927-7671	cs@zappos.com

Online retailers' compliance

Of the 76 predominant online retailers:

- 86 percent do not acknowledge the California law
- 16 percent post warnings about the law
- 7percent block California shoppers from obtaining kangaroo shoes

86 percent of websites accept California addresses for shipment

The majority of websites appear to not comply with the law prohibiting the sale of kangaroo products to California buyers. On 65 websites, nothing alerts California shoppers to the ban or appears to stop them from making illegal purchases. Because both importing and selling kangaroo products are illegal, customers as well as sellers violate the law when prohibited transactions occur.

However, the Center cannot say definiti ely that these websites will break the law when California customers come shopping. A site might cancel an order after payment is accepted, as was the case for adidas.com, or block the sale to a California address when a customer clicks on "place my order." Investigators did not submit payment and test whether kangaroo leather soccer cleats would be delivered from these 76 online sellers.

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Table 13: Online Retailers That Acknowledge The Law

Company	Law Violation	Appearing	Warning Language
6pm	Yes	Usually	Please note that due to the use of kangaroo leather in this product and restrictions under California law, we are unable to ship this style to addresses in California.
Amazon	No	Always	This item cannot be shipped to your selected location.
Dick's Sporting Goods	Yes	Sometimes	Items containing kangaroo leather — The sale or shipment of this product to residents of the following is restricted: California
Hibbett Sports	No	Always	Not available for shipping to California.
Rev Up Sports	No	Always	These cleats cannot be shipped to California due to the kangaroo leather.
Soccer.com	No	Usually	This product contains k-leather and is not available for sale or shipment to California. Please see our Terms of Use
Soccer Magic	Yes	Never	No warning on product page, but in Terms of Service
Soccer Pro	Yes	Usually	This product contains k-leather and is not available for sale or shipment to California
The Soccer Factory	Yes	Usually	This product contains k-leather and is not available for sale or shipment to California.
Ultimate Soccer Store	Yes	Rarely	This product contains k-leather and is not available for sale or shipment to California. Please see our Terms of Use.
World Soccer Shop	No	Usually	This product contains k-leather and is not available for sale or shipment to California. Please see our Terms of Use.
Zappos	Yes	Sometimes	Please note that due to the use of kangaroo leather in this product and restrictions under California law, we are unable to ship this style to addresses in California.

These seven online retailers typically had three main failings with 1) inconsistent application of the California warning, 2) lack of prominence of the warning, and 3) failure to block the transaction.

• **6pm** is the discount arm of Zappos, with both owned by Amazon. Like Zappos, 6pm has a strong selection of kangaroo leather soccer shoes, but typically at lower prices. Appearing about half the time, the California warning is displayed when the product description uses kangaroo leather but not with k-leather. Both Zappos and 6pm use the same strong, bold California warning, the most prominent of

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the sites. But there is no address blocking. The Center purchased and received a pair of adidas World Cup kangaroo leather soccer cleats. Purchase completed.

• **Dick's Sporting Goods** is one of the most popular sites carrying soccer shoes, with 38 million monthly views. The California warning is buried and appears only one-third of the time. After a model and size are selected, a link to Shipping restrictions may apply appears, which when clicked gives information on the California ban. The shipping link appears on models described as kangaroo leather, but not as k-leather. Address blocking worked for two out of six attempts. The Center ordered and received a pair of Puma King Pro kangaroo leather soccer cleats. Purchase completed.

• **Soccer Magic** has a physical store in Pennsylvania and a strong virtual store with a large selection of kangaroo leather soccer shoes. None of the product pages display the California warning but, curiously, the website duplicates word-for-word the Soccer.com Terms of Service, including the paragraph about the site's strict adherence to the California law. The Center ordered and received pair of adidas Copa 19.1 kangaroo leather soccer cleats. Purchase completed.

• **Soccer Pro** operates one of the most-visited soccer specialty e-commerce sites online, in addition to a store in Missouri. A California warning is camouflaged within the ext of individual product descriptions and appears for 21 out of 30 kangaroo leather shoes. The warning is so arbitrarily applied that, even within the same model of shoe, one color brings up the California warning while a different color does not. The Center ordered and received a pair of adidas Mundial Team kangaroo leather soccer cleats. Purchase completed.

• **The Soccer Factory** has three stores in Texas to augment a strong e-commerce platform, selling a wide range of soccer cleats from four manufacturers. The California warning displays for less than two out of every three kangaroo leather cleats offered. The Center ordered and received a pair of adidas Copa Mundial kangaroo leather soccer shoes, confi ming that address blocking is not in place. The Center ordered and received a pair of Puma King Pro kangaroo leather soccer cleats. Purchase completed.

• **Ultimate Soccer Store** has four stores in Florida and Texas and offers four kangaroo leather models of soccer shoes from three brands on its website. Only one model displays a California warning, which is prominent. The Center determined address blocking does not occur by purchasing a pair of adidas Mundial Team indoor kangaroo leather soccer shoes. The Center ordered and received a pair of Puma King Pro kangaroo leather soccer cleats. Purchase completed.

• **Zappos** has perhaps the best California warning of any of the websites, grabbing attention as the

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second bullet point in a shoe's product description, offset with a big and bold font. The warning appears on half of the kangaroo soccer shoes, catching all the adidas models described as kangaroo leather, but missing all the Puma models described as k-leather. Zappos is the opposite of its owner Amazon. Amazon has no California warning but excellent address blocking. Zappos has an excellent California warning (if unevenly applied) but no address blocking. The Center ordered and received a pair of adidas Copa Mundial kangaroo leather soccer cleats. **Purchase completed.**

In successfully blocking California addresses, these fi e online retailers observe the California law.

• **Amazon** With one of the largest selections of soccer cleats online, Amazon does not post a California warning on its shoe product pages, but it unfailingly prevents the sale of kangaroo cleats to shoppers in California through address blocking at checkout. Without explanation, another shipping address is requested. An arduous click trail on the website eventually leads to a reference about kangaroo products and § 653o. This effective address blocking policy applies to cleats sold and shipped by Amazon, cleats sold by third parties and shipped by Amazon, and cleats sold and shipped by third parties. Purchase blocked.

• **Hibbett Sports** does not sell kangaroo cleats in any of its 15 California stores, but they offer a few models online. The California warning appears on two of three models and is easy to overlook. Address blocking to California was successful in attempts to order each of the three shoes. Purchase blocked.

• **Rev Up Soccer** runs a sporting goods store in Tennessee in addition to an e-store. Among its many dozens of cleats there are two kangaroo models. Its California warning is one of the best. Prominently placed in all capital letters, it is meant to be noticed. When the Center attempted to purchase a pair of adidas Copa Mundial kangaroo leather cleats, the sale seemed to go through, but hours later an email arrived cancelling the order, refunding the purchase and specifically citing the alifornia law. Purchase blocked.

• **Soccer.com** is the biggest soccer specialty store online, with 680,000 monthly views and a huge selection of cleats. A subsidiary of North Carolina-based Sports Endeavors, with sister sites in different sports, it takes § 653o seriously. A paragraph devoted to compliance with the kangaroo ban appears in the Terms of Service. The California warning appears as the final bullet poi t in the shoe descriptions 80 percent of the time (24 out of 30 shoes). Address blocking worked every time, triggering a generic "out of stock" message. Purchase blocked.

• **World Soccer Shop** became a sister site of Soccer.com when acquired by Sports Endeavors and has a

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very similar site with subtle difference is pricing and product descriptions. Like Soccer.com, the Terms of Service contains a paragraph devoted to § 653o, and the California warning appears on 80 percent of kangaroo leather soccer shoes. Address blocking is solidly in place for attempted sales to California. **Purchase blocked**.

A note about eBay, which has a vibrant market in kangaroo leather goods. Californians buying or selling kangaroo leather cleats on the platform are violating eBay's policies. Though it requires the daunting click trail of Policies>Our Policies>Animals Products Policy>California Laws>California Penal Code Section 639-653.2, the California kangaroo parts ban can be found. Enforcement (administrative remedies) may occur if community members flag the po ential violation.

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Discussion

California is a sentinel state, its legislature routinely shaping national policy with firs -on-the-books laws on issues as disparate as emissions standards, gig workers, offshore drilling, and health care. In the animal protection arena, California legislators have pioneered laws that ban lead ammunition for hunting, trapping for fur, wild animals in circus acts – and the sale of kangaroo products.

But the state's application of its prohibition on the trade in kangaroo parts has been, to say the least, uneven. Bowing to pressure from the commercial kangaroo-killing industry and some end-users of the skins, California suspended the law for a time. It has been in place during the last four years, though, and has gone unchallenged. Laws are not statements or exhortations – they are to be applied and enforced.

While the legislature has proven determined and foresighted on animal welfare, California's influen e also comes from its heft: 40 million residents (1 of every 8 Americans) and an economy that recently eclipsed Britain to be the fi th largest in the world.

The state's presence in the soccer world is similarly outsized. California has the most Major League Soccer teams, produces the most professional players, has the most soccer participants (college, youth, and recreation) and the most soccer spectators of any state in the country. Websites and magazines regularly crown LA "America's Top Soccer City." California has the highest consumer spending on soccer of all US cities, certain to reach new heights with the World Cup coming in 2026.

When Australia was strongly *intervening* in the legislative process to eliminate California's kangaroo ban, for which it was fined and ondemned in editorials here and at home, it published a monograph* that reads:

> California is the largest market in the US for high quality sporting shoes, especially soccer boots. Many of these are made with kangaroo leather. The US is the largest market in the world for such sporting goods. Hence it is essential for ongoing kangaroo industry development that there is uninhibited access to this market.

It is clear from this publication that the Australian government viewed the California legislation as a bellwether, writing that having access to the California market is "critical to ongoing kangaroo industry development, both in terms of the level of actual trade with them, but more so, in their global significan e."

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Despite an unambiguous legal proscription on selling kangaroo parts since 2016, it's largely been business as usual for scores of retailers.

While dwindling kangaroo populations first spu red California legislators to impose the ban 50 years ago, it's the inhumanity of killing kangaroos in their native habitat that drove the ban's reinstatement 46 years later. Yet the California Department of Fish and Wildlife chose inaction, ignoring the law and undermining the will of the people, represented through their elected officia .

And choosing to not enforce the law they certainly are. There is no black or gray market in kangaroo cleats. They are out in plain sight, in eye-catching displays, sporting tags advertising their kangaroo leather content.

The Department conducts tightly orchestrated high-profile aids to confisc te ivory from galleries and auction houses, but this challenge is almost too simple. By writing letters and press releases, speaking to store owners and manufacturers' reps, and issuing citations for the most recalcitrant offenders, the Department can mop up this problem readily. There is no illicit, underground trade in kangaroo parts driven by poachers and wildlife trafficke . The people using kangaroo skins are major corporations, with compliance officers and boards of directors. If they are merely reminded of their illegal action, they should respond.

Tens of thousands of kangaroo leather soccer shoes continue to fl w into the state annually while Fish and Wildlife officials stand asi . The commercial shooting of kangaroos – at night with spotlights, then field d essed, stored in a chiller and eventually driven to a processing plant to bring less than 25 cents per pound – is not hunting. It's as if we licensed 300 shooters to kill 1.5 million elk in our wildlands to sell abroad for boots or hats.

Commodifying wildlife and commercializing their killing is not popular with Californians, and it is at odds with the wildlife management principles put into practice throughout the United States.

As evidenced by what's on professional soccer players' feet, today's state-of-the-art soccer cleats are high-tech, computer-designed, and synthetic. They are the most popular and purchased soccer shoe, across price points. Kangaroo skin shoes, with old school appeal and throwback profile , are a relic but given the popularity of the sport, even a modest segment of soccer enthusiasts buying these shoes creates the demand for the skins of millions of kangaroos. As Nike says, kangaroo leather is found "only on a small number of models in one of four silos." Retailers and manufacturers will not be harmed if kangaroo leather

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cleats, a small portion of the market, are eliminated. And it will level the playing field or those retailers that have been following the law.

On occasion the California legislature enacts a law that has far-reaching impact. That's the reality in a world where supply chains are long and in far-flung pla es where regulation and oversight are ineffectual. California's lawmakers uphold the values of the people of California. They don't want to see kangaroos killed for shoes, and most of them have no idea that they may be buying footwear that comes from the mass slaughter of native wildlife.

Australia's monograph opposing the California law banning sales of kangaroo products included a dire warning:

> (M)ajor producers had indicated that if they cannot sell kangaroo leather soccer boots in California, then they may not produce them at all.

The government's hyperbole may have been intended just to convey a sense of urgency. But as the state legislature has proven in the past, "As goes California…."

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Conclusion

After several month of research, The Center for a Humane Economy has identified specific businesses e-sponsible for the import and sale of tens of thousands of kangaroo skin soccer shoes In California, violating California Penal Code § 653o. Those businesses include:

- 9 manufacturers wholesaling into the state
- 7 manufacturers selling online and shipping to California shoppers
- 71 dominant e-commerce websites selling and shipping to California shoppers
- 78 soccer stores selling to shoppers
- 1 national sporting goods chain selling to shoppers

In this report we have provided contact information for each violator: name, address, phone number, email and website, as they are discoverable.

We are forwarding our research to the Department of Fish and Wildlife and other state agencies and officials in the hope that they will contact these businesses as a first s ep in enforcing the law, seeking voluntary compliance.

The Center is not aware of any communication from state officials o soccer store owners four years ago or at any time since then, explaining the change in the law. No official or age y has asked retailers to follow the law. Without worrying about enforcement, it has been left to the individual's business ethics and personal conscience.

Absent that instruction, it's understandable that some retailers would think they can get away with law-breaking. Had the delineation between legal and illegal been made clear and a new tone set by the authorities, things might have been different.

Still, there can be little doubt that store owners have been aware of the reinstatement of the ban on sales of kangaroo products. Some owners might have been involved in the debate, lobbying for one position or another. Others may have followed it more casually through the media, trade groups, soccer websites or word of mouth.

The national chains operate differently than smaller independent retailers. With in-house attorneys and

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required to obey a wide range of state regulations, they are less likely to take their chances with ignoring the law. That might explain the generally sound compliance by the national chains, but there is another possible answer. Most of the chains follow the discount model and have never carried top tier cleats.
As for the websites, after a few months of notices, Nike did temporarily halt the direct-to-California illegal selling. But as quickly as it stopped, Nike resumed kangaroo skin shoe sales to Californians, even though the Center has had multiple personal communications with corporate leaders there.

Among the other online retailers, there are big and small companies trying to comply with the law, and big and small companies flouting the l w. When retailers understand adherence is not discretionary, and someone is keeping track, they will likely make the necessary adjustments to be in good standing, given the size of the California market.

It all begins with the officials ch ged with enforcing this law making it a priority, changing their mindset and getting to work.

The Center for a Humane Economy has ten recommendations for California authorities:

1. **California Department of Fish and Wildlife should appoint an enforcement official, for a short period, to orchestrate an enforcement plan:** Appointing the appropriate person of authority to coordinate increased enforcement of § 653o and organizing a task force will create efficiencies and quicker ogress.

2. **Communicate with retailers:** Write letters to stores explaining the law and encouraging voluntary compliance. Direct communication from authorities will bring clarity and motivation.

3. **Communicate with manufacturers:** Write to manufacturers and speak with local sales representatives to stop wholesaling to retailers and selling to consumers on their websites. Corporations have legal teams and computer programmers to swiftly implement best practices.

4. **Communicate with online retailers:** Publish guidance for how online retailers can best comply with § 653o, and follow up to monitor compliance.

5. **Statewide and local:** Coordinate with local law enforcement including Humane Officers to educate soccer stores about § 653o and, if necessary, report noncompliance. Our research found local authorities were unclear on key aspects of this law and its enforcement.

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6. **Ask the public for help:** Notify the public that tip lines are open for reports of noncompliance with § 653o. Be ready to follow up on those tips.

7. **Media:** Use social media and engage with news media through press releases to educate the public about the law.

8. **Talk to marketplace platforms:** Open a dialogue with e-commerce platforms that offer marketplaces, like eBay, to understand how to best achieve the intent of § 653o.

9. E**ncourage enforcement:** Legislators could pass a Resolution or earmarked funding measure; the Attorney General could offer a legal opinion as encouragement

10. **Leadership:** Local and law enforcement may be looking for political leadership to begin fully implementing this law. We call on the Governor, agency heads, leading lawmakers and others to give strong guidance to California's frontline enforcement officers. It is long overdue.

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More on the commercial kangaroo industry in Australia

What's wrong with kangaroo leather?

In rural areas and under cover of darkness kangaroos, Australia's iconic animals, are killed by a profi -driven industry to make kangaroo skin goods like soccer cleats, with more than a million kangaroo skins exported each year to countries worldwide.

The widespread removal of Australia's largest herbivore has major implications for the country's ecological resilience. Over the last decade more than 18.2 million adult kangaroos were recorded as being killed for commercial purposes.

The commercial killing of kangaroos is permitted for four species on the mainland of Australia including the Red Kangaroo (Macropus rufus), Eastern Grey Kangaroo (M. Giganteus), Western Grey Kangaroo (M. fuliginosus) and Wallaroo (M. robustus). The commercial killing of other species in the macropod family such as Bennet's wallaby and pademelons occurs in Tasmania.

Ethical concerns

Although the government's Codes of Conduct require kangaroos to be shot in the brain, many are "body shot," meaning they are wounded but not killed instantaneously. These animals are likely to suffer slow and incredibly painful deaths from gunshot wounds. When an adult female is shot she may have a joey or young kangaroo who is dependent on her for survival. Shooters are instructed to 'euthanize' the joeys of any slaughtered female with either a single blow to the head or a single shot to the brain or heart. The 'single forceful blow to the base of the skull' can be achieved with a blunt object such as a metal pipe or by swinging the young animal's head against a car's tow bar.

A government report (Rural Industries Research and Development Corporation) investigated the fate of joeys after their mothers were killed and found the majority of dependent at-foot joeys had not been euthanized by shooters but were instead left in the fiel , taking up to ten days to die from starvation, exposure or predation without their mothers to teach them vital survival skills.

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Enforcement of the laws to protect kangaroos

Compounding the welfare concerns associated with the killing of kangaroos for commercial purposes are issues with enforcement of laws and prosecutions for offences. The authorities responsible for monitoring the industry and ensuring animal welfare are also responsible for promoting the industry. This confli t of interest often results in the prioritization of the industry agenda over animal welfare. The slaughter of kangaroos is virtually unmonitored in the field and onsequently the Codes are rarely enforced.

Shooting occurs at night in remote and regional areas far from the scrutiny of government regulatory agencies and the general public. There are a limited number of inspectors. For example, in New South Wales, the Office of Environment and Heritage has only one inspector for the state's 309,000 square miles.

Ecological concerns

The commercial industry promotes itself as sustainable by imposing a shooting quota set by the government of between 14 and 20 percent of the estimated population for the four kangaroo species. These quotas allow for an annual kill of between 3.6 and 8.3 million kangaroos. However, population estimates are very imprecise.

Given the vast size of Australia, population surveys are conducted aerially using a fi ed-wing aircraft or helicopter. But kangaroos are hard to spot, as vegetation can obscure sight and kangaroos like to relax in the shade during the day. Therefore, the government uses a "correction factor" assuming for every kangaroo sighted there may be seven or ten unseen.

The problem with correction factors is their tendency to infl te kangaroo population estimates. In addition, scientists have raised concerns that with population growth rates averaging a maximum of 10% across kangaroo species in good conditions, shooting quotas are too high to maintain viable populations. While the total number of kangaroos killed for commercial purposes declined slightly between 2010 and 2018 with an average of 1.57 million adult kangaroos killed annually (Department of the Environment and Energy, 2019), the total allowable "take" quota increased by almost 70% between 2010 and 2016 to make it appear the killing is within sustainable levels.

Consequently, some locations are being depleted of kangaroos, now facing localized extinction. In the state of South Australia, Red Kangaroo numbers declined by more than 39% from 2018 to 2019. In the Northeast commercial zone in South Australia, Wallaroo numbers declined by 92% since 2017 and Western Grey Kangaroos declined by 77% from 2018 to 2019. In Queensland, the 2020 commercial kill in two

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western commercial zones was suspended as populations of Eastern Grey Kangaroos and Wallaroos declined below trigger points.

It is unknown what the cumulative impacts of severe drought, extreme heat, and widespread fi es causing wildlife deaths and habitat destruction on a massive scale will be on kangaroo populations. The "sustainable harvest quotas" are intended to ensure conservation of kangaroo populations. Clearly the intention differs from reality.

More information on the killing of kangaroos can be found on www.kangaroosarenotshoes.com.

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From: Phoebe Lenhart [redacted]
Sent: Tuesday, August 4, 2020 1:29 PM
To: FGC <FGC@fgc.ca.gov>; Lehr, Stafford@Wildlife <Stafford.Lehr@wildlife.ca.gov>; Fresz, Shawn@Wildlife <Shawn.Fresz@wildlife.ca.gov>; Stoddard, Jeffrey@Wildlife <Jeffrey.Stoddard@wildlife.ca.gov>; Bartlett, Tina@Wildlife <Tina.Bartlett@wildlife.ca.gov>; Burkholder, Brad@Wildlife <Brad.Burkholder@wildlife.ca.gov>; Gardner, Scott@Wildlife <Scott.Gardner@wildlife.ca.gov>; Denryter, Kristin@Wildlife <Kristin.Denryter@Wildlife.ca.gov>; Roger Gitlin <rgitlin@co.del-norte.ca.us>
Subject: Roosevelt elk, FGC meeting August 18-19, 2020. Agenda item #2 (the DFW stated that the Roosevelt elk are not an item on the agenda)

Dear FGC and Mr. Stafford Lehr,

You may not be pleased to hear from me again, it appears necessary due to deliberate deception by the DFW's staff during the Del Norte County (DNC) Board of Supervisors (BOS) meeting on July 14, 2020. Supervisor Roger Gitlin (1:09 hours) asked a DFW staff how many Roosevelt elk are in DNC? The reply from this DFW staff was "minimum count, 1,500" Roosevelt elk. The DFW staff misled the DNC BOS (and the public) with false population statistics. The DFW"S own biologist, Ms. C Hilson, has counted and reported to the DFW 404 Roosevelt elk living in DNC (NOT 1,500). I send this E-mail requesting that the DFW not only publicly apologize for deceiving the BOS, but also to insist on immediate retraction of this erroneous statement made by DFW staff promptly! For the record, I request that the correct population of 404 Roosevelt elk is given.

For accurate data on the Roosevelt elk, I refer the DFW and the BOS to a report published by the Redwood National and State parks, "2018 Herd Unit Classification and Management of Roosevelt Elk" (K Schmidt, October 2019). The population statistics in this report, basically confirm the findings of Ms. Hilson; there are a few hundred Roosevelt elk in northwest CA (NOT 1,500 elk in DNC). In addition, this professional research documents include the ratio of calves per cows (overall declining percentage) and the bull: cow ratio (in precipitous decline since 2012).

Also, it is important for the DFW to specify that of these 404 Roosevelt elk, an estimated 200 elk are calves and spikes (immature bulls); indicating that there are instead, approximately 200 mature elk in DNC. This is such a small number, that I believe it puts the Roosevelt elk at risk for extinction! The DFW should know that this population of Roosevelt elk is very marginal, yet this concern is never addressed. Rather, the DFW approves tags to hunt more and more Roosevelt elk in DNC every year. The arrival of the TAHD threatens the vulnerability of our fragmented, small herds.

Research at Washington State University (WSU) confirms that the TAHD infected elk ("limping" due to the debilitating pain caused by the TAHD disease) do NOT make for successful breeders. Both the bulls and the cows are incapacitated, thus, the birth rate of calves declines. According to WSU, up to 90% of the Roosevelt elk in a herd can have some stage of development of TAHD.

Further, the FGC and Mr. Lehr, according to DFW staff, there are no plans to curtail hunting permits in DNC (1:11 hours); yet, there are only approximately 200 mature Roosevelt elk (among 9 herds, per Ms. Hilson). Among those, it appears that 30 Roosevelt elk, per DFW staff, are under "surveillance" for

TAHD. The DFW staff stated that the DFW has the ability to limit the pressure on herds if the DFW staff "FEELS" a need to do so (1:06 hours).

I would like to remind the DFW and the FGC that wildlife management is NOT a "feely" subject, it is a science. Good stewardship is not based on "feely" decisions, it is based upon science. Obviously, if this DFW staff does not "feel" a need to restrict hunting pressure this year (with 30 Roosevelt elk under "surveillance" for TAHD); then, he states that he won't. I take issue with the DFW staff and whether the DFW "feels" like protecting our healthy cows and bulls. Again, I think the DFW is taking the wrong approach (which I have observed the DFW as having a history of doing so over the past 5 years). It is as basic as attending to the research at WSU.

It is critical to many of us that the DFW staff protect the healthy elk from hunters. It appears to me that the DFW staff is more concerned about the satisfaction of "happy hunters", than the consideration of the welfare of our suffering Roosevelt elk. By comments made during the DNC BOS presentation, the DFW exhibits more sympathy for the hunters (who want to kill trophy elk), than empathy for the Roosevelt elk suffering from this painful TAHD. This warped mentality is unacceptable. Is it any coincidence that the DFW has accepted $243, 227 from the Rocky Mountain Elk Foundation (RMEF) and has more affiliation with them, than with the public and tourists who enjoy viewing our Roosevelt elk (which apparently were healthy, now, they are at risk of death)?

The DFW staff stated concern about "population density" (1:07 hours). Obviously, the CA DFW does not know anything about the history of the arrival of the Roosevelt elk in North American, 35,000 years ago. Before the discovery of CA by the white man in the 1800's, Roosevelt elk traveled in herds in the "hundreds of thousands". The Roosevelt elk did not suffer and die from TAHD 200 years ago. The Roosevelt elk need competent scientific management, not "feely" regulations.

In addition, the FGC and Mr. Lehr, tragically there are reports from reliable sources that the TAHD has spread to Roosevelt elk herds in Orick. That indicates to me that the TAHD arrived in DNC much earlier then in 2019; it is possible that the TAHD has been in CA for at least 2-3 years without DFW staff acknowledgment. None of the DFW reports on Roosevelt elk since the "Draft Environmental Document, Elk Hunting" (dated Dec. 8, 2015) have ever addressed this TAHD spreading from Washington into Oregon and form Oregon into CA! What could be more important for the DFW staff to address than the threat and the impact of the spread of the TAHD to our Roosevelt elk herds? An infection that can only be treated by gunshot (death)! The promise by DFW staff, "surveillance, surveillance" did not stop the spread of this deadly TAHD into northern CA.

Once again, the FGC and Mr. Lehr, I want to refer the DFW to the theory regarding the use of toxic herbicides used in commercial agriculture and forestry. I have shared research (www.columbianinsight.org Gosch, Nov. 19, 2019) on the impact herbicides have on the Roosevelt elk's forage. In particular, "atrazine" was found by the National Toxicology Program (US Department of Health and Human Services) to adversely affect the immune system and was banned by the European Union in 2004 (www.chronline.com Gosch, Nov. 18, 2019).

In an article (www.columbian.com August 2, 2020), the progression of the TAHD over the past 10 years in an area in WA is suspected to be due to the spraying of herbicides. One resident observed that the new outbreaks of TAHD are occurring in areas near timberlands. Another observer noted how "sterile" the timberlands are after spraying without any signs of life among grouse, rabbits, and birds. I have not heard that the DFW is taking any samples of the soil to test for herbicides.

Currently, the DFW has at least 4 methods that they can implement to kill Roosevelt elk. It is tragic that the DFW does nothing to save our Roosevelt elk. The DFW has deliberately and consistently misled the public regarding the population of Roosevelt elk for at least the past 5 years. During this time, I have had the unfortunate experience of interacting with too many incompetent DFW staff. In my analysis, too many incompetent DFW staff to warrant funding by CA taxpayers. There appears to be no accountability here. If there can be social movements to demand reform, due to the destructive attitudes in police departments; then, I don't see why the same call for reform can't apply to encourage a social movement to de-fund the CA DFW. This institution presents itself as causing more harm to the magnificent environment in CA, than creating good.

Sincerely,
Phoebe Lenhart
Supporters for Del Norte Roosevelt Elk

From: Fresz, Shawn@Wildlife <Shawn.Fresz@wildlife.ca.gov>
Sent: Wednesday, August 5, 2020 12:39 PM
To: Phoebe Lenhart [redacted]; FGC <FGC@fgc.ca.gov>; Lehr, Stafford@Wildlife <Stafford.Lehr@wildlife.ca.gov>; Stoddard, Jeffrey@Wildlife <Jeffrey.Stoddard@wildlife.ca.gov>; Bartlett, Tina@Wildlife <Tina.Bartlett@wildlife.ca.gov>; Burkholder, Brad@Wildlife <Brad.Burkholder@wildlife.ca.gov>; Gardner, Scott@Wildlife <Scott.Gardner@wildlife.ca.gov>; Denryter, Kristin@Wildlife <Kristin.Denryter@Wildlife.ca.gov>; Roger Gitlin <rgitlin@co.del-norte.ca.us>
Subject: RE: Roosevelt elk, FGC meeting August 18-19, 2020. Agenda item #2 (the DFW stated that the Roosevelt elk are not an item on the agenda)

Good afternoon everyone,

I would like to clarify and respond to Phoebe's first paragraph in her email below. During the July 14 Del Norte County Board of Supervisor meeting, the question of minimum counts for Roosevelt elk in Del Norte county was asked by supervisor Gitlin. The question was misunderstood and the answer of 1500 was given as an answer. 1500 is in fact the minimum count for Roosevelt elk in the entire North West Zone. The minimum count for elk in Del Norte in 2018 was 451. The minimum count for elk in Del Norte in 2019 was 404 but two herds were not able to be counted. I hope this clears up any confusion and I assure you that no deliberate deception was intended or will ever be intended by Department staff. I will also correct this misunderstanding with the Del Norte county Board of Supervisors. Please let me know if you have further questions.

Thank you,

Shawn Fresz
Lands and Wildlife Program Supervisor
California Department of Fish And Wildlife
619 2nd Street, Eureka California
[redacted]

*Please be advised that after 4/1/2020 my office number will be disconnected. Please use my cell phone number.

From: jonnel covault [redacted]
Sent: Wednesday, August 5, 2020 10:30 AM
To: FGC <FGC@fgc.ca.gov>
Subject: Comment re: Roosevelt elk on 8/18-19/2020 Agenda, item #2

Dear Wildlife Managers,

As a resident of Crescent City, who moved here for the wild and scenic recreation and beauty, I'm very concerned about the health of our Roosevelt elk.

After reading several studies, including "Treponeme-Associated Hoof Disease of Free-Ranging Elk (Cervus elaphus) in Southwest Washington State, USA" (Sept. 24, 2018), I became concerned that there is no way to stop TAHD. I talked to Kristin Mansfield, a co-author of this study. She said they had aggressively culled the St. Helens herd and so far there is no evidence that it stopped TAHD. I read a 2007 report from the USDA Wildlife Services on managing wildlife diseases. Culling was Not one of their top choices.

Collin Gillin, ODFW, told me that the spirochete bacteria is virulent and can live in the soil. It is disturbing how similar TAHD is to Bovine Digital Dermatitis (BDD). The 2018 SW WA study points to the giant Cowlitz drainage mudslide, where 200 cows died, as the probable moment when TAHD was "born". Could dairy cows be transmitting BDD to elk? There are certainly plenty of examples of animals infecting humans, and of cows infecting wildlife and vice versa. Can money from elk tags go to fund more research?

Please do not increase the hunting of healthy elk until there is scientific evidence that hunting will help this situation. The 2007 USDA Wildlife Services report says that culling can disturb social structures which can lead to more migration, which can spread disease. Yes, culling suffering elk, with no hooves, mimics natural processes. But it is counterintuitive to kill healthy elk when the herd is sick.

If aggressive hunting is a legitimate method to address TAHD, the public needs to be aware of the scientific evidence.

Thank you,

Jonnel Covault

Crescent City

From: Janet Gilbert [redacted]
Sent: Wednesday, August 5, 2020 5:00 PM
To: FGC <FGC@fgc.ca.gov>
Subject: Roosevelt elk tag allotments

Warning: This email originated from outside of CDFW and should be treated with extra caution.

Dear California Fish and Game Commisioners, Thank you for the opportunity to weigh in on the issue of Roosevelt Elk tag allotments numbers for hunts and TAHD.
I am very concerned that the tag allotment is too large and may result in a decrease in population numbers in Del Norte. As you know this is a species in recovery from near extinction and does not appear to be close to the recommended population numbers for the area as per the Del Norte elk count of 404 elk and as per the data collected for the past tens of years through Redwood National and State Parks annual elk report. (2018 is the last available data) Elk populations appear to fluctuate yearly up and down without showing great leaps in elk numbers.
Now we have evidence of an infection in elk hoofs and our proposed hunt tag numbers are not targeting "damage hunts". This seems unwise to me in that you are changing the ratio of diseased to non-diseased in the population increasing the fraction of diseased.
Please reduce the number of trophy hunts and seek more data in the disease status and severity.
Thank you for the opportunity to engage in the process.

Sincerely,

Janet Gilbert

California Fish and Game Commission

Staff Report on Staff Time Allocation and Activities

August 11, 2020

Given the challenges that Commission staff is facing, we are again reminded of the importance of how staff time is allocated. The recent service-based budgeting project further emphasized the need to prioritize workload given that the Commission does not have sufficient staffing and funding to meet its mission. While all the work of the Commission is important, insufficient resourcing requires prioritizing some activities over others.

This report identifies where time was allocated in general activity categories, trends in staff time allocation, and examples of the specific activities in which staff engaged during the months of June and July 2020.

General Time Allocation

Task Category	June Staff Time	July Staff Time
Regulatory Program	12%	10%
Non-Regulatory Program	6%	7%
Commission/Committee Meetings	37%	19%
Legal Matters	5%	5%
External Affairs	6%	7%
Special Projects	7%	10%
Administration	23%	26%
Leave Time	7%	18%
Unfilled Positions	6%	6%
Total Staff Time[1]	109%	107%

[1] *Total staff time is greater than 100% due to overtime*

Trends

Administrative responsibilities related to the COVID-19 pandemic are ongoing, resulting in the increase seen in the “administration” category. Responding to evolving guidance from various agencies, implementing safety and other protocols, and learning new technologies require additional staff time. Staff continues to adjust to the high priority demands as it identifies other important tasks that are lesser priority and can be temporarily set to the side, and works to refine processes for this virtual reality that is expected to be the norm for the foreseeable future. Though faced with these challenges, staff continues undaunted in efforts to improve job performance, which is also captured under administration. For instance, to enhance and bring more consistency to staff research, analytical and writing skills, staff has been holding short workshops together as a team to tackle specific needs.

With the onset of COVID-19, Commission meetings have taken more staff time than in the past to prepare for and conduct, as evidenced by the increase in time allocated for the June meeting. Staff has adjusted processes and procedures to the virtual format and continues to

make adjustments with our new audio-visual and webcasting contractor, including researching ways to more closely align official meeting minutes with the format used pre-COVID.

In early July, staff finished aligning its time-tracking categories with tasks and categories developed during the service-based budgeting project, and started applying the new system with the fiscal year that began in July. While the effort required a good deal of time, the investment will pay off during each year's reporting activities and the five-year reassessment at the mission level. In addition, during both months, work resumed in earnest on the coastal fishing communities and bullfrog projects. Combined, these activities led to an increase in the special projects category.

Sample of Activities for June 2020

- Prepared for and conducted one publicly noticed meeting (June 24-25 Commission)
- Began preparations for one publicly noticed meeting (July 29 Marine Resources Committee) and the annual tribal planning meeting
- Responded to requests from the California Natural Resources Agency (CNRA), the California Government Operations Agency, the California Department of Human Resources, and the California Department of Fish and Wildlife (CDFW) for data and information related to the COVID-19 pandemic
- Participated in weekly COVID-19 task force calls with CNRA and directors of other state agencies in the natural resource family
- Coordinated with audio-visual and webcast contractors, and CDFW and CNRA staff, to develop and implement new protocols for hosting meetings remotely
- Continued onboarding new regulatory analyst
- Participated in virtual conference *Online Environmental Engagement*, focused on how to ensure community voice and equity in the era of COVID-19
- Coordinated joint quarterly meeting with DFW Regulations Unit
- Continued analysis of California Law Revision Commission's proposed changes to California Fish and Game Code
- Participated in Coastal Fishing Communities meetings
- Participated in kelp and other marine algae stakeholders meeting
- Participated in wildlife conservation and wildlife behavior webinars

Sample of Activities for July 2020

- Prepared for and conducted one publicly noticed meeting (July 29 Marine Resources Committee) and the annual tribal planning meeting
- Began preparations for two publicly noticed meetings (August 18 Tribal Committee and August 19-20 Commission)
- Responded to requests from CNRA, the California Government Operations Agency, the California Department of Human Resources, and CDFW for data and information related to the COVID-19 pandemic
- Participated in weekly COVID-19 task force calls with CNRA and directors of other state agencies in the natural resource family

- Management team began formal incident command system training via the Federal Emergency Management Agency
- Implemented COVID-19 stay-at-home modification plan for Commission office
- Participated in CDFW staff broadcast meeting with CDFW director
- Engaged in CDFW consultation with Sinkyone InterTribal Wilderness Council
- Participated in MPA Statewide Leadership Team meeting
- Participated in wildlife conservation and wildlife behavior webinars
- Participated in the Secretary Speaker Series events *Preserving Conservation: Revitalizing Fish and Hunting* and *What We Can Learn From Our Past to Move Toward an Equitable Future*

Sample Tasks for the General Allocation Categories

Regulatory Program

- Coordination meetings with DFW to develop timetables and notices
- Prepare and file notices, re-notices, and initial/final statements of reasons
- Prepare administrative records
- Track and respond to public comments
- Consult, research and respond to inquiries from the Office of Administrative Law
- Facilitate CEQA document review, certification of findings, and filing with state clearinghouse.

Non-Regulatory Program

- DFW partnership, including jointly developing management plans and concepts
- Process and analyze non-regulatory requests
- Develop, review and amend Commission policies
- Research and review adaptive management practices
- Review and process California Endangered Species Act petitions

Commission/Committee Meetings and Support

- Research and compile subject-specific information
- Review and develop policies
- Develop and distribute meeting agendas and materials
- Agenda and debrief meetings
- Prepare meeting summaries, audio files and voting records
- Research and secure meeting venues
- Develop and distribute after-meeting memos/letters
- Make travel arrangements for staff and commissioners
- Conduct onsite meeting management
- Process submitted meeting materials
- Provide commissioner support (expense claims, office hours, etc.)
- Process and analyze regulatory petitions

Legal Matters

- Public Records Act requests
- California Law Review Commission
- Process appeals and accusations
- Process requests for permit transfers
- Process kelp and state water bottom leases
- Litigation
- Prepare administrative records

External Affairs

- Engage and educate legislators, monitor legislation
- Maintain state, federal and tribal government relations
- Correspondence
- Respond to public inquiries
- Website maintenance

Special Projects

- Coastal Fishing Communities
- Fisheries Bycatch Workgroup
- Streamline routine regulatory actions
- Strategic planning
- Aquaculture best management practices
- Website accessibility issues
- Service-based budgeting

Administration

- Staff training and development
- Purchases and payments
- Contract management
- Personnel management
- Budget development and tracking
- Health and safety oversight and COVID-19 responses
- Internal processes and procedures
- Document archival

Leave Time

- Holidays
- Sick leave
- Vacation or annual leave
- Jury duty
- Bereavement
- Contact tracing

Vice President Samantha Murray Statement on Equity, Diversity and Inclusion

June 24, 2020

Before we start our meeting I want to take this moment to acknowledge explicitly that as Vice President of the California Fish and Game Commission, I stand against racism, white supremacy, violence against Black communities, and the silencing of marginalized communities.

I applaud the work of organizations like Outdoor Afro, Brown Girl Surf, Textured Waves, Black Girl Surf, HECHO, Latino Outdoors and Latinx Marinos, who are connecting people of color, increasing access to outdoor experiences, and changing the face of conservation. I was inspired by the inaugural Black Birders Week that took place earlier this month. And I celebrate the work of hunting and fishing organizations who are dedicated to increasing representation of Black and Latinx outdoorspeople, while tearing down stereotypes and barriers to participation. I recognize and see the stewardship work that Tribes throughout California have done since time immemorial and am invigorated by the newly formed Tribal Marine Stewards Network.

As the California Fish and Game Commission, I believe we can learn a lot from these entities, so that we are more deliberately fostering a culture of inclusion for Black, Indigenous and People of Color in outdoor recreation and conservation. And so that we are intentionally setting a table for dialogue that includes seats for those who have been historically underrepresented or marginalized in our discussions.

I see my own positionality as a white, privileged woman on this Commission. And I acknowledge the whiteness and privilege of many of my colleagues leading and engaged in fish and wildlife management and conservation. I am committed to leveraging my spheres of influence, developing my personal anti-racism plan, and demonstrating and practicing inclusion, equity and diversity in both visible and internal ways within this Commission.

But I realize it's not enough to just make a powerful statement. I acknowledge we have a lot of listening, learning and unlearning to do. And I recognize it will take sustained effort for FGC to make tangible gains toward more inclusive engagement and ensuring equitable impacts of our policies. For example, we must:

- support equity in our upcoming strategic plan, in tangible and specific ways;
- commit to working with California Department of Fish and Wildlife to address inclusivity barriers in recruiting, retaining and reactivating diverse participants in fishing, hunting, archery, bird watching, wildlife photography, diving and more, so that all Californians who wish to, can enjoy these activities;
- continue to prioritize our work within the Tribal Committee and through our Tribal Consultation Policy, in partnership with the tribes of California;
- double down on our commitment to engage marginalized stakeholders in our decision-making so that our policies have more equitable impacts on Californians; and
- see and hear those communities who rely on subsistence fishing for nourishment, especially those who don't speak English or use English as a second language.

I see these challenges as opportunities and I am emboldened to have the uncomfortable conversations as we work toward equity and justice for Black, Indigenous and People of Color, within the mission of the California Fish and Game Commission.

Taken together with the ongoing economic, social justice and public health impacts of COVID-19, I know this is an exceedingly difficult time for everyone. And I want to explicitly acknowledge the challenges associated with holding space to both be here today to speak on behalf of your interest in the fish and wildlife of California, while also standing alongside communities in support of human rights and equity, and managing personal circumstances related to COVID-19.

So, thank you for being here today, in spite of this impossibly difficult backdrop, in this extraordinary moment. The work we do here together matters. And our policies *are better* when informed by inclusive, wide-ranging voices and varied perspectives.

We won't always agree on every issue and I don't have all the answers, but do know that there is a seat for all stakeholders at the California Fish and Game Commission table. Together, I know we can find ways to make California more just, more civil, more equitable, more livable, and more enjoyable for all its inhabitants, into the future.

Statement by Commissioner Peter S. Silva

June 25, 2020

Thanks for allowing me time to make opening remarks for today's meeting.

First, I want to thank Vice President Murray and [California Department of Fish and Wildlife] Director Bonham for their inspiring and heartfelt words yesterday regarding the difficult times we are experiencing, both with respect to social justice issues as well as the deadly pandemic, COVID-19. I will build on their comments.

In thinking about what to say today, I decided it might be best to share my experience and perspective as a person of color in this society.

As background, I am a first-generation American of Mexican descent and also am proud of my rich Native American heritage. I was born and raised in the small town of Brawley, California, one of 13 children. Growing up, my father was a farm worker who worked hard to keep food on the table and provide for his family.

Looking back on my younger years, very early on I was made to feel somehow different, not totally American. Even through high school, there were many subtle and not-so subtle actions that at times made me ashamed of my Mexican heritage.

Despite some obstacles, I was able to obtain a college degree and make a career in civil engineering. While going through college and through most of my career, it has been disappointing to see the lack of diversity in my chosen field.

Even in California, there were times where clearly the color of my skin was a factor in decisions that negatively affected my career.

Fast forward to today.

I am older and wiser and can tell you from personal experience that white privilege does indeed exist.

I fully understand how most, it not all, people of color in this country are made to feel less than whole as an American. It is disheartening to know that the president of the United States feels that Mexicans coming to this country are largely murderers and rapists. Yes, racism is still alive and well.

But I do have hope. The numerous protests that we have seen in this country are bringing attention to the long-standing issue of social injustice that has long plagued our country.

Part of my hope is that I am finally hearing from the white community that indeed there is white privilege. I applaud both Vice President Murray and Director Bonham for making that statement in their remarks yesterday. We cannot have a dialogue about race without first agreeing on what the core issues are, and where we are starting from.

So, what does this mean for us as a commission and the department?

I have a few thoughts:

I agree totally with Vice President Murray that we have to work harder to ensure that our work at the commission can better engage people of color and disadvantaged communities in all of our programs. I also challenge the department to make this a priority.

Director Bonham raised the point about training for his staff on diversity issues and I support his effort. However, I think it goes beyond that to hiring and ensuring that our commission and department staffs reflect the diversity that we have currently in California.

We have some work to do as a commission and as a society to get to a better place for social justice. Again, I am hopeful and look forward to working together to do our part.

Thank you.

California Fish and Game Commission
Delegations to the Executive Director

Adopted June 24, 2020

The California Fish and Game Commission (Commission) has a wide range of responsibilities, some general in nature and some very specific. While the Commission meets at least once per month via committee or regular meetings, its authorities require daily actions to meet its responsibilities and, hence, employs an executive director and other staff to assist in conducting the Commission's operations.

The Commission believes that inherent in the employment of its executive director and other staff, those staff members have authority to carry out functions to help the Commission fulfill its responsibilities. However, the Commission adopts this document to explicitly authorize and ensure that its staff has the ability to maintain full functionality of the Commission. By adopting this document, the Commission grants power for future actions and ratifies past staff action consistent with this grant.

Conditions of Delegations

1. The Commission reserves the power to continue to exercise all lawful authority and this action is not a relinquishment of any such authority.
2. The delegations herein are not exclusive and the Commission reserves the power to delegate other powers by other means on a temporary or permanent basis
3. These delegations do not supersede any previous delegations (including authority in regulation such as CESA petition processing in Section 670.1, regulatory petition processing in Section 662, and adding meeting agenda items in Section 665(a)(3)(B)4.).
4. The executive director is granted the power to further delegate to other Commission staff or legal counsel the authority provided herein to the extent not expressly prohibited by this delegation, or not expressly prohibited by law.
5. The executive director shall report to the Commission at each regular meeting on important delegated actions.

Delegations

The Commission hereby grants authority upon its executive director for the functions listed herein.

Regulations

1. Perform all functions necessary to carry out decisions of the Commission regarding regulatory actions; those functions include, but are not limited to:
    a. Prepare and submit notices and other documents to the Office of Administrative Law (OAL) consistent with Commission action on a regulatory agenda item.
    b. Communicate with OAL regarding submissions and responding to issues raised by OAL or the public.
    c. Withdraw rulemaking submissions in response to OAL objections or proposed objections and resubmit revised documents addressing OAL issues or concerns

d. Develop final statements of reason and associated responses to public comments.
e. Draft and file statements of proposed emergency regulatory action, consistent with Commission actions.
f. Submit to OAL amendments to Commission regulations in response to a final determination regarding the listing status of a species under the California Endangered Species Act.
g. Submit to OAL amendments to Commission regulations for auto-conforming to federal regulations.
h. Provide notice of amendments to the regulation or the rulemaking file pursuant to sections 11346.8 and 11347.1 after the Commission's final decision.
i. Adopt, amend, or repeal a regulation consistent with a final decision and any notice provided in h. above.

Adjudicatory Matters

2. Issue warnings in lieu of instituting a discretionary suspension or revocation of any license or permit.
3. Issue notice of revocation for instances of non-discretionary revocation (such as that under California Fish and Game Code Section 12155).
4. Assign hearing officers for the conduct of hearings on adjudicatory matters pending before the Commission (with a proposed decision resulting for the Commission's final consideration).
5. Entry of any orders that do not terminate the proceeding either in response to a party's motion or without prompting.
6. Issue notices regarding the status of adjudicatory matters pending before the Commission.
7. Reject untimely appeals.
8. Enter orders terminating any proceeding in response to settlement of the parties or in an otherwise uncontested matter.

Ongoing and Pending Litigation

9. Accept service of process on behalf of the Commission.
10. Refer litigation to the Office of the California Attorney General and request representation.
11. Make procedural determinations related to litigation strategy.
12. Negotiate terms of settlements in response to offers from other parties (with final approval reserved to the Commission).

California Environmental Quality Act

13. All actions necessary to comply with the California Environmental Quality Act (CEQA), the guidelines generally implementing CEQA, and the Commission's Certified Regulatory Program approved under CEQA, except that the following authority is not delegated: (1) reviewing and considering a final environmental impact report (EIR or a functional equivalent document under the Commission's Certified Regulatory Program) or approving

a negative declaration or mitigated negative declaration prior to approving a project, (2) making findings as required by Section 21081of the Public Resources Code, and (3) approving a project under CEQA. This delegation includes but is not limited to:

a. Determining whether a project is exempt.
b. Conducting or causing to be conducted an initial study and deciding whether to prepare a draft EIR or negative declaration.
c. Preparing a negative declaration, mitigated negative declaration, or EIR.
d. Independently reviewing and analyzing any report or declaration required by CEQA that is prepared by anyone other than the Commission or its staff to determine whether those documents reflect the independent judgment of the Commission.
e. Circulating draft documents that reflect the Commission's independent judgment.
f. Determining that a negative declaration has been completed within a period of 180 days.
g. Preparing responses to comments on environmental documents.
h. Filing notices.

Contracts and Procurement

14. Obligate and manage Commission funds and all associated processing for the expenditure of those funds.
15. Execute contracts and amendments to contracts on behalf of the Commission or authorize the execution of those documents.
16. Acquire, maintain and dispose of tangible property, excluding real property, deemed appropriate for aiding in Commission and Commission staff functioning.
17. Execute leases and amendments to leases consistent with Commission approval to lease specific water bottoms for purposes of aquaculture.
18. Execute leases and amendments to leases consistent with Commission approval to lease kelp beds for the exclusive harvest of kelp.
19. Execute non-substantive amendments to leases for kelp beds or leases for water bottoms.

Interagency and External Affairs

20. Act as tribal liaison and engage in consultations and negotiations with California tribes and tribal communities.
21. Represent Commission interests on formal and informal interagency and stakeholder work groups, leadership teams, and committees.
22. Submit reports to the California State Legislature where required by California Fish and Game Code.
23. Meet with legislators, legislative staff, and legislative committees and caucuses concerning subjects related to the work of the Commission, consistent with Commission direction.
24. Meet with local, state and federal government entities concerning subjects related to the work of the Commission.

25. Meet with members of the public and representatives of organizations concerning subjects related to the work of the Commission.

General Administration

26. Administer all personnel rules and take any personnel actions relating to employees of the Commission, contractors, or volunteers.
27. Make all necessary preparations for conducting Commission meetings.
28. Receive and send correspondence.
29. Develop and maintain document retention schedules for all Commission records and maintain Commission records consistent with those schedules.
30. Authorize federal acquisitions through the Migratory Bird Conservation Commission, when the affected county/counties and the California Department of Fish and Wildlife are in support.
31. Perform other administrative actions as may be necessary to supervise, direct, conduct, and administer the operations of the Commission pursuant to its duties under the California Fish and Game Code and other provisions of California law applicable to the Commission.

Department of Fish & Wildlife Legislative Report

August 2020

(as of August 10, 2020)

AB 235

(Mayes I) Endangered species: candidate species: petitions: takings.
Introduced: 1/18/2019
Last Amend: 6/29/2020
Status: 7/2/2020-Re-referred to Com. on N.R. & W.
Location: 7/2/2020-S. N.R. & W.
Summary: The California Endangered Species Act requires the Fish and Game Commission to establish a list of endangered species and a list of threatened species and to add a species to, or remove a species from, either list if it finds, upon the receipt of sufficient scientific information, and based solely upon the best available scientific information, that the action is warranted. The act requires a petition for the listing or delisting of a species to include, at a minimum, sufficient scientific information that the petitioned action may be warranted, including information regarding the population trend, range, distribution, abundance, and life history of the species, the factors affecting the ability of the population to survive and reproduce, and the degree and immediacy of the threat. This bill would require the commission to accept a petition for consideration concurrent with a taking if the commission finds that the petition provides sufficient information to indicate that the petitioned action may be warranted, but the geographic proliferation of the species may lead to significant economic hardship or an impact on critical infrastructure during the above-described review of an accepted petition, and if a preponderance of the evidence presented in the petition shows there is no direct threat to the species that would lead to its decline during that period.

AB 352

(Garcia, Eduardo D) Wildfire Prevention, Safe Drinking Water, Drought Preparation, and Flood Protection Bond Act of 2020.
Introduced: 2/4/2019
Last Amend: 8/14/2019
Status: 8/14/2019-From committee chair, with author's amendments: Amend, and re-refer to committee. Read second time, amended, and re-referred to Com. on EQ.
Location: 8/14/2019-S. E.Q.
Summary: Would enact the Wildfire Prevention, Safe Drinking Water, Drought Preparation, and Flood Protection Bond Act of 2020, which, if approved by the voters, would authorize the issuance of bonds in the amount of $3,920,000,000 pursuant to the State General Obligation Bond Law to finance a wildlife prevention, safe drinking water, drought preparation, and flood protection program. The bill would provide for the submission of these provisions to the voters at the November 3, 2020, statewide general election. The bill would provide that its provisions are severable.

AB 559
(Arambula D) Millerton Lake State Recreation Area: acquisition of land.
Introduced: 2/13/2019
Status: 6/23/2020-Referred to Com. on N.R. & W.
Location: 6/23/2020-S. N.R. & W.
Summary: Would require the Department of Parks and Recreation to effectively manage lands currently within its jurisdiction in the Millerton Lake State Recreation Area adjacent to the San Joaquin River, and would authorize the department to enter into an agreement with the conservancy to manage lands acquired by the conservancy adjacent to the state recreation area, as specified.

AB 609
(Levine D) California Environmental Quality Act: notices and documents: electronic filing and posting.
Introduced: 2/14/2019
Last Amend: 6/23/2020
Status: 7/1/2020-Re-referred to Com. on EQ.
Location: 7/1/2020-S. E.Q.
Summary: The California Environmental Quality Act requires a lead agency to prepare a mitigated negative declaration for a project that may have a significant effect on the environment if revisions in the project would avoid or mitigate that effect and there is no substantial evidence that the project, as revised, would have a significant effect on the environment. The act requires the lead agency to mail certain notices to persons who have filed a written request for notices. This bill would require the lead agency and the project applicant to post those notices on their internet website.

AB 664
(Cooper D) Workers' compensation: injury: communicable disease.
Introduced: 2/15/2019
Last Amend: 7/31/2020
Status: 7/31/2020-From committee chair, with author's amendments: Amend, and re-refer to committee. Read second time, amended, and re-referred to Com. on L., P.E. & R.
Location: 7/12/2019-S. L., P.E. & R.
Summary: Would define "injury," for certain state and local firefighting personnel, peace officers, certain hospital employees, and certain fire and rescue services coordinators who work for the Office of Emergency Services to include being exposed to or contracting, on or after January 1, 2020, a communicable disease, including COVID-19 that is the subject of a state public health emergency that is issued on or after January 1, 2020. The bill would create a disputable presumption, as specified, that the injury arose out of and in the course of the employment. The bill would require a claim to be presumed compensable, if not rejected within 30 days, as specified. The bill would apply to injuries that occurred prior to the declaration of the state of emergency. The bill would also exempt these provisions from the apportionment requirements.

AB 1022
(Holden D) Peace officers: use of force.
Introduced: 2/21/2019
Last Amend: 7/30/2020

Status: 8/8/2020-From committee: Do pass and re-refer to Com. on APPR. (Ayes 5. Noes 1.) (August 7). Re-referred to Com. on APPR.
Location: 8/7/2020-S. APPR.
Summary: Current law requires each law enforcement agency, on or before January 1, 2021, to maintain a policy that provides a minimum standard on the use of force. Current law requires that policy, among other things, to require that officers report potential excessive force to a superior officer when present and observing another officer using force that the officer believes to be unnecessary, and to require that officers intercede when present and observing another officer using force that is clearly beyond that which is necessary, as specified. This bill would require those law enforcement policies to require those officers to immediately report potential excessive force, and to intercede when present and observing an officer using excessive force, as defined.

AB 1190
(Irwin D) Unmanned aircraft: state and local regulation: limitations.
Introduced: 2/21/2019
Last Amend: 5/1/2019
Status: 6/19/2019-Referred to Com. on RLS.
Location: 5/24/2019-S. RLS.
Summary: Would, among other things, prohibit a state or local agency from adopting any law or regulation that bans the operation of an unmanned aircraft system. The bill would also authorize a local agency to adopt regulations to enforce FAA regulations regarding the operation of unmanned aircraft systems and would authorize local agencies to regulate the operation of unmanned aircraft and unmanned aircraft systems within their jurisdictions, as specified. The bill would also authorize a local agency to require an unmanned aircraft operator to provide proof of federal, state, or local registration to licensing or enforcement officials.

AB 1279
(Bloom D) Planning and zoning: housing development: high-opportunity areas.
Introduced: 2/21/2019
Last Amend: 7/22/2020
Status: 7/22/2020-From committee chair, with author's amendments: Amend, and re-refer to committee. Read second time, amended, and re-referred to Com. on HOUSING.
Location: 4/24/2020-S. HOUSING
Summary: The Planning and Zoning Law allows a development proponent to submit an application for a development that is subject to a specified streamlined, ministerial approval process not subject to a conditional use permit if the development satisfies certain objective planning standards, including that the development is (1) located in a locality determined by the Department of Housing and Community Development to have not met its share of the regional housing needs for the reporting period, and (2) subject to a requirement mandating a minimum percentage of below-market rate housing, as provided. This bill would require the department to designate areas in this state as high-opportunity areas, as provided, by January 1, 2022, in accordance with specified requirements and to update those designations within 6 months of the adoption of new Opportunity Maps by the California Tax Credit Allocation Committee.

AB 1305
(Obernolte R) Junior hunting licenses: eligibility: age requirement.
Introduced: 2/22/2019
Last Amend: 6/18/2019
Status: 6/19/2019-Withdrawn from committee. Re-referred to Com. on RLS.
Location: 6/19/2019-S. RLS.
Summary: Current law requires the Department of Fish and Wildlife to issue various types of hunting licenses, including a discounted hunting license known as a junior hunting license, upon payment of a certain fee from an eligible applicant. Current law provides that, until July 1, 2020, a person is eligible for a junior hunting license if the person is under 18 years of age on July 1 of the licensing year. Existing law provides that, on and after July 1, 2020, a person is eligible for a junior hunting license if the person is under 16 years of age on July 1 of the licensing year. Current law makes conforming changes to certain other types of hunting licenses as a result of the age change for a junior hunting license. This bill would extend the eligibility for a junior hunting license to a person who is under 18 years of age on July 1 of the licensing year until July 1, 2021.

AB 1709
(Weber D) Law enforcement: use of force.
Introduced: 2/22/2019
Last Amend: 7/21/2020
Status: 7/21/2020-From committee chair, with author's amendments: Amend, and re-refer to committee. Read second time, amended, and re-referred to Com. on PUB. S.
Location: 7/2/2020-S. PUB. S.
Summary: This bill would remove the specification that a peace officer making an arrest need not desist in their efforts because of resistance or threatened resistance from the person being arrested. The bill would also require a peace officer to attempt to control an incident through de-escalation tactics, as defined, in an effort to reduce or avoid the need to use force, to render medical aid immediately or as soon as feasible, and to intervene to stop a violation of law or an excessive use of force by another peace officer.

AB 1788
(Bloom D) Pesticides: use of second generation anticoagulant rodenticides.
Introduced: 2/22/2019
Last Amend: 7/30/2020
Status: 7/30/2020-From committee chair, with author's amendments: Amend, and re-refer to committee. Read second time, amended, and re-referred to Com. on APPR.
Location: 7/30/2020-S. APPR.
Summary: Current law prohibits the use of any pesticide that contains one or more of specified anticoagulants in wildlife habitat areas, as defined. Current law exempts from this prohibition the use of these pesticides for agricultural activities, as defined. Current law requires the Director of Pesticide Regulation, and each county agricultural commissioner under the direction and supervision of the director, to enforce the provisions regulating the use of pesticides. This bill, the California Ecosystems Protection Act of 2020, would additionally prohibit the use of any second generation anticoagulant rodenticide, as defined, in this state until the director certifies to the

Secretary of State that, among other things, the Department of Pesticide Regulation has completed a reevaluation of second generation anticoagulant rodenticides and the Department of Fish and Wildlife has determined that the Department of Pesticide Regulation has adopted any additional restrictions necessary to ensure that continued use of second generation anticoagulant rodenticides will not result in significant adverse effects to nontarget wildlife, as provided.

AB 1948
(Bonta D) Taxation: cannabis.
Introduced: 1/17/2020
Status: 3/9/2020-In committee: Hearing for testimony only.
Location: 1/30/2020-A. REV. & TAX
Summary: AUMA requires the Legislative Analyst's Office to submit a report to the Legislature by January 1, 2020, with recommendations for adjustments to the tax rate to achieve the goals of undercutting illicit market prices and discouraging use by persons younger than 21 years of age while ensuring sufficient revenues are generated for specified programs. AUMA authorizes the Legislature to amend its provisions with a 2/3 vote of both houses to further its purposes and intent. This bill would reduce that excise tax rate to 11% on and after the operative date of this bill until July 1, 2023, at which time the excise tax rate would revert back to 15%. The bill would suspend the imposition of the cultivation tax on and after the operative date of this bill until July 1, 2023. The bill would require the bureau, the Department of Food and Agriculture, and the California Department of Tax and Fee Administration to provide the Legislature with reports measuring the success of this bill, as specified.

AB 1949
(Boerner Horvath D) Fisheries: California Ocean Resources Enhancement and Hatchery Program.
Introduced: 1/17/2020
Last Amend: 6/3/2020
Status: 8/5/2020-Action From N.R. & W.: Do pass as amended.To APPR..
Location: 8/5/2020-S. APPR.
Summary: Would expand the purpose of the California Ocean Resources Enhancement and Hatchery to encompass any marine fish species important to sport and commercial fishing. The bill would revise provisions relating to the advisory panel by, among other things, specifying which members are voting members, by adding a voting member representing the public or nongovernmental organization interests, or both, by providing for an alternate member to be designated for each voting member, and by establishing 3-year terms for each member and alternate member. The bill would require all members and alternate members to be appointed by the director after soliciting nominations for members and evaluating certain criteria. Except for the advisory panel's advisory function, the bill would eliminate the advisory panel's other functions, including the power to approve financing of any part of the program.

AB 2028
(Aguiar-Curry D) State agencies: meetings.
Introduced: 1/30/2020
Last Amend: 7/28/2020

Status: 7/28/2020-From committee chair, with author's amendments: Amend, and re-refer to committee. Read second time, amended, and re-referred to Com. on G.O.
Location: 6/23/2020-S. G.O.
Summary: The Bagley-Keene Open Meeting Act requires that all meetings of a state body, as defined, be open and public, and that all persons be permitted to attend any meeting of a state body, except as otherwise provided in that act. Current law requires the state body to provide notice of its meeting, including specified information and a specific agenda of the meeting, as provided, to any person who requests that notice in writing and to make that notice available on the internet at least 10 days in advance of the meeting. This bill would, except for closed sessions, require that this notice include all writings or materials provided for the noticed meeting to a member of the state body by staff of a state agency, board, or commission, or another member of the state body, that are in connection with a matter subject to discussion or consideration at the meeting.

AB 2106
(Aguiar-Curry D) Wildlife habitat: Nesting Bird Habitat Incentive Program: upland game bird hunting validation: state duck hunting validation.
Introduced: 2/6/2020
Last Amend: 8/8/2020
Status: 8/7/2020-From committee: Amend, and do pass as amended and re-refer to Com. on APPR. (Ayes 9. Noes 0.) (August 5). (Amended 8/8/2020)
Location: 8/5/2020-S. APPR.
Summary: Would raise by $5 the upland game bird hunting validation and the state duck hunting validation fees, as specified, with that $5 to be deposited, and available upon appropriation to the department for the Nesting Bird Habitat Incentive Program, in the Nesting Bird Habitat Incentive Program Account, which the bill would create in the Fish and Game Preservation Fund.

AB 2122
(Rubio, Blanca D) Unlawful cannabis activity: enforcement.
Introduced: 2/6/2020
Status: 7/1/2020-Referred to Com. on JUD.
Location: 7/1/2020-S. JUD.
Summary: Would impose a civil penalty on persons aiding and abetting unlicensed commercial cannabis activity of up to $30,000 for each violation. The bill would prohibit an action for civil penalties brought against a person pursuant to MAUCRSA from commencing unless the action is filed within 3 years from the first date of discovery of the violation by a licensing authority or a participating agency, whichever is earlier or earliest. This bill contains other related provisions and other existing laws.

AB 2312
(Quirk D) Cannabis: state temporary event licenses: venues licensed by the Department of Alcoholic Beverage Control: unsold inventory.
Introduced: 2/14/2020
Last Amend: 5/4/2020
Status: 5/5/2020-Re-referred to Com. on B. & P.
Location: 4/24/2020-A. B.&P.

Summary: Would specifically authorize the Bureau of Cannabis Control to issue a state temporary event license to a retail licensee under MAUCRSA authorizing onsite cannabis retail sales of cannabis or cannabis products to, and consumption by, persons 21 years of age or older at an event held at a venue that is licensed by the Department of Alcoholic Beverage Control pursuant to the Alcoholic Beverage Control Act if the activities comply with specified requirements, including that the local jurisdiction authorized the event and onsite sales and consumption of cannabis or cannabis products may only occur in a separate and distinct area from alcohol sales and consumption.

AB 2323
(Friedman D) California Environmental Quality Act: exemptions.
Introduced: 2/14/2020
Last Amend: 7/1/2020
Status: 7/1/2020-From committee chair, with author's amendments: Amend, and re-refer to committee. Read second time, amended, and re-referred to Com. on EQ.
Location: 6/23/2020-S. E.Q.
Summary: CEQA exempts from its requirements certain residential, employment center, and mixed-use development projects meeting specified criteria, including that the project is undertaken and is consistent with a specific plan for which an environmental impact report has been certified. This bill would require that the project is undertaken and is consistent with either a specific plan prepared pursuant to specific provisions of law or a community plan, as defined, in order to be exempt. Because a lead agency would be required to determine the applicability of this exemption, this bill would impose a state-mandated local program.

AB 2370
(Limón D) Ventura Port District: aquaculture plots: federal waters.
Introduced: 2/18/2020
Last Amend: 3/16/2020
Status: 3/17/2020-Re-referred to Com. on L. GOV.
Location: 3/12/2020-A. L. GOV.
Summary: Under the Cortese-Knox-Hertzberg Local Government Reorganization Act of 2000, a city or district may only provide new or extended services by contract or agreement outside of its jurisdictional boundary if it requests and receives written approval, as provided, from the local agency formation commission in the county in which the extension of service is proposed. This bill would, notwithstanding the Cortese-Knox-Hertzberg Local Government Reorganization Act of 2000, authorize the Ventura Port District, to the extent permitted by federal law, to construct, maintain, operate, lease, and grant permits to others for the installation, maintenance, and operation of aquaculture plots in federal waters off the coast of California the County of Ventura, as prescribed, in order to aid in the development or improvement of navigation or commerce to the port district.

AB 2371
(Friedman D) Climate change: Office of Planning and Research: science advisory team: climate adaptation and hazard mitigation.
Introduced: 2/18/2020
Last Amend: 7/8/2020

Status: 7/8/2020-From committee chair, with author's amendments: Amend, and re-refer to committee. Read second time, amended, and re-referred to Com. on EQ.
Location: 6/23/2020-S. E.Q.
Summary: Would require the Office of Planning and Research, by July 1, 2021, to convene a climate science advisory team to provide independent, timely, and science-based advice on the state's climate adaptation and climate-related hazard mitigation efforts and to, among other things, provide input to improve climate adaptation and climate-related hazard mitigation planning across state agencies, including the plan. The bill would require the team to serve as a working group of a specified ICARP advisory group. The bill would require the team to provide recommendations to inform certain activities of the council regarding climate change.

AB 2437
(Quirk D) Civil actions: statute of limitations.
Introduced: 2/19/2020
Last Amend: 3/10/2020
Status: 3/17/2020-In committee: Hearing postponed by committee.
Location: 2/27/2020-A. JUD.
Summary: MAUCRSA imposes a 5-year statute of limitations for a licensing authority to file accusations and to seek a fine against a licensee for noncompliance with MAUCRSA's provisions, except as specified. MAUCRSA also permits a licensing authority, the Attorney General, a district attorney, a county counsel, a city prosecutor, or a city attorney to bring an action for civil penalties against a person engaging in commercial cannabis activity without a license of up to 3 times the amount of the license fee. Current law requires specified actions upon a statute for a penalty or forfeiture to commence within one year. This bill would require the agency bringing the civil action for penalties to do so within three years of discovery of the facts constituting the grounds for commencing the action.

AB 2621
(Mullin D) Office of Planning and Research: regional climate networks: climate adaptation action plans.
Introduced: 2/20/2020
Last Amend: 7/2/2020
Status: 7/2/2020-From committee chair, with author's amendments: Amend, and re-refer to committee. Read second time, amended, and re-referred to Com. on EQ.
Location: 7/1/2020-S. E.Q.
Summary: Current law requires, by July 1, 2017, and every 3 years thereafter, the Natural Resources Agency to update, as prescribed, the state's climate adaptation strategy, known as the Safeguarding California Plan. Current law establishes the Office of Planning and Research in state government in the Governor's office. Current law establishes the Integrated Climate Adaptation and Resiliency Program to be administered by the office to coordinate regional and local efforts with state climate adaptation strategies to adapt to the impacts of climate change, as prescribed. This bill would authorize eligible agencies, as defined, to establish and participate in a regional climate network, as defined, to prepare a regional climate adaptation action plan for certain regions, as specified. The bill would authorize eligible agencies to voluntarily determine whether to establish membership in a regional climate network.

AB 2954
(Rivas, Robert D) California Global Warming Solutions Act of 2006: climate goal: natural and working lands.
Introduced: 2/21/2020
Last Amend: 5/4/2020
Status: 6/23/2020-Referred to Com. on EQ.
Location: 6/23/2020-S. E.Q.
Summary: The California Global Warming Solutions Act of 2006 requires the State Air Resources Board to prepare and approve a scoping plan for achieving the maximum technologically feasible and cost-effective reductions in greenhouse gas emissions and to update the scoping plan at least once every 5 years. This bill would require the state board, when updating the scoping plan and in collaboration with This bill would require the state board, when updating the scoping plan and in collaboration with by January 1, 2023, an overall climate goal for the state's natural and working lands, as defined, to sequester carbon and reduce atmospheric greenhouse gas emissions and identify practices, policy incentives, and potential reductions in barriers that would help achieve the climate goal.

AB 3005
(Rivas, Robert D) Leroy Anderson Dam and Reservoir: permitting, and public contracting.
Introduced: 2/21/2020
Last Amend: 6/3/2020
Status: 8/5/2020-In committee: Hearing postponed by committee.
Location: 7/1/2020-S. N.R. & W.
Summary: Would, if the Department of Fish and Wildlife determines that the Anderson Dam project, as defined, will substantially adversely affect existing fish and wildlife resources and the Santa Clara Valley Water District complete certain actions for the project, require the department within 180 days of receipt of a notification, as defined, from the district to issue a final agreement with the district that includes reasonable measures necessary to protect the affected resource, unless the department and the district agree to an extension.

AB 3022
(Obernolte R) Junior hunting licenses: eligibility: age requirement.
Introduced: 2/21/2020
Status: 6/3/2020-In committee: Held under submission.
Location: 6/2/2020-A. APPR. SUSPENSE FILE
Summary: Current law provides that, on and after July 1, 2020, a person is eligible for a junior hunting license if the person is under 16 years of age on July 1 of the licensing year. Current law makes conforming changes to certain other types of hunting licenses as a result of the age change for a junior hunting license. This bill would extend the eligibility for a junior hunting license to a person who is under 18 years of age on July 1 of the licensing year until July 1, 2021.

AB 3030
(Kalra D) Resource conservation: land and ocean conservation goals.
Introduced: 2/21/2020
Last Amend: 7/21/2020

Status: 8/5/2020-In committee: Hearing postponed by committee.
Location: 6/23/2020-S. N.R. & W.
Summary: Would declare it to be the goals of the state by 2030 to protect at least 30% of the state's land areas and waters; to help advance the protection of 30% of the nation's oceans; and to support regional, national, and international efforts to protect at least 30% of the world's land areas and waters and 30% of the world's ocean. The bill would authorize the state to achieve these goals through specified activities.

AB 3214
(Limón D) Oil and gas: oil spills: financial security, fines, and penalties.
Introduced: 2/21/2020
Last Amend: 5/4/2020
Status: 8/5/2020-In committee: Hearing postponed by committee.
Location: 7/1/2020-S. N.R. & W.
Summary: Current law prohibits a tank vessel, as defined, that is required to have a contingency plan, from entering the waters of the state unless the tank vessel owner or operator provides to the administrator evidence of financial responsibility that demonstrates, to the administrator's satisfaction, the ability to pay at least $1,000,000,000 to cover damages caused by a spill, and the owner or operator of the tank vessel has obtained a certificate of financial responsibility from the administrator for the tank vessel. Current law prohibits a nontank vessel from entering waters of the state unless the nontank vessel owner or operator has provided to the administrator evidence of financial responsibility that demonstrates, to the administrator's satisfaction, the ability to pay at least $300,000,000 to cover damages caused by a spill, and the owner or operator of the nontank vessel has obtained a certificate of financial responsibility from the administrator for the nontank vessel. This bill would double those amounts from $1,000,000,000 to $2,000,000,000 and from $300,000,000 to $600,000,000, respectively.

AB 3256
(Garcia, Eduardo D) Economic Recovery, Wildfire Prevention, Safe Drinking Water, Drought Preparation, and Flood Protection Bond Act of 2020.
Introduced: 2/21/2020
Last Amend: 6/4/2020
Status: 6/8/2020-Re-referred to Com. on RLS.
Location: 6/3/2020-A. RLS.
Summary: Would enact the Economic Recovery, Wildfire Prevention, Safe Drinking Water, Drought Preparation, and Flood Protection Bond Act of 2020, which, if approved by the voters, would authorize the issuance of bonds in the amount of $6,980,000,000 pursuant to the State General Obligation Bond Law to finance projects for an economic recovery, wildfire prevention, safe drinking water, drought preparation, and flood protection program.

ACA 22
(Melendez R) Environmental quality: California Environmental Quality Act: housing projects: injunctions: exemptions.
Introduced: 2/20/2020
Status: 2/21/2020-From printer. May be heard in committee March 22.
Location: 2/20/2020-A. PRINT

Summary: Would prohibit a court, in granting relief in an action or proceeding brought under CEQA, from enjoining a housing project, as defined, unless the court finds that the continuation of the housing project presents an imminent threat to public health and safety or that the housing project site contains unforeseen important Native American artifacts or important historical, archaeological, or ecological values that would be materially, permanently, and adversely affected by the continuation of the housing project. The measure would, except as provided, prohibit the Legislature from enacting legislation to exempt projects from the requirements of CEQA unless the projects are housing projects, projects for the development of roadway infrastructure, or projects to address an emergency circumstance for which the Governor has declared a state of emergency.

SB 45
(Allen D) Wildfire Prevention, Safe Drinking Water, Drought Preparation, and Flood Protection Bond Act of 2020.
Introduced: 12/3/2018
Last Amend: 1/23/2020
Status: 1/30/2020-In Assembly. Read first time. Held at Desk.
Location: 1/29/2020-A. DESK
Summary: Would enact the Wildfire Prevention, Safe Drinking Water, Drought Preparation, and Flood Protection Bond Act of 2020, which, if approved by the voters, would authorize the issuance of bonds in the amount of $5,510,000,000 pursuant to the State General Obligation Bond Law to finance projects for a wildfire prevention, safe drinking water, drought preparation, and flood protection program.

SB 281
(Wiener D) Housing development: permits and other entitlements: extension.
Introduced: 2/13/2019
Last Amend: 7/30/2020
Status: 7/30/2020-From committee with author's amendments. Read second time and amended. Re-referred to Com. on L. GOV.
Location: 6/18/2020-A. L. GOV.
Summary: The Planning and Zoning Law requires each county and each city to adopt a comprehensive, long-term general plan for its physical development, and the development of specified land outside its boundaries, that includes, among other mandatory elements, a housing element. Current law, the Permit Streamlining Act, among other things, requires a public agency that is the lead agency for a development project to approve or disapprove that project within specified time periods. This bill would extend by 18 months the period for the expiration, effectuation, or utilization of a housing entitlement, as defined, that was issued before, and was in effect on, March 4, 2020, and that will expire before December 31, 2021, except as specified. The bill would toll this 18-month extension during any time that the housing entitlement is the subject of a legal challenge.

SB 288
(Wiener D) California Environmental Quality Act: exemptions: transportation-related projects.
Introduced: 2/13/2019
Last Amend: 7/27/2020

Status: 8/6/2020-Action From NAT. RES.: Do pass as amended. To APPR..
Location: 8/6/2020-A. APPR.
Summary: CEQA includes exemptions from its environmental review requirements for numerous categories of projects, including, among others, projects for the institution or increase of passenger or commuter services on rail or highway rights-of-way already in use and projects for the institution or increase of passenger or commuter service on high-occupancy vehicle lanes already in use, as specified. This bill would further exempt from the requirements of CEQA certain projects, including projects for the institution or increase of new bus rapid transit, bus, or light rail services on public rail or highway rights-of-way, as specified, whether or not the right-of-way is in use for public mass transit, as specified, and projects for the designation and conversion of general purpose lanes, high-occupancy toll lanes, high-occupancy vehicle lanes, or highway shoulders, as specified. The bill would additionally exempt projects that improve customer information and wayfinding for transit riders, bicyclists, or pedestrians, and projects for pedestrian and bicycle facilities.

SB 587
(Monning D) California Sea Otter Voluntary Tax Contribution Fund.
Introduced: 2/22/2019
Last Amend: 6/24/2020
Status: 7/27/2020-From committee: Do pass and re-refer to Com. on APPR. with recommendation: To consent calendar. (Ayes 9. Noes 0.) (July 27). Re-referred to Com. on APPR.
Location: 7/27/2020-A. APPR.
Summary: Current law, until January 1, 2021, establishes the California Sea Otter Fund. Current law requires any new or extended voluntary tax contribution to include the words “voluntary tax contribution” in the name of the fund, to require the administrative agency to include specified information about the fund on its internet website, and to continuously appropriate voluntary tax contributions made to the fund to the administrative agency. Current law requires the minimum contribution amount to a new or extended voluntary tax contribution fund for the second calendar year after the first appearance of the fund on the tax refund form, and each calendar year thereafter, to be $250,000. This bill would extend the operation of the above-described provisions relating to the California Sea Otter Fund to January 1, 2028, or until an earlier date if the Franchise Tax Board determines that the amount of contributions estimated to be received during a calendar year will not equal or exceed $250,000.

SB 731
(Bradford D) Peace Officers: civil rights.
Introduced: 2/22/2019
Last Amend: 7/29/2020
Status: 8/3/2020-August 5 hearing postponed by committee. Re-referred to Com. on RLS. pursuant to Assembly Rule 96.
Location: 8/3/2020-A. RLS.
Summary: Would provide that a threat, intimidation, or coercion under the Tom Bane Civil Rights Act may be inherent in any interference with a civil right and would describe intentional acts for these purposes as an act in which the person acted with general intent or a conscious objective to engage in particular conduct.

SB 776
(Skinner D) Peace officers: release of records.
Introduced: 2/22/2019
Last Amend: 7/27/2020
Status: 8/6/2020-From committee: Do pass as amended and re-refer to Com. on APPR. (Ayes 6. Noes 2.) (August 5).
Location: 8/6/2020-A. APPR.
Summary: Would make every incident involving use of force subject to disclosure. The bill would remove the requirement that a complaint relating to sexual assault or dishonesty be found to be sustained following an investigation in order to be subject to disclosure. The bill would require records relating to sustained findings of wrongful arrests and wrongful searches to be subject to disclosure. The bill would also require the disclosure of records relating to an incident involving prejudice or discrimination on the basis of specified protected classes. The bill would require the retention of all complaints currently in the possession of a department or agency.

SB 899
(Wiener D) Planning and zoning: housing development: higher education institutions and religious institutions.
Introduced: 1/30/2020
Last Amend: 8/3/2020
Status: 8/3/2020-Read second time and amended. Re-referred to Com. on APPR.
Location: 8/3/2020-A. APPR.
Summary: Would require that a housing development project be a use by right upon the request of an independent institution of higher education or religious institution that partners with a qualified developer on any land owned in fee simple by the applicant on or before January 1, 2020, if the development satisfies specified criteria. The bill would define various terms for these purposes. Among other things, the bill would require that 100% of the units, exclusive of manager units, in a housing development project eligible for approval as a use by right under these provisions be affordable to lower income households, except that 20% of the units may be for moderate-income households, provided that all the units are provided at affordable rent or affordable housing cost, as specified. The bill would authorize the development to include ancillary uses on the ground floor of the development, as specified.

SB 902
(Wiener D) Planning and zoning: housing development: density.
Introduced: 1/30/2020
Last Amend: 5/21/2020
Status: 6/29/2020-Referred to Com. on L. GOV.
Location: 6/29/2020-A. L. GOV.
Summary: Would authorize a local government to pass an ordinance, notwithstanding any local restrictions on adopting zoning ordinances, to zone any parcel for up to 10 units of residential density per parcel, at a height specified by the local government in the ordinance, if the parcel is located in a transit-rich area, a jobs-rich area, or an urban infill site, as those terms are defined. In this regard, the bill would require the Department of Housing and Community Development, in consultation with the Office of

Planning and Research, to determine jobs-rich areas and publish a map of those areas every 5 years, commencing January 1, 2022, based on specified criteria.

SB 914
(Portantino D) Firearms.
Introduced: 2/3/2020
Last Amend: 5/11/2020
Status: 8/6/2020-From committee: Do pass and re-refer to Com. on APPR. (Ayes 6. Noes 2.) (August 5). Re-referred to Com. on APPR.
Location: 8/6/2020-A. APPR.
Summary: Current law prohibits the purchase or receipt of a firearm by, or the sale or transfer of a firearm to, any person who does not have a firearm safety certificate, as specified. Current law also prohibits the sale or transfer of a firearm by a licensed firearm dealer to a person under 21 years of age. Current law exempts from these provisions the sale, transfer, purchase, or receipt of a firearm, other than a handgun, to or by a person without a firearm safety certificate, but in possession of a valid, unexpired hunting license, as specified. Current law also exempts the sale or transfer of a firearm, other than a handgun or semiautomatic centerfire rifle, to a person 18 years of age or older who possesses a valid, unexpired hunting license, as specified. This bill would, for purposes of these provisions, define a valid and unexpired hunting license.

SB 974
(Hurtado D) California Environmental Quality Act: small disadvantaged community water system: exemption.
Introduced: 2/11/2020
Last Amend: 6/18/2020
Status: 8/6/2020-Action From NAT. RES.: Do pass as amended. To APPR..
Location: 8/6/2020-A. APPR.
Summary: Would, with certain specified exceptions, exempt from CEQA certain projects consisting solely of the installation, repair, or reconstruction of water infrastructure, as specified, that primarily benefit a small disadvantaged community water system by improving the small disadvantaged community water system's water quality, water supply, or water supply reliability, by encouraging water conservation, or by providing drinking water service to existing residences within a disadvantaged community where there is evidence that the water exceeds maximum contaminant levels for primary or secondary drinking water standards or where the drinking water well is no longer able to produce an adequate supply of safe drinking water. To qualify for this CEQA exemption, the bill would require these projects to meet certain labor requirements and certain conditions, including fully mitigating all construction impacts and not affecting wetlands or sensitive habitat.

SB 1046
(Dahle R) Fish and wildlife: catastrophic wildfires: Sierra Nevada region: reports.
Introduced: 2/18/2020
Last Amend: 3/25/2020
Status: 3/25/2020-From committee with author's amendments. Read second time and amended. Re-referred to Com. on RLS.
Location: 2/18/2020-S. RLS.

Summary: Would require the Department of Fish and Wildlife, in consultation with the Department of Forestry and Fire Protection, on or before December 31, 2021, and by December 31 each year thereafter, to study, investigate, and report to the Legislature on the impacts on wildlife and wildlife habitat resulting from any catastrophic wildfire, as defined, that occurred within the Sierra Nevada region during that calendar year, including specified information on a catastrophic wildfire's impact on ecosystems, biodiversity, and protected species. For the report required to be submitted on or before December 31, 2021, the bill would also require the report to include information about catastrophic wildfires that occurred in the Sierra Nevada region during the calendar years 2017 to 2020, inclusive.

SB 1048
(Borgeas R) Advisory bodies.
Introduced: 2/18/2020
Status: 2/27/2020-Referred to Com. on RLS.
Location: 2/18/2020-S. RLS.
Summary: Current law abolishes specified advisory bodies of various state agencies, boards, and commissions. This bill would make a nonsubstantive change to those provisions.

SB 1089
(Archuleta D) Law enforcement: training policies.
Introduced: 2/19/2020
Status: 2/27/2020-Referred to Com. on RLS.
Location: 2/19/2020-S. RLS.
Summary: Current law establishes the Commission on Peace Officer Standards and Training in the Department of Justice and requires the commission to adopt rules establishing minimum standards regarding the recruitment of peace officers. Existing law requires the commission to develop guidelines and implement courses of instruction regarding racial profiling, domestic violence, hate crimes, vehicle pursuits, and human trafficking, among others. Current law requires the commission to implement a course or courses of instruction for the regular and periodic training of law enforcement officers in the use of force. This bill would make a technical, nonsubstantive change to those provisions.

SB 1128
(McGuire D) Commercial fishing: inspection: crab traps: eviscerated Dungeness crab.
Introduced: 2/19/2020
Last Amend: 3/26/2020
Status: 5/12/2020-Referral to Coms. on HEALTH, and JUD. rescinded due to the shortened 2020 Legislative Calendar.
Location: 5/12/2020-S. HEALTH
Summary: Would require a person who holds a commercial fishing license or a commercial fish business license, upon request of an authorized agent or employee of the Department of Fish and Wildlife, to immediately relinquish, at no charge, a fish or parts of a fish caught or landed in California to the department for the purpose of collecting a biological sample. Because a violation of this provision would be a crime, this bill would impose a state-mandated local program.

SB 1159
(Hill D) Workers' compensation: COVID-19: critical workers.
Introduced: 2/20/2020
Last Amend: 8/3/2020
Status: 8/3/2020-From committee with author's amendments. Read second time and amended. Re-referred to Com. on INS.
Location: 6/29/2020-A. INS.
Summary: Would define "injury" for an employee to include illness or death resulting from the 2019 novel coronavirus disease (COVID-19) under specified circumstances, until January 1, 2024, and July 1, 2024, for employees generally, and until July 1, 2024, for certain peace officers, firefighters, and health care workers, among others. The bill would create a disputable presumption, as specified, that the injury arose out of and in the course of the employment and is compensable. The bill would limit the applicability of the presumption under certain circumstances. The bill would require an employee to exhaust their paid sick leave benefits and meet specified certification requirements before receiving any temporary disability benefits or, for police officers, firefighters, and other specified employees, a leave of absence. The bill would also make a claim relating to a COVID-19 illness presumptively compensable, as described above, after 30 days rather than 90 days.

SB 1175
(Stern D) Animals: prohibitions on importation and possession of wild animals: live animal markets.
Introduced: 2/20/2020
Last Amend: 8/5/2020
Status: 8/5/2020-Read second time and amended. Re-referred to Com. on APPR.
Location: 8/4/2020-A. APPR.
Summary: Current law prohibits the importation, transportation, possession, or live release of listed wild animals, except under a revocable, nontransferable permit. Current law permits the Fish and Game Commission, by regulation, and in cooperation with the Department of Food and Agriculture, to add or delete wild animals from the listed wild animals that are in addition to those listed by statute. Current law requires the Department of Fish and Wildlife to publish, from time to time as changes arise, a list of animals that may not be imported or transported into this state. Under current law, any violation of the Fish and Game Code, or of any rule, regulation, or order made or adopted under this code, is a crime. This bill would delete the requirement for the department to publish the list and would instead require the department, no later than December 31, 2021, to establish a list of wild animals that may not be imported or transported into this state.

SB 1208
(Monning D) Wildlife: dudleya: taking and possession.
Introduced: 2/20/2020
Last Amend: 3/25/2020
Status: 3/25/2020-From committee with author's amendments. Read second time and amended. Re-referred to Com. on RLS.
Location: 2/20/2020-S. RLS.

Summary: The California Endangered Species Act requires the Fish and Game Commission to establish a list of endangered species and a list of threatened species and to add or remove species from either list if it finds, upon the receipt of sufficient scientific information, as specified, and based solely upon the best available scientific information, that the action is warranted. The commission has listed certain species of dudleya as threatened or endangered under the act. This bill would make it unlawful to uproot, remove, harvest, or cut dudleya, as defined, from land owned by the state or a local government or from property not their own without written permission from the landowner in their immediate possession, except as provided, and would make it unlawful to sell, offer for sale, possess with intent to sell, transport for sale, export for sale, or purchase dudleya uprooted, removed, harvested, or cut in violation of that provision.

SB 1231
(Monning D) Endangered species: take: Santa Cruz long-toed salamander.
Introduced: 2/20/2020
Last Amend: 5/6/2020
Status: 8/4/2020-From committee: Do pass and re-refer to Com. on APPR. with recommendation: To consent calendar. (Ayes 14. Noes 0.) (August 4). Re-referred to Com. on APPR.
Location: 8/4/2020-A. APPR.
Summary: Would permit the Department of Fish and Wildlife to authorize under the California Endangered Species Act,, by permit, the take of the Santa Cruz long-toed salamander (Ambystoma macrodactylum croceum) resulting from impacts attributable to the construction along the State Route 156 corridor through Moro Cojo Slough in the County of Monterey for the purpose of enhancing safety and access, if certain conditions are satisfied. The bill would also provide that those conditions are subject to amendment if required by a certain monitoring program and adaptive management process. The bill would also make a conforming change.

SB 1235
(Caballero D) Administrative Procedure Act: adverse economic impact.
Introduced: 2/20/2020
Last Amend: 3/25/2020
Status: 3/25/2020-From committee with author's amendments. Read second time and amended. Re-referred to Com. on RLS.
Location: 2/20/2020-S. RLS.
Summary: Current law requires a state agency proposing to adopt, amend, or repeal a major regulation, on or after November 1, 2013, to prepare a standardized regulatory impact analysis in the manner prescribed by the Department of Finance that addresses, among other things, the creation or elimination of jobs within the state. This bill, among other things, would delete the requirement that a state agency prepare an economic impact assessment for proposed changes to a major regulation proposed prior to November 1, 2013, and would instead require a state agency to prepare a standardized regulatory impact analysis for proposed changes to all major regulations. The bill would require that the economic impact assessment and the standardized regulatory impact analysis also include identification of each regulation adopted within 10 years prior to the date of the proposed regulations when the prior adopted regulations are located in

the same title or division as the proposed regulations and include a brief summary of any economic impact analysis previously performed with regard to those regulations.

SB 1248
(Borgeas R) Forestry: timber harvesting plans: exemptions.
Introduced: 2/21/2020
Status: 3/5/2020-Referred to Com. on RLS.
Location: 2/21/2020-S. RLS.
Summary: The Z'berg-Nejedly Forest Practice Act of 1973 prohibits a person from conducting timber operations, as defined, unless a timber harvesting plan prepared by a registered professional forester has been submitted to, and approved by, the Department of Forestry and Fire Protection. The act authorizes the State Board of Forestry and Fire Protection to exempt from some or all of those provisions of the act a person engaging in specified forest management activities, as prescribed, including the cutting or removal of trees on the person's property that eliminates the vertical continuity of vegetative fuels and the horizontal continuity of tree crowns for the purpose of reducing flammable materials and maintaining a fuel break, known as the Small Timberland Owner Exemption. This bill would make nonsubstantive changes to the above provision relating to the exemptions.

SB 1320
(Stern D) Climate change: California Climate Change Assessment.
Introduced: 2/21/2020
Last Amend: 7/27/2020
Status: 8/6/2020-VOTE: Do pass as amended and be re-referred to the Committee on [Appropriations] (PASS)
Location: 8/6/2020-A. APPR.
Summary: Would require the Office of Planning and Research, through the Integrated Climate Adaptation and Resiliency Program, to develop the California Climate Change Assessment, in coordination with the Natural Resources Agency, the State Energy Resources Conservation and Development Commission, and the Strategic Growth Council, and in consultation with partner public agencies designated by the office. The bill would require the office to conduct the assessment no less frequently than every 5 years. The bill would require the assessment to provide an integrated suite of products that report the impacts and risks of climate change, based on the best available science, and identify potential solutions to inform legislative policy, as provided.

SB 1392
(Bradford D) Peace officers: basic course of training.
Introduced: 2/21/2020
Status: 3/12/2020-Referred to Com. on RLS.
Location: 2/21/2020-S. RLS.
Summary: Current law requires every peace officer to have satisfactorily completed an introductory training course prescribed by the Commission on Peace Officer Standards and Training. Current law requires each applicant for admission to a basic course of training certified by the commission that includes the carrying and use of firearms, who is not sponsored by a local or other law enforcement agency, or is not a peace officer, to submit written certification to the Department of Justice that the applicant has no

criminal history background that would disqualify them from possessing a firearm. This bill would make technical, nonsubstantive changes to these provisions.

SB 1405
(Galgiani D) Marine mammals: protection of cetaceans: unlawful activities.
Introduced: 2/21/2020
Status: 2/24/2020-From printer. May be acted upon on or after March 25. Read first time.
Location: 2/21/2020-S. RLS.
Summary: Current law makes it unlawful to hold in captivity an orca, whether wild caught or captive bred, for any purpose, including for display, performance, or entertainment purposes; to breed or impregnate an orca held in captivity; to export, collect, or import the semen, other gametes, or embryos of an orca held in captivity for the purpose of artificial insemination; or to export, transport, move, or sell an orca located in the state to another state or country. Current law creates certain exceptions to these provisions, including an exception that authorizes an orca located in the state on January 1, 2017, to continue to be held in captivity for its current purpose and, after June 1, 2017, to continue to be used for educational presentations. This bill would expand these provisions to include cetaceans, which the bill would define to mean a whale, dolphin, or porpoise in the order Cetacea.

For more information call:

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You can also find legislative information on the web at http://leginfo.legislature.ca.gov/ and follow the prompts from the ‘bill information’ link.

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Cc: kathy Lynch <lynch@lynchlobby.com>
Subject: Article Re SB 1175: California May Ban African Trophies. Africans Say That's Bad News for Animals

Attached please find the article, "California May Ban African Trophies. Africans Say That's Bad News for Animals," about SB 1175.

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California may ban African trophies. Africans say that's bad news for animals

California lawmakers this week will debate Black inequality and injustice in an unlikely arena: Trophy hunting.

For years, animal rights groups across Western nations, in campaigns often led by white celebrities, have pushed for bans on trophy hunting of iconic African species such as lions, hippos, rhinos, zebras, and elephants.

California, home to many of those activists, is no exception. The state Legislature is moving forward with a bill, Senate Bill 1175, that would ban the possession of trophies taken from several African species. The bill faces a committee hearing on Tuesday and is supported by a long list of animal rights and environmental groups.

Tucked among the opposition letters from the usual cadre of hunting associations and taxidermists are pleas from some African nations and conservation organizations whose leaders are urging lawmakers to kill the bill.

They argue that wealthy trophy hunters provide a key source of money for anti-poaching efforts, wildlife habitat protection and funding for impoverished rural communities that might otherwise kill off entire populations of animals if not for the huge sums of money hunters pay to shoot a few of them a year.

They say the sentiment behind this bill, and similar efforts in Western countries, amount to whites making sweeping generalizations about the people living in 54 separate African countries. In effect, they're saying it's racist and insulting for wealthy white Westerners to imply that all Africans are too corrupt or incompetent to make hunting sustainable.

"Africa is not a country," Masego Madzwamuse, CEO of the Southern Africa Trust, said in a video interview Friday from her home in South Africa, echoing a now-common phrase asking people to understand the vibrant diversity of the continent.

"This is where it links to the issue of Black Lives Matter," Madzwamuse said.

Banning the possession of trophy animals is an easy sell in a predominantly liberal state like California. Every few months, social media erupts with vitriol over photos of wealthy whites, including the president's son, Donald Trump, Jr., smiling next to the carcasses of the African beasts they'd shot on a safari.

But Madzwamuse said trophy hunting's foes are forgetting that those photos are taken on land owned by Africans and managed by Africans, who "ought to be determining the future of Africa's wildlife."

"They've lived side by side with these resources for many years and have been able to conserve them," Madzwamuse said. "To take away economic opportunities from families that are struggling to feed themselves, that are struggling to take children through school, struggling to put food on the table on a day-to-day basis, is really to push people into a space of indignity."

Supporting a trophy-hunting ban

The bill's author, State Sen. Henry Stern, D-Calabasas, said he's aware of those criticisms, and he discussed them with a Zimbabwean wildlife official who testified against the bill in the Senate.

"I don't dispute the fact that these safaris bring some economic value to these countries," Stern said. "And I'm not so self-important that I think we know what's best for Zimbabwe. But there's nothing in this bill that inhibits anyone from going to Zimbabwe or any game preserve in Africa and going on one of these hunts."

Hunters would, however, face a fine of up to $40,000 if they possess their trophies in California.

Stern argues that there are better and more effective ways to monetize African animals to benefit local people that don't involve killing them, such as expanding ecotourism. He points to reports that show wildlife tourism can replace or surpass trophy hunting whose revenues often don't make their way back to conservation.

Many environmental groups strongly believe that trophy hunting is incompatible with their values, and they point to research that shows it can have a negative impact on wildlife.

SB 1175 also contains provisions that would ban the importation of foreign wildlife that could harbor diseases, though local, state and federal agricultural, customs and wildlife agencies already enforce a slew of regulations pertaining to live-animal imports.

Critics say the bill is a cynical attempt to link trophy hunting to concerns around so-called "wet markets" that sell live animals similar to the market in Wuhan, China, that was originally described as the source of the COVID-19 pandemic. (The Chinese government disputes that claim.) Environmental groups counter that the bill is an important step to ending the dangerous global trade in wildlife.

"The international wildlife trade not only poses a disease risk to people but is a threat to biodiversity," Brendan Cummings, conservation director of the Center for Biological Diversity, said in a statement. "Whether it's dead animals brought in as trophies or curios, or live animals imported as pets or food, our unsustainable appetite for wildlife is one of the main drivers of the extinction crisis."

California's second attempt

This is not the California Legislature's first attempt to ban the possession of African trophy animals. In 2018, then Gov. Jerry Brown vetoed a similar bill that Stern also authored.

"Even though I share the sentiments of the author, this bill, if enacted, would be unenforceable," Brown wrote.

Gov. Gavin Newsom's late father, Judge William Newsom, was a beloved figure in the state's animal rights movement, having founded the state's influential Mountain Lion Foundation. As lieutenant governor, Newsom supported Stern's earlier bill, and he's made it clear that he finds African trophy hunting repugnant.

"Some of these trophy hunters are trying to call their hunting 'ethical hunting,' Newsom wrote on Facebook in 2015. "That is absolutely absurd. Don't go into the jungle in an SUV with three paid guides, GPS and an elephant gun and have the audacity to call that ethical. You want to be an ethical hunter? Go into the jungle with a spear at midnight, but you won't...because we all know how that will turn out."

The new legislation would, starting next year, prohibit possession of trophies from African elephants, lions, leopards, rhinos, giraffes, Jentink's duikers (a deer-like animal), pangolins, zebras, hippos, hyenas and baboons.

Opponents of the bill say the U.S. Endangered Species Act allows for the importation of African trophies, so the state's possession ban would likely be overturned in court.

They also argue that the bill would create a large "unfunded mandate" for California's already understaffed wildlife officers at the California Department of Fish and Wildlife. Since the bill bans people from possessing trophies brought into the state after 2021, the state's game wardens would require proof that the trophies people already possess were acquired before the ban.

According to the nonpartisan Legislative Analyst's Office, the bill comes with a one-time cost of $3.6 million when it takes effect in 2021, and ongoing enforcement costs of $2.7 million each year. The costs represent a tiny fraction of the state's $151.6 billion general fund budget.

For Stern and the bill's supporters, ending trophy hunting and the global wildlife trade is a matter of life and death for endangered species, and funding issues shouldn't stand in the way.

"I think that's a resolvable fiscal challenge, and not something that should make us throw up our hands and just let extinction happen on our watch because we don't want to fund a few more law enforcement officers," Stern said. "We want people policing … this extinction possibility."

If not trophy hunting, then what?

But is trophy hunting really a source of an African extinction crisis?

Amy Dickman, a University of Oxford scholar who founded the Ruaha Carnivore Project in Tanzania, said she's seen the opposite in the rural areas where she works trying to protect predators like lions.

Without the incentive to keep those animals alive so a few of them can be hunted, she said, they end up killed as bushmeat, captured for the wildlife trade or shot, poisoned or speared and left to rot because they're a nuisance to impoverished villagers.

For Dickman, it's easy to judge how others manage their wildlife when you're thousands of miles away and a herd of elephants isn't trampling your crops or lions aren't hunting outside your village.

"The further you get from the field, the further you get from the realities of conservation, and the louder the voices are and the stronger the opinions about how (wildlife) should be managed," she said.

Dickman also asks: Why do Westerners think that Africans can't create a system of well-regulated hunting that can protect wildlife like the way North American governments have?

In the U.S., no species hunted for "sport" has gone extinct from overhunting since regulations were implemented early last century. Hunting revenues also have been a key source of funding for wildlife habitat and for bringing animals like elk back from the brink of extinction.

"It really concerns me that we do see a lot of celebrities, musicians, and actors driving and amplifying the debate because they end up with the power and the platform," Dickman said. "There is no equivalent power and platform for the people most affected."

Pushing back against celebrities

African conservation groups and local communities are starting to push back.

Last month, facing similar anti-trophy-hunting campaigns in England, 50 community leaders representing millions of people across southern Africa, wrote an open letter to British celebrities Ricky Gervais, Joanna Lumley, Peter Egan, Ed Sheeran, Judi Dench and Piers Morgan urging them to stop using their influence to undermine the rights of impoverished people to manage their own wildlife.

These celebrities' generalizations about all African species being endangered also doesn't ring true for Fulton Mangwanya, the director general of Zimbabwe's parks and wildlife authority.

Citing elephants as an example, he noted that there are more than 83,000 of them in his country, he said. One park alone is home to 45,000 elephants, but that's 15,000 more than the park's habitat can sustainably support, he said.

While non-hunting tourism provides an important revenue stream for his country, it can't replace hunting to sustainably manage game populations. He said if trophy hunters stop flying to Zimbabwe, the animals will suffer for it.

"You want to talk of ecotourism? Fine," Mangwanya said. "It's another tool we can have in our toolbox, but, honestly, we are talking of the cog of conservation, wildlife conservation, and it's hunting."

Ryan Sabalow

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Ryan Sabalow covers environment, general news and enterprise and investigative stories for McClatchy's Western newspapers. Before joining The Bee in 2015, he was a reporter at The Auburn Journal, The Redding Record Searchlight and The Indianapolis Star.

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Cc: kathy Lynch <lynch@lynchlobby.com>
Subject: SB 1175 Oppose - African Pictures

Warning: This email originated from outside of CDFW and should be treated with extra caution.

Attached please find pictures of Africa supporting opposition to SB 1175 (Stern) Animals: prohibitions on importation and possession of wild animals: live animal markets.

Lynch & Associates
1127 11th Street, Suite 610
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July 28, 2020

SB 1175 OPPOSE – African Photos
Environmental and Wildlife Impacts

These photos represent a hunting area which covers more than 3,000 square kilometers in Western Tanzania, an area on the opposite side of the country from the primary airport.

There is little interest in photographic tourism in this area because of the difficulty in reaching it, the dense brush (which makes it harder to see animals), the high numbers of local people and villages on the borders of the game management areas, and the availability of better tourism areas (i.e., Kilimanjaro, Serengeti, Selous).

Regulated hunting from areas like these used to comprise over 80% of the budget for the Tanzania Wildlife Management Authority, which was reinvested in law enforcement, research, and making compensation payments to local people who were damaged by wildlife (e.g., lost livestock, injured). However, decreased hunting in Tanzania reduces the operators' abilities to continue running and protecting these concessions, and simultaneously, the Wildlife Authority's operating budget.

When the operators can no longer protect the borders of the concessions, local people move in. Tanzania has one of the fastest-growing human populations in the world, and two-thirds of the human population inhabit rural areas. They burn the brush for farming and grazing. They log the trees for resale to foreign companies or for charcoal (fuel). Accordingly, without economic means and incentives to secure wildlife habitat, those lands will be lost to human encroachment. The habitat and tree cover will also be lost—and is irreplaceable.

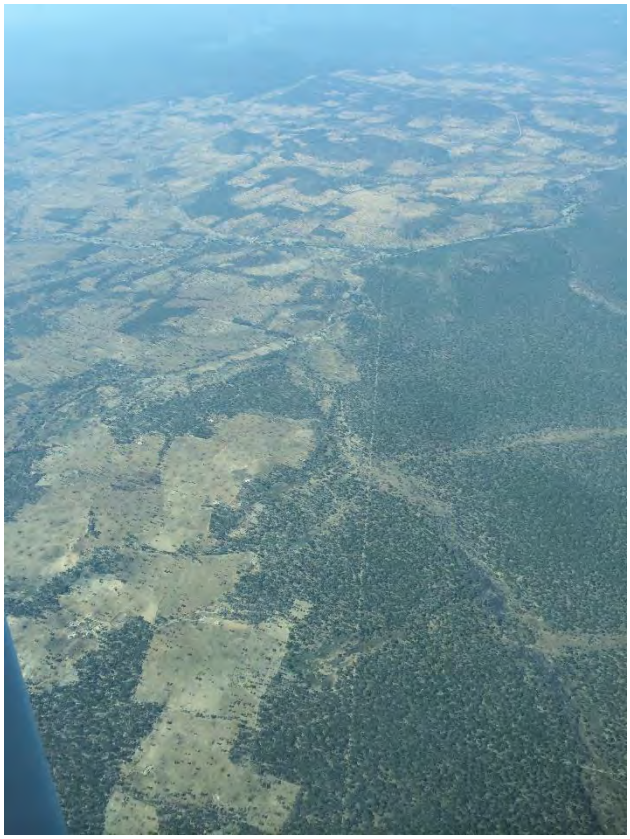
California should not contribute to the problem of reduced habitat and increased deforestation by adding additional barriers to trade in sustainable hunting such as proposed in SB 1175.

Unspoiled Dense Brush

New Farm Being Cleared – Forest Cover Lost

Lbanda Game Reserve Boundary

Nabarera – Once All Land Was for Resources / Wildlife



Rungwa Game Reserve Boundary 2018 **Rungwa Game Reserve Boundary-2**

Difference between Land used for Resources/Wildlife and Land Being Encroached

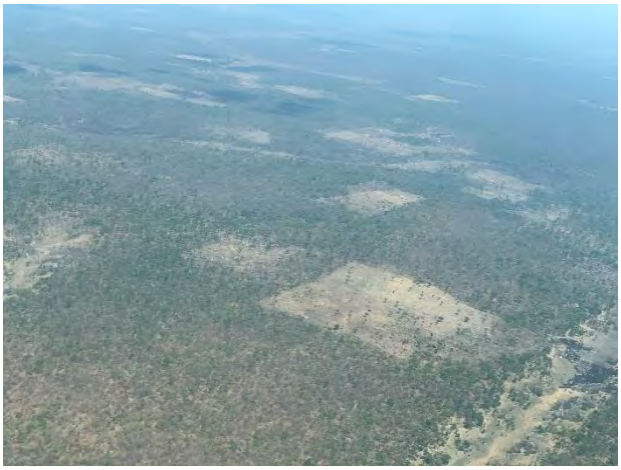
Habitat contrast between Ibanda Game Reserve, Tanzania (hunting area) on left and communities on right (Mike Angelides)

Encroachment into Hunting Block

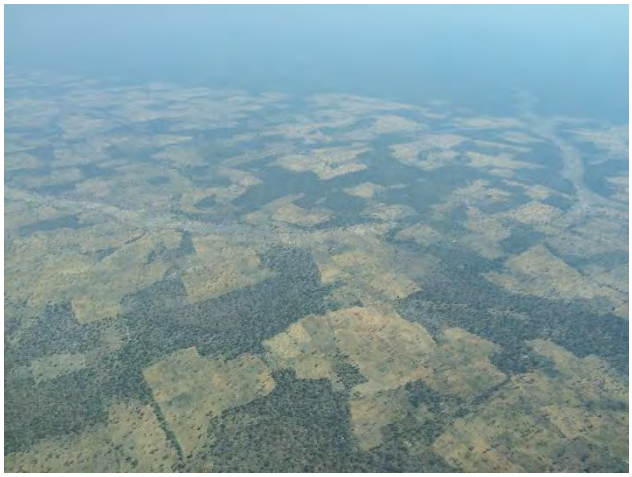
Farming – Wildlife/Resources Being Encroached

Farming Encroaching into Dense Brush

Farms – Land No Longer Dedicated to Wildlife



Farms Moving into Land Previously Dedicated to Wildlife



More Farms Replacing Land Dedicated to Wildlife

Hard Wood Log – Logging Causing Loss of Forest Cover

Hard Wood Logging – Loss of Forest Cover

Hard Wood Log – Loss of Forest Cover

Loss of lands dedicated to wildlife

Land Use – Increased Developed Land Formerly Dedicated to Wildlife

Piti West Game Reserve Boundary

Serengeti Boundary

Wet Season Poaching Camp

From: kathy Lynch <lynch@lynchlobby.com>
Sent: Tuesday, July 14, 2020 2:54 PM
To: Wildlife DIRECTOR <DIRECTOR@wildlife.ca.gov>; FGC <FGC@fgc.ca.gov>
Cc: kathy Lynch <lynch@lynchlobby.com>
Subject: Article: COVID-19 Pandemic Mauls Zimparks Wildlife Operations -- SB 1175 Impacts to Consider

Attached please find the article, "COVID-19 Pandemic Mauls Zimparks Wildlife Operations."

These impacts should be considered as the Legislature considers SB 1175.

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SB 1175 Impacts to Consider

https://thezimbabwedaily.com/news/494170-covid-19-pandemic-mauls-zimparks-wildlife-operations.html?utm_campaign=revuenewsletter&utm_medium=email&utm_source=Revue%20newsletter

Covid-19 pandemic mauls Zimparks wildlife operations

30th June 2020
Sifelani Tsiko

Agric, Environment & Innovations Editor

The novel coronavirus pandemic has hit hardest all wildlife conservation efforts by the Zimbabwe Parks and Wildlife Management Authority (Zimparks) as its main lifeline earnings from foreign tourism have dwindled to critical levels.

Zimparks spokesperson Tinashe Farawo told the Herald recently that lack of tourism revenues had badly affected his organisation to an extent that the authority would soon fail to pay its more than 2000 workers and meet other financial obligations.

"The situation is bad and very soon we will not be able to pay our rangers," he said. "Tourism is dead for now and we are appealing to the Government to allow us to open our parks and other income generating activities.

“Zimparks relies heavily from tourism earnings for its operational activities. Wildlife tourism plays a critical role in our foreign currency generation through game viewing and licensed hunting. We also use the proceeds to respond to human wildlife conflicts.”

Tourism in Zimbabwe and most other African countries has been hard hit by coronavirus lockdowns with hotel bookings canceled, safaris postponed and cultural tours stopped.

“Zimparks revenues have fallen drastically – by up to nearly 100 percent,” Farawo said.

“We are struggling to stay afloat and want the Government to allow us to open tourism activities to enable us to pay rangers and meet our mandate. Between January and June this year, we received 973 cases of human wildlife conflict cases and we only managed to respond to only half of the cases.

“We need money to pay rangers allowances, we need money for fuel and patrols. The situation is dire and if we don’t pay rangers and support their operations, this might pose serious problems for the country’s wildlife conservation efforts.”

The Victoria Falls, the country’s premier resort spot, national parks and other recreation sites under Zimparks have closed down as a result of the Covid-19 outbreak which has killed more than 477 000 people out of the over 9,2 million confirmed cases of coronavirus across the world.

Several safari operators have shut down their operations while local communities living close to the conservation areas have also been affected.

Lockdowns have piled financial pressures and strain to tourism operators and communities that depend on wildlife tourism.

“We are appealing to all other stakeholders for support,” Farawo said. “We need help and we appreciate all the assistance we are getting from our partners. It’s not enough and we need help to fill in all the critical gaps.”

Zimparks requires between US$20 million and US$25 million a year to fund its wildlife conservation activities.

“We are in the midst of the hunting season and our revenue is zero due to the Covid – 19 lockdowns. The impact has been severe and more than 40 people have been killed by wild animals while 38 others were wounded,” said Farawo.

“Elephants, crocodiles, lions and buffaloes are still a major problem and we are incapacitated to respond effectively whenever we receive distress calls from local communities living close to wildlife conservation areas.”

The tourism sector in Zimbabwe and most other African countries have suffered badly due to the Covid -19 outbreak.

It is estimated that more than 70 million tourists visited Africa last year, according to the UN World Tourism Organization to enjoy safari tours, game drives and trophy hunting.

But with airports and borders now closed, most of this income has been lost.

Fears abound that the loss of revenue will increase poaching activities as impoverished families search for food to survive and game patrols weaken.

Zimparks does not receive government funding and it largely depends on tourism revenue to run their operations and care for the animals and plants in protected areas.

“Without money we cannot do frequent patrols as we need fuel for rangers. We need food and allowances for rangers to go on patrol,” said Farawo.

“Zimparks needs to patrol about 13 percent of this country to protect our wildlife and ensure the survival of the tourism sector. The Hwange National Park is almost the size of Belgium and we need resources to patrol and protect our wildlife.”

STAFF SUMMARY FOR FEBRUARY 21, 2020
For Background Purposes Only

17. RECREATIONAL TAKE OF PURPLE SEA URCHIN EMERGENCY

Today's Item **Information ☐** **Action ☒**

Discuss and consider adopting emergency regulations concerning recreational take of purple sea urchin at Caspar Cove, Mendocino County.

Summary of Previous/Future Actions

• Adopted emergency regulations	Apr 18-19, 2018; Ventura
• Adopted regular rulemaking	Feb 6, 2019; Sacramento
• MRC vetting	Nov 5, 2019; MRC, Sacramento
• **Today's adoption hearing**	**Feb 21, 2020; Sacramento**

Background

Since 2014, FGC and DFW have been tracking a combination of environmental and biological stressors in the nearshore waters across northern California. The nearshore conditions have led to the near collapse of the bull kelp forest ecosystem and significant declines in the corresponding species that the kelp ecosystem supports, including red sea urchin and red abalone. Already weakened by environmental stressors and a severely limited kelp food source, an exploding purple sea urchin population has outcompeted red sea urchin and red abalone for the remaining kelp, ultimately leading to the widespread starvation and death of abalone and the collapse of both fisheries; recovery of these fisheries will not be possible without the eventual recovery of bull kelp forests and the return of sufficient food to support survival and reproduction.

In 2018, based on a DFW findings that volatile and adverse conditions on the north coast posed an emergency situation for resident abalone populations and the kelp forest ecosystem upon which they rely, FGC adopted emergency regulations to raise the daily bag limit for purple sea urchin from 35 individual urchin to 20 gallons per person, per day, taken only while skin-diving or SCUBA diving in state waters off Sonoma and Mendocino counties. Seen as part of a broader collaborative process, the regulation helped to facilitate citizen science efforts and initiate a coordinated approach to kelp ecosystem recovery on the north coast (Exhibit 1).

In Feb 2019, FGC adopted a regular rulemaking that further increased the daily recreational take limit of purple sea urchin to 40 gallons in the waters off Sonoma, Mendocino, and Humboldt counties (Exhibit 2). The intent of the higher 40 gallons limit was to promote the continued involvement of recreational divers in efforts to restore the severely-impacted kelp forest ecosystems in northern California, and contribute more greatly to reduction efforts without adversely affecting the long-term health of the purple sea urchin population.

DFW coordinated with divers to monitor recreational harvest events in 2018 and 2019. While some events were successful at moving large volumes of purple sea urchin, DFW has reported that recreational divers often found removing and transporting 40 gallons of urchin to shore to be unattainable, and that removing that volume put diver safety at risk due to regional ocean conditions. Environmental conditions have continued to deteriorate in northern California, and

divers remain committed to testing alternative methods that might increase the expected benefits to the kelp ecosystem and the species that rely upon it from removing larger amounts of purple urchin.

DFW is requesting that FGC take emergency action to amend Section 29.06 of Title 14 to temporarily remove the daily bag limit and expand authorized recreational take methods for purple sea urchin in a discrete geographic area in Mendocino County, specifically an area offshore of Caspar Headlands State Beach known as Caspar Cove (exhibits 3 and 4). The proposed regulations are intended to explore and evaluate whether intensified removals may promote the recovery of kelp and the associated species that it supports (Exhibit 3). Recreational take of purple sea urchin in Caspar Cove would be allowed only by hand or with manually operated handheld tools.

If adopted today, the new regulations are expected to take effect on or around Mar 2 and continue for 180 days, during which time DFW and partners intend to monitor and evaluate effectiveness by comparing ecosystem recovery in the recreational removal area to similar nearby areas with commercial take and/or no purple urchin removal efforts.

California Environmental Quality Act (CEQA)

DFW has determined that the proposed action falls within the statutory exemption under Public Resources Code Section 21080(b)(4) (Exhibit 5). The statutory exemption, which is repeated in Section 15359 of the CEQA guidelines, applies to actions necessary to prevent or mitigate an emergency. DFW has also determined that, under CEQA guidelines in Section 15061, the proposed action falls within categorical exemptions class 7 and 8 as related to agency actions to protect natural resources and the environment (exhibits 6 and 7); FGC staff agrees these exemptions are applicable.

As to the exceptions to categorical exemptions set forth in CEQA guidelines in Section 15300.2, including the prospect of unusual circumstances and related effects, FGC staff's review was guided by the Supreme Court of California's recent decision in *Berkeley Hillside Preservation v. City of Berkeley.* FGC staff has reviewed all of the available information possessed by FGC relevant to the issue and does not believe adopting the regulations poses any unusual circumstances that would constitute an exception to the categorical exemptions set forth above. Compared to the activities that fall within Class 7 and Class 8 generally, which include the given example of wildlife preservation activities such as the effort here, there is nothing unusual about the proposed regulations. In addition, even if there were unusual circumstances, no potentially significant effects on either project-specific or cumulative bases are expected.

In considering emergency action, FGC must determine the magnitude of potential harm, the existence of a crisis situation, the immediacy of the need, and whether the anticipation of harm has a basis firmer than simple speculation. All available information indicates that conditions in the kelp ecosystem have continued to decline and extraordinary measures must be taken immediately to help restore the important habitat for the benefit of a myriad species that rely upon it. DFW will provide an overview at the meeting (Exhibit 11).

Significant Public Comments

Ten commenters submitted emails to express support for the emergency action. Representative emails are included as exhibits 8-10. In addition to supporting the emergency action, one commenter advocates for other measures to address the problem, including using drones, site selection by volunteers, and hiring unemployed commercial urchin divers for removal efforts.

Recommendation

FGC staff: Adopt the proposed emergency action as recommended by DFW, recognizing the essential nature of DFW and partner monitoring of outcomes to help determine effectiveness of the strategy.

DFW: Temporarily remove the daily bag limit for recreational take of purple sea urchin in Caspar Cove, Mendocino County.

Exhibits

1. Staff summary from Apr 18-19, 2018 FGC meeting (for background only)
2. Staff summary from Feb 6, 2019 FGC meeting (for background only)
3. DFW memo transmitting proposed emergency statement, received Feb 10, 2020
4. Draft emergency statement
5. DFW memo transmitting notice of exemption under CEQA, received Feb 10, 2020
6. Draft CEQA notice of exemption
7. CEQA notice of exemption attachment
8. Email from Madeleine Russo, received Jan 31, 2020
9. Email from Captain Dan Walsh, received Feb 5, 2020
10. Email from Doug Jung, received Feb 9, 2020
11. DFW presentation (*added Feb 18, 2020*)

Motion/Direction

Moved by _____ and seconded by _____ that the Commission 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.

The Commission further determines, based on the record, pursuant to sections 15061(a), 15307, and 15308 of Title 14, that the proposed action is exempt from the California Environmental Quality Act as an action necessary to prevent or mitigate an emergency and as an action to protect natural resources and the environment.

The Commission further determines, pursuant to Section 399 of the Fish and Game Code, that adopting this regulation is necessary for the immediate conservation, preservation, or protection of birds, mammals, fish, amphibians, or reptiles, including but not limited to their nests or eggs.

Therefore, the Commission adopts the emergency regulation to amend Section 29.06.

State of California
Department of Fish and Wildlife

Memorandum

Original on file,
received August 5, 2020

Date: July 25, 2020

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

From: Charlton H. Bonham
Director

Subject: **Agenda Item for the August 2020, Fish and Game Commission Meeting**
Re: Request Re-Adoption of Purple Sea Urchin Emergency Rule

On February 21, 2020, the Fish and Game Commission (Commission) took action to abolish the recreational bag limit for purple sea urchins (PSU) taken by hand and hand-held tools inside Caspar Cove, Mendocino County. The action was taken in response to the poor condition of the Northern California kelp forests. The kelp forests have been slow to recover from the adverse conditions in the past years in large part due to overgrazing by sea urchins, particularly by PSU. The problem of sea urchin overgrazing is further exacerbated by the loss of sea stars, an important predator of sea urchin, from the recent sea star wasting disease epidemic.

The emergency rule went into effect on March 17, 2020. Without a re-adoption, the rule will sunset on September 14, 2020. The current effort to study the effect of PSU removal within Caspar Cove supported by the Department and the Ocean Protection Council has been hampered by the COVID-19 Pandemic and is still ongoing. Department staff is currently working with Commission staff through a regular rulemaking to remove the daily bag limit of PSU within Caspar Cove. The ongoing effort in Caspar Cove is critical at providing data to inform the regular rulemaking.

Therefore, the Department requests that the Commission take action at its August 2020 meeting to re-adopt the emergency regulation to allow unlimited take of PSU by hand or hand-held tool within Caspar Cove.

If you have any questions or need additional information, please contact Dr. Craig Shuman, Marine Regional Manager at (916) 373-5491. The public notice for this rulemaking should identify Environmental Scientist, Anthony Shiao as the Department's point of contact. His contact information is (805) 560-6056 or Anthony.Shiao@Wildlife.ca.gov.

ec: Stafford Lehr, Deputy Director
Wildlife and Fisheries Division
Stafford.Lehr@wildlife.ca.gov

Craig Shuman, D. Env. Regional Manager
Marine Region
Craig.Shuman@wildlife.ca.gov

Sonke Mastrup, Environmental Program Manager
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Michelle Selmon, Program Manager
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Robert Puccinelli, Captain
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Garrett Wheeler, Staff Counsel
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James Ray, Environmental Scientist
Marine Region
James.Ray@wildlife.ca.gov

CALIFORNIA FISH AND GAME COMMISSION
DRAFT STATEMENT OF PROPOSED EMERGENCY REGULATORY ACTION FOR READOPTION OF EMERGENCY REGULATIONS

Readoption of Section 29.06
Title 14, California Code of Regulations
Re: Purple Sea Urchin

Date of Statement: July 20, 2020

I. Emergency Regulation in Effect to Date

The California Fish and Game Commission (Commission) approved an emergency rulemaking, Section 29.06, that became effective on March 17, 2020. The emergency addresses concerns over the impact of purple sea urchin (PSU) overpopulation along the Northern California coast. The rule allowed recreational divers to take an unlimited number of PSU within Caspar Cove, Mendocino County.

The rule was adopted to allow recreational divers to participate in an effort supported by the California Department of Fish and Wildlife (Department) and Ocean Protection Council (OPC) to test the effect of controlling overpopulated sea urchins through anthropogenic influence. Studies have suggested that for such projects to work, intense and sustained take, mirroring that of natural predators, might be necessary. The Department has since been working with recreational divers and other partners to evaluate PSU population control in Caspar Cove.

II. Request for Approval of Readoption of Emergency Regulations

The current emergency rule, Section 29.06, will expire on September 15, 2020 unless it is readopted for an additional 90 days.

Since its adoption in March, Department staff has been working closely with recreational and commercial divers to remove PSUs in Caspar Cove. However, the COVID-19 pandemic has made public participation in these efforts and studying the effects much more difficult. Department staff is currently in the process of developing a regular rulemaking that will abolish recreational daily bag limit for PSU in Caspar Cove. In order to develop the necessary information to inform that rulemaking, the ongoing study at Caspar Cove must continue, and the current emergency rule would have to be extended.

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

Since 2014, bull kelp (*N. luetkeana*) in Northern California has declined by more than 90%. This decline has been linked to a combination of severe warm water events and multiple ecological stressors, particularly an explosive increase in

PSU populations exacerbated by the loss of predatory sea stars due to sea star wasting disease. PSU are a native species in California; however, the species' abundance is now at a 60-fold increase compared to historic levels. This has led to the suppression of bull kelp forests on the North Coast, and a regime shift from bull kelp forests to urchin barrens across most of the region. The collapse of the kelp has had cascading effects resulting in significant losses of kelp forest ecosystem services, as well as the collapse of the North Coast commercial red urchin fishery in 2015 and the closure of the recreational red abalone fishery in 2018.

The environmental conditions in Northern California have continued to deteriorate. By 2019, divers from the California Department of Fish and Wildlife (Department) have observed very few remaining patches of bull kelp in Northern California, a condition corroborated by local divers, research entities such as Reef Check California, and the latest kelp coverage data (Figure 1). These stands tend to occupy the top of isolated, frequently disturbed boulders and rock formations that are more difficult for PSU to reach. However, Department staff are extremely concerned that the expanding PSU population may soon reach these remaining stands. As annual plants, bull kelp requires a large standing spore stock to persist successfully, and the preservation of the remaining stands is critically important.

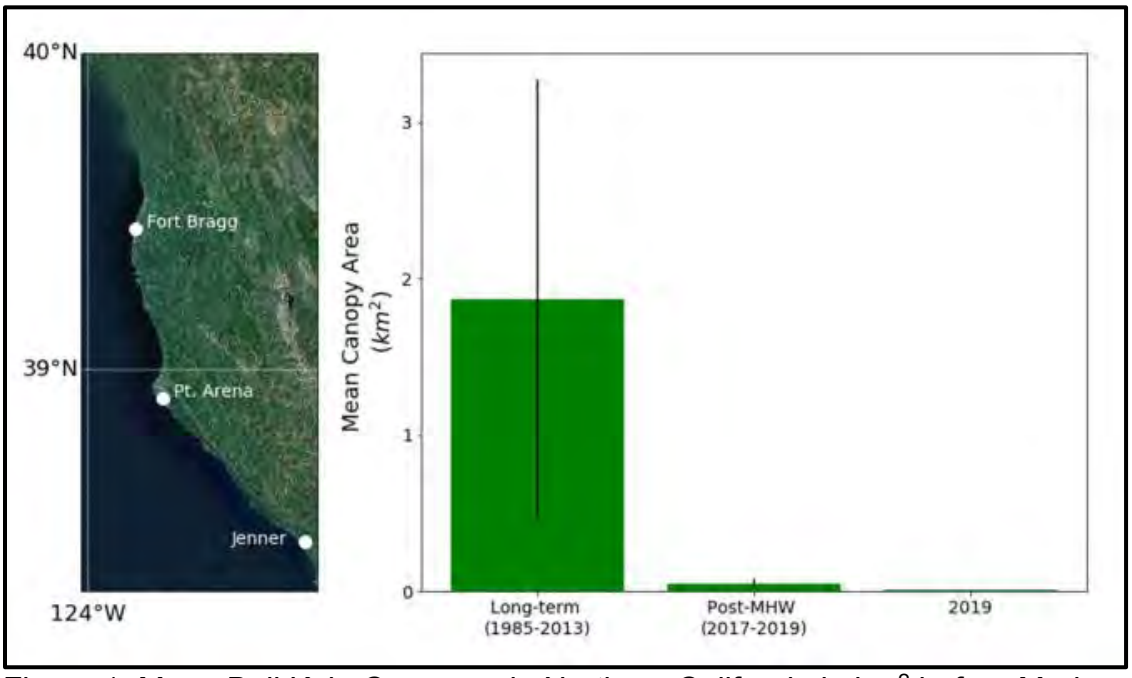

Figure 1. Mean Bull Kelp Coverage in Northern California in km^2 before Marine Heat Wave (MHW), after MHW, and in 2019 (Source: McPherson, Finger, Housekeeper, Bell, Carr, Rogers-Bennett, & Kudela 2020).

Prior Commission Actions

In December 2017, the Commission closed the red abalone fishery for the 2018 season. Since then, the poor condition of the kelp forests has persisted. In August 2018, Commission and stakeholders agreed to potentially extend the closure by another two years. Recovery of the abalone fishery will not be possible without the recovery of the bull kelp forests and the return of sufficient food to support abalone survival and reproduction.

Also, in December 2017, the Commission considered alternatives to increasing or removing the take restrictions on the recreational PSU harvest, with the goal of supporting possible restoration of naturally occurring kelp along the environmentally impacted areas. In April 2018, the Commission adopted the emergency rule to significantly increase take of PSU and the emergency regulation went into effect on May 10, 2018. In February 2019, the increased take limit was adopted through regular rulemaking by the Commission.

In February 2020, the Commission adopted an emergency rule allowing unlimited take of PSU by hand or hand-held tools inside Caspar Cove, Mendocino County to help Department staff scope the feasibility of population control in a new study.

Existence of an Emergency and Need for Immediate Action

The Commission considered the following factors in determining whether an emergency exists: The magnitude of potential harm; the existence of a crisis situation; the immediacy of the need; and whether the anticipation of harm has a basis firmer than simple speculation. All available information shows that the ecological conditions in Northern California continues to be poor; the PSU overpopulation is still severe. The COVID-19 pandemic has significantly constrained the recreational diver community's participation in the Caspar Cove urchin control experiment and work to date is inadequate to assess the effectiveness of this method to help protect and restore kelp. If the urchin control study in Caspar Cove is to stop because the current emergency rule expires, little useful information will have been generated by this effort and high PSU abundance will continued to suppress kelp growth in the cove.

Proposed Action by the Commission

The Commission proposes the readoption of Section 29.06 that is the same as previously adopted.

IV. 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 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: None.

(b) Nondiscretionary Costs/Savings to Local Agencies: None.

(c) Programs Mandated on Local Agencies or School Districts: None.

(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.

V. Readoption Criteria

1) Same as or Substantially Equivalent

Pursuant to Government Code Section 11346.1(h), the text of a readopted "emergency regulation that 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.

2) Substantial Progress

Government Code Section 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 rulemaking in compliance with these sections is currently ongoing and scheduled for public notice towards the end of 2020.

VI. Authority and Reference

The Commission proposes this emergency action pursuant to the authority vested by sections 200, 205, and 399 of the Fish and Game Code and to implement, interpret, or make more specific sections 200, 205, and 399 of said code.

VII. IV. Section 399 Finding

Pursuant to Section 399 of the Fish and Game Code, the Commission finds that the adoption of this regulation is necessary for the immediate conservation, preservation, or protection of birds, mammals, reptiles, or fish.

Informative Digest

The California Fish and Game Commission (Commission) adopted Section 29.06, Purple Sea Urchin, as an emergency rulemaking abolishing daily bag limit for Purple Sea Urchin (PSU) taken by hand or hand-held tools inside Caspar Cove, Mendocino County, effective on March 17, 2020.

The emergency rule is due to expire on September 14, 2020 if a readoption is not filed. A readoption is necessary to ensure that the Department can continue to collect the data it needs to obtain necessary information on a controlled study supported by the California Department of Fish and Wildlife (Department) and the California Ocean Protection Council on the efficacy of PSU population control. Commission and Department staff are currently developing a regular rulemaking package that would remove the daily recreational bag limit for PSU in Caspar Cove. However, the development of that proposal is dependent on the data currently being collected from Caspar Cove, which will occur only if the emergency rule is readopted.

Proposed Regulatory Action:

The regulation temporarily abolishes the daily bag limit for PSUs inside Caspar Cove.

Benefits of the Regulation to the State's Environment:

The Commission anticipates benefits to the State's environment by the sustainable management of California's ocean resources. The increased take for the recreational purple sea urchin harvest, with the goal of supporting restoration of naturally occurring kelp inside Caspar Cove, is critical to the recovery of Northern California's kelp forest ecosystem.

Consistency and Compatibility with Existing State Regulations:

The Legislature has delegated authority to the Commission to promulgate sport fishing regulations (Fish and Game Code, sections 200 and 205) as well as authority to promulgate corresponding emergency regulations as necessary (Fish and Game Code, Section 399). No other state agency has the authority to promulgate such regulations. The Commission has conducted a search of Title 14, California Code or Regulations (CCR) and determined that the proposed regulation is neither inconsistent nor incompatible with existing State regulations, and that the proposed regulation is consistent with other sport fishing regulations and marine protected area regulations in Title 14, CCR.

Emergency Regulatory Language

Section 29.06, Title 14, CCR, is amended as follows:

§ 29.06. Purple Sea Urchin

(a) Except as provided in this section, the daily bag limit for purple sea urchin is 35 individuals.

(b) The daily bag limit for purple sea urchin is forty (40) gallons when taken while skin or SCUBA diving in ocean waters of the following counties: Humboldt, Mendocino, and Sonoma.

(c) There is no possession limit for purple sea urchin.

(d) Notwithstanding subsection (b) of this Section, there is no bag limit for the take of purple sea urchins in Caspar Cove, Mendocino County in the area east of a straight line drawn between 39° 22.045 ′ N. lat. 123° 49.462 ′ W. long. and 39° 21.695 ′ N. lat. 123° 49.423 ′ W. long. for the purpose of restoring kelp. The purple sea urchin may only be taken by hand or with manually operated hand-held tools.

Authority cited: Sections 200, ~~and~~ 205, and 399, Fish and Game Code.

Reference: Sections 200, ~~and~~ 205, and 399, Fish and Game Code.

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STATE OF CALIFORNIA — DEPARTMENT OF FINANCE

ECONOMIC AND FISCAL IMPACT STATEMENT (REGULATIONS AND ORDERS)

STD. 399 (Rev. 10/2019)

DRAFT DOCUMENT

ECONOMIC IMPACT STATEMENT

DEPARTMENT NAME	CONTACT PERSON	EMAIL ADDRESS	TELEPHONE NUMBER
Fish and Game Commission	Margaret.Duncan@	wildlife.ca.gov	916 704-3215

DESCRIPTIVE TITLE FROM NOTICE REGISTER OR FORM 400	NOTICE FILE NUMBER
Section 29.06(d) Purple Sea Urchin, Extension of emergency action to allow unlimited take in Caspar Cove	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:

- ☐ a. Impacts business and/or employees
- ☐ b. Impacts small businesses
- ☐ c. Impacts jobs or occupations
- ☐ d. Impacts California competitiveness
- ☐ e. Imposes reporting requirements
- ☐ f. Imposes prescriptive instead of performance
- ☐ g. Impacts individuals
- ☒ h. None of the above (Explain below): Emergency regulations, GOV 11346.1(a)(1)

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 _____ (Agency/Department) estimates that the economic impact of this regulation (which includes the fiscal impact) is:

- ☐ 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 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 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 ☐ NO

Explain: _____

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 through12 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: _____

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Print Form Reset Form

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 _____

_____

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
DocuSigned by: Dennis Farrell E8B0B535880C4FB...	

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

State of California
Department of Fish and Wildlife

Memorandum

Original on file,
received August 5, 2020

Date: August 4, 2020

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

From: Charlton H. Bonham
Director

Subject: **Consent Item for the August 19-20, 2020, Fish and Game Commission Meeting Re: White Seabass Fishery Management Plan 2018-2019 Annual Review Report**

The Department of Fish and Wildlife (Department) requests the Fish and Game Commission (Commission) receive the White Seabass Fishery Management Plan (WSFMP) 2018-2019 Annual Review Report at its August meeting.

The Department met with the White Seabass Scientific and Constituent Advisory Panel (WSSCAP) in May 2020 to review fishery information and to consider if current management measures were providing adequate protection for the White Seabass resource. The WSSCAP reviewed the points of concern established in the WSFMP, including criteria-based evaluation of the White Seabass fishery, to determine if an overfished condition exists.

Commercial and recreational landings of White Seabass reached a low point in 2014-2015 but then increased over the next two seasons. In the 2017-2018 season, commercial and recreational landings decreased once again and continued to decline through the 2018-2019 season. However, an overfished condition did not exist, and none of the other points of concern were met. Thus, the Department recommends no changes to the current management of the commercial and recreational White Seabass fisheries.

If you have any questions or need additional information, please contact Dr. Craig Shuman, Marine Regional Manager at (916) 373-5491.

Attachment

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White Seabass Fishery Management Plan
2018-2019 Annual Review

White Seabass, *Atractoscion nobilis*.
(Photo Credit: Scott Aalbers, Pfleger Institute of Environmental Research (PIER).

Prepared by

California Department of Fish and Wildlife
Marine Region
July 2020

White Seabass Fishery Management Plan
2018-2019 Annual Review

Executive Summary

The California Fish and Game Commission (Commission) adopted the White Seabass Fishery Management Plan (WSFMP) in June 2002. The WSFMP includes a provision for annual monitoring and assessment of the White Seabass fisheries. The White Seabass Scientific and Constituent Advisory Panel (WSSCAP) was established to assist the Department of Fish and Wildlife (Department) and the Commission with the review of the fishery assessments, management proposals, and plan amendments. The annual review includes fishery-dependent data (e.g., commercial and recreational landings and length frequencies), and fishery-independent data (e.g., recruitment information) if available, as well as documented changes within the social and economic structure of the recreational and commercial industries that utilize the White Seabass resource within California. The review also includes information on the harvest of White Seabass from Mexican waters and other relevant data. Based on the results of the annual review, in cooperation with the WSSCAP, the Department will provide management recommendations, if needed, to the Commission.

To assist the Commission in determining if management measures need to be modified or added, the WSFMP framework includes, and the Commission adopted, points of concern criteria to help determine when management measures are needed to address resource issues. The points of concern are:

1. Catch is expected to exceed the current harvest guideline or quota.
2. Any adverse or significant change in the biological characteristics of White Seabass (age composition, size composition, age at maturity or recruitment) is discovered.
3. An overfishing condition exists or is imminent.
4. Any adverse or significant change in the availability of White Seabass forage or in the status of a dependent species is discovered.
5. New information on the status of White Seabass is discovered.
6. An error in data or stock assessment is detected that significantly changes estimates of impacts due to current management.

The Department and WSSCAP met on May 14, 2020, to review the 2018-2019 fishery season (September 1 to August 31), and together agreed that none of the points of concern were met. Additional social and economic information along with the catch information from Mexico support this conclusion. As a result, the Department does not recommend any changes to the management of White Seabass or to the WSFMP at this time.

Background

The WSSCAP annually reviews current information to evaluate the status of the White Seabass resource based on points of concern adopted to implement the WSFMP, and to consider whether current management measures provide adequate protection for the resource. If a resource conservation issue is found, the WSSCAP will provide its recommendation, rationale, and analysis to the Department. The Department will evaluate the recommendation from the WSSCAP and all available information and will recommend to the Commission management measure(s) to address the issue(s).

Results

Analysis of the points of concern (Table 1) showed that none of the criteria were met in 2018-2019.

Table 1. Analysis of the points of concern (2018-2019).

Criteria	Analysis	Result
Catch is expected to exceed the current harvest guideline or quota.	2018-2019 total catch = 292,955 pounds. Optimum Yield = 1.2 million pounds; Total catch is below optimum yield.	No action necessary
Any adverse or significant change in the biological characteristics of White Seabass (age composition, size composition, age at maturity or recruitment) is discovered.	Recreational and commercial fishery length-frequencies showed no significant change that would indicate a problem in the fishery. No new published information on age composition, age at maturity, or age at recruitment.	No action necessary
An overfishing condition exists or is imminent.	See analysis in Table 2. No overall overfishing condition noted.	No action necessary
Any adverse or significant change in the availability of White Seabass forage or in the status of a dependent species is discovered.	Four out of five forage species decreased, and one fishery remained closed in the 2018/19 season. However, White Seabass are opportunistic feeders and the Department and WSSCAP understand that there are other prey items for them to feed on.	No action necessary
New information on the status of White Seabass is discovered.	The Department is currently collecting samples to investigate age/length at maturity.	No action necessary
An error in data or stock assessment is detected that significantly changes estimates of impacts due to current management.	Stock assessment was completed in May 2016.	No action necessary

Point of Concern: Expectation of optimum yield being exceeded.

The Commission established a fishing season of September 1 through August 31 of the following year. The Commission also adopted an optimum yield. The optimum yield is based on a maximum sustainable yield proxy of the unfished biomass and is currently set at 1.2 million pounds. In the 2018-2019 season, the total recreational and commercial harvest was 292,955 pounds, 24 percent of the allowable catch (Appendix A, Table 1).

Point of Concern: Changes in the biological characteristics of White Seabass.

The commercial fishery continues to harvest White Seabass across a wide size range (Appendix A, Figure 1). In 2018-2019, 140 fish were sampled from the commercial fishery. One hundred percent of the fish sampled were larger than the minimum size limit of 28 inches and approximately three-fourths of the fish sampled were larger than 45 inches. Based on previous age-at-length information from reading otoliths and from a previously calculated weight/length relationship, those fish larger than 45 inches are likely more than 11 years old and weigh more than 30 pounds.

Sampled length frequency data for the recreational fishery are presented in Appendix A, Figure 2. Before the start of the 2009-2010 season the Department prepared and distributed a brochure targeting recreational anglers to improve compliance with the recreational minimum size limit for White Seabass. In the seasons immediately after this brochure was distributed (2009-2010 to 2013-2014), less than 10 percent of the fish measured were smaller than the minimum size limit of 28 inches. This is a significant improvement from the previous seasons, in which 17-19 percent of all fish measured were less than minimum legal size. However, in 2014-2015 and 2017-2018, greater than 10 percent of the sampled catch was sub-legal. This season, the percent of sub-legal fish decreased to 7 percent. Overall, 107 legal-sized fish were measured from the recreational fishery, and approximately one third (35 percent) were larger than 40 inches total length. Based on the previously calculated weight/length relationship, those fish larger than 40 inches are likely more than 9 years old and weigh more than 24 pounds.

Point of Concern: An overfishing condition exists or is imminent.

Three criteria (Table 2), all of which must be met to establish a point of concern, determine if an overfishing condition exists or is imminent. For the commercial fishery, there must be a 20 percent decline in landings in each of two consecutive seasons compared to the prior 5-season running average. In the previous 2017-2018 season, commercial landings totaled 220,687 pounds; this is a 11 percent decrease compared to the prior 5-season running average (285,687 pounds). Commercial landings of White Seabass (Appendix A, Table 2) totaled 168,077 pounds in the 2018-2019 season; this is a 27 percent decrease when compared to the prior 5-season running average (229,196 pounds). The WSSCAP and the Department agreed that the overfishing criterion for the commercial fishery was not met, so no action is recommended at this time.

For the recreational fishery, the overfishing criterion is defined as a 20 percent decline in each of two consecutive seasons for <u>both</u> the number of fish and the average weight

(Appendix A, Table 3). In the recreational fishery, the number of fish caught in the 2018-2019 season increased by 23 percent when compared to the previous season. The estimated average weight of fish caught in the 2017-2018 season did not change compared to the previous season. However, it decreased by 12 percent in the 2018-2019 season. The WSSCAP and the Department agreed that the overfishing criterion for the recreational fishery was not met.

The final criterion for determining if an overfishing condition exists is a 30 percent decline in the recruitment index for juvenile White Seabass compared to the prior 5-season running average of recruitment. The Ocean Resources Enhancement and Hatchery Program (OREHP) previously conducted standardized field studies four times a year (August, October, April and June) for juvenile recruitment. However, reductions in funding curtailed survey effort. The Ocean Enhancement Stamp fund was insufficient to cover all the OREHP activities as well as the gill net recruitment surveys, and consequently there was no gill net sampling between 2009 and 2011. In October 2012, gill net sampling similar to previous surveys was reinstated. The objective of the current sampling design seeks to resume the prior gill net sampling plan but includes more embayment sites and less coastal sites than previously sampled.

Previously, the number of fish caught per set across the entire sampling year was used as an index to evaluate juvenile White Seabass recruitment. There was an increasing trend in number of juvenile White Seabass caught per set from 2012 to 2015. However, this trend decreased during the 2016 survey and again in 2017. In 2018, the number of juvenile White Seabass caught per set increased slightly (Appendix A, Figure 3). The number of fish caught per gill net set was averaged from the years 2012 to 2017 and was compared to 2018. The number of White Seabass caught per set for juvenile White Seabass recruits for 2018 decreased by 11 percent from the previous 5-year average (Appendix A, Table 4).

Based on the analysis of all three overfishing criteria, the WSSCAP and the Department agreed that the overall overfishing point of concern for the fishery was not met.

Table 2. Analysis to determine if the White Seabass resource is overfished (Criteria taken from Section 51.01 (b), Title 14, California Code of Regulations).

Criteria	**Analysis**	**Result**
A 20 percent decline in the total annual commercial landings of White Seabass for the past two consecutive seasons compared to the prior 5-season running average of landings, based on landing receipt data.	2018-2019: 168,077 pounds = 27% decrease. 5-season average = 229,196 pounds. 2017-2018: 220,687 pounds = 11% decrease. 5-season average = 247,921 pounds.	Criterion not met
A 20 percent decline in both the number of fish and the average weight of White Seabass caught in the recreational fishery for the same two consecutive seasons, as determined by the best available data.	2018-2019: 5,981 fish = 23% increase. 20.1 pound average = no change. 2017-2018: 4,874 fish = 14% decrease. 23.0 pound average = 12% decrease	Criterion not met
A 30 percent decline in recruitment indices for juvenile White Seabass compared to prior 5-season running average of recruitment, as determined by the best available data.	2018-2019: 0.98 fish/set = 11% decrease. 5-season average = 1.10 fish/set.	Criterion not met

Point of Concern: Any adverse or significant change in the availability of White Seabass forage or in the status of a dependent species is discovered.

Prey species (Northern Anchovy (*Engraulis mordax*), Jack Mackerel (*Trachurus symmetricus*), Market Squid (*Doryteuthis opalescens*), Pacific Mackerel (*Scomber japonicus),* and Pacific Sardine (*Sardinops sagax*)) are highly mobile and their distributions are affected by oceanographic conditions. A review of White Seabass forage species (Appendix A, Figures 3, 4, and 5) revealed some changes in availability.

Both Pacific Mackerel and Pacific Sardine have stock assessments conducted by the National Marine Fisheries Service (NMFS). These stock assessments include biomass estimates. Since 2008, Pacific Mackerel biomass estimates have been conducted every two years. Pacific Sardine biomass estimates are conducted every year. The biomass estimates for Pacific Mackerel have been steady for the last five seasons. The Pacific Sardine fishery has been closed since near the end of the 2014-2015 season.

Since there are currently no biomass estimates or stock assessments for Market Squid, commercial fishery landings were used as a proxy for their availability. Market Squid availability decreased from the previous year.

Relative indices of abundance are being collected by NMFS for Jack Mackerel, although comparisons from year to year would need to account for differences in the geographic

area covered by the sampling design. Jack Mackerel landings have decreased for the past three years.

Relative abundance of Northern Anchovy was estimated by NMFS in 2018 and found to be greater than a prior estimate in 2016. However, landings for Northern Anchovy in 2019 decreased but are still greater than landing from 2016 and 2017.

Based on the analysis of all the prey species, the WSSCAP and the Department agreed that this point of concern was not met because of the opportunistic nature of White Seabass foraging.

Other Points of Concern:

The remaining two points of concern (Table 1) consider any new information on the status of White Seabass and if any errors in data or stock assessment were found.

Currently, the Department, in collaboration with the Pfleger Institute of Environmental Research (PIER), is collecting White Seabass samples to assess length/age at maturity.

No errors in the current stock assessment have been found.

Additional Information

The Department has used one indicator each of some basic socioeconomic information to characterize the commercial fishery and provided those summaries to the WSSCAP (Appendix A, Table 5). As a social information indicator, the number of commercial vessels landing White Seabass has been tracked over time. In the 2018-2019 season, the number of vessels fishing for White Seabass increased by 8.7% (17 vessels). This increase in the number of vessels occurred mostly in the gill net fishery in southern California. An economic information indicator of the most frequent ex-vessel price per pound has also been tracked over time. The most common ex-vessel price per pound has shown a steady increase over time and is presently at $5.00 per pound for all gears combined. No similar social or economic data are available for the recreational fleet.

Information about the take of White Seabass in Mexican waters was considered by the WSSCAP. California commercial fishermen are prohibited by Mexican law to fish in the territorial seas of Mexico, and no landings of White Seabass from Mexico by California commercial fishermen were reported in 2018-2019. Recreational anglers may fish in Mexico under the authority of a Mexican sport fishing license. During the 2018-2019 season, Commercial Passenger Fishing Vessel logbook data reported 180 White Seabass taken in Mexico. This is the second highest number of White Seabass landed from Mexico in the past nine seasons, with the highest total being 183 in the 2012-2013 season. No additional information about either the recreational or commercial catch of White Seabass in Mexico is available.

Appendix A – Data Analyses

Table 1. Total catch (pounds) of White Seabass, 2009-2010 to 2018-2019. Source: California Recreational Fisheries Survey extracted from the RecFIN database at https://www.recfin.org, and commercial landings data extracted from the Department's Marine Landings Data System (MLDS) and Marine Logs System (MLS) (CPFV log data).

Season	Recreational	Commercial	Total
2009/10	215,071	502,021	717,092
2010/11	306,491	520,605	827,096
2011/12	259,028	406,746	665,774
2012/13	265,816	315,533	581,349
2013/14	219,116	262,441	481,557
2014/15	63,125	196,521	259,646
2015/16	100,406	247,195	347,601
2016/17	177,582	217,915	395,497
2017/18	129,195	220,687	349,882
2018/19	124,878	168,077	292,955

Table 2. Commercial White Seabass landings in pounds, 2009-2010 to 2018-2019. Source: Department's MLDS.

Season	Pounds Landed	Prior 5-season average	Percent change from previous 5-season average
2009/10	502,021	433,621	16
2010/11	520,605	476,487	9
2011/12	406,746	502,347	-19
2012/13	315,533	499,419	-37
2013/14	262,441	431,873	-39
2014/15	196,521	401,469	-51
2015/16	247,195	340,369	-27
2016/17	217,915	285,687	-24
2017/18	220,687	247,921	-11
2018/19	168,077	229,196	-27

Table 3. Recreational White Seabass catch, 2009-2010 to 2018-2019. Source: California Recreational Fisheries Survey extracted from the RecFIN database at https://www.recfin.org and the Department's MLS (CPFV log data).

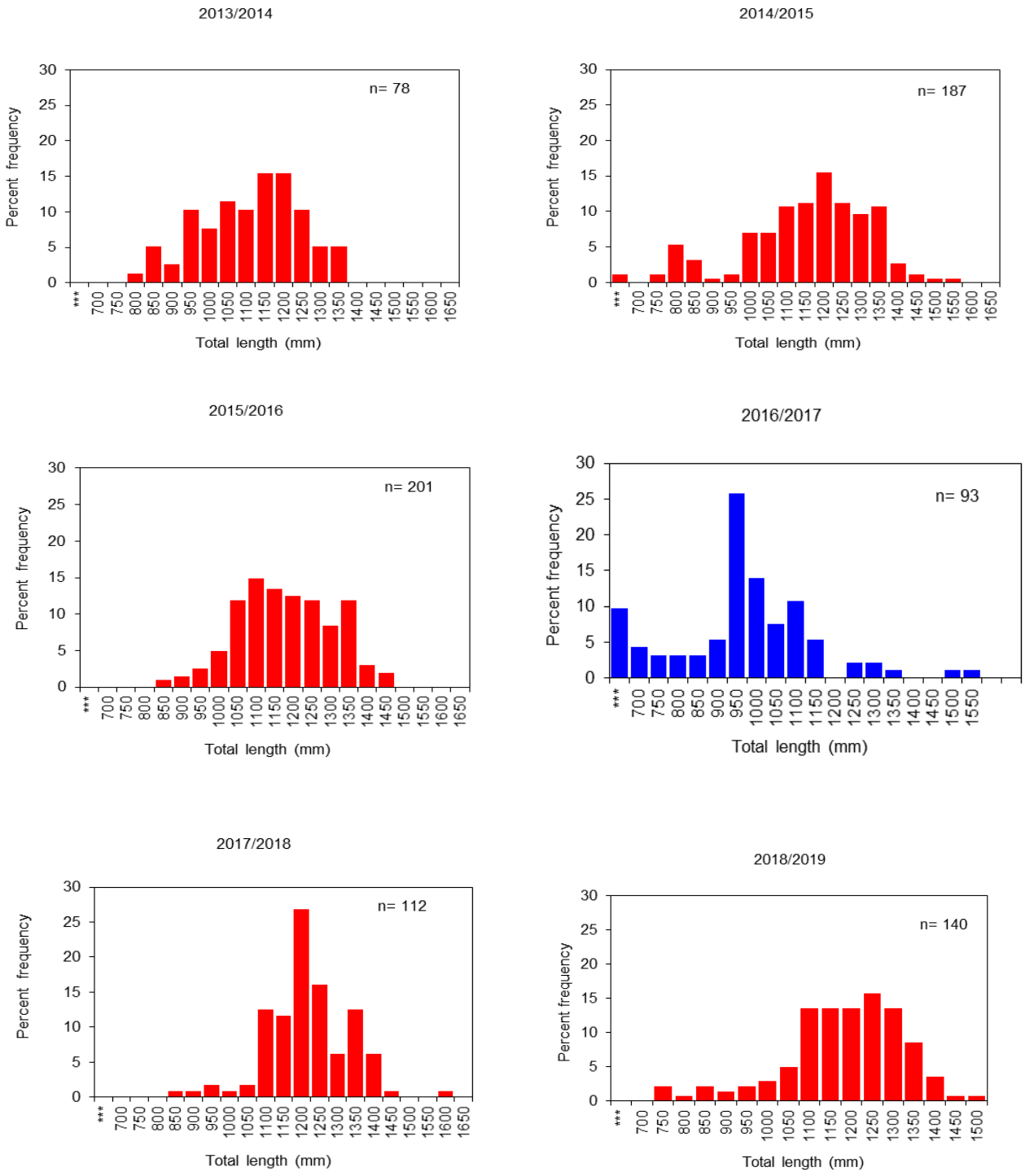
Season	Total number of fish caught	Percent change in number of fish from prior season	Average weight in pounds	Percent in weight from prior season
2009/10	8,788	30	24.3	23
2010/11	12,672	44	29.1	20
2011/12	9,876	-22	26.9	-8
2012/13	10,634	8	19.3	-28
2013/14	9,567	-10	22.4	16
2014/15	3,136	-67	18.9	-15
2015/16	3,793	21	23.1	22
2016/17	5,675	50	22.9	-1
2017/18	4,874	-14	23.0	0
2018/19	5,981	23	20.1	-12

Table 4. Number of juvenile fish (<711 mm) caught per gill net set, 2012-2018. Source: White Seabass Gill net Survey Database. Hubbs-SeaWorld Research Institute and San Diego State University.

Season	Fish per set	Prior 5-year average	Percent change from previous 5-year average
2012	0.67	-	-
2013	0.97	-	-
2014	1.19	-	-
2015	1.46	-	-
2016	1.02	-	-
2017	0.88	1.06	-17
2018	0.98	1.10	-11

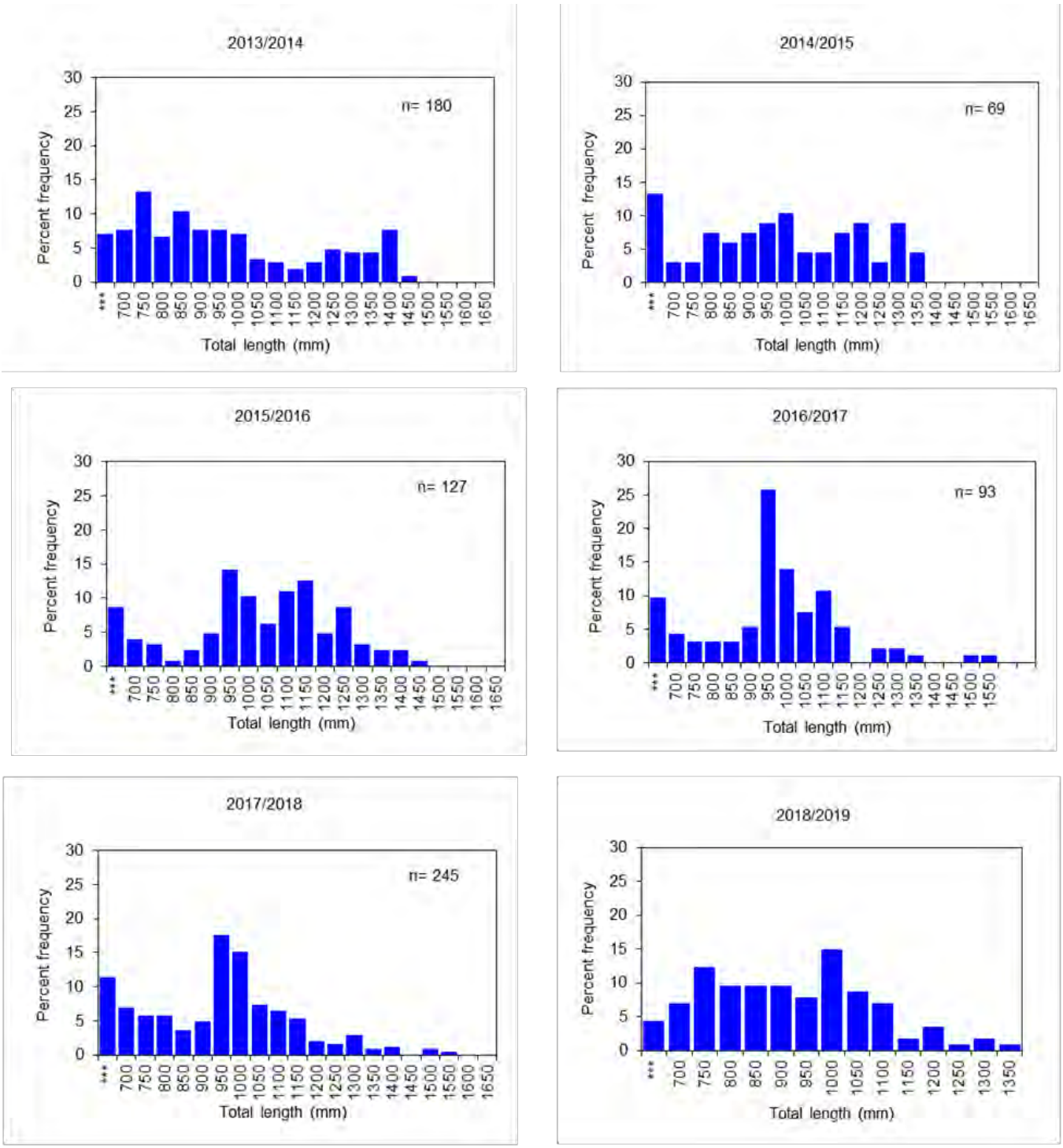
Table 5. Socioeconomic Factors, 2009-2010 to 2018-2019. Source: Department's MLDS and MLS (CPFV log data).

Season	Total number of vessels landing White Seabass	Most common ex-vessel price per pound
2009/10	183	$3.50
2010/11	254	$4.00
2011/12	276	$4.00
2012/13	257	$5.00
2013/14	238	$5.50
2014/15	177	$4.00
2015/16	190	$6.00
2016/17	139	$4.00
2017/18	196	$6.00
2018/19	213	$5.00



***all sub-legal fish were grouped together
Source: Department of Fish and Wildlife Market Sampling Program

Figure 1. Commercial White Seabass sampled length frequencies, 2012-2013 to 2018-2019.



***all sub-legal fish were grouped together

Source: Sampler examined landed catch data from California Recreational Fisheries Survey extracted from the RecFIN database at https://www.recfin.org

Figure 2. Recreational White Seabass sampled length frequencies, 2012-2013 to 2018-2019.

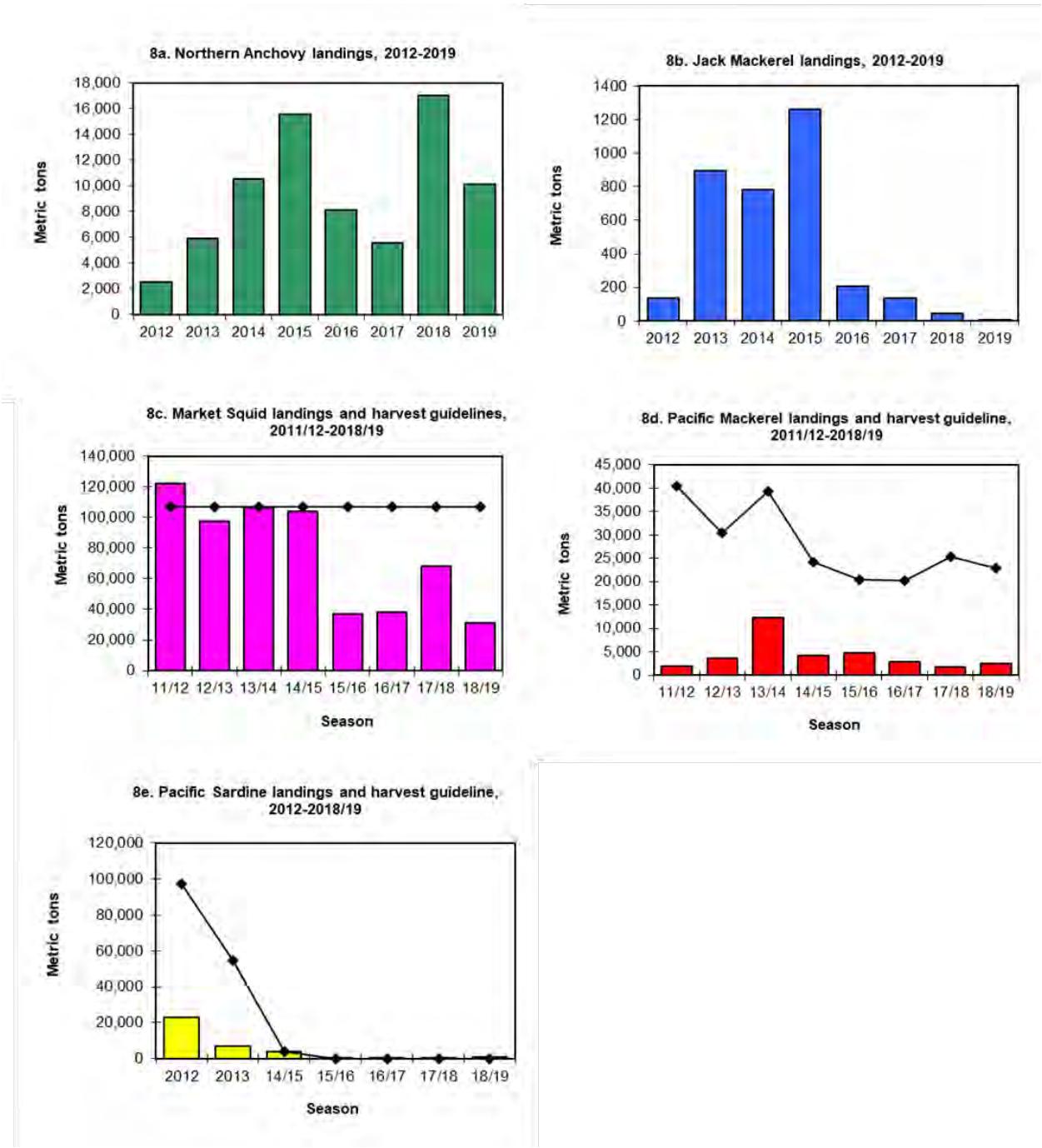
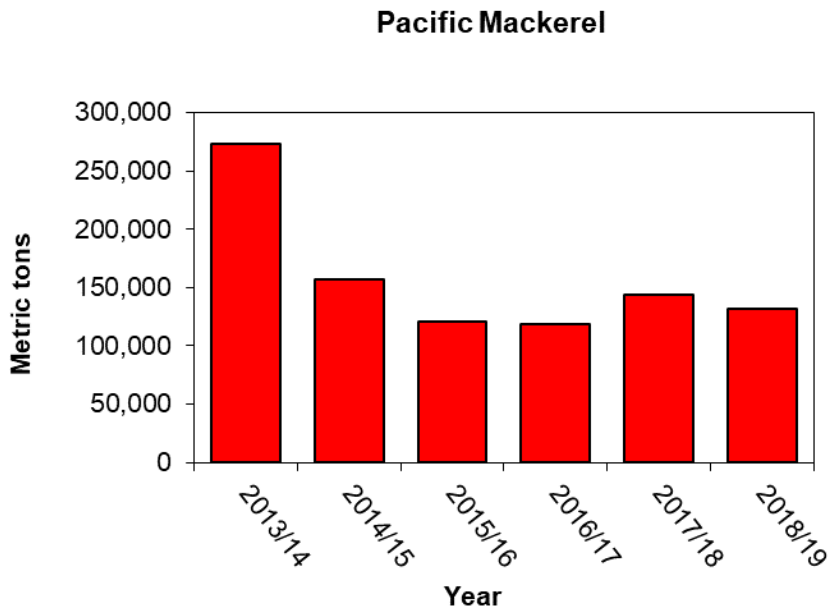
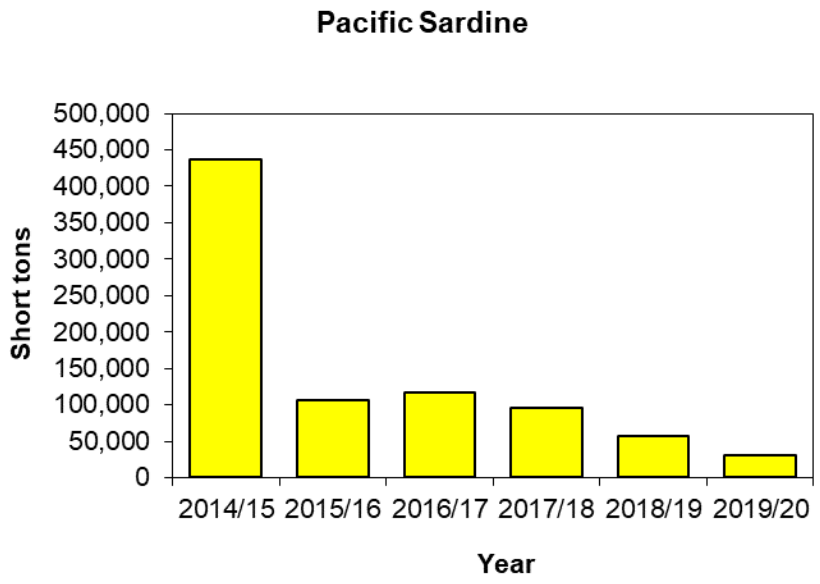


Figure 3. Harvest guidelines and commercial catch of White Seabass forage species. Northern Anchovy and Jack Mackerel season is January 1 through December 31. Market Squid season is April 1 through March 31 of the following year. Pacific Mackerel and Pacific Sardine season is July 1 through June 30 of the following year. Source: Department's MLDS.



Source: Pacific Fishery Management Council. 2017 CPS SAFE document and PFMC proceedings

Figure 4. Biomass estimates for Pacific Mackerel in short tons, 2014-2015 to 2018-2019 seasons.

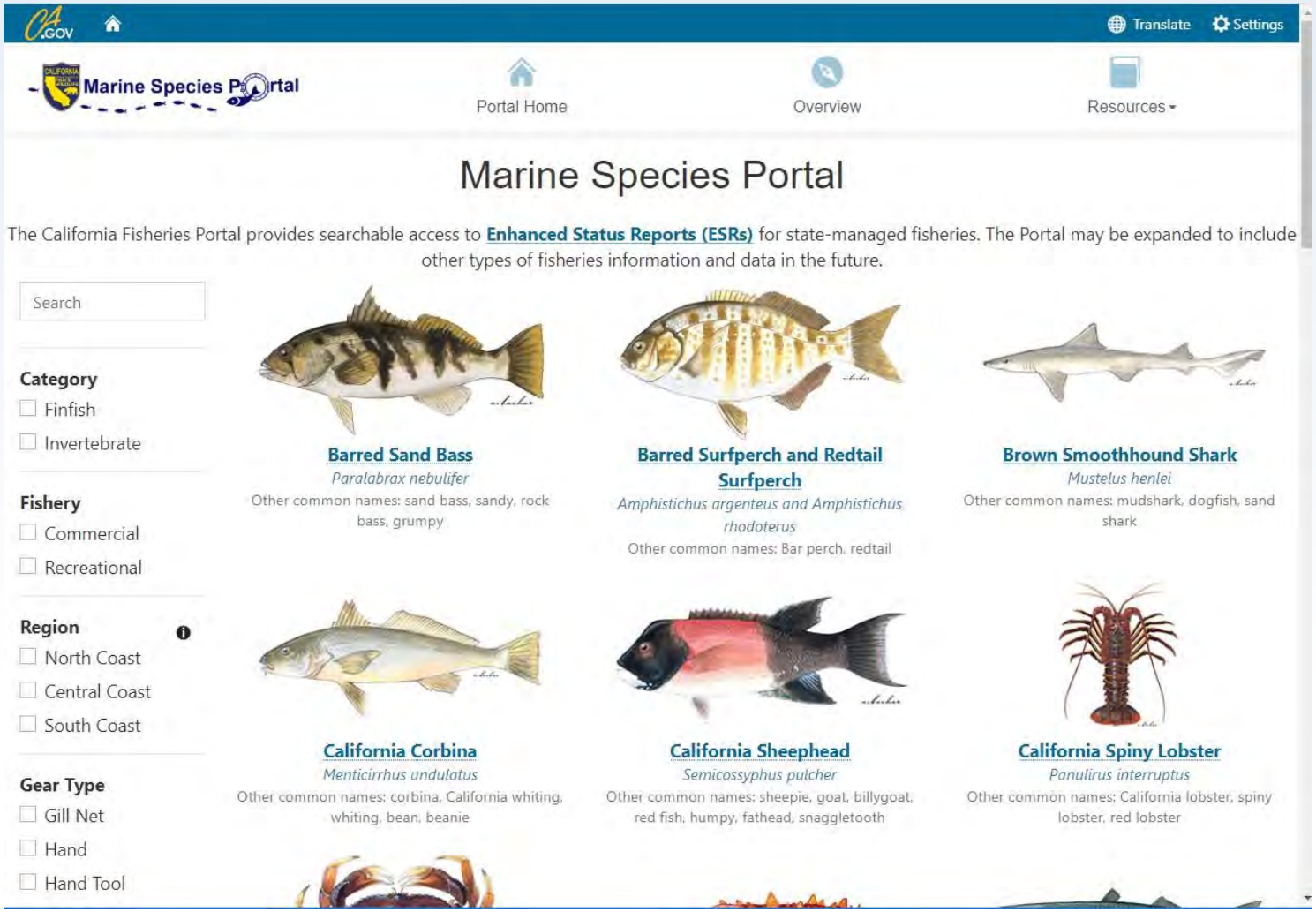


Source: Pacific Fishery Management Council. 2018 CPS SAFE document and PFMC proceedings

Figure 5. Biomass estimates for Pacific Sardine in short tons, 2014-2015 to 2019-2020 seasons.

Marine Species Portal Home Page

- https://marinespecies.wildlife.ca.gov



California Fisheries Relief Funding Soon to be Available for Select Sectors Affected by COVID-19

July 30, 2020

Coastal and marine fishery participants – including licensed commercial fishermen, fish buyers, aquaculture businesses, charter boat owners and guides – who have experienced a loss of income due to the effects of COVID-19 may be eligible for federal relief funding disbursed through the California Department of Fish and Wildlife (CDFW).

The funding is part of the federal Coronavirus Aid, Relief and Economic Security (CARES) Act. This more than $2 trillion economic relief package provides direct economic assistance for American workers, families and small businesses that have been impacted COVID-19. About $18 million in CARES funding was earmarked specifically for fisheries assistance in California.

CDFW estimates that there are more than 11,500 potentially eligible applicants for this funding, including individuals who work in the offshore, shoreside, aquaculture, commercial passenger fishing vessel and guide sectors.

Eligibility will be based on, among other things, a minimum 35 percent loss of fishing related income due to COVID-19 between Jan. 1 and June 30, 2020. Applicants must also submit documentation demonstrating active involvement in a qualifying sector. The approved disbursement plan can be found here.

The Pacific States Marine Fisheries Commission (PSMFC) is serving as fiscal agent for these funds. PSMFC will mail claim forms to all potentially eligible applicants to the address on file with CDFW. Forms and documentation must be returned within 30 days to be eligible for disbursement. Following the close of the 30-day response period, final disbursement totals will be calculated and relief checks will be issued to qualified applicants. CDFW is requesting all potentially eligible applicants update their address on file by Monday, Aug. 17, 2020. Address verification instructions are available here.

For more information, please refer to CDFW's webpage for the CARES Act. Email inquiries can be sent to CDFW at CARESfisheriesInfo@wildlife.ca.gov.

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Media Contacts:

Craig Shuman, CDFW Marine Region, (916) 215-9694

Kirsten Macintyre, CDFW Communications, (916) 804-1714

California Fish and Game Commission
Tribal Consultation Policy

Adopted June 2015

On September 19, 2011, Governor Edmund G. Brown, Jr., issued Executive Order B-10-11, which provides, among other things, that it is the policy of the administration that every state agency and department subject to executive control implement effective government-to-government consultation with California Indian Tribes.

Purpose of the Policy

The mission of the California Fish and Game Commission (FGC) is, on the behalf of California citizens, to ensure the long term sustainability of California's fish and wildlife resources by setting policies, establishing appropriate rules and regulations, guiding scientific evaluation and assessments, and building partnerships to implement this mission. California Native American Tribes, whether federally recognized or not, have distinct cultural, spiritual, environmental, economic and public health interests and unique traditional knowledge about the natural resources of California.

The purpose of this policy is to create a means by which tribes and FGC can effectively work together to realize sustainably-managed natural resources of mutual interest.

Policy Implementation

1. Communication. Both FGC and the tribes are faced with innumerable demands on their limited time and resources. In the interest of efficiency, FGC will annually host a tribal planning meeting to coordinate the upcoming regulatory and policy activities before FGC. The meeting will provide a venue for education about process, identifying regulatory and policy needs, and developing collaborative interests; this will include inviting sister agencies to participate.

2. Collaboration. In areas or subjects of mutual interest, FGC will pursue partnerships with tribes to collaborate on solutions tailored to each tribe's unique needs and capacity. The structure of these collaborative efforts can range from informal information sharing, to a memorandum of understanding with more specific agreements regarding working relationships and desired outcomes, to co-management agreements with specific responsibilities and authorities.

3. Record-keeping. FGC will maintain a record of all comments provided by tribes and will include them in administrative records where appropriate.

4. Training. FGC will provide training to interested tribes on its processes for regulation and policy development.

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Saint Helena
Samantha Murray, Vice President
Del Mar
Jacque Hostler-Carmesin, Member
McKinleyville
Russell E. Burns, Member
Napa
Peter S. Silva, Member
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(INFORMAL) ANNUAL TRIBAL PLANNING MEETING

Commissioner Jacque Hostler-Carmesin and Commissioner Russell Burns

Meeting Agenda
July 15, 2020; 2:00 p.m.
Webinar and Teleconference

The California Fish and Game Commission is conducting this informal annual meeting by webinar and teleconference to avoid a public gathering and protect public health during the COVID-19 pandemic, consistent with Executive Order N-33-20.

To participate in the meeting, please join via Zoom or by telephone.

The link to join the Zoom webinar is https://ca-water-gov.zoom.us/j/99680560111.

If you are not able to join using your computer or mobile device app (which give you maximum functionality for participating), you may join by phone by dialing 214-765-0479 or 888-278-0296 (US toll free).

Conference code: 596019 Webinar ID: 996 8056 0111

For assistance in joining Zoom meetings, you can visit https://support.zoom.us/hc/en-us/articles/115004954946-Joining-and-participating-in-a-webinar-attendee-.

If you are experiencing audio issues, please call (888) 796-6118 for customer care.

Call to order

1. Approve agenda and order of items

2. Introductions
Make introductions for commissioners, tribal representatives, Commission staff and agency representatives.

3. Roundtable discussion
An open dialogue about our experiences in adjusting and advancing priorities in the midst of a pandemic and social change, and new ways we are collaborating in a virtual world.

4. Co-management definition

Discuss what implementation may look like for the co-management definition adopted by the Commission earlier this year.

5. Closing thoughts

What have we learned about our collective experiences? Where can we help each other emerge stronger, more engaged and more capable than before?

Adjourn

California Fish and Game Commission
2020 Meeting Schedule

Note: As meeting dates and locations can change, please visit www.fgc.ca.gov for the most current list of meeting dates and locations.

Meeting Date	Commission Meeting	Committee Meeting
August 18		**Tribal** Webinar/teleconference
August 19 - 20	Webinar/teleconference	
September 17		**Wildlife Resources** Webinar/teleconference
October 14 - 15	Webinar/teleconference	
November 9		**Tribal** Webinar/teleconference
November 10		**Marine Resources** Webinar/teleconference
December 9 - 10	Webinar/teleconference	

Other 2020 Meetings of Interest

Association of Fish and Wildlife Agencies
- September 13-16, virtual meeting

Pacific Fishery Management Council
- September 10-17, Spokane, WA
- November 13-20, Garden Grove, CA

Pacific Flyway Council
- August 28, virtual meeting

Western Association of Fish and Wildlife Agencies
- July 9-14, virtual conference

Wildlife Conservation Board
- August 26, Sacramento, CA
- November 18, Sacramento, CA

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ANNUAL TRIBAL PLANNING MEETING

Commissioners in attendance: Jacque Hostler-Carmesin and Russell Burns

July 15, 2020 Meeting Summary

This document is a summary of the California Fish and Game Commission (Commission) annual tribal planning meeting, as prepared by staff.

Call to order

The meeting was called to order at 2:07 p.m. by Commissioner Jacque Hostler-Carmesin, who gave welcoming remarks and introduced Commissioner Russell Burns and Executive Director Melissa Miller-Henson. Melissa provided technical notes for participating in the meeting.

1. Approve agenda and order of items

Commissioners Hostler-Carmesin and Burns approved the agenda and order of items.

2. Introductions

Commissioner Hostler-Carmesin requested that attendees introduce themselves. Tribal representatives introduced themselves first, followed by California Department of Fish and Wildlife (Department) staff, other agency staff, and then Commission staff.

3. Roundtable discussion

Commissioner Hostler-Carmesin began the open dialogue by acknowledging the challenge in adjusting and advancing priorities in the midst of a pandemic and social change, and that tribes have been especially impacted by the COVID-19 pandemic. She asked representatives how the pandemic was affecting their natural resource goals and how the Commission could help advance their priorities during the pandemic.

A significant portion of the discussion focused on food security. The indigenous right to native food sources was frequently highlighted. Tribes and tribal communities have established protocols for gathering food and distributing it to those in need in their community, but have had difficulty accessing some food sources. There is a meat shortage in some communities resulting

from limits to subsistence hunting, which is presenting a particular difficulty for elders and those in the community who have to self-isolate for health reasons.

In addition to COVID-19-related shortages, access to some traditional food sources has been affected by environmental changes or by recent regulation changes. For example, red abalone are a ceremonial item and staple food for some tribes, but the abalone fishery is currently closed. Tribal representatives expressed that tribes should be allocated take outside of the confines of the closure, as they believe the regulations strip their native rights to the land. There was also concern about recent damming efforts inhibiting salmon runs, and runoff from the Camp Fire affecting salmon health, as salmon is another staple food source for many tribes. Representatives expressed that they wished to be able to continue to fish, hunt, and gather their traditional food items, and that tribes should be consulted first when Commission-approved regulations or projects (such as urchin culling) may impact traditional gathering sites.

Tribal representatives also raised concerns about preserving sacred sites, keeping waters clean and safe, and having access to traditional gathering areas when much of the state's public land is closed due to the pandemic.

There was discussion of issues with co-management, collaboration, and agricultural concerns with certain species, and that tribes need to be given subsistence priority over depredation permits for agriculture. A Department representative noted that the Commission and Department are limited by what the California State Legislature has authorized through statute with regard to co-management initiatives, but they are interested in exploratory conversations.

Two relatively new marine organizations were raised as topics for future discussion. There is a new marine tribal stewards network being funded by the California Ocean Protection Council to help build tribal capacity for marine monitoring and management in cooperation with state agencies, such and the Commission and Department. The West Coast Ocean Alliance Tribal Caucus recently released guidance on tribal and government-to-government consultation, and hopefully can participate in the Tribal Committee meeting in August to share more about the recent guidance and tribal caucus activities in general.

Commissioner Hostler-Carmesin agreed that tribal concerns about closure exemptions, separate fishery allocations, and co-management engagement, especially for red abalone, should be prioritized. She supports the need to address subsistence. She emphasized that working with each tribe has to be on an individual basis with the Department, and that more information on co-management will be shared in the near future.

4. Co-management definition

Commissioner Hostler-Carmesin asked tribal representatives to share how the co-management definition is interpreted at a tribal level and how it aligns with tribal priorities. She requested input on how to use the definition in moving forward.

A few representatives commented on the difficulty of coordinating co-management among many organizations, especially in circumstances that require certain staff or experts on site and authorization from multiple entities. Bill Tripp and Daniel Sarna provided an example from the Karuk Tribe, which is seeking an extension on an elk trapping project that is subject to the National Environmental Protection Act (NEPA); the project has seen setbacks due to field requirements being interrupted by the pandemic and the lengthy approval process.

There was some consensus that the co-management definition would need to be somewhat flexible on a tribe-by-tribe and case-by-case basis, depending on capacity and engagement, and that it would take shape as processes were carried out.

Some of the discussion focused on using and prioritizing traditional ecological knowledge (TEK). Participants indicated that tribal knowledge is extremely valuable and should be used as a key management driver, though disseminating and interpreting TEK should be at the discretion of the tribes. There was interest in pursuing potential pathways to allow TEK to be applied to California Environmental Quality Act analyses or NEPA qualification processes.

Memorandums of understanding (MOUs) were also discussed; MOUs are the preferred agreement type between tribes and the Department since this type of agreement allows some flexibility in approach as it is not a contract. Nathan Voegeli, tribal liaison for the Department, expressed that he has seen great success in using MOUs to facilitate access to specific resources of importance and interest to tribes. However, tribal representatives felt that species- or resource-specific MOUs were too limiting and would inhibit tribal management capability; they suggested that, for successful TEK application, a more system-oriented or area-based agreement would be necessary and that the Department should be consulting with tribes on all projects within their traditional lands.

Nathan agreed that there are several approaches to an MOU that would work and that the resource-specific approach was only appropriate in some cases. There was a request to see examples or templates for the types of agreements (MOUs or otherwise) that might be pursued with the Department.

Megan Van Pelt provided an update on the California Marine Protected Areas Statewide Leadership Team, also known as the MSLT, which recently expanded to include tribal leaders from four California regions.

Commissioner Hostler-Carmesin requested a report on coordination and collaboration within the MSLT at the August Tribal Committee meeting. Executive Director Miller-Henson agreed that the report could easily be added to the standing agenda item for agency updates.

5. Closing thoughts

Commissioner Burns shared that he understands concerns about not being able to gather food in a traditional manner and that he looks forward to working together on solutions and to developing actionable outcomes in co-management. Commissioner Hostler-Carmesin thanked everyone for their participation and sharing some of the challenges they face at this extraordinary time. Everyone was invited to participate in the next Tribal Committee meeting on August 18, the day before the next Commission meeting, as well as the November 9 Tribal Committee meeting that will be held the day prior to the Commission's Marine Resources Committee meeting.

Adjourn

The meeting adjourned at 4:00 p.m.

California Fish and Game Commission Tribal Committee (TC)

Work Plan: Scheduled Topics and Timeline for Items Referred to TC by the California Fish and Game Commission

Updated June 26, 2020

Topic / Goal	Type / Lead	Jan 2020	Aug 2020	Nov 2020
Special Projects				
Co-management: Definition, implementation, and potential amendments	TC Project	X/R	X	X/R
Coastal Fishing Communities Project: Updates	MRC Project	X	X	X
Regulatory / Legislative				
Kelp and algae harvest management regulations: Updates and then recommendation and guidance	DFW Project and Regulation Change	X	X	X/R
Developing Management Issues				
FGC Climate Policy: During development of policy, make recommendations and provide guidance	FGC Policy			
Management Plans				
Sheep, deer, antelope, trout, abalone, kelp/seaweed: Updates and guidance (timing as appropriate for each)	DFW	X	X	X
Informational Topics				
Annual tribal planning meeting: Review topics discussed at annual meeting	FGC	X	X	X
Studies of pinnipeds and California's fisheries: What studies have been conducted, how they affect California's fisheries, and options for addressing impacts	DFW	X	X	
Marine Protected Areas Statewide Leadership Team (MSLT): Update on tribal participation in MSLT and implementation of the MSLT work plan	OPC Project	X	X	X
West Coast Ocean Alliance Tribal Caucus: Presentation and discussion regarding its work to enhance coordination and management for the ocean along the West Coast	FGC staff		X	
Wildfire impacts and state response: Update as requested	DFW			X
Kelp recovery efforts: Update as requested	DFW			
Status of abalone recovery: Update as requested	DFW			
Proposition 64 (cannabis): Update as requested	DFW LED			
Cross-pollination with MRC and WRC: Identify tribal concerns and common themes with WRC and MRC	FGC Committees	X	X	X
FGC regulatory calendar: Update	FGC staff	X	X	X

Key: X = Discussion scheduled X/R = Recommendation developed and moved to FGC

FGC = California Fish and Game Commission
TC = FGC's Tribal Committee
MRC = FGC's Marine Resources Committee
WRC = FGC's Wildlife Resources Committee
DFW = California Department of Fish and Wildlife
LED = DFW's Law Enforcement Division

California Fish and Game Commission
Co-Management Vision Statement and Definition

February 2020

Vision Statement

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.

Definition

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.

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MARINE RESOURCES COMMITTEE

Committee co-chairs: Commissioner Silva and Commissioner Murray

July 29, 2020 Meeting Summary

Following is a summary of the California Fish and Game Commission Marine Resources Committee (MRC) meeting as prepared by staff. An audio recording of the meeting is available upon request.

Call to order

The meeting was called to order at 9:02 a.m. by MRC Co-chair Murray. All participation was by webinar and teleconference, consistent with current health orders and state travel restrictions.

Susan Ashcraft gave welcoming remarks and outlined meeting procedures and guidelines for participating in committee discussions, noting that the MRC is a non-decision-making body that provides recommendations to the California Fish and Game Commission (Commission) on marine items. The following MRC member(s), Commission staff and California Department of Fish and Wildlife (Department) staff were in attendance:

Committee Co-Chairs

Peter Silva	Present
Samantha Murray	Present

Commission Staff

Melissa Miller-Henson	Executive Director
Rachel Ballanti	Deputy Executive Director
Susan Ashcraft	Marine Advisor
Sherrie Fonbuena	Associate Governmental Program Analyst
Rose Dodgen	Sea Grant State Fellow

Department Staff

Mike Stefanak	Assistant Chief, Law Enforcement Division
Bob Puccinelli	Captain, Law Enforcement Division
Craig Shuman	Regional Manager, Marine Region
Sonke Mastrup	State Managed Invertebrates Program Manager, Marine Region
Tom Mason	Senior Environmental Scientist Supervisor, Marine Region

Invited Speakers

Paige Berube Fisheries Program Manager, California Ocean Protection Council

1. Approve agenda and order of items

MRC approved the agenda in the order listed.

2. General public comment for items not on agenda

Two commenters expressed concerns about lobster traps along the boundaries of Laguna Beach State Marine Reserve and the potential risk of whale entanglements or disruption of whale migration. The commenters shared their plans to conduct independent surveys documenting traps and requested guidance from the Department to ensure the validity of their methodology.

Commenters reported recent sightings of invasive *Sargassum horneri* in Monterey Bay and expressed concern that restoration is not being authorized in marine protected areas (MPAs); one of the commenters also suggested altering legislative language to allow restoration activities and removal of invasive species in state marine conservation areas in response to these sightings.

Several harvesters of edible seaweed requested to collaborate with the Department and other stakeholders on upcoming commercial kelp and seaweed harvest regulation changes and offered to provide their data and photo documentation to inform the effort. A representative of an environmental non-governmental organization (NGO) outlined its kelp conservation initiative in California.

An environmental NGO representative reported that they have seen an increase in illegal take in intertidal areas of the Palos Verdes peninsula; Mike Stefanak concurred that Department enforcement has also observed the increase, and is focusing additional effort on enforcement in intertidal areas during low tides.

3. Recreational red abalone fishery

(A) Fishery management plan (FMP)

Sonke Mastrup presented on behalf of the red abalone management integration administrative team. Consistent with MRC recommendations from its previous meeting, Sonke recapped the eight recommendations from the final administrative team report and clarified those elements of the recommendations for which the Department was seeking guidance prior to preparing a revised draft red abalone FMP. Specifically, he requested MRC guidance on selecting a harvest control rule, the number of fishing management zones to include, which types of data should be used in assessment and management, the possibility of a biological fishery conducted by recreational divers, and a possible permit lottery system. The Department also proposed the concept of including a tribal take allocation option.

Discussion

Based on questions from the MRC co-chairs, Sonke provided additional clarifications. A biological fishery is a type of *de minimis* fishery, which would be conducted only when the Department needs data, employing a very cautious approach and allowing an

amount of take that would not impact recovery of the stock. Any *de minimis* opportunity could be offered through a preference point system for a potential permit lottery, similar to California's big game draw system, and the available fishing period would be kept short to aid in effective enforcement.

The Department suggested that establishing two management zones with the possibility of opening a third upon availability of adequate data, and using both density and spawning potential ratio data in the harvest control rule, would be consistent with guidance from the peer review to provide more robust data-driven management.

The proposal for tribal allocation in the FMP would require the Commission to allocate some part of any *de minimis* total allowable catch (TAC) to federally-recognized tribes on a tribe-by-tribe basis, dividing TAC between tribal and non-tribal interests.

Tribal representatives supported the tribal allocation concept and requested the FMP include further co-management options and consider tribal subsistence over other uses. Several abalone fishermen expressed support for the biological fishery. Several NGO representatives asked the co-chairs to uphold the findings of the administrative team report. An environmental NGO is supporting a pilot citizen science program; the organization has been working with Reef Check on organizing pilot dives and is interested in collaborating with the Department. One former Department biologist was concerned about pursuing an FMP for a collapsing population and requested minimum viable population criteria and specific environmental or biological triggers in the FMP.

MRC Recommendation

MRC recommends that the Commission support the Department developing a draft FMP for further MRC and public review to include all FMP elements identified in the administrative team report recommendations with four options identified:

1. Harvest control rule: Use both spawning potential ratio and density metrics wherever possible.
2. Fishing zones: Two zones, with a framework in the FMP for data needed to establish a third zone.
3. Biological fishery: Include, but with a strong caveat that It needs to be very cautious and entirely driven by scientific need.
4. Tribal allocation: General support.

(B) Current fishery closure sunset date

Sonke Mastrup provided an update on options to extend the recreational red abalone fishery closure beyond the current sunset date of April 1, 2021; he presented the Department's recommendation to extend the sunset date for a period of five years—to April 1, 2026—rather than to remove the closure sunset date. Susan Ashcraft clarified that Commission staff supports the recommendation for a five-year extension but suggested that the Department provide the Commission with annual reports regarding the status of environmental and abalone stock conditions and recovery.

Discussion

An abalone diver urged MRC to consider establishing a biological fishery before the FMP is adopted, to provide a mechanism to continue data collection while the fishery is closed and the FMP is being completed. Sonke clarified that moving the sunset date from 2021 to 2026 would not prevent establishing a biological fishery outside of the FMP, as the sunset date could be modified in regulation as needed to accommodate a potential biological fishery.

MRC Recommendation

MRC recommends that the Commission extend the current recreational red abalone fishery closure for five years, with a sunset date of April 1, 2026, through a rulemaking proposed to commence in August 2020, and request that the Department provide annual reports to the Commission regarding the status of environmental and abalone stock conditions and recovery.

4. Experimental Fishing Permit Program phase II

Tom Mason provided an update regarding the proposed Experimental Fishing Permit (EFP) Program; he provided specific recommendations for the permit application cycle and proposed fees for each of four tier-based permits. The fees are intended to recover the Department's administrative costs, though it was acknowledged that some of the Department's costs would likely be absorbed. The permit tier structure and associated fees are proposed to be determined by two factors: (1) whether the permit is for research or conservation engineering versus exploratory fishing, and (2) whether the permit would be self-supported or require a higher level of Department assistance. The Department is exploring options for reducing fees for projects that would meet Department research priorities.

Discussion

Melissa Miller-Henson highlighted that the Department-estimated EFP fees identified for cost recovery did not yet include Commissions administrative costs, which is included in the cost-recovery statutory language. Commission staff and Department staff agreed to confer on options following the meeting.

Several commenters requested a provision where any new fishery resulting from an EFP would give EFP participants preference to receive permits due to the EFP participants' investment in developing the fishery. Tom explained that the Department has had internal discussions about how the end of an EFP and beginning of a fishery develops, but that considering a new fishery is a separate process from the EFP. A representative of an environmental NGO emphasized the importance of subsidizing costs for collaborative EFP projects.

MRC Recommendation

MRC recommends that the Commission advance to rulemaking the proposed phase II regulations to establish an Experimental Fishing Permit Program as proposed by the Department, including the proposed permit tiers, associated fee structure, and application cycle as discussed today, on a timeline to be determined, and authorize Commission staff to work with the Department to explore possible additions to the stated fees associated with Commission administrative costs.

5. Marine Life Management Act master plan implementation

Susan Ashcraft provided an overview of the topic. She explained that this item includes initial vetting of possible California grunion recreational fishing regulations, with options developed by the Department at the Commission's request based on a regulation change petition granted by the Commission in February 2020. The topic of grunion is included with the master plan update in order to provide context with other fisheries management priorities developed according to the master plan prioritization framework.

Craig Shuman provided a verbal update on Department efforts to implement the 2018 master plan for fisheries, including the recent unveiling of a marine species portal web page that provides access to species enhanced status reports (ESRs, available at: https://marinespecies.wildlife.ca.gov/). He additionally presented an overview of potential regulation changes for a recreational California grunion season and bag limit for initial vetting. The Department will be conducting stakeholder outreach and proposes to bring a refined proposal to the November MRC meeting for a possible recommendation. The Department also proposes to schedule the rulemaking to commence with notice in December 2020, which would be necessary to avoid a mid-season change to regulations; the Department wants printed fishery information to be consistent throughout the season.

Discussion

Co-Chair Murray addressed the question of prioritization, as the petition that prompted the grunion rulemaking seemed to cause the potential rulemaking to move ahead of other MLMA topics. Under current circumstances, where both the Department and Commission staff have limited capacity, she stated that prioritization is key to effectively implementing MLMA master plan topics. The co-chairs want to ensure that the Department and Commission staff are communicating and have the same understanding of priorities moving forward.

Melissa Miller-Henson highlighted that the timing of a grunion rulemaking was uncertain due to the regulatory staff capacity constraints explained to the Commission in June, but that the Department program staff could continue to work on the grunion package in preparation for scheduling when staff capacity is improved.

Comments related to California Grunion: Two commenters spoke in support of the original petition to change the recreational grunion regulations. An NGO representative requested that the recent survey released for grunion permit holders should be extended to a broader range of stakeholders.

Comments related to master plan implementation steps: An NGO representative requested that set gillnet and trawl fisheries for California halibut, pink shrimp, and sea cucumbers be prioritized because of bycatch concerns, and that the master plan bycatch evaluation framework be used. A commercial kelp harvester requested implementation of an FMP for giant kelp, as their community holds that it is an established fishery.

Co-Chair Murray expressed support for scheduling a discussion of more specific grunion regulation proposals in November, with the caveats as discussed regarding potential timing for a rulemaking.

6. Staff and agency updates requested by the Committee

Note: To enhance meeting efficiency in the webinar/teleconference format, MRC received some updates in written format.

(A) California Ocean Protection Council

Paige Berube provided a brief verbal update on OPC's recent activities to supplement the written update provided prior to the meeting. Her update included information about funding recently allocated to pop-up gear research relevant to whale and turtle entanglements, funding for kelp restoration, and an upcoming interagency meeting to discuss aquaculture principles for a statewide aquaculture action plan.

(B) Department

Craig Shuman provided an update for the Marine Region. A potential rulemaking is being developed to allow inside state marine reserves the maintenance and repair of artificial structures (such as intake/outflow pipes) that were installed under the authority of other permitting agencies prior to the reserves being established as part of California's MPA network. The Commission's authority to designate MPAs did not override authority for structures already permitted by other agencies, and the Commission and Department want those agencies to be able to maintain and repair the structures without violating MPA statutes or regulations. The rulemaking will establish a definition of an artificial structure and define a buffer around structures which, together, will be a no-take state marine conservation area rather than a state marine reserve. The Department is scheduled to give a detailed presentation in November, with a goal to complete the rulemaking process by fall of 2021.

Craig also provided an update on the recreational crab regulations rulemaking package scheduled for notice next month. The package will not be limited to trapping for Dungeness crab as originally discussed, but will also apply to trap fishing for other species of crab, including rock crab, to avoid a regulatory loophole.

Mike Stefanak announced Robert Puccinelli's retirement, effective two days after the MRC meeting.

(C) Commission staff: Update on Coastal Fishing Communities Project

Rose Dodgen provided an update on progress on the Coastal Fishing Communities Project, last discussed by MRC in November 2019. MRC previously directed staff to continue to evaluate ten staff recommendations included in the *Final Staff Synthesis Report on Coastal Fishing Community Meetings;* Rose has developed status update sheets for each recommendation to summarize efforts relevant to each recommendation. Rose presented a straw analytical approach for a more in-depth evaluation to inform MRC and Commission prioritization for future actions to assist coastal fishing communities. Co-chair Murray confirmed that the straw approach for analysis was useful and could be moved forward. The co-chairs requested an update on this project in November.

Discussion

A representative of a large coalition of whale conservation interests requested that the Department allow Department-approved ropeless gear to be used any time in the fishing season in its upcoming commercial Dungeness crab Risk Assessment and Mitigation Program regulations, rather than just in closed areas after April 1 as currently allowed; the new regulations will require virtual marking to avoid conflict.

7. Future agenda items

Susan Ashcraft provided an overview of the topic. She noted that the scope of this MRC meeting had been narrowed to allow in-depth discussion of topics consistent with the intent of committee meetings, provided that sensitive and urgent items could be advanced. As seen today, it is possible for MRC to successfully hear and complete discussions of topics in this format. There are eleven meeting topics identified for November in the MRC work plan, and staff recommended that the MRC co-chairs discuss priorities for November to help narrow the scope of that meeting as well. Regarding the work plan in general, Susan recommended that cowcod rockfish recovery could be removed from the work plan as the Department had provided a detailed verbal presentation of this informational item during the March 17/April 29 MRC meeting.

Discussion

The co-chairs agreed that cowcod rockfish recovery could be removed from the November agenda and work plan, in light of the Department presentation provided previously. The Department further advised that swordfish could be removed as any updates on the topic could be provided in writing. After conferring with Commission staff, the co-chairs further decided to support development of the California grunion package for review in November, but that the timing for a rulemaking should be discussed at the August Commission meeting in the context of all other upcoming rulemakings to determine priority. Should the rulemaking need to be put on hold for any reason, it would need to be discussed prior to November.

A kelp harvester commented that the kelp wild harvest, kelp recovery, and aquaculture items could be looked at holistically.

Susan will provide further information about how to potentially allocate time to November agenda items at the October Commission meeting.

MRC Recommendation

MRC recommends that the Commission (a) remove the cowcod rockfish recovery topic from the committee work plan, (b) remove the recreational swordfish topic from the November committee meeting agenda, and (c) keep California grunion recreational fishing regulations on the November committee meeting schedule, but (d) discuss and provide direction on the potential timing for a Commission rulemaking for California grunion relative to other rulemakings.

Adjourn

The meeting adjourned at 2:27 p.m.

California Fish and Game Commission
Marine Resources Committee (MRC) Work Plan
Scheduled Topics and Timeline for Items Referred to MRC
Updated July 30, 2020

TOPIC	CATEGORY	JUL 2020	NOV 2020	MAR 2021
Planning Documents & Fishery Management Plans (FMPs)				
MLMA Master Plan for Fisheries - Implementation Updates	Master Plan Implementation	X	X	X
Red Abalone FMP / ARMP Update	FMP	X/R	X	X
Aquaculture Program Planning (Information Report, Action Plan)	Aquaculture		X	
Regulations				
Aquaculture Lease Best Management Practices (BMP) Plan Requirements (HOLD, TBD)	Aquaculture			
Experimental Fishing Permit Program, Phase II	Fisheries	X/R		
Kelp and Algae Commercial Harvest	Kelp		X	X/R
Update on and possible review of California Spiny Lobster FMP implementing regulations (*added Feb 2019; timing TBD*)	FMP			
California Grunion Recreational Fishing Regulations	Fisheries	X	X/R	
Emerging/Developing Management Issues				
Aquaculture State Water Bottom Leases: Existing & Future Lease Considerations	Aquaculture			
Moratorium on New Aquaculture Lease Applications	Aquaculture		X/R	
Kelp Restoration and Recovery Tracking	Kelp		X	
Recreational Swordfish Fishing Regulations				
Maintenance of Preexisting Structures Within Marine Protected Areas	Marine Protected Areas	X	X/R	
Special Projects				
California's Coastal Fishing Communities	MRC Special Project	X	X	
Informational / External Topics of Interest				
~~Recovery of Cowcod Stock Status (South of Cape Mendocino)~~				

KEY: **X** Discussion scheduled **X/R** Recommendation developed and moved to FGC **~~Strike-through~~** indicates topic is proposed for removal from work plan

From: Kubler, Janet E <janet.kubler@csun.edu>
Sent: Tuesday, July 21, 2020 2:00 PM
To: Wildlife Kelp <Kelp@wildlife.ca.gov>; Flores Miller, Rebecca@Wildlife <Rebecca.FloresMiller@wildlife.ca.gov>
Cc: Frimodig, Adam@Wildlife <Adam.Frimodig@wildlife.ca.gov>; Ashcraft, Susan@FGC <Susan.Ashcraft@fgc.ca.gov>; Dodgen, Rose-Contractor@FGC <Rose.Dodgen@FGC.ca.gov>
Subject: Resending A Comment on Proposed Seaweed Harvesting Regulations

Warning: This email originated from outside of CDFW and should be treated with extra caution.

Dear Ms Flores-Miller,

I am resending, attached here, a letter that you may not have received last month - due to technical problems on my end while working from home. It is a reply to the call for stakeholder comment on the Proposed Update to the California Seaweed Harvesting Regulations.

Thank you for your efforts to balance the needs for sustainable coastal economies and sustainable ecological communities in California.

Sincerely,

Janet Kubler

Janet E. Kübler, Ph.D.
Biology Department
CSUN
18111 Nordhoff Street
Northridge, CA 91330-8303

California State University
Northridge

Department of Biology

June 3rd, 2020

California Department of Fish and Wildlife

This letter is to give input on the proposed changes to California Commercial Seaweed Harvesting Regulations as presented in the June 2nd public webinar held by the California Department of Fish and Wildlife.

As a marine biologist employed by California State University at Northridge since 1999, I am familiar with coastal ecosystems in Southern California and deeply interested in their ecological sustainability. My research expertise is in seaweed biology, specifically, how seaweeds are affected by climate change and coastal pollution. That work has led me to collaborate with growers and harvesters of seaweed in the US. I am not a commercial harvester but a local expert and community stakeholder.

My concerns about the proposed changes to the regulations are:

1) The proposed new catch limits are based on previous landings rather than any assessment of stocks and sustainable harvest sizes. In the stakeholder webinar, I heard that data on seaweed stocks was not available. There is, in fact, a large amount of publicly available data that could be used to better inform management of the fishery. In addition to the primary literature which would require more synthesis, there are several long-term datasets on kelp forest and intertidal communities in California which are rich with data including changes over decades. These include the Channel Islands National Park, California Coastal LTER, PISCO, the long-term monitoring records associated with powerplants using ocean water cooling, and the monitoring of the California Marine Protected Areas. Those abundant, long-term data sets could be used to estimate stocks and/or to target additional data collection.

2) The proposed regulation against collecting by SCUBA is counterproductive for conservation and management of some seaweed species. SCUBA is the most ecologically sound and selective way to harvest seed stock for seaweed nurseries and land-based aquaculture. It is currently in use for this purpose.

3) Regulation of the entire coast of California without regard for seasonality and biogeographic regions is counter to the biology of seaweeds. Most red seaweeds have strong population genetic structure on small scales. For example, the commercially harvested species, *Mastocarpus papillatus*, has recently been found to be to something between 3 and 6 genetically isolated species that are not distinguishable based on appearance. Some of those cryptic species have been found to differ in their timing of reproduction from shore to shore on the Central California coast. They reproduce in different ways in different places. What we know about the biogeography of seaweeds argues for harvesting to managed regionally rather than statewide.

California State University, Northridge . 18111 Nordhoff Street . Northridge, California 91330-8303

FAX (818) 677-2034 janet.kubler@csun.edu

4) There is consensus among kelp biologists that the decline of large brown seaweeds in Northern California is due to a spike in urchin population following the wave of seastar wasting disease, and possibly warming water temperature. It is not believed to be – in any way – due to harvesting. Banning harvesting of bull kelp on the entire coast of California will not solve the actual cause of the bull kelp decline.

I join others in the webinar who called for regional, active management of seaweed resources in California. While harvesters focus on the most economically sustainable use of the resource for their businesses, I am concerned with the ecological sustainability of seaweed-dominant ecosystems in California. Data-informed, regional, active management of the fishery supports both of these goals. I hope you will continue to work with the harvesters to develop such a plan.

Sincerely,
Janet Kübler, PhD

FOR BACKGROUND PURPOSES ONLY

12. RED ABALONE

Today's Item **Information** ☐ **Action** ☒

Consider authorizing publication of notice of intent to amend regulations to extend the fishery closure sunset date for the recreational red abalone fishery.

Summary of Previous/Future Actions

- **Today's notice hearing** **Aug 22-23, 2018; Fortuna**
- Discussion hearing Oct 17-18, 2018; Fresno
- Adoption hearing Dec 12-13, 2018; Oceanside

Background

In Sep 2017, DFW identified sweeping changes in density, occurrence, depth distribution, size and health of red abalone as well as the kelp upon which it depends for food. In addition, DFW found that the average density of red abalone populations has declined below the Abalone Recovery and Management Plan (ARMP) fishery closure trigger of 0.30 abalone per square meter, indicating that the stock could no longer support a fishery.

In response to the DFW findings of a dramatic fishery-wide decline of red abalone populations from severe starvation conditions, in Dec 2017 FGC adopted regulations to close the recreational abalone fishery consistent with the ARMP. FGC also adopted a sunset provision for the closure based on significant public comments received during the rulemaking process to address concerns about having a fishery closure for an indeterminate period. Under existing regulations, the fishery would re-open on Apr 1, 2019, or upon adoption of a red abalone fishery management plan (FMP) and the guidance it provides for fishery reopening, whichever comes first.

The regulations closing the recreational abalone fishery became effective on Mar 29, 2018. If the existing regulations are not amended to delete or extend the sunset date (subsection 29.15(j)), the fishery will re-open on Apr 1, 2019, which will allow for the recreational take of abalone in open fishing areas during the open season (subsections 29.15(a), (b), and (c)).

Since the closure of the recreational fishery, DFW has found no meaningful changes in the abalone resource conditions described in the Sep 2017 initial statement of reasons. DFW received documented reports from the public of dead and dying abalone washed ashore at various locations in Sonoma and Mendocino counties over the 2017/18 winter and spring seasons. This information suggests that abalone continue to be weak and die due to current environmental conditions and, thus, there are no substantial positive population changes since last year. DFW concludes that re-opening the fishery at this time would be inconsistent with the ARMP and would be detrimental to the recovery of red abalone populations.

Proposed Amendment

DFW proposes to extend the closure of the abalone fishery beyond the current Apr 1, 2019

sunset date for another two years, until Apr 1, 2021. Effective dates for take and possession contained in the abalone fishing regulations would be updated as well to reflect the proposed change.

DFW's proposal allows for consideration of a fishery re-opening prior to reaching full recovery (i.e., re-opening the fishery before density standards are fully realized under the ARMP or a red abalone FMP upon adoption by FGC). DFW recommends, however, considering the management triggers in the ARMP or a red abalone FMP once adopted by FGC to determine whether re-opening the fishery to recreational harvesting is warranted. The proposed regulation change is necessary to facilitate recovery of the red abalone population while preparation of the red abalone FMP is currently underway.

Public Comments (N/A)

Recommendation

FGC staff: Authorize publication of the notice as recommended by DFW.

DFW: Authorize publication of the notice as detailed in the draft initial statement of reasons (ISOR).

Exhibits

1. DFW memo, received Jul 30, 2018
2. Draft ISOR

Motion/Direction

Moved by _____ and seconded by _____ that the Fish and Game Commission authorizes publication of a notice of its intent to amend Section 29.15, related to recreational red abalone fishing regulations.

State of California
Department of Fish and Wildlife

M e m o r a n d u m

Original on file, received August 6, 2020

Date: August 6, 2020

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

From: Charlton H. Bonham
Director

Subject: **Agenda Item for the August 19-20, 2020 Fish and Game Commission Meeting - Initial Statement of Reasons to Amend Section 29.15 Re: Recreational Abalone Closure**

The Department of Fish and Wildlife (Department) requests the Fish and Game Commission (Commission) authorize publication of notice of its intent to amend regulations for the recreational abalone fishery to extend the fishery closure sunset date by an additional five years from April 1, 2021 to April 1, 2026. Authorization of this request will allow for possible adoption at the December 9, 2020 meeting.

The Department is submitting the attached Initial Statement of Reasons (ISOR) to extend the closure sunset date for an additional five years. This proposal is based on data that indicate the abalone resource and current environmental conditions remain unchanged since adoption of the closure in 2017. In addition, the Department has been engaged with stakeholders to develop a Red Abalone Fishery Management Plan (FMP). It is expected that the FMP and associated implementing regulations will be completed well before 2026.

If you have any questions or need additional information, please contact Dr. Craig Shuman, Marine Regional Manager at (916) 373-5491. The public notice for this rulemaking should identify Senior Environmental Scientist Specialist, Ian Taniguchi as the Department's point of contact. His contact information is (562) 342-7182 or Ian.Taniguchi@wildlife.ca.gov.

ec: Stafford Lehr, Deputy Director
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DRAFT DOCUMENT

State of California
Fish and Game Commission
Initial Statement of Reasons for Regulatory Action

Amend Section 29.15
Title 14, California Code of Regulations
Re: Recreational Abalone Closure

I. Date of Initial Statement of Reasons: July 20, 2020

II. Dates and Locations of Scheduled Hearings

(a) Notice Hearing

Date: August 19, 2020 Location: Webinar/ Teleconference

(b) Discussion Hearing

Date: October 14, 2020 Location: Webinar/ Teleconference

(c) Adoption Hearing

Date: December 9, 2020 Location: Webinar/ Teleconference

III. Description of Regulatory Action

(a) Statement of Specific Purpose of Regulatory Change and Factual Basis for Determining that Regulation Change is Reasonably Necessary

Red abalone (*Haliotis rufescens*) is a resource managed by the California Department of Fish and Wildlife (Department) under the Abalone Recovery and Management Plan (ARMP). The Fish and Game Commission (Commission) is the decision-making body that regulates the recreational take of abalone and adopted the ARMP in 2005.

Red abalone are herbivores that live on rocky reefs in kelp forests, eating red and brown algae. Starting in 2014, a combination of unprecedented environmental and biological stressors, including warmer-than-normal waters and decreasing food resources leading to starvation conditions, began to negatively impact abalone populations. Since then, the Department has actively conducted surveys, visual assessments, and histological sampling of north coast abalone, and received citizen reports of unhealthy or moribund abalone within the fishery. In the September 2017 Initial Statement of Reasons for Regulatory Action (Commission, 2017) the Department identified wide-sweeping changes in the density, occurrence, size and health of red abalone and the kelp upon which it depends for food.

Due to the sharp decline of abalone, the expanding urchin barren, and the dwindling kelp stands throughout the state, the Commission adopted emergency regulations in 2016 to reduce the season by two months and the per-person annual take limit from 18 to 12 (Office of Administrative Law (OAL) rulemaking file 2016-1216-01E). Scientific research conducted by

Department staff continued to document the extent of the degradation experienced by the stock and the environment. In 2017, the Commission closed the fishery until 2021 through a regular rulemaking (OAL rulemaking file 2018-0329-01SR).

Since the closure of the recreational fishery, the Department has found no meaningful changes in conditions of the abalone resource or environment as described in the September 2017 Initial Statement of Reasons for Regulatory Action (Commission, 2017). Surveys at selected coastal sites in late summer and early fall of 2019 show no evidence of improved conditions, with bull kelp coverage still significantly lower than historical average (Figure 1). Recent analysis suggests that the red abalone stock is not expected to be able to sustain even a *de minimis* fishery for another 9-11 years. A fishery management plan (FMP) for red abalone is currently under development by the Department and stakeholders to guide future management actions for the northern California recreational fishery, separate from the ARMP. The FMP is expected to be completed and adopted before 2026, at which point Section 29.15 will likely be amended to accommodate the implementing regulations of the FMP.

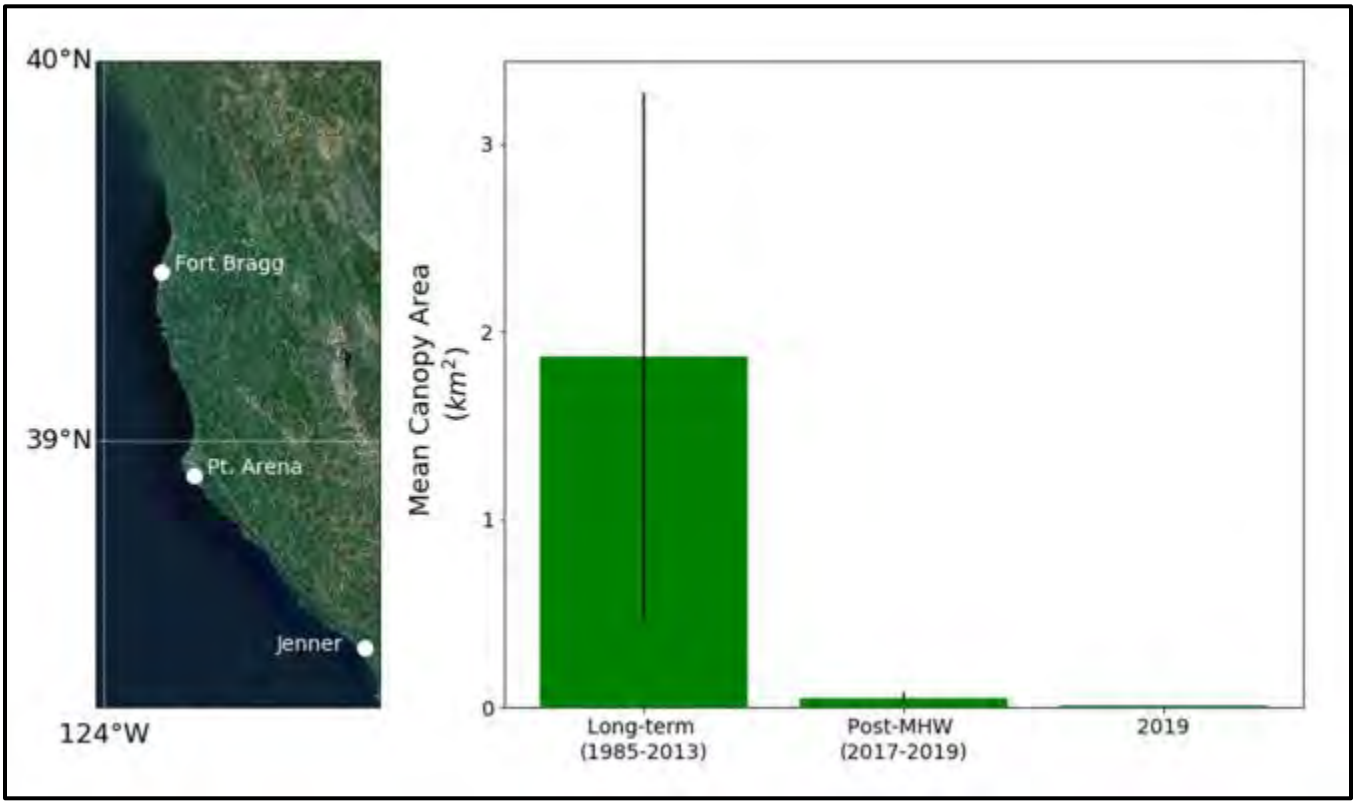

Figure 1. Mean Bull Kelp Coverage in Northern California in km^2 before Marine Heat Wave (MHW), after MHW, and in 2019 (Source: McPherson et al., 2020).

Current Regulations

Current recreational abalone fishing regulations in Section 29.15, Title 14, California Code of Regulations (CCR), specify open areas, season, hours, daily limits, special gear provisions, measuring devices, abalone report card requirements, and minimum size limit. Subsection 29.15 (i) closes all ocean waters to the take of abalone beginning on April 1, 2018. The closure

is in effect until April 1, 2021 under subsection 29.15 (j). If the regulations are not amended to delete or extend that date, the fishery will re-open on April 1, 2021, which will allow for the recreational take of abalone in open fishing areas during the open season (current subsections 29.15(a), (b), and (c)).

Proposed Amendment - Subsections 29.15 (a)-(c), (i) and (j)

Extend the Sunset Date

The Commission is proposing to extend the sunset date of the closure in Section 29.15 by replacing the effective year of 2021 with the year 2026 in current subsections 29.15 (a), (b), (c) and (j). Delaying the reopening date is necessary because without the delay, the fishery will re-open while the stock is still in a vulnerable state, which would be detrimental to the recovery of the red abalone population. The April 1, 2018 effective date listed in current subsection (i) will also be removed since the closure is already in place.

The red abalone population is not expected to recover by 2026; however, Department staff has been engaging with stakeholders since 2014 to draft a comprehensive FMP. The FMP is expected to be completed before 2026 and will include implementing regulations which will amend Section 29.15. Language pertaining to the current closure is expected to be included as part of the implementing regulations of the FMP.

Rearrange Order of Subsections

The proposal would also rearrange the order of current subsections (a), (b), (c), (i) and (j) and would split current subsection (i) into two subsections. The relocated language from subsection (a) to subsection (j), from subsection (b) to subsection (k), and from subsection (j) to subsection (b) is unchanged except the date change described above and updates to the cross references to reflect the rearrangement of the subsections. The relocated language from subsection (i) to subsections (a) and (c) is unchanged except for the removal of the words “Effective April 1, 2018” and the amendments to clarify the exceptions for abalone taken prior to April 1, 2018. This re-ordering of the subsections places the requirements effective 2026 in sequence, and the requirements for abalone taken prior to the closure April 1, 2018 in sequence in the regulation text. This rearrangement in language is necessary to improve clarity, emphasize the fishery closure, and aid with enforcement.

Repeal Requirement to Retain All Detached Legal Size Abalone

Subsection 29.15(d) specifies the minimum size limit for red abalone and states that all legal size abalone detached must be retained. The proposed regulation will repeal the requirement to retain detached legal size abalone. This change is necessary for consistency with subsection (a) which prohibits take and possession of abalone.

(b) Goals and Benefits of the Regulation

The policy of this state is “to ensure the conservation, sustainable use, and, where feasible, restoration of California’s marine living resources for the benefit of all the citizens of the State” (Fish and Game Code section 7050(b)). The proposed regulation changes are intended to

facilitate the red abalone population's recovery from the multi-year poor environmental conditions and massive losses of red abalone fishery stock. The proposed extension of the red abalone fishery closure will benefit the valuable red abalone resource by protecting it from fishing mortality during the current poor environmental conditions. Further conserving the red abalone resource now will allow it the opportunity to rebuild and be sustainable for the future.

(c) Authority and Reference Sections from Fish and Game Code for Regulation

Authority: Sections 200, 205, 260, 265, 399, 5520, 5521 and 7149.8, Fish and Game Code

Reference: Sections 200, 205, 265, 275, 5520, 5521, 7145 and 7149.8, Fish and Game Code

(d) Specific Technology or Equipment Required by Regulatory Change

None

(e) Identification of Reports or Documents Supporting Regulation Change

Jackson, A., Berube, P., Taniguchi, I., Likins, J., Silva, J., Pope, E., and S. Mastrup. 2020. *Summary of the Management Strategy Integration Process for the North Coast Recreational Red Abalone Fishery Management Plan*. Administrative Team Report to the California Fish and Game Commission. 115 pp. Available from: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=178566&inline

McPherson, Finger, Housekeeper, Bell, Carr, Rogers-Bennett, & Kudela. 2020. Paper Under Review (Analyzes kelp coverage data gathered from Northern California from 1985-2019).

Fish and Game Commission. (Commission, 2017). Initial Statement of Reasons for Regulatory Action to Amend Section 29.15, Title 14, California Code of Regulations, Re Abalone Regulations. Available from: https://fgc.ca.gov/Regulations/2017-New-and-Proposed#29_15S

Abalone Recovery and Management Plan
https://www.wildlife.ca.gov/Conservation/Marine/ARMP

(f) Public Discussions of Proposed Regulations Prior to Notice Publication

The poor conditions of the red abalone populations have been well-known and have been discussed extensively in previous rulemakings. The subject was discussed during the August 2017, October 2017, December 2017, August 2018, October 2018, and December 2018 Commission meetings. The present action to extend the sunset date from 2021 to 2026 has been discussed at the June 24, 2020 Commission meeting, as well as during a pre-notice outreach webinar with the Red Abalone Advisory Committee on July 11, 2020.

IV. Description of Reasonable Alternatives to Regulatory Action

(a) Alternatives to Regulation Change

Elimination of the sunset date was rejected due to stakeholders' opposition to an indefinite fishery closure. No other alternatives have been identified by or brought to the attention of Commission staff that would have the same desired regulatory effect.

(b) No Change Alternative

Without the proposed regulatory change, the red abalone populations will be open to recreational take in 2021 to the detriment of the fishery's recovery.

V. Mitigation Measures Required by Regulatory Action

The proposed regulatory action will have no negative impact on the environment; therefore, no mitigation measures 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. The regulatory action will not impact compliance costs or fishery activity due to the existing closure and applies to a fishery that is unique to the State of California.

(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 impacts on the creation or elimination of jobs within the state, the creation of new businesses, the elimination of existing businesses or worker safety. The Commission anticipates generalized benefits to the health and welfare of California residents and benefits to the state's environment. The proposed action continues an existing closure designed to ensure the long-term sustainability and quality of the fishery, promoting future participation, fishing activity, and economic activity.

(c) Cost Impacts on a Representative Private Person or Business

The agency is not aware of any cost impacts that a representative private person or business would necessarily incur in reasonable compliance with the proposed action.

(d) Costs or Savings to State Agencies or Costs/Savings in Federal Funding to the State

None

(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 any negative impacts on the creation or elimination of jobs within the state. The abalone fishery has been closed since April 1, 2018. No change in employment is anticipated in direct relation to the proposed extension through 2026. The proposed extension is designed to ensure the long-term sustainability and quality of the fishery, promoting future participation, fishing activity, and economic activity.

(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 impacts on the creation of new businesses or the elimination of existing businesses within the state. The abalone fishery has been closed since April 1, 2018. No change is anticipated in relation to the creation of new businesses or the elimination of existing businesses within the state from the proposed action. Continuing the fishery closure is proposed to support the long-term sustainability of the abalone resource and, thus, the future viability of the fishery that may support fishery related businesses.

(c) Effects of the Regulation on the Expansion of Businesses Currently Doing Business Within the State

The Commission does not anticipate any impacts on the expansion of businesses currently doing business within the state. The abalone fishery has been closed since April 1, 2018. Continuing the fishery closure is proposed to support the long-term sustainability of the abalone resource and, thus, the future viability of the fishery that may support fishery-related businesses.

(d) Benefits of the Regulation to the Health and Welfare of California Residents

The Commission anticipates generalized benefits to the health and welfare of California residents

(e) Benefits of the Regulation to Worker Safety

None. The proposed regulation does not impact working conditions

(f) Benefits of the Regulation to the State's Environment

The Commission anticipates benefits to the state's environment. It is the policy of the state to ensure "the conservation, sustainable use, and, where feasible, restoration of California's marine living resources for the benefit of all the citizens of the state" (Fish and Game Code Section 7050(b)). The proposed regulation will benefit the state's environment by helping to ensure sustainable populations of red abalone for fishery and ecosystem management.

Informative Digest/Policy Statement Overview

Current recreational abalone fishing regulations in Section 29.15, Title 14, California Code of Regulations (CCR), specify open areas, season, hours, daily limits, special gear provisions, measuring devices, abalone report card requirements, and minimum size limit. Subsection 29.15 (i) closes all ocean waters to the take of abalone beginning on April 1, 2018. The closure is currently set to expire on April 1, 2021.

The Fish and Game Commission (Commission) is proposing to extend the sunset date of the closure to April 1, 2026. A five-year extension of the sunset is expected to allow sufficient time for completion of the Red Abalone Fishery Management Plan and associated implementing regulations. In addition, the proposal will reorganize the subsections of Section 29.15 and update cross references to reflect that reorganization. The proposed regulation will also repeal the requirement in subsection (d) that states all legal size abalone detached must be retained.

Benefits of the Regulations

The proposed regulation will benefit the state's environment by helping to ensure sustainable populations of red abalone for fishery and ecosystem management.

Consistency and Compatibility with Existing Regulations

The Legislature has delegated authority to the Commission to promulgate recreational fishing regulations (Fish and Game Code, sections 200, 205, and 265); no other state agency has the authority to promulgate such regulations. The Commission has conducted a search of Title 14, CCR, and determined that the proposed regulations are consistent with other recreational fishing regulations and marine protected area regulations in Title 14, CCR, and therefore has determined that the proposed regulation is neither inconsistent nor incompatible with existing state regulations.

Proposed Regulatory Language

Section 29.15, Title 14 CCR, is amended to read:

§29.15. Abalone

~~(a) Effective April 1, 2021: Open Area: Except in the area described in subsection (a)(1) below, abalone may only be taken north of a line drawn due west magnetic from the center of the mouth of San Francisco Bay. No abalone may be taken, landed, or possessed if landed south of this line.~~

~~(1) No Abalone may be taken in the Fort Ross area bounded by the mean high tide line and a line drawn due south true from 38º30.63' N, 123º14.98' W (the northern point of Fort Ross Cove) and a line drawn due west true from 38º29.45' N, 123º11.72' W (Jewel Gulch, south boundary Fort Ross State Park).~~

~~(b) Effective April 1, 2021: Open Season and Hours:~~

~~(1) Open Season: Abalone may be taken only during the months of April, May, June, August, September, October and November.~~

~~(2) Open Hours: Abalone may be taken only from 8:00 AM to one-half hour after sunset.~~

~~(c) Effective April 1, 2021: Bag Limit and Yearly Trip Limit: Three red abalone, *Haliotis rufescens*, may be taken per day. No more than three abalone may be possessed at any time. No other species of abalone may be taken or possessed. Each person taking abalone shall stop detaching abalone when the limit of three is reached. No person shall take more than 18 abalone during a calendar year. In the Open Area as defined in subsections 29.15(a) and 29.15(a)(1) above, not more than 9 abalone of the yearly trip limit may be taken south of the boundary between Sonoma and Mendocino Counties.~~

(a) All ocean waters are closed to the take of abalone. Abalone may not be taken or possessed.

(b) This subsection and subsection (a) shall remain in effect only until April 1, 2026, and as of that date are repealed, unless a later enacted amendment deletes or extends that date.

(c) Notwithstanding subsection (a), subsections (c)(1) and (c)(2) are applicable for abalone in possession prior to April 1, 2018:

(1) Minimum Abalone Size: All red abalone must be seven inches or greater measured along the longest shell diameter.

(2) Abalone Possession and Transportation: It shall be unlawful to possess any untagged abalone or any abalone that have been removed from their shell, except when they are being prepared for immediate consumption.

(d) Minimum Abalone Size: All red abalone must be seven inches or greater measured along the longest shell diameter. ~~All legal size abalone detached must be retained.~~ No undersized abalone may be brought ashore or aboard any boat, placed in any type of receiver, kept on the person, or retained in any person's possession or under his control. Undersize abalone must be replaced immediately to the same surface of the rock from which detached. Abalones brought ashore shall be in such a condition that the size can be determined.

(e) Special Gear Provisions: The use of SCUBA gear or surface supplied air to take abalone is prohibited. Abalone may not be taken or possessed aboard any boat, vessel, or floating device in the water containing SCUBA or surface supplied air. Abalone may be taken only by hand or by devices commonly known as abalone irons. Abalone irons must be less than 36 inches long, straight or with a curve having a radius of not less than 18 inches, and must not be less than 3/4 inch wide nor less than 1/16 inch thick. All edges must be rounded and free of sharp edges. Knives, screwdrivers and sharp instruments are prohibited.

(f) Measuring Device. Every person while taking abalone shall carry a fixed caliper measuring gauge capable of accurately measuring seven inches. The measuring device shall have fixed opposing arms of sufficient length to measure the abalone by placing the gauge over the shell.

(g) Abalone Possession and Transportation:

Abalones shall not be removed from their shell, except when being prepared for immediate consumption.

(1) Individuals taking abalone shall maintain separate possession of their abalone. Abalone may not be commingled in a float tube, dive board, dive bag, or any other container or device, until properly tagged. Only after abalones are properly tagged, as described in Section 29.16(b), Title 14, CCR, may they be commingled with other abalone taken by another person.

(h) Report Card Required: Any person fishing for or taking abalone shall have in their possession a nontransferable Abalone Report Card issued by the department and shall adhere to all reporting and tagging requirements for abalone defined in Sections 1.74 and 29.16, Title 14, CCR.

~~(i) Effective April 1, 2018: All ocean waters are closed to the take of abalone. Abalone may not be taken or possessed. The following exceptions are for abalone in possession prior to April 1, 2018:~~

~~(1) Minimum Abalone Size: All red abalone must be seven inches or greater measured along the longest shell diameter.~~

~~(2) Abalone Possession and Transportation: It shall be unlawful to possess any untagged abalone or any abalone that have been removed from their shell, except when they are being prepared for immediate consumption.~~

~~(j) This subsection and subsection (i) shall remain in effect only until April 1, 2018, and as of that date are repealed, unless a later enacted amendment deletes or extends that date.~~

(i) Effective April 1, 2026: Bag Limit and Yearly Trip Limit: Three red abalone, *Haliotis rufescens*, may be taken per day. No more than three abalone may be possessed at any time. No other species of abalone may be taken or possessed. Each person taking abalone shall stop detaching abalone when the limit of three is reached. No person shall take more than 18 abalone during a calendar year. In the Open Area as defined in subsections 29.15(j) and 29.15(j)(1), not more than 9 abalone of the yearly trip limit may be taken south of the boundary between Sonoma and Mendocino Counties.

(j) Effective April 1, 2026: Open Area: Except in the area described in subsection (j)(1) below, abalone may only be taken north of a line drawn due west magnetic from the center of the mouth of San Francisco Bay. No abalone may be taken, landed, or possessed if landed south of this line.

(1) No abalone may be taken in the Fort Ross area bounded by the mean high tide line and a line drawn due south true from 38º30.63' N, 123º14.98' W (the northern point of Fort Ross Cove) and a line drawn due west true from 38º29.45' N, 123º11.72' W (Jewel Gulch, south boundary Fort Ross State Park).

(k) Effective April 1, 2026: Open Season and Hours:

(1) Open Season: Abalone may be taken only during the months of April, May, June, August, September, October and November.

(2) Open Hours: Abalone may be taken only from 8:00 AM to one-half hour after sunset.

Note: Authority cited: Sections 200, 205, 260, 265, 399, 5520, 5521 and 7149.8, Fish and Game Code. Reference: Sections 200, 205, 265, 275, 5520, 5521, 7145 and 7149.8, Fish and Game Code.

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Instructions and Code Citations:
SAM Section 6601-6616

STATE OF CALIFORNIA — DEPARTMENT OF FINANCE

ECONOMIC AND FISCAL IMPACT STATEMENT
(REGULATIONS AND ORDERS)

STD. 399 (Rev. 10/2019)

DRAFT

ECONOMIC IMPACT STATEMENT

DEPARTMENT NAME	CONTACT PERSON	EMAIL ADDRESS	TELEPHONE NUMBER
Fish and Game Commission	Margaret Duncan	margaret.duncan@wildlife.ca.gc	916 704-3215

DESCRIPTIVE TITLE FROM NOTICE REGISTER OR FORM 400	NOTICE FILE NUMBER
Amend 29.15, Title 14, CCR Re: Recreational Abalone Closure	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:

- ☐ a. Impacts business and/or employees
- ☐ b. Impacts small businesses
- ☐ c. Impacts jobs or occupations
- ☐ d. Impacts California competitiveness
- ☐ e. Imposes reporting requirements
- ☐ f. Imposes prescriptive instead of performance
- ☐ g. Impacts individuals
- ☒ h. None of the above (Explain below):

Extension to the end date for an existing recreational fishery closure.

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 _____ (Agency/Department) estimates that the economic impact of this regulation (which includes the fiscal impact) is:

- ☐ 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: _____

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Instructions and Code Citations:
SAM Section 6601-6616

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: _____

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Instructions and Code Citations:
SAM Section 6601-6616

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 ☐ NO

Explain: _____

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 through12 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: _____

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Instructions and Code Citations:
SAM Section 6601-6616

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 _____

_____

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Instructions and Code Citations:
SAM Section 6601-6616

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
DocuSigned by: Dennis Farrell E8B0B535880C4E6...	

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

COMMITTEE STAFF SUMMARY FOR MARCH 17, 2020 MRC
For Background Purposes Only

5. WHALE/TURTLE PROTECTIONS – RECREATIONAL DUNGENESS CRAB FISHERY

Today's Item **Information ☐** **Action ☒**

Discuss and consider possible recommendation on DFW-proposed management measures for the recreational Dungeness crab fishery.

Summary of Previous/Future Actions

• FGC discussed commercial entanglement settlement and referred discussion to MRC	Apr 17, 2019; Santa Monica
• MRC discussed and recommended possible management measures for the recreational fishery	Jul 11, 2019; MRC, San Clemente
• FGC supported MRC recommendation	Aug 7-8, 2019; Sacramento
• MRC discussed possible management measures in more detail	Nov 5, 2019; MRC, Sacramento
• FGC approved MRC recommendation and requested additional DFW outreach to stakeholders	Dec 11-12, 2019; Sacramento
• FGC re-referred to MRC to refine management recommendations	Feb 21, 2020; Sacramento
• **Today's update and potential recommendation**	**Mar 17, 2020; MRC, Santa Rosa**
• Notice hearing	Jun 24-25, 2020; Santa Ana
• Discussion hearing	Aug 19-20, 2020; Fortuna
• Adoption hearing	Oct 14-15, 2020; Oakland

Background

FGC has authority to regulate the recreational Dungeness crab fishery; authority over the commercial Dungeness crab fishery is held by both DFW and the California State Legislature.

In recent years, whale populations in California's waters have increased, leading to a greater risk of, and drastic increase in, entanglement in deployed commercial crab fishing gear. DFW has initiated implementation of collaboratively developed management measures centered on reducing the risk of whale and sea turtle entanglements in the commercial fishery. In Apr 2019, FGC initiated discussions around potential management measures for the recreational Dungeness crab trap fishery (see Exhibit 1 for additional background).

MRC held discussions in Jul and Nov 2019 to explore a suite of possible "common-sense" management measures, as proposed by DFW, and recommended FGC support for those measures (Exhibit 1). Following an FGC request in Dec 2019 for DFW to conduct further

stakeholder outreach, DFW held workshops in Jan 2020 to solicit additional stakeholder input and inform a final proposal.

At the Feb 2020 FGC meeting, DFW reported on the outcomes of the Jan 2020 workshops that helped shape refinements to the DFW-proposed management measures (Exhibit 2) in five categories: gear marking (buoys or floats), trap limit (range of 5-10 pots), trap service interval (range of 9-16 days), validation stamp, and possible DFW director authority for swift management response to entanglement risk. At its Feb meeting, FGC approved moving forward to define proposed changes in the five categories, re-referred the item to MRC to refine specific aspects of the proposals, and approved a rulemaking schedule to commence in Jun 2020.

Since Feb, DFW has refined its proposal taking additional stakeholder and DFW enforcement feedback into consideration. In addition to recommendations within the five categories previously presented, DFW has added options related to surface gear, note fishing, and fair start provisions (Exhibit 3).

Significant Public Comments

Three recreational fishing organizations express support for some proposed measures, specifically gear marking and a service interval (16 days). The organizations express concerns about the extent of some proposed measures, specifically stamp validation (prefer requiring only for those deploying traps), trap limits (prefer collecting data on number of traps in use prior to setting an informed trap limit), and granting DFW director authority to take in-season actions (asserting that imposing the same commercial mitigation measures to the recreational fleet is inappropriate relative to the risk they each pose). They further request that the rulemaking not be rushed so that legal and factual differences between the commercial and recreational sectors can be considered when assigning corresponding management measures (Exhibit 4).

Recommendation

FGC staff: Support including the proposed management measures as recommended by DFW in a draft rulemaking for the recreational Dungeness crab fishery. Staff believes the proposed changes recommended by DFW provide a reasonable balance between resource protection needs, stakeholder desires, and DFW enforcement concerns.

DFW: Advance a rulemaking that includes the following proposed changes, with additional provisions and options shown in Exhibit 4, for the recreational Dungeness crab fishery:

- gear marking with small buoys or unique floats;
- a trap limit of 10 traps per angler from Nov 1 to Mar 31, and 5 traps from Apr 1 to season end;
- a service interval of 9 days (with severe weather extension option);
- a validation stamp for all participating anglers, with the option to sunset in 5 years;
- give the DFW director authority to delay the season or close the season early when entanglement risk is high, with a zonal option and FGC notification;
- specific surface gear requirements for surface buoys and line length;
- ‘note fishing’ (select one of two options); and

- A fair start provision of no less than 5 days before commercial pre-soak.

Exhibits

1. Background document: Staff summary for Agenda Item 9, Nov 5, 2019 MRC meeting
2. Background document: Staff summary for Agenda Item 18, Feb 21, 2020 FGC meeting
3. DFW presentation
4. Email from Marc Gorelnik on behalf of Coastside Fishing Club, Humboldt Area Saltwater Anglers, and Coastal Conservation Association of California, received Jan 20, 2020

Committee Direction/Recommendation

The Marine Resources Committee recommends a proposed rulemaking that includes management measures to minimize the risk of whale and turtle entanglements in the recreational Dungeness crab fishery as recommended by the Department in Exhibit 3 and discussed today.

OR

The Marine Resources Committee recommends a proposed rulemaking that includes management measures to minimize the risk of whale and turtle entanglements in the recreational Dungeness crab fishery as recommended by the Department in Exhibit 3, except:

Enhanced gear marking: _____

Trap limit: _____ [5-10 pots]

Service interval: _____ [9-16 days]

Validation stamp: Applies to _____ [all licensed crab fishermen versus boat owner], **and** *include*____ **or** *do not include* ____ a 5-year sunset date

Director's authority: *No* ____ **or** *Yes*___ with these parameters: _____

Surface gear: _____ [buoys, line length]

Note fishing: _____ [Option 1 or Option 2]

Fair start: _____

STAFF SUMMARY FOR JUNE 24-25, 2020
For Background Purposes Only.

13. DUNGENESS CRAB (RECREATIONAL)

Today's Item **Information ☐** **Action ☒**

Discuss and consider direction on regulatory options and consider authorizing publication of a notice of intent to amend recreational Dungeness crab regulations for marine life protection measures.

Summary of Previous/Future Actions

• FGC/MRC considered management measures for the recreational fishery	Apr 2019-Feb 2020; various
• Most recent MRC update and recommendation	Mar 17, 2020; MRC, Santa Rosa/ teleconference
• FGC approved MRC recommendation	Apr 15-16, 2020; Teleconference
• **Today's direction and notice hearing, with staff proposal to continue notice hearing to Aug 2020**	**Jun 24-25, 2020; Webinar/teleconference** or Aug 19-20, 2020 if notice hearing continued
• Discussion hearing	Aug 19-20, 2020; Fortuna or Oct 14-15, 2020 if notice hearing continued
• Adoption hearing	Oct 14-15, 2020; Oakland or Dec 9-10, 2020 if notice hearing continued

Background

FGC has authority to regulate the recreational Dungeness crab fishery; authority over the commercial Dungeness crab fishery is held by both DFW and the California State Legislature.

In recent years, whale populations in California's waters have increased, leading to a greater risk of, and drastic increase in, entanglement in deployed commercial crab fishing gear. In response, DFW implemented a series of management measures centered on reducing the risk of whale and sea turtle entanglements in the commercial fishery.

In early 2019, FGC initiated discussions about potential management measures for the recreational Dungeness crab trap fishery to minimize similar entanglement risks (see Exhibit 1 for background). Management options were explored and refined at various FGC and MRC meetings throughout 2019 and early 2020, culminating in FGC action to schedule a rulemaking to commence in Jun 2020.

In Apr 2020, FGC received and approved an MRC recommendation for specific management measures to be included in the proposed rulemaking. FGC also requested that DFW return to the Jun notice hearing with more specific criteria and considerations for several items:

1. Director's authority – criteria to guide possible pre- or in-season action.
2. Service interval – criteria to provide a "severe weather extension."
3. Validation stamp – possible sunset period.

4. Proposed recreational gear retrieval program – consider adding a provision.

As requested, for today's meeting DFW has provided feedback and recommendations related to the items for FGC consideration and direction (exhibits 2 and 3). Given the number of items still under consideration and in need of FGC direction, an initial statement of reasons (ISOR) has not been completed; with direction provided today, DFW can integrate regulatory options into a draft ISOR for the Aug 19-20, 2020 meeting.

Significant Public Comments

Coastside Fishing Club expresses concerns about basing criteria for the DFW director's action under a delegated authority on the Risk Assessment and Mitigation Program (RAMP), which was designed for the commercial fishery. The club states that metrics must be adjusted to reflect the lower risk of whale entanglements in the recreational sector; it proposes that the threshold for animal concentrations be adjusted by a factor of ten, suggests how to ascribe unidentified entanglements by sector, and suggests that in-season action should only be taken when animal concentrations have been documented via surveys (Exhibit 4).

Recommendation

FGC staff: Support DFW recommendations for regulatory options as reflected and explained in Exhibit 2; and continue the notice hearing to Aug (with Oct discussion and Dec adoption) to provide time for DFW to integrate direction on regulatory options into a draft ISOR.

Committee: Authorize publication of notice as proposed after providing direction on the four DFW-developed options.

DFW: Approve integrating four regulatory options into the proposed rulemaking: (1) include delegated authority for DFW director's action with reliance on its RAMP developed for the commercial fishery; (2) include a severe weather extension to the trap service interval using criteria already established in Fish and Game Code for the commercial fishery (specifically related to weather conditions); (3) do not include a sunset date for the proposed validation stamp; and 4) do not include a recreational gear retrieval program at this time, for the reasons identified by DFW in Exhibit 2.

Exhibits

1. Staff summary from Mar 17, 2020 MRC meeting (for background purposes)
2. DFW memo, received Jun 16, 2020
3. DFW presentation
4. Email from George Osborn transmitting a letter from Coastside Fishing Club, received May 7, 2020

Motion/Direction

Moved by _____ and seconded by _____ that the Commission approves including three specific management measures in the proposed changes to recreational Dungeness crab fishing regulations:

- Department director authority to delay the season's start or close the season early using

the Department's Risk Assessment and Mitigation Program as developed for the commercial fishery to determine elevated risks to concentrations of marine life;

- A "severe weather extension" to the trap service interval with provisions founded on California Fish and Game Code Section 9004, to condition trap servicing on "weather conditions at sea permitting;" and
- A validation stamp requirement without a sunset date specified.

Further, the Commission approves the staff request to continue the notice hearing to August 2020, followed by discussion in October 2020 and adoption in December 2020, and directs staff to continue to evaluate options for a recreational gear retrieval program, as time allows, for potential future consideration.

OR

Moved by _____ and seconded by _____ that the Commission approves the following specific management measures to be included in the draft changes to recreational Dungeness crab fishing regulations:

- Director authority to delay the season's start or close the season early using the Department's Risk Assessment and Mitigation Program as developed for the commercial fishery to determine elevated risks to concentrations of marine life, except as follows:_____;
- A "severe weather extension" to the trap service interval with provisions founded on California Fish and Game Code Section 9004, to condition trap servicing on "weather conditions at sea permitting," except as follows:_____; and
- A validation stamp requirement [*without or with a sunset date*] specified.

Further, the Commission approves the staff request to continue the notice hearing to August 2020, followed by discussion in October 2020 and adoption in December 2020, and directs staff to continue to evaluate options for a recreational gear retrieval program, as time allows, for potential future consideration.

State of California
Department of Fish and Wildlife

Received August 12, 2020
Original signed copy on file.

M e m o r a n d u m

Date: August 11, 2020

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

From: Charlton H. Bonham
Director

Subject: **Submission of Initial Statement of Reasons for Agenda Item for the August 19-20, 2020 Fish and Game Commission Meeting - RE: Amend Sections 29.80, 29.85 and 701, Recreational Crab Marine Life Protection Measures**

The Department of Fish and Wildlife (Department) requests the Fish and Game Commission (Commission) authorize publication of notice of its intent to amend regulations for the recreational crab fishery to include management measures to reduce the risk of marine life entanglement. Authorization of this request will allow for discussion at the October 14, 2020 Commission meeting, and possible adoption at the December 9, 2020 Commission meeting.

The Department is submitting the attached Initial Statement of Reasons (ISOR) supporting proposed regulations to require enhanced trap gear marking, a nine-day service interval for checking traps, a limit of 10 traps per individual angler, the addition of a trap validation program, and the provision for the Director of the Department to delay the season or take in-season management action to minimize entanglement risk.

The Department recommends adoption of the marine life protection measures in this rulemaking. They are consistent with measures the Department has already employed or is in progress of employing for the commercial Dungeness crab fishery to protect large whales and sea turtles under the Risk Assessment Mitigation Program.

If you have any questions or need additional information, please contact Dr. Craig Shuman, Marine Regional Manager at (916) 373-5491. The public notice for this rulemaking should identify Senior Environmental Scientist Specialist, Ryan Bartling as the Department's point of contact. His contact information is (415) 761-1843 or Ryan.Bartling@wildlife.ca.gov.

ec: Stafford Lehr, Deputy Director
Wildlife and Fisheries Division
Stafford.Lehr@wildlife.ca.gov

Craig Shuman, D. Env., Regional Manager
Marine Region
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State of California
Fish and Game Commission
Initial Statement of Reasons for Regulatory Action

DRAFT

Amend Sections 29.80, 29.85, and 701
Title 14, California Code of Regulations
Re: Recreational Crab Trap Fishery Marine Life Protection Measures

I. Date of Initial Statement of Reasons: July 31, 2020

II. Dates and Locations of Scheduled Hearings

(a) Notice Hearing

Date: August 19, 2020 Location: Webinar/Teleconference

(b) Discussion Hearing

Date: October 14, 2020 Location: Webinar/Teleconference

(c) Adoption Hearing

Date: December 9, 2020 Location: Webinar/Teleconference

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).

In the last several years, there has been an increase in the number of reported entanglements of marine life with fishing gear on portions of the Pacific coast. Between 2014 and 2019, three Humpback whale entanglements were attributed to the recreational crab fishery in California. (Saez et al. 2020; National Oceanic Atmospheric Administration [NOAA] Fisheries, 2020). The California Fish and Game Commission (Commission) has worked with the California Department of Fish and Wildlife (Department; CDFW) and with numerous stakeholders to identify the underlying issues and proposed solutions for minimizing risk of entanglement of marine life with fishing gear. This regulatory proposal is part of the state's ongoing efforts to reduce marine life entanglements, particularly entanglements of whales and sea turtles protected and/or listed under the federal Endangered Species Act (ESA). These proposed regulations would help minimize risk of entanglement through a management response and also help collect essential baseline information for future response to entanglement risk for the recreational crab sector. The proposed regulations include five elements: enhanced gear marking, trap servicing interval, traps limits, delegated management authority, and a validation program.

There are similarities between the California recreational (sport) fishery and the commercial fishery for Dungeness and other crabs. The California recreational crab fishery uses traps to

target primarily Dungeness crab, with rock crabs being targeted in some areas and taken incidentally in others. The recreational crab fishery uses similar gear as the commercial Dungeness crab fishery and overlaps with both the commercial fishing areas and the commercial fishing season (CDFW, 2019). The California commercial Dungeness crab fishery has specific licensing and reporting requirements, providing data on fishing location and landings, and commercial operators abide by a specified service interval when traps must be raised, cleaned and emptied. Unlike it does for the commercial Dungeness crab fishery, the Department has very little information on the recreational crab fishery, including information on the levels of take or effort.

Identifying the fishery responsible for an entanglement is essential to reducing future incidences. The current marking requirements for the recreational crab fishery are less stringent than those for the commercial crab fisheries. Buoy(s) attached to a recreational crab trap must be marked with the operator's GO ID (i.e., the "Get Outdoors Identification number", a unique number issued by the Automatic License Data System (ALDS) that is permanently tied to an individual and located on their sport fishing license), or, when deployed from a Commercial Passenger Fishing Vessel (CPFV), the CPFV's commercial boat registration number. However, the GO ID and CPFV numbering does not have a specific number size requirement, making the numbers difficult or impossible to read from a distance. As such, the ability to distinguish recreational crab trap gear from other fishing gear during a marine life entanglement response is limited. In contrast, commercial Dungeness crab trap buoys must be marked with state-issued buoy tags, which are more easily observed on entanglements involving commercial gear.

Furthermore, while fishing buoys used by commercial fishermen are relatively standardized, the recreational sector is not required under current regulations to use a certain buoy type. Thus, the recreational sector uses a variety of floatation devices, leading to inconsistency that also makes recreational gear difficult to identify during entanglement events.

The proposed regulatory changes are designed to implement simple, common-sense measures intended both to minimize the risk of entanglements in recreational crab fishing gear and to gather baseline information towards informing mitigation measures and future fishery management actions. The proposed regulations would apply to the recreational take of any crabs by trap.

The proposed regulations introduce five elements for the recreational crab fishery:

- enhanced gear marking with a more defined surface marker buoy system,
- an interval during which traps must be retrieved for servicing,
- a per-individual trap limit of 10 traps for each recreational crab trap operator,
- delegation of authority from the Commission to the Department's Director to allow modifications to the season to help minimize entanglements in the recreational crab fishery, and
- a validation ("stamp") program to allow collection of essential fishery information.

CURRENT REGULATIONS

Current regulations for rock crab and Dungeness crab specify seasons, size limits, bag and possession limits, closed fishing areas, and gear restrictions. Like most recreational fisheries, a

recreational fishing license is the only license required to participate in recreational crab fishing. In addition to traps, crabs can also be taken recreationally by hand, crab loop traps (snares), or hoop nets. Individuals are generally not allowed to operate a trap owned by another person unless they have in possession written permission from the owner.

Individual fishermen may fish using their own gear, or may join a scheduled fishing trip on a CPFV. CPFVs take customers on fishing trips and provide fishing gear for use by their clients or passengers. Subsection 29.85(a)(4) restricts the number of crab traps used to take Dungeness crab by a CPFV to 60. Subsection 29.85(a)(5) also requires the commercial boat registration number of the CPFV to be affixed to each trap and trap buoy deployed by that vessel. Traps not operated from CPFVs must be marked with buoys with the operator's GO ID number.

There is currently no limit to how many traps an individual may deploy, no required service interval (how often traps must be raised, cleaned and emptied), and no other buoy or trap marking requirements for recreational crab fishing.

PROPOSED REGULATIONS

The proposed regulations would establish restrictions to minimize entanglement risk as well as allow the state to collect data that would inform management of the crab fishery. The proposed regulations focus primarily on those recreational crab fishers who use and deploy traps to take crab. The proposal includes the following provisions:

- **Enhanced Gear Marking:** The proposed regulation would require all recreational crab traps be marked with a Main Buoy that is at least 5 inches in diameter and 11 inches in length and that a red Marker Buoy that is 3 inches in diameter and 5 inches in length be attached no more than three feet from the Main Buoy in order to help identify gear as originating from the recreational crab fishery should it entangle marine life. (Proposed subsection 29.80(c)(3))

- **Service Interval:** The proposed regulation would establish a maximum trap service interval of 9 days, which would help reduce lost and abandoned traps, and prevent fishers from storing gear at sea when not actively fishing, would prohibit abandoned traps, and would specify that any trap not serviced at least every 14 days shall be considered abandoned. (Proposed subsection 29.80(c)(5))

- **Trap Limit:** The proposed regulation would establish an individual trap limit of 10 traps per operator which would reduce risk of entanglement by limiting the total number of vertical lines, and help determine a baseline effort for the recreational crab fishery. (Proposed subsection 29.80(c)(6))

- **Director Authority:** The Commission currently has exclusive management authority over the recreational crab fishery. Proposed subsection 29.80(c)(7) would provide authority for the Director of the Department to delay the fishery opener or close the season early in ocean waters of the state when the concentrations of Humpback whales, Blue whales, or Pacific Leatherback sea turtles exceed thresholds established in the Risk Assessment and Mitigation Program (Section 132.8). Proposed subsection 29.80(c)(7) states that before implementing a delay or closure, the recreational crab trap fishery will be given at least 5-

days' notice through a Director's declaration on the Department's "Whale Safe Fisheries" webpage (https://wildlife.ca.gov/Conservation/Marine/Whale-Safe-Fisheries).

- **Trap Validation Program:** The proposed "Recreational Crab Trap Validation" program would require those individuals who fish for crabs with recreational crab traps to purchase an annual validation. The purpose of the proposed Recreational Crab Trap Validation would be to identify sport fishers that use crab traps so that the Department could conduct outreach on entanglement minimization efforts and collect essential fishery information. A small fee of $2.25 would be required for each validation (proposed subsection 29.85(b), and Section 701).

The proposed regulatory package also includes clarifying, organizational and non-substantive edits to Sections 29.80, 29.85, and 701.

Amend Subsection 29.80(a)

Subsection 29.80(a) describes allowable methods of take for saltwater crustaceans. This subsection also makes it unlawful to disturb, move or damage any trap, or remove any saltwater crustacean from a trap that belongs to another person without written permission from the trap owner.

The current text specifically references the marking requirement under the current subsection (c)(3). Under the proposed regulations, the referenced text will be moved to (c)(3)(A)1., so an update to the language is necessary to maintain its original intent.

Amend Subsection 29.80(b)

Subsection 28.80(b) prescribes how hoop nets may be used to take saltwater crustaceans. The language limits the number of hoop nets a person may possess, and further prescribes the two configurations of hoop nets that can be used legally in California.

This proposal would remove the reference to subsections (b)(1)(A) and (b)(1)(B) within the main body of subsection (b). The reference is redundant since the referenced subsections immediately follow the paragraph in which the reference is listed. The same applies to the reference to subsections (b)(3)(A) and (b)(3)(B) within subsection (b)(3). The proposed revisions to this subsection would also remove the phrase "[t]hey shall be defined as" in subsection (b)(1). "They" in this context refers to hoop nets and is redundant since the first phrase of the subsection is "Hoop Net Defined." A comma is removed after the word, "crab" to correct the punctuation.

The proposed amendments to this subsection are necessary for streamlining the regulation and improving clarity.

Amend Subsection 29.80(c)(3)

Subsection 29.80(c)(3) addresses crab trap specifications and means for deployment, including the requirement for a single buoy marked with the operator's GO ID. However, recent entanglement events have demonstrated that this marking is inadequate for attribution of the entanglement to the recreational crab fisheries in the event of an entanglement.

Between 1982 and 2019, there have been 506 separate large whale entanglements along the U.S. West Coast which have been confirmed by the National Marine Fisheries Service (NMFS; Saez et al. 2020; NOAA Fisheries 2020; NOAA Fisheries 2019). Of those entanglements, the gear type could not be identified in 44% of the cases. The California recreational crab fishery has been responsible for three known entanglements, and potentially more due to the difficulties of identifying recreational gear as outlined above. Uncertainty in verifying fishery gear types from entanglements significantly limits fishery managers' ability to implement any targeted management response. A standardized marker buoy on recreational crab traps would greatly enhance the ability to identify the fishing gear type in the event of an entanglement. (Figure 1).

Figure 1. Example of a Main Buoy attached to a Marker Buoy (left) and a commercial California Dungeness crab buoy tag (right). Since 2013, commercial California Dungeness crab traps have been marked with standardized buoy tags, which have proven useful for identifying fishing gear type in marine life entanglement cases.

Proposed revisions to subsection 29.80(c)(3) relocate the information on buoy identification and expand the buoy requirements for recreational crab traps. This regulatory proposal would add to the existing buoy requirement by requiring all traps to be marked with two buoys (Main and Marker Buoy).

Proposed subsection 29.80(c)(3)(A): This subsection defines the "Main Buoy." The specific dimensions of the buoy are proposed to be at least 5 inches in diameter and 11 inches in length, to be known as the Main Buoy. This minimum buoy size is available at most locations where fishing supplies are purchased and are commonly sold with crab traps.

Proposed subsection 29.80(c)(3)(A)1.: The language from current subsection (c)(3) is revised and relocated to this paragraph to state that an individual's Main Buoy must be marked with the operator's GO ID.

Proposed subsection 29.80(c)(3)(A)2.: The requirement for CPFV trap buoys to be labeled with the commercial boat registration number is moved from subsection 29.85(a)(5) to proposed subsection 29.80(c)(3)(A)2. This is a consolidation of the current requirement for CPFVs for buoy marking, and is necessary for placing all the buoy marking requirements in the same Section 29.80.

Proposed subsection 29.80(c)(3)(B): This subsection defines "Marker Buoy." The Marker Buoy is a red buoy attached to the Main Buoy with no more than 3 feet of line with dimensions of 3 inches in diameter and 5 inches in length (Figure 2). .

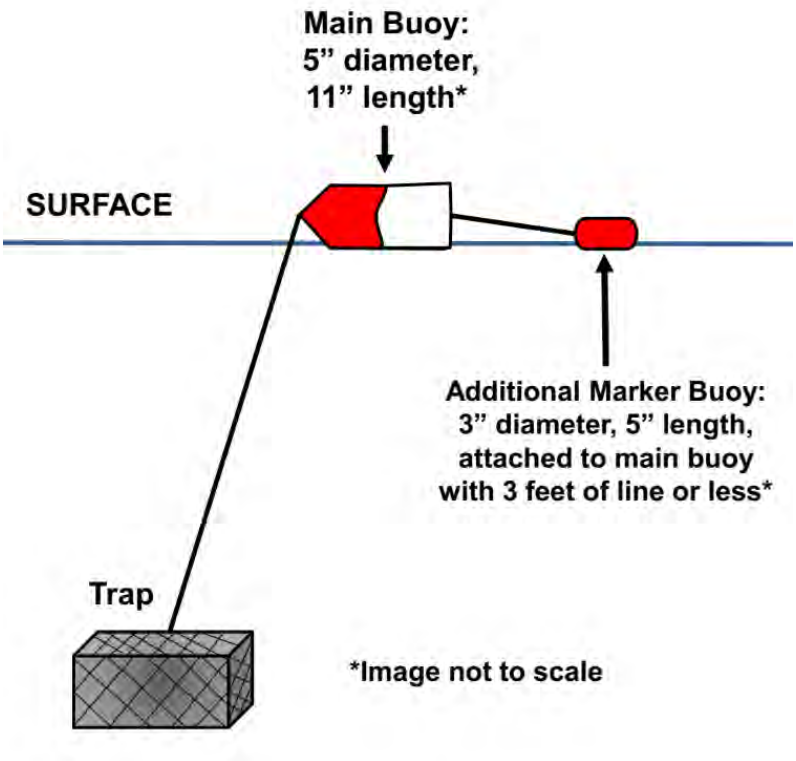

*Figure 2. Diagram of Main Buoy and additional Marker Buoy attached to crab trap as proposed in regulations (*image not to scale).*

This length of line will ensure that the Main Buoy and the Marker Buoy are likely to be viewed together in the event of an entanglement. Minimizing the length of line is also important to minimize risk of entanglement. These regulations would be consistent with end marker buoy regulations that the commercial fishery employs to designate the last traps located at the end of a row of deployed traps. The commercial buoys have similar dimensions although they can be any color and are required to be no more than 3 feet away from the Main Buoy or last trailer buoy as specified in subsections 132.6(a)(2) and (b).

Marker buoys are necessary to help identify recreational crab traps in the event of an entanglement. This buoy size and color were selected for marking recreational gear because such buoys are widely available at fishing supply stores.

Limiting the number of buoys to two is necessary to minimize risk of entanglement.

Proposed subsection 29.80(c)(3)(C): The requirement for CPFV traps themselves to be labeled with the commercial boat registration number is moved from subsection 29.85(a)(5). This is necessary to place all marking requirements in the same Section 29.80.

Figure 3. A Main Buoy marked with a Marker Buoy (top) versus a Main Buoy on its own. The addition of a Marker Buoy helps distinguish the buoy from a distance.

Add Subsection 29.80(c)(5)

Proposed subsection 29.80(c)(5) would add a 9-day maximum service interval to the recreational crab fishery and prohibit abandonment of traps in state waters. “Servicing” means raising the trap from the sea floor, cleaning the trap and related gear, and emptying out the trap. This 9-day service interval will help ensure regular tending and maintenance of recreational trap gear to reduce drifting or loss of the gear. Servicing of the trap can include removing fouling organisms, such as kelp, that may weigh down on the vertical line as well as re-baiting of traps, removing traps entirely from the ocean or redeploying traps to locations that better account for changing ocean conditions like large swells and storms. Lost and

abandoned traps pose a long-term entanglement hazard for marine species, including ESA-protected species, long after the recreational crab fishing season ends. The 9-day period was chosen out of practical concerns for how the recreational fishery operates. Many participants may only be able to check and retrieve traps during the weekends due to traditional weekday work schedules. A 9-day period thus covers two consecutive weekends, allowing crab trap operators at least two weekends to tend to their gear.

The proposed regulation mirrors Fish and Game Code (FGC) Section 9004, which establishes a maximum service interval for commercial trap fisheries. The statute has been in place for decades with firmly established enforcement practices. The servicing requirement is qualified by a weather exemption. The proposed regulatory text under subsection 29.80(c)(5) also exempts individuals from the service interval in the event of adverse weather to ensure individuals are not forced to choose between complying with a regulatory requirement and safety when ocean conditions are dangerous.

Add Subsection 29.80(c)(6) – Trap Limits

Proposed subsection 29.80(c)(6)(A) would add a 10-trap limit for each individual crab trap operator. The individual trap limit requirement is necessary to cap the number of deployed traps to a number a crab trap operator can responsibly deploy and still achieve a rewarding recreational experience. The individual trap limit requirement helps determine a baseline for recreational crab trap effort in the state. A trap limit also reduces the likelihood that a fisher will operate more traps than can be reasonably retrieved during a single fishing trip.

A trap limit may reduce the total number of deployed traps by individual fishers but will likely not reduce overall effort because of “trap sharing” within fisher groups. This proposed revision also makes it clear that an individual may service up to 10 traps from other operator(s), in addition to the 10 crab traps the individual is restricted to operate under the new crab trap limit. Any individual can currently service another person’s trap if that owner or operator provides a written note. This allows a fisher to operate additional traps in the event an owner is incapacitated. This proposed language is necessary to preserve the existing ability to share gear, as it is recognized that gear-sharing has become important for some fishers and may help reduce the overall number of traps deployed, in some circumstances. Discussions with constituent groups suggest that the option to share traps is important for certain segments of the recreational fishing community. However, allowing unlimited gear sharing would complicate law enforcement efforts, blur the responsibility of trap operators, and ultimately work to the detriment of the fishery, therefore servicing a maximum of another 10 crab traps is proposed.

While a 10-trap limit may not significantly reduce the total number of deployed traps, a trap limit in conjunction with a trap validation requirement (see below) can help determine the baseline effort level for this fishery, and prevent unlimited expansion of individual effort. The 10-trap limit was chosen based on extensive consultation with stakeholders, and is expected to accommodate fishing effort of most, if not all, recreational crab fishers. The lack of impact to existing fishing behavior is also supported by data from the California Recreational Fisheries Survey, which shows that between 2015 and 2019 the average number of traps used per boat-based fisher was less than two.

Proposed subsection 29.80(c)(6)(B) consolidates the new individual trap operator limit with the current trap limit for CPFVs, moving the existing maximum of 60 traps from subsection

29.85(a)(4) to subsection 29.80(c)(6). The trap limit for CPFVs will remain at the current 60 traps per vessel, but the limit will apply to all crab traps instead of only applying to Dungeness crab traps. Moving the CPFV 60-trap limit to this subsection is necessary to place all the trap limit requirements (in addition to the buoy marking requirements) in the same section for ease of reference for recreational crab fishery participants. This regulation change will maintain the current trap limit for CPFVs of 60 traps but will apply the trap limit for the take of all crab species, and not just Dungeness crab. Typically, CPFVs will target Dungeness crab while other crabs could be caught incidentally in traps. Establishing that this trap limit is for the take of all crab would prohibit additional traps from being deployed from CPFVs that target other crab, which, if allowed could increase the number of deployed traps and entanglement risks.

Add Subsection 29.80(c)(7)

Proposed subsection 29.80(c)(7) would provide authority to the Director of the Department to respond to potential marine life entanglement risk. This allows the Director to possibly delay the recreational crab fishing season, or close the season early based on entanglement risk to Humpback whales, Blue whales, and/or Pacific Leatherback sea turtles. The proposed regulation uses the numerical triggers in subsection 132.8(c)(2), which is part of the Risk Assessment Mitigation Program (RAMP) (OAL Notice #Z2020-0505-11) that requires the delay or closure of the commercial Dungeness crab fishery when certain criteria are met for ESA-protected marine species.

The underlying structure of the RAMP was developed by the California Dungeness Crab Fishing Gear Working Group (Working Group) through a multi-year iterative process. The Working Group was convened in 2015 to address the increased rate of marine life entanglements in California commercial Dungeness crab fishing gear and is comprised of commercial and recreational fishermen, environmental organization representatives, state and federal agencies, and subject matter experts. Additionally, the RAMP has undergone extensive public outreach through the regulatory development process.

The RAMP was originally developed by the Working Group to assess circumstances where entanglement risk by the commercial sector may be elevated and provide recommendations on appropriate management responses for the Department's Director to take action (CDFW, 2020). Section 132.8 will formalize that management framework into regulation, allowing the Director to take actions to reduce entanglement risk when such risk is elevated (e.g., high concentration of Humpback whales in fishing grounds at the start of the fishing season, or in the spring/summer months). The RAMP rulemaking process is currently underway and is expected to be completed prior to the adoption of this proposal for the recreational sector (CDFW, 2020).

Due to the dynamic nature of ocean processes and the risk of entanglements, it is proposed that the regulatory authority to restrict fishing be delegated to the Director. Thus under this proposal, starting at least 5 days in advance of the opening of the recreational Dungeness crab fishing season pursuant to Section 29.85, the Director would, on at least a monthly basis, evaluate and respond to risk of marine life entanglements and implement a management action in the case of elevated risk consistent with acceptable data and numerical triggers outlined in subsection 132.8(c)(2). This delegation of authority is necessary to provide for real-time response to environmental conditions as urgent as a potential whale entanglement, which

is not possible under the Commission's regulatory process and Bagley-Keene Open Meeting Act requirements. During periods of elevated entanglement risk, entanglements could occur within days of triggering events and the Commission decision-making process cannot be implemented as quickly as that of the executive officer of an agency (i.e., the Department's Director). Furthermore, managing a seasonal delay or early closure for the recreational fishery separately from the commercial Dungeness crab fishery which is already subject to RAMP would add an extra layer of complexity that could further impede the management process; whereas consolidating this entanglement risk management for both fisheries under the authority of the Director would implement a timely and coordinated response. Thus, the proposed regulation outlines a separate but parallel process that allows the Director to take coordinated action.

After the initial risk evaluation at least 5 days in advance of the start of the recreational Dungeness crab fishing season, the Director shall undertake additional evaluations at least monthly through June 15. Experience from implementing pilot forms of the RAMP in the commercial fishery has shown that this time frame adequately allows for additional information gathering and analysis by the Department to evaluate risk. Additionally, the monthly evaluations cycle mirrors the requirements in the commercial fishery RAMP, and the Department anticipates matching up (to the extent possible) the risk evaluation process for the recreational and commercial fisheries. After June 15, the Department expects potential entanglement risk to be low given anecdotal information on recreational fishing effort at this point in the summer.

Add Subsection 29.80(c)(7)(A)

Proposed subsection 29.80(c)(7)(A) specifies that the Director shall evaluate risk based on marine life concentrations as defined in RAMP subsection 132.8(a)(10), and consistent with the data and numerical triggers outlined in subsection 132.8(c)(2). The RAMP triggers for marine life concentrations are based on the historical migration patterns of protected Humpback whales, Blue whales, and Pacific Leatherback sea turtles. Triggers are defined primarily for two time periods when ESA-protected species are expected to leave waters off California during the fall (November 1 through the opening of the commercial Dungeness crab season) and arrive back to those same waters in spring (March 1 through the close of the commercial Dungeness crab season). "Data" as described in subsection 132.8(c)(2) include those current surveys and telemetry monitoring of those ESA-protected species that the Director shall consider to determine marine life concentrations as information for choosing an appropriate "recreational management action" in response to entanglement risk (as determined by the triggers). This provides the most reliable and up-to-date information on presence of species of concern, which can indicate the need to take a recreational management action.

Under proposed subsection 29.80(c)(7)(A)1., if data are available prior to the start of the season, and those data indicate the numerical triggers for marine life concentrations outlined in subsection 132.8(c)(2) are met, the Director shall implement one of the recreational management actions listed under subsection 29.80(c)(7)(B). Potential actions include an advisory to recreational fishers, a season delay or a season closure. Under subsection 29.80(c)(7)(A)2., if data are unavailable, the Director shall similarly implement a recreational management action until data become available. If specific triggers are reached, then the resulting management actions could delay the start of the season, close the season early, or

both. Ensuring that the Director will implement (a) recreational management action(s) when the different scenarios under subsections 29.80(c)(7)(A)1. and 29.80(c)(7)(A)2. are met provides clarity to recreational fishers on how the Director would respond in the event of elevated risk, communicating the Director's responsibility to address an entanglement risk. This subsection is necessary to provide a framework for risk evaluation by the Director, and to explain the framework within which the Director may implement management actions in response to an entanglement risk. It provides for consistency with the framework for Director management action in the commercial sector.

Add Subsection 29.80(c)(7)(B)

If the conditions in subsection 29.80(c)(7)(A) are met, the Director is required to pick from one of the three potential recreational management actions listed in subsection 29.80(c)(7)(B). The Director shall implement the recreational management action that the Director demonstrates protects Humpback whales, Blue whales, and Pacific Leatherback sea turtles based on best available science. Rationale for the recreational management action is provided in the Director declaration (further discussed below). The appropriate recreational management action shall be determined based on consideration of information outlined in subsection 132.8(d).

- Under proposed subsection 29.80(c)(7)(B)1.: an advisory to recreational fishers to employ voluntary efforts to reduce the risk of entanglements. In certain instances, for example depending on the depth of the whales or sea turtles, a delay or closure of the recreational fishery is not necessary to address the entanglement risk. However, even under those circumstances, an advisory is necessary to remind fishers of important measures to reduce entanglement risk and avoid further management response.
- Under proposed subsection 29.80(c)(7)(B)2.: a season delay whereby the Director shall prohibit the deployment and use of recreational crab traps until new data indicate the measures are no longer necessary. A season delay is appropriate in circumstances when before the opening of the season, marine life concentrations indicate that putting traps in the water would cause overlap between fishing activity and location of whales or sea turtles, which causes entanglement risk.
- Under proposed subsection 29.80(c)(7)(B)3.: a season closure, whereby the Director shall prohibit the deployment and use of recreational crab traps until new data indicate the measures are no longer necessary. A season closure would be implemented after the opening of the season when marine life concentrations indicate removing traps is necessary to address an entanglement risk.

This subsection is necessary to make clear to recreational crab fishery participants what recreational management action(s) the Director may implement given the triggers for marine life concentrations under the risk assessment framework of RAMP referenced in Section 132.8. Additionally, it provides clarity on the duration of a recreational management action (i.e. until new data indicate the triggers are no longer met).

Add subsection 29.80(c)(7)(C)

The marine life concentration trigger under RAMP is determined by the number of Humpback whales, Blue whales, or Pacific Leatherback sea turtles that occur in one of seven delineated fishing zones (Figure 4), one of which applies exclusively to the Pacific leatherback sea turtle (Zone 7). Proposed subsection 29.80(c)(7)(C) describes the geographic scale in crab fishing

grounds at which a recreational management action may be implented by the Director, either statewide or by fishing zone as defined in subsections 132.8(a)(7)(A)-(G). The zones are designed around the likely geographic resolution of available data, and behavioral dynamics of both fishing activities and protected species.

Figure 4. Proposed RAMP Fishing Zones.

If the Director demonstrates less-than-statewide action protects Humpback whales, Blue whales, and Pacific Leatherback sea turtles based on best available science, the Director may implement a recreational management action by fishing zone(s). For example, survey data may indicate that whale presence is concentrated in the fishing zone encompassing Monterey Bay, but no whales were surveyed in the northern coast. In that instance, a fishing zone closure would appropriately address the entanglement risk while leaving recreational fishing opportunities available in other areas of the state where data indicate there is not an entanglement risk.

This subsection is necessary to make clear to recreational crab fishery participants what geographic scale a recreational management action may encompass.

Add Subsection 29.80(c)(7)(D)

Proposed subsection 29.80(c)(7)(D) requires the Director to provide notice of a recreational management action to the recreational fishery participants through a Director's declaration. Similar to the declaration prescribed in subsection 132.8(f)(1) for the commercial fishery, the recreational declaration will provide the information relied upon for recreational management action and supporting rationale for the Director's determination of risk and accompanying recreational management action, as well as anticipated duration of the recreational management action. If timing allows, the Department anticipates the recreational declaration will be paired with the commercial declaration for efficiencies in internal processing.

This subsection is necessary to specify how the Director and the Department will clearly articulate the basis and rationale for any decision on recreational management actions. This will ensure transparency to interested stakeholders and provide a record of decision-making.

Add Subsection 29.80(c)(8)

Proposed subsection 29.80(c)(8) will require any declaration made by the Director pursuant to subsection 29.80(c)(7) to include a minimum of 5-days' notice before any closure or delay takes effect. This notice is necessary to establish a reasonable time period for recreational fishery participants to receive the notice and make preparations to implement any required modification to their fishing practices.

Add Subsection 29.80(c)(9)

Proposed subsection 29.80(c)(9) will require all declarations made by the Director pursuant to subsection 29.80(c)(7) to be posted on the Department's "Whale Safe Fisheries" webpage, located at https://wildlife.ca.gov/Conservation/Marine/Whale-Safe-Fisheries. This subsection is necessary to inform recreational fishers of where to find the most up-to-date information on any recreational management actions. Posting to the webpage is the most efficient way to quickly provide notification of any Director's declaration or other recreational management action made by the Department. However, at its discretion, the Department may also provide notification through other means.

Amend Subsection 29.80(e)

The revision to subsection 29.80(e) removes the reference to 29.85 regarding take of crabs from commercial passenger fishing vessels, as that language was moved to subsection 29.80(c)(3) for consolidation purposes.

Amend Subsection 29.85(a)(1)

The term "Closure" is proposed to be removed from subsection 29.85(a)(1). As explained above for subsection 29.80(c)(7)(B), this rulemaking would add a new type of closure/season delay for the recreational crab fishery. It is necessary to remove the term "Closure" under in subsection 29.85(a)(1) to avoid confusion with a closure pursuant to proposed subsection 28.90(c)(7)(B). The removal will not lead to any substantive change to the regulation.

Repeal Subsection 29.85(a)(4)-(5)

Trap limit and marking requirements for the recreational crab fishery would be consolidated under subsection 29.80(c)(6). Subsections 28.85(a)(4) and (a)(5), which prescribe such trap limits and marking requirements for CPFVs, would also be moved to Section 29.80 accordingly. Moving these two subsections is necessary to consolidate and streamline the regulation so recreational crab fishers can refer to such requirements in a single section.

Add New Subsection 29.85(a)

Proposed subsection 29.85(a) would require anyone who is required to have a sport fishing license and takes crab recreationally using crab traps to possess a valid Recreational Crab Trap Validation. The validation is an add-on to a recreational fishing license, and will alert Department staff that the individual intends to participate in the recreational crab fishery using crab traps. The proposed trap validation would be valid for current license year and will only be needed for those that take crab recreationally using crab traps pursuant to subsection 29.80(c).

Department staff will be able to target validation holders with surveys to obtain essential fisheries data, and potentially share information to help minimize entanglement risk (i.e., the Director's declarations or fishery advisories pursuant to subsection 29.80(c)(7)).

Information on recreational crab fishery effort, such as where and how many traps are deployed, can help the Department evaluate whether there is substantial overlap between fishing areas and key forage habitats of the protected species. Moreover, the validation along with the trap limit will allow Department staff to acquire essential fishery information, such as the number of participants, maximum trap effort and the level of take each year, which has not been formally accounted for in this fishery. Acquiring such information will allow the state to better monitor the direct and incidental impacts the fishery has on the natural environment through the use of traps in the recreational fishery, as well as its value to California's coastal economy, ultimately resulting in management more consistent with the state's marine life management goals.

Amend Subsections 29.85(a)-(e)

Current subsections 29.85(a), (b), (c), (d), and (e) will be renumbered to accommodate new subsection 29.85(a).

Amend Section 701

A nominal fee will be assessed for the Recreational Crab Trap Validation to cover its administrative cost. The fee will be added as subsection 701(h), and the original subsection (h) will be renumbered as subsection (i). The fee is proposed to be $2.25. See the Addendum to the STD. 399 for the fee determination calculation. This fee amount may be adjusted in the future as the Department develops a better understanding of the number of participants of the recreational crab fishery and is subject to annual adjustments pursuant to Section 699, Title 14, CCR.

Changes Without Regulatory Effect

Reference citations are being updated to better reflect the statutes being implemented, interpreted, and made specific. Section 110 of the Fish and Game Code (FGC) is being removed from the list of reference sections for sections 29.80, 29.85 and 701. Prior to January 1, 2007, Section 206 FGC outlined the Commission process for the adoption of sport fishing regulations. In 2006, Senate Bill (SB) 1535 repealed Section 206 and added a new Section 206 which outlined the Commission's general meeting schedule. In 2016 legislation (SB 1473), the then-current Section 206 FGC was amended and renumbered as Section 110 FGC. When updates to the authority and reference citations were made in rulemaking file 2017-0818-05S, staff inadvertently changed Section 206 FGC to Section 110 FGC. Section 1055 FGC is being replaced with Section 1055.1 FGC in the reference sections for Section 701 due to the repeal of Section 1055 FGC and addition of Section 1055.1 in 2015 legislation (SB 798).

(b) Goals and Benefits of the Regulation

It is the policy of this state to conserve, protect, restore, and enhance any endangered species or any threatened species and its habitat.

The proposed regulation would help reduce the entanglement risk posed by recreational crab traps towards marine animals protected by the federal Endangered Species Act and Marine Mammal Protection Act. The proposed regulations would also help the state obtain valuable information on recreational crab fishery participants. The information acquired would help the state better mitigate entanglement risk as well as better manage the crab fisheries overall to meet the state's various policy goals.

(c) Authority and Reference Sections from Fish and Game Code for Regulation

Authority: Sections 200, 205, 265, 270, 275, 713, 1050, 1053.1, 7075, 7078 and 7149.8, Fish and Game Code

Reference: Section s 200, 205, 265, 270, 275, 713, 1050, 1053.1,1055.1, 7050, 7055, 7056 and 7149.8, Fish and Game Code

(d) Specific Technology or Equipment Required by Regulatory Change

Under subsection 29.80(c), new buoy requirements include the designation of the existing buoy requirement to be the "Main Buoy," and add specific dimensions (5 inches diameter, 11 inches in length). The addition of the "Marker Buoy" to all recreational crab Main Buoys is intended to be the distinguishing characteristic of the fishery.

(e) Identification of Reports or Documents Supporting Regulation Change

California Department of Fish and Wildlife. 2019. Dungeness Crab, *Metacarcinus magister*, Enhanced Status Report. Available from https://marinespecies.wildlife.ca.gov/dungeness-crab/

California Department of Fish and Wildlife. 2020. Initial Statement of Reasons for Regulatory Action to Add Section 132.8, Title 14, California Code of Regulations, Re Risk Assessment Mitigation Program: Commercial Dungeness Crab Fishery. Available from

https://wildlife.ca.gov/Notices/Regulations/RAMP
Documents Supporting RAMP regulation change:

- Senate Bill 1309, 2018, McGuire: https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180SB1309
- Benson, S.R., K.A. Forney, J.T. Harvey, J.V. Carretta, and P.H. Dutton (2007). Abundance, distribution, and habitat of leatherback turtles (Dermochelys coriacea) off California, 1990-2003. Fishery Bulletin, 105(3): 337–347.
- Calambokidis, J., G.H. Steiger, C. Curtice, J. Harrison, M.C. Ferguson, E. Becker, M. DeAngelis, and S.M. Van Parijs. 2015. Biologically Important Areas for Selected Cetaceans Within U.S. Waters – West Coast Region. *Aquatic Mammals,* 41(1): 39-53. DOI 10.1578/AM.41.1.2015.39
- Carretta, J. V., K.A. Forney, E.M. Oleson, D.W. Weller, A.R. Lang, J. Baker, M.M. Muto, B. Hanson, A.J. Orr, H. Huber, M.S. Lowry, J. Barlow, J.E. Moore, D. Lynch, L. Carswell, and R.L. Brownell Jr. 2019. Humpback Whale (*Megaptera novaengliae*): California/ Oregon/ Washington Stock (pp. 173-182), and Blue Whale (*Balaenoptera musculus musculus*): Eastern North Pacific Stock (pp. 183-190), *In* Assessment U.S. Pacific Marine Mammal Stock Assessments: 2018. U.S. Department of Commerce, NOAA Technical Memorandum NMFSSWFSC-617.
- California Dungeness Crab Fishing Gear Working Group, Guidelines for Research and Development Projects, Focus on Ropeless Gear Innovations, Feb 2019: http://www.opc.ca.gov/webmaster/_media_library/2019/02/Whales-Gear-Innovations-R-and-D-Guidelines-February-2019.pdf
- California Dungeness Crab Fishing Gear Working Group, Recommendations Memo, November 12 2019: http://www.opc.ca.gov/webmaster/_media_library/2019/11/CAWhaleWorkingGroup_HighlightsRecommendationsMemo_SeptOct2019_FINAL.pdf
- California Dungeness Crab Fishing Gear Working Group, Recommendations Memo, October 15 2018: http://www.opc.ca.gov/webmaster/_media_library/2018/10/Whales_WorkingGroupRecommendationsMemo_October2018_FINAL.pdf
- California Dungeness Crab Fishing Gear Working Group, Call Summary, September 26 2019: http://www.opc.ca.gov/webmaster/_media_library/2019/10/CAWorkingGroup_WebinarSummary_Sept262019.pdf
- California Dungeness Crab Fishing Gear Working Group, Summary of Key Themes, September 4-5 2019: http://www.opc.ca.gov/webmaster/_media_library/2019/10/CAWorkingGroup_KeyThemesSummary_FINAL_Sept4-52019.pdf
- California Dungeness Crab Fishing Gear Working Group, Summary of Key Themes, March 26 2019:

http://www.opc.ca.gov/webmaster/_media_library/2019/04/CAWhaleWorkingGroup_KeyThemesSummary_26March2019Meeting_FINAL.pdf

- California Dungeness Crab Fishing Gear Working Group Risk Assessment and Recommendation https://www.wildlife.ca.gov/Conservation/Marine/Whale-Safe-Fisheries
- California Ocean Protection Council, Strategic Plan to Protect California's Coast and Ocean 2020-2025 http://www.opc.ca.gov/webmaster/ftp/pdf/agenda_items/20200226/OPC2020-2025-
- Strategic-Plan-FINAL-20200228.pdf NMFS, 2020. West Coast Region Protected Resources Division, Draft Serious Injury Mortality Report, July 13, 2020. Available from: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=180688
- NMFS, 2012a. NMFS Policy Directive (PD-02-038), Process for Distinguishing Serious from Non-Serious Injury of Marine Mammals, effective January 27, 2012, available from: https://www.avma.org/sites/default/files/resources/noaa_serious_injury_policy.pdf
- NMFS, 2012b. NMFS Instruction (02-038-01), Process for Distinguishing Serious from Non-Serious Injury of Marine Mammals: Process for Injury Determinations, effective January 27, 2012, available from: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-protection-act-policies-guidance-and-regulations
- Saez, L., D. Lawson, and M. DeAngelis. 2020. Large whale entanglements off the U.S. West Coast, from 1982-2017. NOAA Tech. Memo. NMFS-OPR-63, 48 p. Available from https://www.fisheries.noaa.gov/resource/document/large-whale-entanglements-us-west-coast-1982-2017
- 64 Federal Register 102, May 27,1999. North Pacific Fishery Management Council; Public Meetings, pages 28800-28802. Available from: https://www.govinfo.gov/content/pkg/FR-1999-05-27/pdf/FR-1999-05-27.pdf
- 77 Federal Register 4169, January 26, 2012. NOAA Endangered and Threatened Species: Final rule to revise the critical habitat designation for the endangered Leatherback Sea Turtle, pages 4170-4201. Available from https://www.govinfo.gov/content/pkg/FR-2012-01-26/pdf/2012-995.pdf

NOAA Fisheries. 2020. 2019 West Coast Whale Entanglement Summary. Available from https://www.fisheries.noaa.gov/resource/document/2019-west-coast-whale-entanglement-summary-and-infographic

NOAA Fisheries. 2019. 2018 West Coast Whale Entanglement Summary. Available from https://www.fisheries.noaa.gov/resource/document/2018-west-coast-whale-entanglement-summary

(f) Identification of Reports or Documents Providing Background Information:

Santora, J. A., Mantua, N. J., Schroeder, I. D., *et al*. (2020). Habitat compression and ecosystem shifts as potential links between marine heatwave and record whale

entanglements. *Nature communications*, 11(1), 1-12. Available from https://www.nature.com/articles/s41467-019-14215-w

(g) Public Discussions of Proposed Regulations Prior to Notice Publication

- November 5, 2019: Commission Marine Resources Committee meeting in Sacramento.
- December 3, 2019: Public webinar to discuss proposed regulations.
- December 12, 2020: Fish and Game Commission meeting in Sacramento.
- January 6, 2020: Workshop with representatives of the recreational sector in Sacramento.
- January 11, 2020: Workshop with representatives of the recreational sector in Sausalito.
- January 23, 2020: Workshop with representatives of the recreational sector in Eureka.
- March 17, 2020: Commission Marine Resources Committee webinar.
- March 19, 2020: CA Dungeness Crab Fishing Gear Working Group teleconference.
- April 16, 2020: Fish and Game Commission teleconference.
- June 24, 2020: Fish and Game Commission webinar/teleconference.

On May 11, 2020, the Department provided formal notice to California tribal governments regarding the development of the proposed regulations and requested preliminary input by June 15, 2020. As of the date on this Initial Statement of Reasons, no requests for government-to-government consultation have been received. Four tribal governments did contact the Department: Santa Ynez Band of Chumash Indians, Yocha Dehe Wintun Nation, Manchester Band of Pomo Indians, and Federated Indians of Graton Rancheria. Three tribal governments had questions about the intent or background of the rulemaking proposals which the Department was able to provide. A fourth tribal government voiced its support for measures to protect marine animals.

IV. Description of Reasonable Alternatives to Regulatory Action

(a) Alternatives to Regulation Change

Alternative 1:
Adoption of a trap limit that would appreciably reduce the number of recreational crab traps deployed in the ocean. Initial discussions included a range from three to ten traps. Based on stakeholder feedback, a more stringent trap reduction would constrain an fishers' ability to share gear with family and friends during fishing trips. Allowing individuals to share gear with other fishers may also help to limit the total number of traps fished by area. As a result, a lower trap limit was rejected. The issue of gear sharing may be addressed in a future rulemaking.

Alternative 2:
Requiring that *all* crab fishers, not just those fishing with crab traps, obtain the validation. There are many unknowns about the number of individuals fishing with the various

methods and the validation would provide an opportunity for information gathering. However, the purpose of the regulation is to gather information to inform ways of minimizing whale entanglement risk, and crab fishers using methods other than crab traps deployed from boats have no known contribution to that risk. Therefore, this alternative was rejected.

Alternative 3:
A Recreational Crab Trap Validation “sunset” date. The intent of the validation is to gather information to inform the Department on recreational crab trap fishing effort and to document the crab trap fishery participants for the purpose of communication of Director’s declarations, advisories to recreational fishers, etc. Due to the likelihood of ongoing entanglement risk as well as the need to obtain ongoing information for the orderly management of the fishery, continued data collection is essential for maintaining consistent seasonal communication with fishery participants. As a result, a sunset provision was rejected. If the validation ever outlives its purpose, it can be eliminated in a future rulemaking.

Alternative 4:
A recreational gear retrieval program which would remove lost and/or abandoned recreational crab trap gear. The commercial gear retrieval program started for the first time on May 22, 2020. Before layering on an additional program, the Department wants to implement and evaluate the current program to determine if there are any changes that need to be made. Additionally, the Department has not conducted outreach on this alternative, and it was not included in the initial proposals that have been discussed with the recreational fishery participants dating back to July of 2019. The buoy marking aspect in this rulemaking needs to be implemented so that gear can clearly be identified before a retrieval program is established. Lastly, prior to implementing this type of program, considerations of Commission authority need to be further explored to ensure a retrieval program can be appropriately implemented. For these reasons, this alternative was rejected.

Alternative 5:
Inclusion of specific regulatory language banning the use of plastic liquid containers such as used milk jugs or detergent bottles as main buoys. These items are not intended to serve as buoys, nor built for the harsh conditions of the marine environment and may easily contribute to gear loss. However, the difficulty of developing adequate regulatory language led to the rejection of this alternative at this time.

Alternative 6:
Marking recreational traps with tags or lettering. These methods are already being used to mark commercial gear. Department staff were concerned that using either tags or lettering would lead to the traps being conflated with commercial gear in the event of an entanglement and this alternative was rejected.

Alternative 7:
The development of an independent recreational counterpart to RAMP. This alternative was rejected due to the lack of an identifiable trigger unique to the recreational fishery. The recreational and commercial fisheries operate using similar, if not identical gear, and over

the same fishing grounds at roughly the same time of year. As such, the Department is recommending use of the established RAMP program to inform a management action in the recreational fishery using only the Marine Life Concentrations trigger in the RAMP.

(b) No Change Alternative

Without change, the recreational crab fishery will maintain the same level of entanglement risk for ESA-protected species, and the Department and Commission will continue to lack baseline information regarding the fishery that could inform a management action to address risk. When entanglement risk is elevated, the quickest regulatory response would be through emergency regulations, providing stakeholders with a shortened opportunity for input. While the emergency rulemaking process is faster than a regular rulemaking, it still would not be responsive enough to address the immediate threat of entanglement when large whales are actively migrating along the coast.

(c) Description of Reasonable Alternatives that Would Lessen Adverse Impact on Small Business

No reasonable alternatives that would lessen adverse impacts on small businesses were identified by or brought to the attention of Department or Commission staff.

V. Mitigation Measures Required by Regulatory Action

The proposed regulatory action will have no negative impact on the environment; therefore, no mitigation measures 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 because the proposed regulations are for a recreational marine fishery and are not anticipated to change the level of fishing activity. CPFVs that take fishers on crab fishing trips would be required to attach additional buoys to crab trap lines at a cost of $4.00 per buoy for up to the maximum 60 traps per vessel, resulting in industry costs of [$240 x # of vessels] in initial costs and approximately [$120 x # of vessels] in subsequent years to replace lost or damaged buoys.

(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 impacts on the creation or elimination of jobs, the creation of new business, the elimination of existing businesses or the expansion of businesses in California because the proposed regulations are not anticipated to affect the volume of recreational crab trapping activity nor result in significant costs to CPFVs that serve recreational crab trappers.

The Commission does not anticipate any benefits to the health and welfare of California residents or to worker safety.

The Commission anticipates benefits to the state's environment by reducing the potential for marine life entanglement in recreational fishing gear.

(c) Cost Impacts on a Representative Private Person or Business

Recreational crab fishers would be required to purchase a $2.25 Recreational Crab Trap Validation annually to participate in any crab trap fishery. Fishers may also incur costs for up to ten buoys at approximately $4.00 each if they elect to fish the maximum number of traps. The proposed changes are not expected to change the level of fishing activity. CPFVs that take individual fishers on crab fishing trips would be required to attach additional buoys to crab trap lines at a cost of $4.00 per buoy for up to the maximum 60 traps, summing to $240 in initial costs and approximately $120 in subsequent years to replace lost or damaged buoys.

The proposed regulation also includes the provision of authority for the Director of the Department to take in-season action to reduce the risk of marine life entanglement. This component of the regulation is not anticipated to have cost impacts to individuals. However, CPFV operations could be impacted depending on the percentage of their group fishing trips that are solely or predominantly for crab trapping. Vessels that pursue multiple species could more readily shift effort away from trap-taken crabs should crab season delays or closures occur.

(d) Costs or Savings to State Agencies or Costs/Savings in Federal Funding to the State

The proposed regulations are anticipated to introduce some start-up and ongoing implementation and enforcement costs that will be re-covered with the proposed Recreational Crab Trap validation program. An estimated additional $13,500 in validation revenue is anticipated to be collected by the Department. The Commission does not anticipate any savings to State agencies or costs/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

The principal intent of the proposed regulation is to minimize entanglement risks as well as to improve marine resource management through the collection of key fishery activity information. Department recreational fishing survey data indicate that at least 6,000 individuals engage in recreational crab trap fishing and would be affected by changes in requirements regarding: enhanced gear marking; service intervals; trap limits; Director authority to restrict take; and a new validation program. CPFV operators provide recreational fishing trips for dozens of ocean species, and those who provide crab trapping (average of 64 vessels per 2010-2019 CPFV log data), would also be directly affected by the proposed regulations. CPFVs operating in California are characterized as small businesses (per CA Government Code Article 2, Section 11342.610) as all are independently owned and operated and not dominant in its field of operation.

(a) Effects of the Regulation on the Creation or Elimination of Jobs Within the State

The Commission does not anticipate impacts on the creation or elimination of jobs within the state because the proposed regulations are for a recreational marine fishery and are not anticipated to change the level of fishing activity. The additional costs for CPFVs to purchase marker buoys is not anticipated to result in the creation or elimination of jobs because these costs are a very small share of CPFV operating costs and would not change procedures so as to require more or less labor. As a result of fishing season closures or delays, CPFV operations could be impacted depending on the percentage of their group fishing trips that are solely or predominantly for crab trapping. Vessels that pursue multiple species could more readily shift effort away from trap-taken crabs should crab season delays or closures occur. Impacts to the creation or elimination of jobs are not anticipated because the number of CPFV trips are not anticipated to change more than the typical seasonal variation due to weather and other unknown influences.

(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 new businesses, or elimination of existing businesses, because the proposed regulation is not likely to substantially increase or decrease recreational fishing activity within the state. The additional costs for CPFVs to purchase marker buoys is not anticipated to result in the creation or elimination of

businesses because costs are a very small share of CPFV operating costs and the supply of buoys is already sufficient to fulfill this requirement. As a result of fishing season closures or delays, CPFV operations could be impacted depending on the percentage of their group fishing trips that are solely or predominantly for crab trapping. Vessels that pursue multiple species could more readily shift effort away from trap-taken crabs should crab season delays or closures occur. However, this is not anticipated to result in the creation or elimination of businesses because the number of CPFV trips are not anticipated to change more than the typical seasonal variation due to weather and other unknown influences.

(c) Effects of the Regulation on the Expansion of Businesses Currently Doing Business Within the State

The Commission does not anticipate any effects on the expansion of businesses currently doing business in the State because the proposed regulation is not likely to substantially increase or decrease recreational fishing activity within the State.

The additional costs for CPFVs to purchase marker buoys is not anticipated to result in the expansion of businesses because costs are a very small share of CPFV operating costs and the supply of buoys is already sufficient to fulfill this requirement. As a result of fishing season closures or delays, CPFV operations could be impacted depending on the percentage of their group fishing trips that are solely or predominantly for crab trapping. Vessels that pursue multiple species could more readily shift effort away from trap-taken crabs should crab season delays or closures occur. However, this is not anticipated to result in the expansion of businesses because the number of CPFV trips are not anticipated to change more than the typical seasonal variation due to weather and other unknown influences.

(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.

(e) Benefits of the Regulation to Worker Safety

The Commission does not anticipate any benefits to worker safety because the proposed regulation does not affect existing working conditions.

(f) Benefits of the Regulation to the State's Environment

The regulation is anticipated to benefit the State's environment by reducing the potential for entanglements of ESA-protected marine life species in fishing gear.

Informative Digest/Policy Statement Overview

Current regulations for the recreational take of rock crab and Dungeness crab specify seasons, size limits, bag and possession limits, closed fishing areas, and gear restrictions. Like most recreational fisheries, a recreational fishing license is the only license required to participate in recreational crab fishing. In addition to traps, crabs can also be taken recreationally by hand, crab loop traps (snares), or hoop nets. Individuals are generally not allowed to operate a trap owned by another person unless they have in possession written permission from the owner.

Individual fishermen may fish using their own gear, or may join a scheduled fishing trip on a Commercial Passenger Fishing Vessel (CPFV). CPFVs take customers on fishing trips and provide fishing gear for use by their clients or passengers. Current regulations limit the number of crab traps used to take Dungeness crab by a CPFV to 60 and specific that the commercial boat registration number of the CPFV must be affixed to each trap and trap buoy deployed by that vessel. Current regulations specify that traps not operated from CPFVs must be marked with buoys with the operator's GO ID number.

There is currently no limit to how many traps an individual may deploy, no required service interval (how often traps must be raised, cleaned and emptied), and no other buoy or trap marking requirements for recreational crab fishing.

The Fish and Game Commission (Commission) and the Department of Fish and Wildlife (Department) are proposing to amend sections 29.80, 29.85, and 701, Title 14, California Code of Regulations (CCR). The proposed regulatory changes would be the first step in addressing entanglement risk posed by the recreational crab fishery in California towards species listed under the federal Endangered Species Act (ESA). Between 2014 and 2019, three Humpback whale entanglements were attributed to the recreational crab fishery in California. The proposal would also allow the Department to gather essential fishery information.

The fishing gear responsible for entanglement could not be identified in 44% of all confirmed entanglements between 1982 and 2017, and the recreational crab fishery may be responsible in some of these instances. This uncertainty, along with the scarcity of essential fishery information, makes development of mitigation measures very difficult.

The proposed regulations would establish some restrictions to minimize entanglement risks as well as allow the state to collect crucial information that would contribute to future management. The proposed regulations include the following provisions:

- **Enhanced Gear Marking**: Proposed subsection 29.80(c)(3), Title 14, CCR, would require all recreational crab traps be marked with a Main Buoy that is at least 5 inches in diameter and 11 inches in length and that a red Marker Buoy that is 3 inches in diameter and 5 inches in length be attached no more than three feet from the Main Buoy. Current regulation requiring buoy marking, and in the case of CPFV's, trap marking, would be consolidated in this subsections.
- **Service Interval**: Proposed subsection 29.80(c)(5), Title 14 ,CCR, would establish a maximum service interval of 9 days, weather conditions at sea permitting, and would prohibit abandoned traps.

- **Trap Limit**: Proposed subsection 29.80(c)(6), Title 14, CCR, would establish an individual trap limit of 10 traps per The current 60-trap limit for Commercial Passenger Fishing Vessels (CPFVs) targeting Dungeness crab will be moved from subsection 29.85(a)(4) to this subsection and will apply to CPFVs targeting any crab. The proposed regulation would allow an individual to service up to 10 additional traps if they possess written permission from the operator(s) of the additional traps whose gear are identified in accordance with subsection 29.80(c)(3).
- **Director Authority**: Proposed subsection 29.80(c)(7), Title 14, CCR, would provide authority for the Director of the Department to delay the fishery opener or close the season early in ocean waters of the state when the concentrations of Humpback whales, Blue whales, or Pacific Leatherback sea turtles exceed thresholds established in the Risk Assessment and Mitigation Program (Section 132.8. Title 14, CCR). Starting at least 5 days in advance of the opening of the recreational Dungeness crab fishing season, the Director shall, on at least a monthly basis through June 15, evaluate and respond to risk. Any delay or closure could apply statewide or by zone(s). The proposed regulation provides that before implementing a delay or closure, the recreational crab trap fishery will be given at least 5-days' notice through a Director's declaration on the Department's "Whale Safe Fisheries" webpage (https://wildlife.ca.gov/Conservation/Marine/Whale-Safe-Fisheries).
- **Trap Validation Program**: Proposed subsection 29.85(b) and Section 701, Title 14, CCR, would establish a "Recreational Crab Trap Validation" program that would require those individuals who fish for crabs with recreational crab traps to purchase an annual validation. A small fee of $2.25 would be required for each validation.

The proposed regulatory package also includes clarifying, organizational and non-substantive edits to Sections 29.80, 29.85, and 701, Title 14, CCR.

Benefits of the Regulations

The proposed regulation would help reduce marine life entanglement caused by the recreational crab fishery. It would also establish a framework by which the Commission and the Department can collect the requisite information to better manage the fishery to further reduce entanglement and to better meet the state's fishery management goals.

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 authority to the Commission to promulgate sport fishing regulations (Fish and Game Code sections 200, 205, 315, and 316.5). Commission staff has searched the California Code of Regulations and has found no other state regulations that address the recreational take of crabs using trap gear. The Commission has reviewed its own regulations and finds that the proposed regulations are consistent with other recreational fishing regulations and marine protected area regulations in Title 14, CCR, and therefore finds that the proposed regulations are neither inconsistent nor incompatible with existing state regulations.

Proposed Regulatory Language

Section 29.80, Title 14 CCR, is amended to read:

§ 29.80. Gear Restrictions for Recreational Take of Saltwater Crustaceans

(a) General Provisions.

(1) Saltwater crustaceans may be taken by hand.

(2) Nets, traps or other appliances may not be used except as provided in this Section.

(3) It is unlawful to disturb, move, or damage any trap; or remove any saltwater crustacean from a trap, that belongs to another person without written permission including permission transmitted electronically, in possession from the operator of the trap. Any person with written permission from the operator of a crab trap will be in compliance with subsection (c)(3)(A)1. if the written permission contains the operator's GO ID number that matches the GO ID number on the buoy of the crab trap being fished.

(b) Hoop nets may be used to take spiny lobsters and all species of crabs. Between Point Arguello, Santa Barbara County, and the United States-Mexico border, not more than five hoop nets~~, as defined in (b)(1)(A) or (b)(1)(B),~~ shall be possessed by a person when taking spiny lobster or crab, not to exceed a total of 10 hoop nets possessed when taking spiny lobster or ~~crab,~~crab per vessel. The owner of the hoop net or person who placed the hoop net into the water shall raise the hoop net to the surface and inspect the contents of the hoop net at intervals not to exceed 2 hours.

(1) Hoop Net Defined: There are two types of hoop nets allowed for use:~~. They shall be defined as:~~

(A) Type A: Fishing gear that is comprised of one to three rigid ring(s), with each ring measuring no greater than 36 inches in inside diameter nor less than 10 inches in inside diameter, which is/are connected to soft mesh thereby forming a circular-shaped net with an enclosed bottom. Lift lines shall be attached only to the top ring. A second and third rigid ring(s) may be connected by soft mesh to the top ring; however, each ring must be equal in size to or smaller than the ring above it. When the net is being raised the top ring shall be above and parallel to all other rings, with the enclosed bottom portion of the soft mesh even with or hanging below all other rings. All parts of the hoop net shall collapse and lie flat when resting on the ocean floor in such a manner that the gear does not entrap or restrict the free movement of crustaceans until lifted. When suspended from lift lines, the entire hoop net shall measure no taller than 36 inches. The ring material shall not be thicker than one inch in any dimension.

(B) Type B: Fishing gear that is comprised of two to three rigid rings (not including the bait ring), with each ring measuring no greater than 36 inches in inside diameter and the top ring measuring no less than 15 inches in inside diameter. The upper ring or rings

shall be connected to the bottom ring and supported by no more than six rigid support arms, and the assembled frame shall measure no more than 10 inches tall. The rings and support material shall not be thicker than one inch in any dimension. All rings shall be connected by soft mesh, thereby forming a net with an enclosed bottom, and lift lines shall be attached only to the top ring. When suspended from lift lines the enclosed bottom portion of the net shall be even with or hanging below all other rings, and the entire net shall measure no taller than 30 inches. A bait ring may be attached to the net as long as the ring is not part of the rigid frame.

(2) Any hoop net abandoned or left unchecked for more than 2 hours shall be considered abandoned and seized by any person authorized to enforce these regulations.

(3) Hoop nets used south of Point Arguello, Santa Barbara County, shall be marked with a surface buoy. Except as provided ~~in subsections (b)(3)(A) and (b)(3)(B)~~ below, the surface buoy shall be legibly marked to identify the operator's GO ID number as stated on the operator's sport fishing license. This section does not apply to hoop nets deployed by persons on shore or manmade structures connected to the shore.

(A) The surface buoy of hoop nets deployed from commercial passenger fishing vessels shall be legibly marked to identify the commercial boat registration number of the vessel.

(B) The surface buoy of hoop nets provided by a licensed guide to clients for use on guided trips shall be legibly marked to identify the guide license number of the accompanying guide.

(c) Crab traps:

(1) Crab traps shall have at least two rigid circular openings of not less than four and one-quarter inches inside diameter so constructed that the lowest portion of each opening is no lower than five inches from the top of the trap.

(2) Crab traps shall contain at least one destruct device of a single strand of untreated cotton twine size No. 120 or less that creates an unobstructed escape opening in the top or upper half of the trap of at least five inches in diameter when the destruct attachment material corrodes or fails.

(3) ~~Every crab trap except those used under authority of subsection 29.85(a)(5) of these regulations shall be marked with a buoy. Each buoy shall be legibly marked to identify the operator's GO ID number as stated on his/her sport fishing license~~ Trap Gear Identification: Every crab trap shall only be marked with a Main Buoy and a Marker Buoy, except as noted under subsection 29.80(c)(3)(C) below.

(A) A Main Buoy is a surface buoy that is at least 5 inches in diameter and 11 inches in length.

1. Each Main Buoy deployed by an individual shall be legibly marked with the operator's assigned GO ID number.

2. For traps deployed from a commercial passenger fishing vessel, the Main Buoy shall be legibly marked to identify the commercial boat registration number of that vessel.

(B) A Marker Buoy is a red buoy 3 inches in diameter and 5 inches in length attached no more than 3 feet from the Main Buoy.

(C) In addition to marking the buoy pursuant to subsection (c)(3)(A)2., traps deployed by commercial passenger fishing vessels shall be legibly marked to identify the commercial boat registration number of the vessel.

(4) Crab traps shall not be deployed and used in ocean waters seven days prior to the opening of the Dungeness crab season.

(5) Every crab trap shall be raised, cleaned, and emptied (serviced) at intervals not to exceed 9 days, weather conditions at sea permitting, and no crab trap shall be abandoned in the waters of this state.

(6) Trap Limits:

(A) An individual shall not operate more than 10 deployed traps, except an individual may service up to 10 additional traps if the individual has in possession written permission from the operator(s) of the additional traps whose gear are identified in accordance with subsection (c)(3)(A)1.

(B) A commercial passenger fishing vessel shall not deploy more than 60 traps per vessel.

(7) Starting at least 5 days in advance of the opening of the recreational Dungeness crab fishing season pursuant to Section 29.85, the director shall, on at least a monthly basis through June 15, evaluate and respond to risk of humpback whales, blue whales, and/or Pacific leatherback sea turtle entanglement with recreational crab fishing gear as follows:

(A) The director shall evaluate entanglement risk based on marine life concentrations as defined in subsection 132.8(a)(10), Title 14, CCR, and consistent with the acceptable data and numerical triggers outlined in subsection 132.8(c)(2).

1. If data are available, and marine life concentrations meet the numerical triggers for any species as specified in subsection 132.8(c)(2)(A)4. (in the fall) or 132.8(c)(2)(B) (in the spring), the director shall implement one of the management actions listed in subsection 29.80(c)(7)(B) below.

2. If data are unavailable prior to the season opener, the director shall implement one of the management actions listed in subsection 29.80(c)(7)(B) below until data are available, at which point subsection 29.80(c)(7)(A)1. shall apply.

(B) If required under subsection 29.80(c)(7)(A) above, the director shall implement one of the following recreational management actions. The director shall implement the management action(s) that the director demonstrates protects humpback whales, blue whales, and/or Pacific leatherback sea turtles based on best available science. Recreational management action shall be determined based on consideration of information outlined in subsection 132.8(d):

1. Advisory notice to recreational crab fishers to employ voluntary efforts and/or measures to reduce the risk of entanglements (e.g. best fishing practices).

2. Season delay, whereby the director shall prohibit the deployment and use of recreational crab traps until new data indicates the numerical triggers for any species as specified in subsection 132.8(c)(2)(A)4. (in the fall) are no longer met, at which point the director shall lift or modify the delay as appropriate.

3. Season closure, whereby the director shall prohibit the deployment and use of recreational crab traps until new data indicates the numerical triggers for any species as specified in subsection 132.8(c)(2)(B) (in the spring) are no longer met, at which point the director shall lift or modify the closure as appropriate.

(C) Recreational management action may be implemented statewide or by fishing zone(s) (as defined in subsections 132.8(a)(7)(A)-(G)), if the director demonstrates less-than-statewide action protects humpback whales, blue whales, and/or Pacific leatherback sea turtles based on best available science.

(D) Notice of a delay or closure pursuant to subsection 29.80(c)(7)(B)2. or 3. shall be transmitted via a director's declaration. The declaration will describe the following:

1. Data supporting the entanglement risk evaluation pursuant to subsection 29.80(c)(7)(A).

2. Relevant information informing management considerations from subsection 132.8(d).

3. Rationale nexus between management considerations in subsection 132.8(d) and chosen recreational management action under 29.80(c)(7)(B).

4. Duration of management action.

(8) The director's declaration pursuant to subsection 29.80(c)(7)(D) shall provide a minimum of 5 days' notice before the delay or closure becomes effective.

(9) The director's declaration and/or any advisory notice shall be communicated via the department's "Whale Safe Fisheries" webpage located at https://wildlife.ca.gov/Conservation/Marine/Whale-Safe-Fisheries. At its discretion, the department may communicate declarations and/or advisory notices via additional formats.

(d) Crab loop traps may have up to six loops.

(e) Crab trap areas: Crab traps, including crab loop traps, may be used north of Point Arguello, Santa Barbara County, to take all species of crabs ~~(see regulations for take of Dungeness crabs in traps from commercial passenger fishing vessels in Section 29.85 of these regulations)~~.

(f) Shrimp and prawn traps may be used to take shrimp and prawns only. Trap openings may not exceed 1/2 inch in any dimension on traps used south of Point Conception nor five inches in any dimension on traps used north of Point Conception.

(g) Diving for crustaceans: In all ocean waters, except as provided in Section 29.05, skin and SCUBA divers may take crustaceans by the use of the hands only. Divers may not possess any hooked device while diving or attempting to dive. Divers may be in possession of spearfishing equipment so long as possession of such equipment is otherwise lawful and is not being used to aid in the take of crustaceans.

(h) Hand operated appliances: Spades, shovels, hoes, rakes or other appliances operated by hand may be used to take sand crabs and shrimp.

(i) Dip nets and Hawaiian type throw nets: Shrimp may be taken with dip nets and Hawaiian type throw nets north of Point Conception.

(j) Shrimp trawls: Shrimp beam trawls may be used to take shrimp only in San Francisco Bay waters east of the Golden Gate Bridge, and in San Pablo Bay. The beam trawl frame from which the net is hung may not exceed 24 inches by 18 inches. The trawl may be towed by motorized vessels but may not be retrieved by mechanical devices. Any fish, other than shrimp, caught in the trawl must be returned immediately to the water.

Note: Authority cited: Sections 200, 205, 265, 270, 275, 7075 and 7078, Fish and Game Code. Reference: Sections ~~110,~~ 200, 205, 265, 270, 275, 7050, 7055 and 7056, Fish and Game Code.

Proposed Regulatory Language

Section 29.85, Title 14 CCR, is amended to read:

§ 29.85. Recreational Take of Crabs

(a) Any individual who fishes for crabs using crab trap(s) pursuant to subsection 29.80(c), shall have in possession a valid Recreational Crab Trap Validation for the current license year (Section 701, Title 14, CCR).

~~(a)~~(b) Dungeness crabs (*Cancer magister*):

(1) ~~Closure:~~

Dungeness crab may not be taken from or possessed if taken from San Francisco Bay and San Pablo Bay, plus all their tidal bays, sloughs and estuaries between the Golden Gate Bridge and Carquinez Bridge.

(2) Open season:

(A) Del Norte, Humboldt and Mendocino counties: From the first Saturday in November through July 30.

(B) All other counties: From the first Saturday in November through June 30.

(3) Limit: Ten.

~~(4) Not more than 60 crab traps are authorized to be used to take Dungeness crab from a vessel operating under authority of a Commercial Passenger Fishing Vessel License issued pursuant to Fish and Game Code Section 7920.~~

~~(5) Traps and trap buoys by a commercial passenger fishing vessel to take Dungeness crab under authority of this Section and Section 29.80 shall have the commercial boat registration number of that vessel affixed to each trap and buoy.~~

(~~6~~4) No vessel that takes Dungeness crabs under authority of this section, or Section 29.80, shall be used to take Dungeness crabs for commercial purposes.

(~~7~~5) Minimum size: Five and three-quarter inches measured by the shortest distance through the body from edge of shell to edge of shell directly in front of and excluding the points (lateral spines).

~~(b)~~(c) All crabs of the Cancer genus except Dungeness crabs, but including: yellow crabs, rock crabs, red crabs and slender crabs:

(1) Open season: All year.

(2) Limit: Thirty-five.

(3) Minimum size: Four inches measured by the shortest distance through the body, from edge of shell to edge of shell at the widest part, except there is no minimum size in Fish and Game districts 8 and 9.

~~(c)~~(d) All crabs of the genus *Cancer*, including Dungeness crabs, yellow crabs, rock crabs, red crabs and slender crabs, may be brought to the surface of the water for measuring, but no undersize crabs may be placed in any type of receiver, kept on the person or retained in any person's possession or

under his direct control; all crabs shall be measured immediately and any undersize crabs shall be released immediately into the water.

~~(d)~~(e) Sand crabs (*Emerita analoga*): Limit: Fifty.

Note: Authority cited: Sections 200, 205, 265 and 275, Fish and Game Code. Reference: Sections ~~110,~~ 200, 205, 265 and 275, Fish and Game Code.

Proposed Regulatory Language

Section 701, Title 14 CCR, is amended to read:

§ 701. Sport Fishing Forms and Fees

Application	Permit Fees (US$)	Replacement Processing Fees (US$)
(a) Declaration for Multi-Day Fishing Trip (FG 935 (Rev. 2/13)), incorporated by reference herein	5.75	
(b) 2014 North Coast Salmon Report Card	5.75	
(c) 2014 Sturgeon Fishing Report Card	7.50	
(d) 2014 Sturgeon Fishing Replacement Report Card and Replacement Fee	7.50	7.50
(e) 2014 Spiny Lobster Report Card	8.75	
(f) 2014 Spiny Lobster Report Card Non-Return Fee	20.00	
(g) 2014 Abalone Replacement Report Card and Replacement Fee	9.50	7.50
(h) 2021 Recreational Crab Trap Validation	2.25	

~~(h)~~(i) Pursuant to the provisions of Section 699, Title 14, the department shall annually adjust the fees of all licenses, stamps, permits, tags, or other entitlements required by regulations set forth in this section.

Note: Authority cited: Sections 200, 205, 265, 275, 713, 1050, 1053.1 and 7149.8, Fish and Game Code. Reference: Sections ~~110,~~ 200, 205, 265, 275, 713, 1050, 1053.1, ~~1055~~1055.1 and 7149.8, Fish and Game Code.

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Instructions and Code Citations:
SAM Section 6601-6616

STATE OF CALIFORNIA — DEPARTMENT OF FINANCE

ECONOMIC AND FISCAL IMPACT STATEMENT
(REGULATIONS AND ORDERS)

STD. 399 (Rev. 10/2019)

DRAFT

ECONOMIC IMPACT STATEMENT

DEPARTMENT NAME	CONTACT PERSON	EMAIL ADDRESS	TELEPHONE NUMBER
Fish and Game Commission	Margaret Duncan	margaret.duncan@wildlife.ca.gc	(916) 704-3215

DESCRIPTIVE TITLE FROM NOTICE REGISTER OR FORM 400	NOTICE FILE NUMBER
Amend Section 29.80, 29.85, 701 CCR, Title 14, Re: Recreational Crab Marine Life Protection Measures	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:

- ☐ a. Impacts business and/or employees
- ☒ b. Impacts small businesses
- ☐ c. Impacts jobs or occupations
- ☐ d. Impacts California competitiveness
- ☐ e. Imposes reporting requirements
- ☐ f. Imposes prescriptive instead of performance
- ☒ g. Impacts individuals
- ☐ 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 Fish and Game Commission (Agency/Department) estimates that the economic impact of this regulation (which includes the fiscal impact) is:

- ☒ 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: 64 CPFVs

Describe the types of businesses (Include nonprofits): N/A

Enter the number or percentage of total businesses impacted that are small businesses: N/A

4. Enter the number of businesses that will be created: none eliminated: none

Explain: Regulation to establish baseline of a recreational fishery, with no change in amount of fishing activity anticipated.

5. Indicate the geographic extent of impacts: ☐ Statewide
☒ Local or regional (List areas): Coastal areas, especially north of Point Arguello

6. Enter the number of jobs created: none and eliminated: none

Describe the types of jobs or occupations impacted: N/A

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:

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SAM Section 6601-6616

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? $ 141,180 / year

   a. Initial costs for a small business: $ 240 Annual ongoing costs: $ 120 Years: 1

   b. Initial costs for a typical business: $ 0 Annual ongoing costs: $ 0 Years: 1

   c. Initial costs for an individual: $ 2.25 to $42.25 Annual ongoing costs: $ 2.25 to $20.25 Years: 1

   d. Describe other economic costs that may occur: $2.25 crab trap validation alone; add($4 per buoy x 5-10 buoys) = $22.25 to $42.25 Annual=$2.25+ some replace 5 buoys.Total costs=average ongoing individual + CPFV costs = $141,180. See Addendum

2. If multiple industries are impacted, enter the share of total costs for each industry: Commercial Passenger Fishing Vessels (CPFV) 100% 2010-2019 Average of 64 CPFVs deployed crab traps on group fishing trips of the 373 CPFVs that submitted logs to CDFW

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.* $ N/A

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: Fish and Game Commission authority to regulate sport fishing in state waters to manage marine resources.

   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: gulation benefits to the State's environment are: better information on recreational crab fishery activity, to aid the mangement of marine resources for continued sport fishing and to reduce marine life bycatch risk. No direct impacts on health and welfare or worker safety.

2. Are the benefits the result of: ☐ specific statutory requirements, or ☒ goals developed by the agency based on broad statutory authority?

   Explain: Statute provides Fish & Game Commission authority to establish sport fishing regulations.

3. What are the total statewide benefits from this regulation over its lifetime? $ 2,061,374

4. Briefly describe any expansion of businesses currently doing business within the State of California that would result from this regulation: No change in the level of fishing activity are anticipated or to be su cient to induce the expansion of businesses currently doing business within the State.

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: Alt 1)Trap limits with no trap sharing was anticipated to be incapatable with the fishery common practices with the potential of higher costs than the proposed Regulation. Alt 2) Validation would be required to pursue Crabs by all methods not only traps.

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SAM Section 6601-6616

ECONOMIC IMPACT STATEMENT (CONTINUED)

2. Summarize the total statewide costs and benefits from this regulation and each alternative considered:

Regulation:	Benefit: $ 2,061,374	Cost: $ 141,180/year
Alternative 1:	Benefit: $ 2,061,374	Cost: $ >141,180/year
Alternative 2:	Benefit: $ 2,061,374	Cost: $ >141,180/year

3. Briefly discuss any quantification issues that are relevant to a comparison of estimated costs and benefits for this regulation or alternatives: Unknown entanglement reductions with Regulation & Alts until in place & benefits are non-use values. Alt 1 may result in trappers needing more equipment. Alt2 more validations req'd.

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: Fisheries management regulations traditionally involve setting season length, and/or imposing gear, and/or bait restrictions.

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 through12 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: Proposed regulation will not a ect investment incentives in the State.

The incentive for innovation in products, materials or processes: Proposed regulation will not a ect innovation incentives in the 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: Reduced entanglements of non-target and listed marine life; obtain information on rec crab fisheries to mitigate risk and benefit the environment.

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SAM Section 6601-6616

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 _____

_____

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Instructions and Code Citations:
SAM Section 6601-6616

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 The CA Department of Fish and Wildlife anticipates recreational crab trap validation fee revenue of about $13,500 (6,000 @ $2.25 ea) for program administration and to fund the management of the marine resources.

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
DocuSigned by: Dennis Farrell E8B0B535880C4F0...	

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

DocuSign Envelope ID: E0635366-0D78-4D9E-BA19-202698FB00DA

STD 399 Addendum

Amend Sections 29.80, 29.85 and 701, CCR, Title 14

Re: Recreational Crab Marine Life Protection Measures

ECONOMIC IMPACT STATEMENT

Background

The principal intent of the proposed regulation is to minimize entanglement risks as well as to improve marine resource management through the collection of key fishery activity information. Department data indicate that at least 6,000 individuals engage in recreational crab trap fishing and would be affected by changes in requirements regarding: enhanced gear marking; service intervals; trap limits; Director authority to restrict take; and a new validation program.

Commercial Passenger Fishing Vessel (CPFV) operators provide recreational fishing trips for dozens of ocean species, and those who provide crab trapping (average of 64 vessels for 2010-2019), would also be directly affected by the proposed regulations. CPFVs operating in California are characterized as small businesses (per CA GOV Code Article 2, Section 11342.610) as no one dominates in the field and annual revenues per vessel do not exceed $1 million. Additional details on CPFVs, trips, and trips for crab are shown in Table 2. in the Appendix to this Addendum.

The proposed regulations introduce five elements for the recreational crab fishery:

- **Enhanced Gear Marking Costs:** All recreational crab traps must be attached to a Main Buoy that is at least 5 inches in diameter and 11 inches long. With the proposed regulation, all crab participant must also mark each crab trap with a unique Marker Buoy that is 3 inches in diameter and 5 inches long, which would help identify gear as originating from the recreational crab fishery should it entangle marine life. Traps targeting all recreational crab would be marked with a red buoy of this size. The extra buoy is widely available at an estimated cost of $4.00 each. Individuals may have up to ten traps although most have between two to five. Using the high-end average quantity of 5 traps x $4.00 for each additional buoy = $20.00. The maximum 10 traps per crab angler or trap operator x $4.00 for each additional buoy = maximum of $40.00 in initial costs. Annual ongoing costs would be the potential replacement of 5 buoys or $4.00 x 5= $20.00. CPFVs have a maximum of 60 buoys that would entail about $240 in initial costs and about $120 in annual ongoing maintenance costs.
- **Service Interval:** Set a minimum service interval of 9 days, which would help reduce lost and abandoned traps and prevent fishermen from storing gear in the ocean when not actively fishing. This component of the regulation has no costs impacts to individuals or businesses.

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- **Trap Limit:** Establish an individual trap limit of 10 traps per operator, which would reduce risk of entanglement by limiting the total number of vertical lines and establish a baseline effort level for further analyses. This does not affect the number of hoop nets, crab loop traps or take by by-hand. This component of the regulation has no costs impacts to individuals because most crab trap participants have between two to five traps and those who deploy the maximum 10 crab traps already possess the gear. The number of traps that a CPFV can deploy remains the same under the amended subsection 29.80(c)(6) (language which was moved from 29.85(a)(4)).
- **Director Authority:** The Fish and Game Commission currently has exclusive management authority over the recreational fishery. The proposal would provide authority for the Director of the Department to take in-season action to reduce the risk of marine life entanglement. This component of the regulation is not anticipated to have cost impacts to individuals. However, CPFV operations could be impacted depending on the percentage of their group fishing trips that are solely or predominantly for crab trapping. Vessels that pursue multiple species could more readily shift effort away from trap-taken crabs should crab season delays or closures occur.
- **Trap Validation Program:** Require all individuals using recreational crab traps to purchase an additional Recreational Crab Trap Validation if they are also required to possess a recreational fishing license and intend to take crab. This would allow the Department to track individuals who participate in the recreational crab fishery and contact them for survey efforts. The surveys in turn would allow the Department to collect crucial information it needs to better manage the fishery and address entanglement risk in the recreational fishery.

A trap validation is a way for a consumer to pay a fair share to contribute to management of the target species, habitat, or specific area. If the validation is purchased at the time the license is purchased, it is imprinted on the license. If purchased separately, then a separate receipt-document is printed to keep with the license.

Table 2 reflects data from trips reporting take of crab. However, it is not currently known how many individuals pursue crabs with traps while aboard CPFVs; depending on size, CPFVs take anywhere from six to about 30 passengers. Department survey[1] data indicate that approximately 6,000 individuals pursue crabs with traps on their own. Information gathered as a result of this regulation will help to more accurately identify the number of anglers in each group.

[1] California Recreational Fishing Survey (CRFS), data extracts for 2015 – 2019.

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The fee to recover reasonable administrative and program costs has been determined to be $2.25 as shown in Table 1. Item Fee Calculation for Recreational Crab Trap Validation.

Table 1. Item Fee Calculation for Recreational Crab Trap Validation

START UP COSTS

Cost Description	Hours	Rate*	Total
ALDS IT support: Item setup/ configuration /reporting			
Information Technology Specialist I	8	$96.42	$771.36
Total Startup Costs			$771.36
Amortized over 5 years:			$154.27
Amortized Startup Costs per Item			$0.03

ONGOING ANNUAL PROGRAM COSTS

ALDS IT support: Item Review			
Information Technology Specialist I	1	$71.48	$71.48
LRB IT support			
Associate Governmental Program Analyst (AGPA)	25	$53.77	$1,344.25
Program technician II (PTII)	42	$32.90	$1,381.80
Total Annual Program Costs			**$2,797.53**
Annual Program Costs per Item			**$0.47**

ONGOING ANNUAL PROGRAM COSTS
ITEM FEE CALCULATION

Amortized Startup Cost per Item Sold			$0.03
Annual Program Cost per Item Sold			$0.47
Overhead for above costs		24%	$0.17
ALDS System costs Per transaction			$0.78
LRB Operations costs Per transaction			$0.89
Item Fee			**$2.33**
Item Fee (rounded to nearest .25) per FGC Section 713			**$2.25**

*Rate per hour = hourly wage with benefits
Sources: CalHR for State Employee by Classification Payscales; CDFW Budgets Branch for Staff Benefit Rates 2019/20 and Departmental Overhead Rates 2019/20.

A. ESTIMATED PRIVATE SECTOR COSTS IMPACTS

Answer (from STD 399): b. Impacts small businesses; g. Impacts individuals

B. ESTIMATED COSTS

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a. **Initial costs for a small business:** = $240 to purchase buoys at $4 each for 60 recreational crab traps, the maximum allowed per CPFV. Buoys can be purchased at most outdoor supply retailers or online. CPFV operators themselves do not have to purchase the crab trap validation, but individuals (passengers) who expect to take crab must.

   Annual ongoing costs: = $120 to replace an estimated 30 buoys (due to damage or loss) or $4.00 x 30 = $120.00 per CPFV.

b. **Initial costs for an individual:** = a total that ranges from $2.25 to $42.25. All individuals that trap crabs incur the cost of an $2.25 validation upon purchase of annual fishing license. For the not yet known number of anglers that pursue crab with traps aboard CPFVs, that is the only new cost. For those that deploy crab traps on their own, the new gear marking requirement for an additional buoy on each crab trap, has an estimated cost of $4.00 each for the average quantity of 5 traps = $20. $2.25 + $20 = $22.25 or up to the maximum 10 traps = $42.25 for initial costs. Buoys can be purchased at most outdoor supply retailers or online.

Annual ongoing costs: = $2.25 to $22.25. The required crab trap validation at $2.25, and for non-CPFV anglers, the potential replacement of 5 buoys (due to damage or loss) or $4.00 x 5= $20.00 + $2.25 = $22.25.

Total Statewide costs: = $141,180, consisting of:

- (Crab Trap Validation fee of $2.25 for 6,000 non-CPFV recreational crab anglers + unknown number of CPFV crab anglers = **$13,500**) **+**
- (average annual buoy costs of $20 x 6,000 non-CPFV individual recreational crab anglers = **$120,000**) **+**
- ($120 buoy costs per year for 64 CPFVs = **$7,680**)

C. ESTIMATED BENEFITS

Total statewide benefits: $2,061,374

However, there are some challenges in the quantification of the anticipated benefits of the proposed regulation because the intended outcomes are comprised of non-use values. The aim is to help reduce the entanglement risk posed by recreational crab fisheries activities towards marine animals protected by the federal Endangered Species Act and Marine Mammal Protection Act. The proposed regulations would also help the state obtain valuable information on recreational crab fisheries to help the state better mitigate entanglement risk as well as better manage the crab fisheries overall to meet the state's various policy goals.

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The value of reduced unintended marine life entanglements in a recreational fishery is inherently difficult to monetize. Any unintended catch, known as "bycatch," whether a listed marine mammal, sea turtle or any other non-target species, could not be traded in the market per codes regarding recreational take. The valuation of bycatch in this case, would be entirely "non-use" (or "non-consumptive") values, that could be estimated with contingent valuation surveys of residents and non-residents as to how much they would pay to protect the various non-target marine wildlife from harm due to this recreational fishery. Such contingent valuation information informs the derivation of the existence, bequest, and altruistic values which are likely to be substantial, given the widely held concern for whales in particular. Additionally, the ecosystem value of a whale's' life, or the contribution of that life to the nutrient composition that supports other marine life, along with beneficial carbon sequestration, and more has been estimated to be $2 M per whale (Chami et al., 2019[2]).

Given these difficulties, this analysis first focuses more narrowly on the monetized market-traded direct uses, such as expenditures in the whale-watching industry, supplemented with monetized travel costs research to estimate the benefits of reducing the risk of marine life entanglement. Whale-watching is an industry that draws value from an abundance of whales that will attract more whale-watchers. Whale-watchers derive value from the sighting of whales and in theory the ticket price along with the travel costs of getting to the shore equal the "price" of seeing whales. The value of the whale-watching industry is evaluated as a proxy for the value of an abundance of whales.

A literature survey[3] of the economic contribution of the whale watching industry in California yielded an estimated $44,614,500 to $59,902,500 in direct expenditures annually. The multipliers for whale-watching tourism expand the initial direct expenditure to a range of $127,894,900 to $171,720,500 in total economic value for the whale-watching industry, that supports 79 jobs per $1 million in direct expenditures. With a total economic value of the industry the next steps taken to arrive at the monetary value of an individual whale are shown below.

Total Economic Value of Whale-Watching Tourism
[Range = $127,894,900 to $171,720,050]

The travel cost research that traces the additional real costs of travel (e.g. gas and time) to estimate the consumer surplus of whale-watching beyond the direct ticket

[2] Chami, R., Cosimano, T., Fullenkamp, C. and S. Oztosun. 2019. Nature's Solution To Climate Change: A strategy to protect whales can limit greenhouse gases and global warming, Finance & Development, December 2019.
[3] Erich Hoyt and E.C.M.Parsons (2014); Knowles, T., Campbell, R. (2011); Linwood Pendleton, (2006).

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costs was also surveyed. Consumer surplus is the benefit that consumers reap beyond what is paid for the experience.

Travel Cost as a Measure of Consumer Surplus
[Average total = $52,400]

The average total travel costs values were added to the total economic impact of direct expenditures in the state. That sum was then divided by the number of whales of the species traveling in the water depths and areas that could be most likely vulnerable to entanglement with crab gear lines. This provides a measure of the total economic value of the whale watching industry and travel cost consumer surplus per whale.

($127,894,900 + $52,400)/2,442 whales = $52,400 per whale
($171,720,050 + $52,400)/2,442 whales = $70,348 per whale

The number of whales off the California coast at risk of entanglement in recreational crab gear is the other key factor in assigning a value for the benefits of this regulatory action. Records on whale entanglement off the California coast show that at least three whales have been entangled over recent years in recreational crab gear (Draft Conservation Plan for California's Commercial Dungeness Crab Fishery 2020). This regulation is intended to reduce the frequency of entanglements of large whales and sea turtles.

The total benefit would be about $52,400 to $70,348, with an average of $61,374 for each whale that is not entangled in recreational crab gear. If the $2M ecosystem services value (Chami, et al., 2019) of that whale is included the proposed regulation benefits sums to **$2,061,374**.

D. ALTERNATIVES TO THE REGULATION

1. List Alternatives Considered

Alternative 1: Lower Trap Limit Without Gear Sharing

One alternative considered was the adoption of a trap limit that would appreciably reduce the number of recreational crab traps deployed in the ocean. Initial discussions included a range from three to ten traps. Based on stakeholder feedback, a more stringent trap limit would constrain an anglers' ability to share gear through written notes by trap owners. Allowing individuals to share gear with other anglers may also help to achieve the goal of limiting the total number of traps fished by area. As a result, a higher trap limit was chosen, and the issue of gear sharing may be addressed in a future rulemaking. The 10-trap individual limit will be used primarily as a benchmark for Department and Commission staff to determine maximum effort.

Alternative 2: Unlimited Validation

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The Department considered requiring that *all* crab anglers obtain the validation stamp, and not just those fishing with crab traps. There are many unknowns about the number of individuals fishing with the various methods, and the validation stamp would provide an opportunity for information gathering. However, the purpose of the regulation is to gather information to inform ways of minimizing whale entanglement risk, and crab anglers using methods other than crab traps deployed from boats have no known contribution to that risk. Therefore, the regulation focuses solely on recreational anglers pursuing the take of crab using crab traps.

D2. Summarize the Total Statewide Costs and Benefits from this Regulation and Each Alternative Considered

Regulation Costs: $141,180, consisting of:(Crab Trap Validation fee of $2.25 for 6,000 non-CPFV recreational crab anglers + unknown number of CPFV crab anglers = **$13,500**) **+** (average annual buoy costs of $20 x 6,000 non-CPFV individual recreational crab anglers = **$120,000**) **+** ($120 buoy costs per year for 64 CPFVs = **$7,680**).

Regulation Benefits: reduction of entanglement risk posed by recreational crab trap fishing activities towards marine animals, particularly those protected by the federal Endangered Species Act and Marine Mammal Protection Act, valued at: **$2,061,374**. The proposed regulations would also help the state obtain valuable information on recreational crab fisheries to help the state better mitigate entanglement risk as well as better manage the crab fisheries overall to meet the state's various policy goals.

Alternatives

The following two alternatives represent likely costs and benefits from two modifications of the rulemaking that were not selected.

Alternative 1 Costs: Greater than $141,180, that is greater than the regulation costs as specified above, but since Alternative 1 would be at odds with current practices, it is likely to entail more costs to individual fishery participants as parts of the recreational sector currently rely heavily on the ability to share gear.

Alternative 1 Benefits: were expected to be similar to the proposed regulation, **$2,061,374**, but at higher costs to the affected recreational fishery participants.

Alternative 2 Costs: An estimated 1,000 crab anglers use methods other than crab traps deployed from boats, such as hoop nets and manual extraction from the sandy shoreline. If those anglers also had to purchase the $2.25 Recreational Crab Validation, total statewide individual costs would increase annually by **$2,250**.

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Alternative 2 Benefits: Anticipated benefits would not be increased by including crab anglers using methods other than deploying crab traps from boats since those other methods do not increase the risk of whale entanglements. The benefits are estimated to be equivalent to the proposed regulation: **$2,061,374.**

FISCAL IMPACT STATEMENT

A. A. FISCAL EFFECT ON LOCAL GOVERNMENT

Answer: 5. No fiscal impact exists. This regulation does not affect any local entity or program.

B. FISCAL EFFECT ON STATE GOVERNMENT

Answer: 4. Other. Explain: (The proposed regulations are anticipated to introduce some start-up and ongoing implementation and enforcement costs that will be absorbable within existing budgets.)

The California Department of Fish and Wildlife expects to sell at least 6,000 recreational crab trap validations at the cost of $2.25 for an annual validation. The additional sales revenue anticipated from 6,000 validations sold is **$13,500.** The Commission does not anticipate any savings to State agencies or costs/savings in federal funding to the State.

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.

Appendix: Table 2. CPFV Vessels and Trips Involving Crab Take: 2010-2020

Year	All Vessels	Vessels with Crab	% Crab Vessels	All Trips	Trips with Crab	% Crab Trips
2010	314	41	13.1%	23,801	618	2.6%
2011	316	55	17.4%	26,144	1,173	4.5%
2012	339	64	18.9%	29,455	1,207	4.1%
2013	361	72	19.9%	31,252	1,214	3.9%
2014	418	79	18.9%	36,465	1,362	3.7%
2015	391	43	11.0%	40,060	657	1.6%
2016	398	76	19.1%	35,101	1,523	4.3%
2017	371	64	17.3%	34,087	1,089	3.2%
2018	423	71	16.8%	35,345	1,129	3.2%
2019	399	75	18.8%	35,051	1,460	4.2%
2020*	280	23	8.2%	6,482	129	2.0%
2010-2019 Average	373	64	17.2%	32,676	1,143	3.5%

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*YTD - July 29, 2020; 2020 is excluded from annual average 2010-1019.
Source: California Department of Fish and Wildlife: CPFV annual reporting logs data extracts: 2010 – 2020.

Recreational Crab Marine Life Protection Measures

Proposed Amendments to Sections 29.80, 29.85 and 701

19 August 2020

Presented to:

Fish and Game Commission

Presented by:

Ryan Bartling

Senior Environmental Scientist
Marine Region

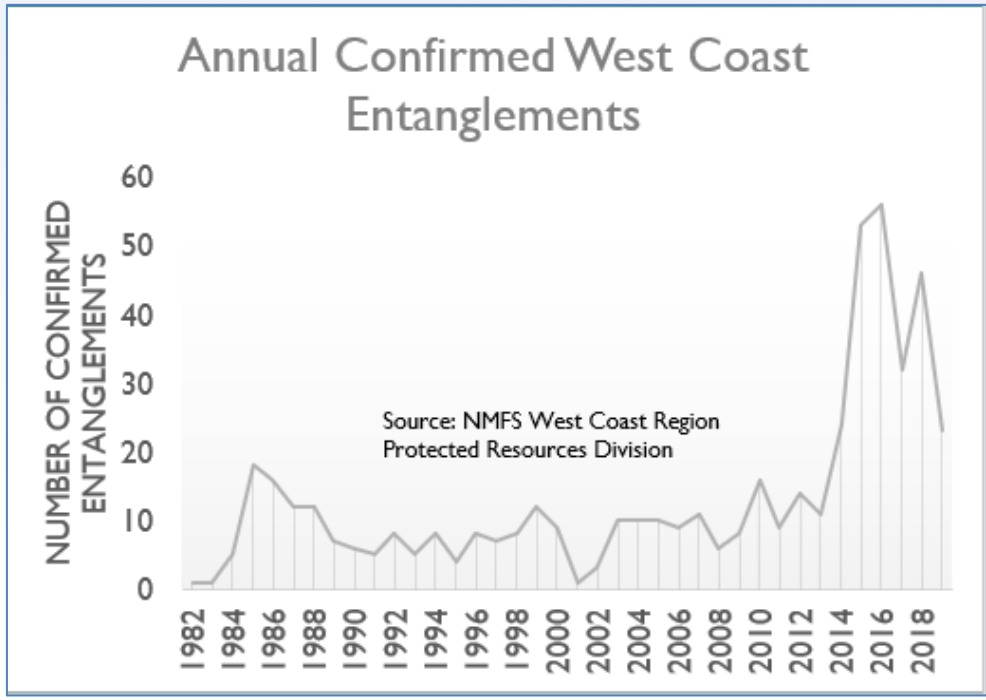
Inclusion of ALL Trap Caught Sport Crab

- Stakeholder engagement started >1 year ago
- Initial scoping/discussions focused on Dungeness crab
- Entanglement risk is from ALL crab trap gear/line
- Drafting revealed broader approach needed to address risk and enforcement
- Proposed regulations apply to all crab

Marine Life Entanglement Risk

- Species listed under Endangered Species Act (ESA) and Marine Mammal Protection Act (MMPA) entangled in trap gear

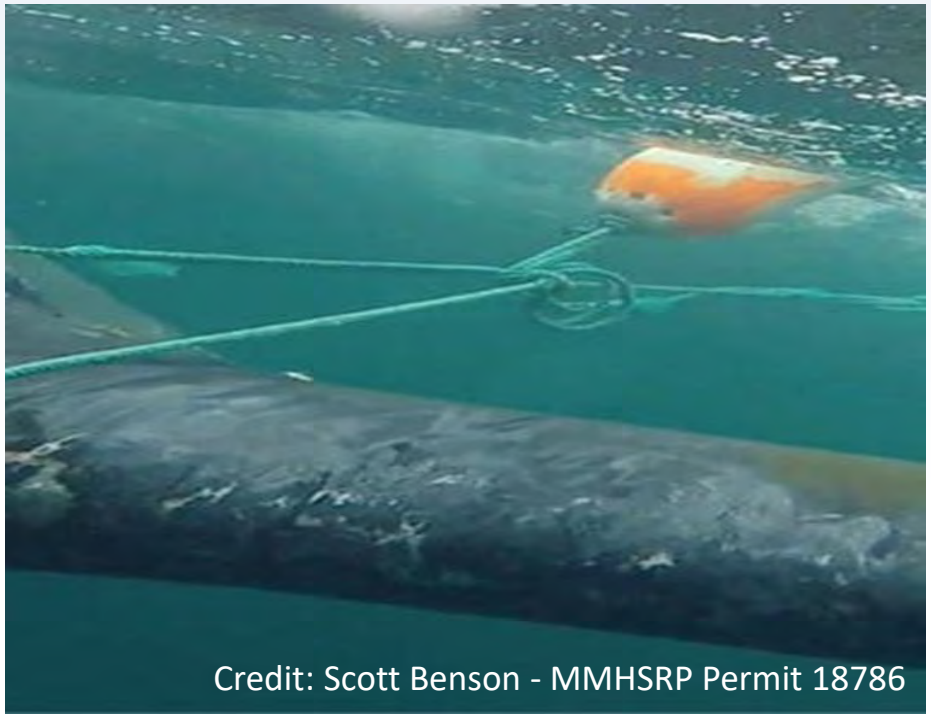
- Since 2014 = 49 confirmed CA Dungeness crab gear entanglements, <u>including 3 from recreational crab gear</u>, 102 entanglements observed in CA from unknown gear types



Credit: NMFS West Coast Protected Resources Division

Rationale for Changes to Recreational Fishery

- Operates in similar locations/configurations
- Few rules regarding deployment, configuration, and servicing
- Align with other trap fisheries and increase accountability
- Reduce “unknown entanglements”


Credit: Scott Benson - MMHSRP Permit 18786

Proposed Changes to Recreational Crab Fishery

Overview of proposals:

1. Unique “marker buoy” (simple red buoy)
2. Trap limit program (10 traps per individual)
3. Service interval requirement (9 days)
4. Recreational Crab Trap Validation (low cost)
5. Director’s authority (minimize entanglement risk)

Credit: CDFW

Proposed Changes to Recreational Crab Fishery (cont. 1)

§ 29.80: Gear Restrictions for Recreational Take of Saltwater Crustaceans

- (b)(1) and (3) Revise: hoop net language to remove redundancy
- (c)(3)(A) Add: Main buoy marking requirements, buoy must 5 x 11 inches
- (c)(3)(A)1. & 2. Reorg: GO ID # and CPFV license buoy marking requirements into this subsection

Proposed Changes to Recreational Crab Fishery (cont. 2)

§ 29.80: Gear Restrictions for Recreational Take of Saltwater Crustaceans

- (c)(3)(B) Add: Marker buoy requirements, 3 x 5-inch red buoy (readily available)
- (c)(3)(C) Reorg: CPFV trap marking requirements into this subsection
- (c)(5) Add: Service interval not to exceed 9 days

Proposed Changes to Recreational Crab Fishery (cont. 3)

§ 29.80: Gear Restrictions for Recreational Take of Saltwater Crustaceans

- (c)(6)(A) Add: Individual trap limit of 10 and provision for servicing up to 10 additional traps with written permission
- (c)(6)(B) Move: CPFV trap limit to this subsection; CPFV trap limit will apply for all crab species

Proposed Changes to Recreational Crab Fishery (cont. 4)

§ 29.80: Gear Restrictions for Recreational Take of Saltwater Crustaceans

- (c)(7)-(9) Add: Director's authority using Risk Assessment Mitigation Program (RAMP) § 132.8
  - Director evaluates risk of entanglement prior to recreational opener
  - Risk will be determined based on consistency with § 132.8 on a monthly basis
  - Data driven process (based on best available science)

Proposed Changes to Recreational Crab Fishery (cont. 5)

§ 29.80: Gear Restrictions for Recreational Take of Saltwater Crustaceans

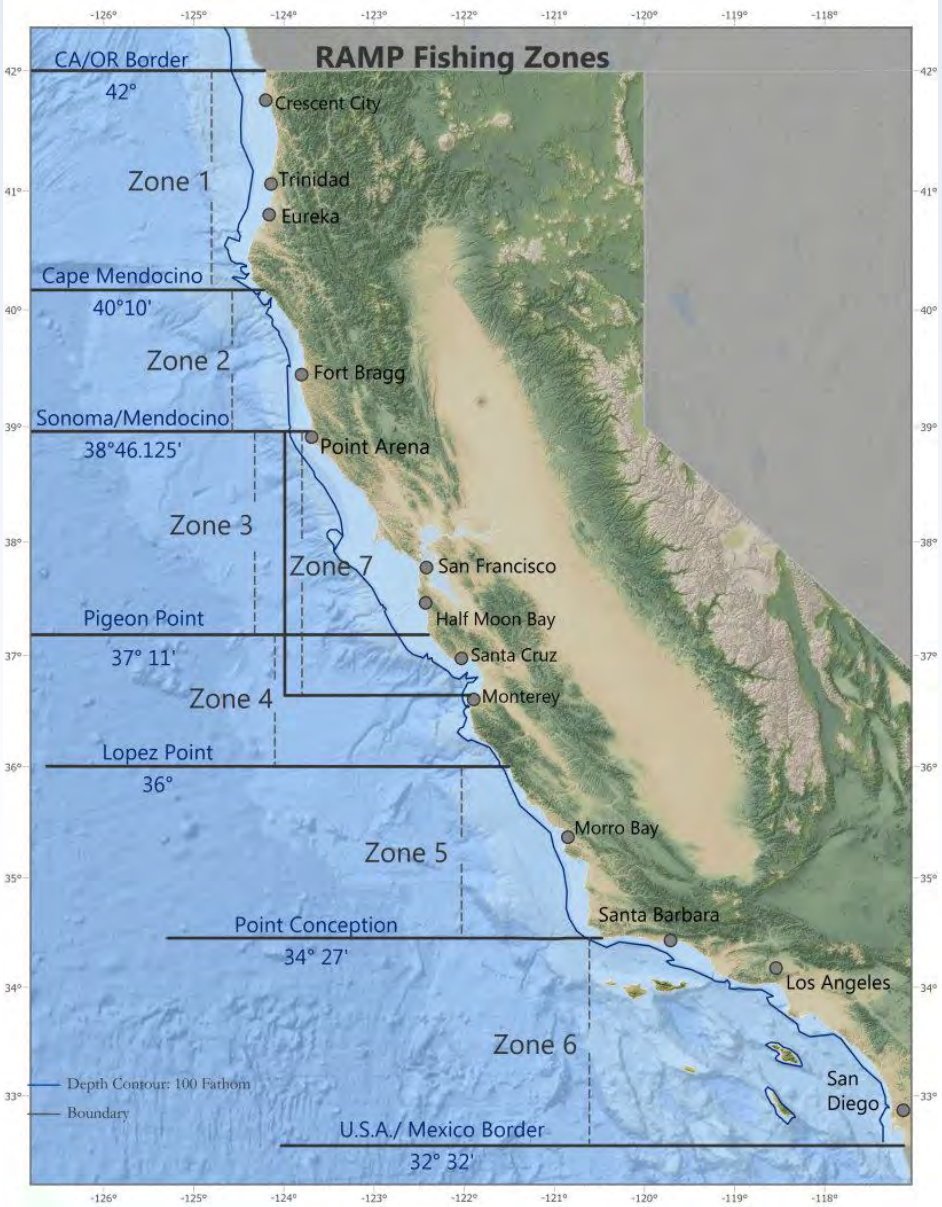
- (c)(7)-(9) Add: Director's authority using Risk Assessment Mitigation Program (RAMP) § 132.8
  - Director shall implement management actions to minimize risk
  - Management actions can be at the Fishing Zone level or statewide
  - Actions include: Advisory, delay or closure

Proposed Changes to Recreational Crab Fishery (cont. 6)

§ 29.80: Gear Restrictions for Recreational Take of Saltwater Crustaceans

- (c)(3)(7)-(9) Add: Director's authority using Risk Assessment Mitigation Program (RAMP) § 132.8
  - Notice of mgmt. action transmitted by Director's declaration
    - Minimum of 5-days prior to implementation
    - Will include data, rational and duration
    - Communicated through the Department's Whale Safe Fisheries webpage

RAMP Fishing Zones



Proposed Changes to Recreational Crab Fishery (cont. 7)

§ 29.85 Recreation Take of Crab

- (a) Add: Recreational Crab Trap Validation to identify anglers for communications
- (a)(1) Amend and re-number: San Francisco Bay closure for clarity
- (a)(4)(5) Move: Subsections to §29.80

§ 701 Sport Fishing Forms and Fees

- (h) Add: Recreational Crab Trap Validation

  Fee = $2.25

Questions?

Whale Safe Fisheries

www.wildlife.ca.gov/Conservation/Marine/Whale-Safe-Fisheries

Ryan Bartling

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State of California
Department of Fish and Wildlife

Received July 23, 2020.
Original signed copy on file.

M e m o r a n d u m

Date: July 22, 2020

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

From: Charlton H. Bonham
Director

Subject: **Submission of Initial Statement of Reasons, Re: Recreational and Commercial Fishing Regulations for Federal Groundfish and Associated Species for Consistency with Federal Rules for 2021 and 2022**

The Pacific Fishery Management Council recommended recreational fishing regulations for federally managed groundfish species for the 2021-2022 management cycle at its June 10-19, 2020 meeting. This action requires the Department of Fish and Wildlife (Department) to recommend to the Fish and Game Commission (Commission) amendment of several state regulations to maintain consistency with these federal regulations. In addition, the Department is proposing modification of state-defined commercial trip limits for cabezon and greenling to promote attainment of federally-established commercial harvest limits.

To ensure conforming state regulations are in place before fishing begins in 2021, at its June 24-25, 2020 meeting, the Commission authorized publication of notice of its intent to amend recreational and commercial fishing regulations for federally managed groundfish species. This allows for discussion and possible adoption at the August 19-20, 2020 and October 14-15, 2020 Commission meetings, respectively.

The Department's Initial Statement of Reasons is attached, which proposes regulatory changes needed to align state regulations with the range of federal regulations expected to be in effect for 2021 and 2022 and to increase fishing opportunity while staying within harvest limits. The changes result in modifications to recreational depth restrictions, and bag limits for federally managed groundfish and state-managed species, which associate with federal groundfish. The changes also result in increases to commercial trip limits for cabezon and greenling.

If you have any questions or need additional information, please contact Dr. Craig Shuman, Marine Region Manager, at (916) 373-5491. The public notice for this rulemaking should identify Senior Environmental Scientist, Kevan Urquhart, as the Department's point of contact for this rulemaking. Mr. Urquhart can be reached at (707) 494-4621 or at Kevan.Urquhart@wildlife.ca.gov.

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State of California
Fish and Game Commission
Initial Statement of Reasons for Regulatory Action

Amend Sections 27.30, 27.35, 27.45, 28.27, 28.28, 28.54, 28.55, 28.65, 150.16
Title 14, California Code of Regulations
Re: Recreational and Commercial Fishing Regulations for Federal Groundfish and Associated Species for Consistency with Federal Rules in 2021 and 2022

I. Date of Initial Statement of Reasons: July 1, 2020

II. Dates and Locations of Scheduled Hearings

(a) Notice Hearing

Date: June 24-25, 2020 Location: Webinar/Teleconference

(b) Discussion Hearing

Date: August 19-20, 2020 Location: Webinar/Teleconference

(c) Adoption Hearing

Date: October 14-15, 2020 Location: Webinar/Teleconference

III. Description of Regulatory Action

(a) Statement of Specific Purpose of Regulatory Change and Factual Basis for Determining that Regulation Change is Reasonably Necessary

Biennially, the Pacific Fishery Management Council (PFMC) reviews the status of west coast groundfish populations. As part of that process, it recommends groundfish fisheries harvest limits and regulations aimed at meeting biological and fishery allocation goals specified in law or established in the Pacific Coast Groundfish Fishery Management Plan (PCGFMP). These recommendations coordinate west coast management of recreational and commercial groundfish fisheries in the Exclusive Economic Zone (EEZ) (three to 200 miles offshore) off Washington, Oregon and California. These recommendations are subsequently reviewed for implementation as federal fishing regulations by National Oceanic and Atmospheric Administration (NOAA) Fisheries.

Under California law (California Fish and Game Code sections 200, 205, 7071, and 8587.1), the California Fish and Game Commission (Commission) adopts regulations in Title 14 of the California Code of Regulations (CCR) for the recreational and nearshore commercial groundfish fisheries in state waters zero to three miles from shore. Management authority for most nearshore stocks is shared jointly between state and federal governments in conjunction with the PCGFMP and the Nearshore Fishery Management Plan (NFMP).

Management of federal groundfish and associated species is based on PFMC-established federal annual catch limits (ACL); in the NFMP these state management limits are called total allowable catch (TAC). ACLs and TACs serve the same purpose of setting a limit on catch. Federal regulations establish management measures for most nearshore stocks but defer to state rules on commercial trip limits for cabezon and greenling.

The California Department of Fish and Wildlife (Department) actively manages cabezon and greenlings to stay within the TAC and recreational and commercial allocations. Although recent attainment of commercial allocations for cabezon and greenling have been low, trip limits have not been adjusted accordingly. Trip limit increases will benefit businesses that rely on commercial groundfish fishing.

It is important to have consistent state and federal regulations establishing harvest limits, season dates, depth constraints and other management measures, and also important that the state and federal regulations be effective concurrently. Consistency of rules in adjacent waters allows for uniformity of enforcement, minimizes confusion which promotes compliance, and allows for a comprehensive approach to resource management. Consistency with federal regulations is also necessary to maintain state authority over its recreational groundfish fishery and avoid federal preemption under the Magnuson-Stevens Fishery Conservation Act (MSA) [16 USC §1856 (b)(1)].

On June 18, 2020, the PFMC recommended changes for ACLs and recreational groundfish fishing in California for the 2021 and 2022 fishing seasons, which are expected to go into effect in federal regulation on or around January 1, 2021.

Present Regulations

Recreational

Existing law authorizes the recreational take of groundfish subject to regulations set forth by federal and state authorities. Current regulations establish season lengths, depth constraints, methods of take, as well as size, bag and possession limits within the five groundfish management areas for all federal groundfish and associated species [Sections 27.20, 27.25, 27.30, 27.35, 27.40, 27.45, 27.50, 27.51, 28.26, 28.27, 28.28, 28.29, 28.48, 28.49, 28.54, 28.55, 28.56, and 28.65 Title 14, CCR].

Present recreational regulations allow anglers to take and possess federally-managed groundfish species as defined in Section 1.91 of Title 14, CCR when the fishing season is open. Regulations also establish that California sheephead, ocean whitefish, and all greenlings of the genus *Hexagrammos*, which are state-managed species known to associate with federal groundfish, can be taken and possessed only when the season is open to recreational groundfish fishing.

Current regulations specify seasons and depth constraints for the five groundfish management areas in ocean waters off California (Figure 1). These regulations serve as management tools that are adjusted biennially and inseason through PFMC action to ensure that mortality of both overfished[1] and non-overfished stocks remain within allowable limits. The current seasons and depth constraints were designed to maximize harvest of healthy stocks while staying within allowable limits for overfished species.

[1] "Overfished" describes any stock or stock complex whose size is sufficiently diminished that a change in management practices is required to achieve an appropriate level and rate of rebuilding. The term generally describes any stock or stock complex determined to be below its overfished/rebuilding threshold. The default proxy is generally 25 percent of its estimated unfished biomass; however, other scientifically valid values are also authorized

Figure 1. Map of five California recreational groundfish management areas.

The Northern and Mendocino Groundfish Management Areas have an eight-month season with a depth constraint of 30 fathoms and 20 fathoms (respectively) from May to October, and no depth constraint during November and December. The San Francisco and Central Groundfish Management Areas have a nine-month season, with a depth constraint of 40 fathoms and 50 fathoms (respectively). The Southern Groundfish Management Area has the least restrictive regulations, with a 10-month season and a depth constraint of 75 fathoms. The Cowcod Conservation Areas (CCA) are within the Southern Groundfish Management Area but have a discrete depth constraint of 40 fathoms.

Present regulations establish recreational bag limits which vary by species or species groups, and are designed to keep harvest within allowable limits. The Rockfish, Cabezon, and Greenling complex (RCG) has a 10 fish bag aggregate limit [Section 28.55 Title 14, CCR] meaning that each angler's catch can be composed of any combination of rockfish, cabezon, or greenling, as long as total catch remains at or below 10 fish. Sub-bag limits are implemented when harvest guidelines can't accommodate the 10 fish bag limit being composed of a single species. Present regulations include sub-bag limits for canary rockfish (two fish), black rockfish (three fish), and cabezon (three fish). Bronzespotted rockfish, cowcod, and yelloweye rockfish have bag limits of zero fish.

Current regulations specify special gear restrictions for lingcod and groundfish species in the RCG complex (i.e. when angling, gear is restricted to not more than two hooks and one line).

Commercial

Current commercial regulations establish TACs, allocations, and trip limits for federal groundfish and associated species [sections 52.10, 150.16, Title 14, CCR]. Allocations of the TAC share for commercial fisheries are often made between the trawl and non-trawl sectors, but there is only a non-trawl fishery for cabezon and greenlings statewide. Trip limits are designed to spread allowable catches through the open season to the extent possible to prevent early attainment of annual limits.

Current regulations establish cumulative two-month trip limits for cabezon, California sheephead, and greenlings statewide. No changes are being proposed for California sheephead trip limits. Current cumulative limits for cabezon are 500 pounds per two-months and greenlings are 250 pounds per two-months.

Proposed Regulations

The Department is proposing the recreational regulatory changes to be consistent with PFMC recommendations for federal groundfish regulations in 2021 and 2022. Other changes are proposed to increase commercial trip limits for cabezon and greenling.

This approach will allow the Commission to adopt state groundfish regulations to timely conform to those taking effect in federal ocean waters in January 2021.

Recreational

The recreational depth restrictions in the Mendocino and San Francisco Groundfish Management Areas are proposed to change from 20 to 30 fathoms and 40 to 50 fathoms, respectively, because of increases in allowable take of yelloweye rockfish. These changes are reflected in sections 27.30 and 27.35, respectively. The latest rebuilding analysis for yelloweye rockfish, completed in December 2017, indicated the stock is rebuilding 47 years faster than estimated in 2011. Due to the estimated acceleration in the rebuilding progress of the stock, harvest limits have increased. Thus, the proposed depth changes are necessary to provide additional angling opportunity, and are not expected to impair the rebuilding process of this stock or the time needed to rebuild.

Moving the Mendocino Groundfish Management Area from 20 to 30 fathoms in Section 27.30 would also allow use of waypoints already in federal regulations that define the 30 fathom Rockfish Conservation Area (RCA) line, instead of the general depth contour line that is currently used in state regulation to define the 20 fathom line. Department law enforcement

prefers federal RCA lines defined by connecting waypoints over the use of general contour lines, and the change would eliminate the last use of the 20 fathom contour line in California's recreational groundfish regulations.

This change is necessary for referencing the contour line in federal regulation. Amendment of these depth restrictions would align the Mendocino Groundfish Management Area RCA with the existing RCA for recreational fishing in the adjacent Northern Groundfish Management Area, and would align the San Francisco Groundfish Management Area RCA with the existing RCA in the adjacent Central Groundfish Management Area.

The recreational depth restriction in Section 27.45 for the Southern Groundfish Management Area is proposed to change from 75 to 100 fathoms. This change is necessary due to increases in allowable take of cowcod. The 2019 cowcod assessment indicates the stock has now attained a healthy and rebuilt status. The cowcod ACL south of Cape Mendocino will increase from 10 metric tons (mt) in 2020 to 84 mt in 2021 as a result of the health of the stock, and allows for the proposed Southern Groundfish Management Area depth restriction change. Note that retention of this species is not proposed, meaning that the increased harvest limits only need to cover potential increases in incidental cowcod take. Yelloweye impacts are expected to be negligible, as this area represents the extreme southern extent of the population range.

A summary of the proposed season and depth changes is provided in Table 1.

Table 1. California recreational groundfish season structure in 2021 and 2022 as recommended by the PFMC in June 2020. CCA = Cowcod Conservation Area

Management Area	Closed Season	Current Open & Depth	Proposed Open & Depth
Northern	Jan 1 – Apr 30	May 1 to Oct 31 < 30 fm Nov 1 to Dec 31 All Depth	No Change
Mendocino	Jan 1 – Apr 30	May 1 to Oct 31 < 20 fm Nov 1 to Dec 31 All Depth	May 1 to Oct 31 < 30 fm Nov 1 to Dec 31 All Depth
San Francisco	Jan 1 – Mar 31	Apr 1 to Dec 31 < 40 fm	Apr 1 to Dec 31 < 50 fm
Central	Jan 1 – Mar 31	Apr 1 to Dec 31 < 50 fm	No Change
Southern	Jan 1 – Feb 28	Mar 1 to Dec 31 < 75 fm	Mar 1 to Dec 31 < 100 fm
CCA	Jan 1 – Feb 28	Mar 1 to Dec 31 < 40 fm	No Change

The proposed regulations remove the recreational sub-bag limits for canary rockfish and black rockfish (subsection 28.55(b)), and cabezon (subsection 28.28(b)), which would have the effect of increasing their respective limits to 10 fish within the RCG aggregate limit of 10 fish. These changes are necessary to provide angling opportunity, and the proposed increase can be accommodated within the harvest guidelines for these species.

The proposed amendment to subsection 28.55(b) also creates a sub-bag limit of five fish for vermilion rockfish, within the RCG limit of 10 fish. The proposed change to be more restrictive is necessary due to increasing take of vermilion rockfish in recent years, without recent population information to justify such high harvest levels, therefore the precautionary reduction would help offset detrimental impacts in the absence of data.

The proposed amendment to Section 28.27 would increase the recreational bag limit for lingcod from one fish to two fish in the Mendocino, San Francisco, Central, and Southern Groundfish Management Areas (the bag limit in the Northern Groundfish Management Areas is currently two fish already). The proposed amendment to subsection 28.27(b) is necessary to simplify the limit for all five groundfish management areas, and be consistent with the current federal regulation, which has been in place since June 2019 as a result of PFMC inseason action. A two fish bag limit can be accommodated within the ACL.

The proposed amendments to Section 28.54 to add a new subsection (d), and to Section 28.65 add a method of take and restrictions for California scorpionfish. This addition is necessary to be consistent with federal regulations and with the method of take language used in state regulations for lingcod and groundfish species in the RCG complex (i.e. when angling, gear is restricted to not more than two hooks and one line).

Commercial

The proposed regulations in Section 150.16 double commercial trip limits for cabezon and greenling. Cabezon trip limits are currently 500 pounds every two months, and Greenling is 250 pounds every two months. Both stocks have been under-harvested in recent years. Offering a modest increase can be accommodated under federal harvest limits, and will uphold the Department's obligation under the NFMP.

Table 2. Proposed commercial trip limits in pounds per individual two-month period for cabezon and greenling statewide

Species	**Jan-Feb**	**Mar-Apr**	**May-Jun**	**Jul-Aug**	**Sep-Oct**	**Nov-Dec**
Cabezon	1,000 lbs/ 2 months	1,000 lbs/ 2 months	1,000 lbs/ 2 months	1,000 lbs/ 2 months	1,000 lbs/ 2 months	1,000 lbs/ 2 months
Greenling	500 lbs/ 2 months	500 lbs/ 2 months	500 lbs/ 2 months	500 lbs/ 2 months	500 lbs/ 2 months	500 lbs/ 2 months

Non-substantive Changes

The proposed regulations will update authority and reference citations.

(b) Goals and Benefits of the Regulation

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. 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, taking into consideration the necessity of regulating individual sport fishery bag limits to the quantity that is sufficient to provide a satisfying sport. Adoption of scientifically-based groundfish seasons, depth restrictions, size limits, and bag and possession limits provides for the maintenance of sufficient populations of groundfish species to ensure their continued existence.

The goals and benefits of the proposed regulations include consistency with federal law, sustainable management of groundfish resources, and promotion of businesses that rely on recreational and commercial groundfish fishing.

(c) Authority and Reference Sections from Fish and Game Code for Regulation

Authority: Sections 200, 205, 265, 270, 275, 702, 7071 and 8587.1, Fish and Game Code

Reference: Sections 200, 205, 265, 270, 275, 702, 1802, 7071, 8585.5, 8587, 8587.1, and 8588, Fish and Game Code; Title 50, Code of Federal Regulations, Part 660, Subpart G; and Section 27.20, Title 14, CCR.

(d) Specific Technology or Equipment Required by Regulatory Change

None.

(e) Identification of Reports or Documents Supporting Regulation Change

June 2020 Pacific Fishery Management Council Decision Document https://www.pcouncil.org/documents/2020/06/june-2020-decision-document.pdf/

Pacific Coast Groundfish Fishery 2021-2022 Harvest Specifications and Management Measures. May 2020. Pacific Fishery Management Council. https://www.pcouncil.org/documents/2020/05/f-1-attachment-8-pacific-coast-groundfish-fishery-2021-2022-harvest-specifications-and-management-measures-analytical-document-organized-as-a-draft-environmental-assessment-chapters-1-5-electroni.pdf/

Pacific Coast Groundfish Fishery Management Plan for the California, Oregon, and Washington Groundfish Fishery. December 2019. Pacific Fishery Management Council. https://www.pcouncil.org/documents/2016/08/pacific-coast-groundfish-fishery-management-plan.pdf/

Nearshore Fishery Management Plan. Adopted October 25, 2002. Department of Fish and Game. https://wildlife.ca.gov/Conservation/Marine/NFMP

National Marine Fisheries Service. 2018. Fisheries Economics of the United States, 2016. U.S. Dept. of Commerce, NOAA Tech. Memo. NMFS-F/SPO-187, 243 p. https://www.fisheries.noaa.gov/resource/document/fisheries-economics-united-states-report-2016

(f) Public Discussions of Proposed Regulations Prior to Notice Publication

Pacific Fishery Management Council meetings where the proposed regulations for the 2021 and 2022 groundfish and associated species were discussed:

- September 11-18, 2019, Boise, ID
- November 14-20, 2019, Costa Mesa, CA
- March 3-9, 2020, Rohnert Park, CA
- April 4-10, 2020, webinar only due to COVID-19
- June 10-19, 2020, webinar only due to COVID-19

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

Under the No Change Alternative, state law would be inconsistent with federal law. Inconsistency in regulations will create confusion among the public and may result in laws that are difficult to enforce. Additional opportunity expected to come with the federal regulation changes effective in January 2021 would not be realized.

It is critical to have consistent state and federal regulations establishing harvest limits, season dates, depth constraints and other management measures, and also critical that the state and federal regulations be effective concurrently. Consistency with federal regulations is also necessary to maintain state authority over its recreational and nearshore commercial groundfish fishery and avoid federal preemption under the MSA.

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. No significant changes in fishing effort and fishing expenditures are expected as a direct result of the proposed regulation changes.

(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 significant impacts on the creation or elimination of jobs, the creation of new business, the elimination of existing businesses or the expansion of businesses in California. No significant changes in fishing effort and fishing expenditures to businesses are expected as a direct result of the proposed regulation changes.

The Commission anticipates benefits to the health and welfare of California residents. Participation in sport fisheries opportunities fosters conservation through education and appreciation of California's wildlife.

The Commission does not anticipate any benefits to worker safety.

The Commission anticipates benefits to the environment by the sustainable management of California's sport and commercial fishing resources.

(c) Cost Impacts on a Representative Private Person or Business

The agency is not aware of any cost impacts that a representative private person or business would necessarily incur in reasonable compliance with the proposed action.

(d) Costs or Savings to State Agencies or Costs/Savings in Federal Funding to the State

None

(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

Recreational

The recreational groundfish fishery is broadly sub-divided between private anglers and commercial passenger fishing vessels. The economic impact of regulatory changes for each of these categories may be estimated by tracking the resulting changes in fishing effort, angler trips and length of stay in the fishery areas. Distance traveled affects gas and other travel expenditures. Daytrips and overnight trips involve different levels of spending for gas, food, and accommodations at area businesses as well as different levels of sales tax impacts. Direct expenditures ripple through the economy, as receiving businesses buy intermediate goods from suppliers that then spend that revenue again. Business spending on wages is received by workers who then spend that income, some of which goes to local businesses. Therefore, recreational fisheries spending multiplies throughout the economy with the indirect and induced effects of the initial direct expenditure.

The adoption of scientifically based regulations provides for the maintenance of sufficient populations of groundfish to ensure their continued existence and future groundfish sport fishing opportunities that in turn support the fishery economy. All marine recreational anglers' trip-related and equipment expenditures sum to approximately $1.5 billion in California

(National Marine Fisheries Service, 2018)[2]. Coupled with the indirect and induced effects of this $1.5 billion direct revenue contribution, the total realized economic benefit to California is estimated at $3.7 billion in total economic output annually.

This corresponds with about $800 million in total wages to Californians, which affects about 17,000 jobs in the state, annually (National Marine Fisheries Service, 2018). While the precise share of these expenditures attributed solely to groundfish anglers is not known, we do know that the groundfish fishery constitutes a large share of the state's marine recreational angler activity (e.g., rockfishes, scorpionfishes, and greenling constituted approximately 64% of all recreationally harvested species in 2016) (National Marine Fisheries Service, 2018).

The proposed regulations will modify state recreational groundfish regulations to conform to federal rules regulations that are expected to be in effect for 2021 and 2022. Currently, state regulations for groundfish provide for: season lengths, depth restrictions, size limits, and bag and possession limits. In adopting these conforming regulations, the state relies on information provided in PFMC documents which includes analysis of impacts to California.

The proposed regulatory changes remove the sub-bag limits for canary rockfish (two fish), black rockfish (three fish) and cabezon (three fish) allowing 10 fish within the RCG complex aggregate limit of 10 fish, increase the bag limit for lingcod south of 40° 10' N. latitude from one to two fish, and create a new five fish sub-bag limit for vermilion rockfish within the 10 fish RCG aggregate limit.

The economic impacts of these bag limit changes cannot be quantified due to the fact that the RCG limit remains 10 fish even though several sub-bag limits have been removed. Since the overall number of rockfish, cabezon, and greenling that can be caught per day has not changed it could be assumed that the same number of anglers will go fishing.

Alternatively, it is possible that the quality of fishing may change as a result of the removal of these sub-bag limits. Higher quality fishing may attract more anglers which would have a positive economic impact. Unfortunately, the precise potential economic impact associated with these shifts in bag and sub-bag limits cannot quantified. This is because the overall RCG bag limit will remain at 10 fish, meaning an angler's ability to take rockfish will remain the same, but there will be changes to what the composition of the 10 fish can be. The vermilion rockfish sub-bag limit is reduced, but the canary sub-bag limit is eliminated, meaning that anglers can now retain 10 canary rockfish within the RCG limit of 10 instead of just 2 canary rockfish.

The proposed changes of the depth restrictions outlined in Table 1 could result in minor economic impacts. However, the potential economic impact of depth increases cannot be quantified. It is possible that the increased area for fishing could result in increased potential fishing use that might translate to an increase in revenue associated with longer or more frequent angler trips, but precise potential impact is unknown, similar as for the bag limits described above.

[2] National Marine Fisheries Service. 2018. Fisheries Economics of the United States, 2016. U.S. Dept. of Commerce, NOAA Tech. Memo. NMFS-F/SPO-187, 243 p. Available from: https://www.fisheries.noaa.gov/resource/document/fisheries-economics-united-states-report-2016

Sport fishing business owners, boat owners, tackle store owners, boat manufacturers, vendors of food, bait, fuel and lodging, and others that provide goods or services to those that recreationally pursue groundfish off California may be positively affected to some degree from increases to business that may result under the range of proposed regulations. However, anticipated impacts may vary by geographic location. Additionally, potential economic impacts to these same businesses may result from a number of factors unrelated to the proposed changes to groundfish fishing regulations, including weather, fuel prices, and success rates in other marine recreational fisheries such as salmon and albacore.

Commercial

The economic impact of regulatory changes for commercial fisheries may be estimated by tracking the resulting changes in fishing effort, amount landed, price paid per pound, and employment generated through the catch or processing of the fish. Fishing effort affects fuel, and other trip expenditures. Landings and price paid per pound affect employment and income. Direct expenditures related to commercial fishing as well as business spending on wages received by workers ripple through the economy, some of which goes to local businesses. Therefore, commercial fisheries spending multiplies throughout the economy with the indirect and induced effects of the initial direct expenditure.

About $216 million in total commercial fishing landings revenue generated about $1.2 billion in sales throughout the state marine economy (National Marine Fisheries Service, 2018). The state marine economy includes several marine-related industries: commercial harvesters, seafood processors and dealers, seafood wholesalers and distributors, and retail seafood sales. Commercial fishing landings revenue also generates about $450 million in total wages to Californians, which affects about 15,000 jobs in the state, annually (National Marine Fisheries Service, 2018). While the precise share of these expenditures attributed solely to nearshore groundfish fishermen is not known, the nearshore groundfish fishery plays an important role in the economy of several California communities.

The proposed regulations increase commercial trip limits for cabezon and greenling. Commercial fishing industry businesses and coastal communities may realize positive benefits from increased greenling and cabezon bimonthly trip limits and catches, and a decrease in regulatory discards; however the extent of anticipated impacts are speculative. Economic impacts to these same businesses may result from several factors unrelated to the proposed changes to groundfish fishing regulations that are similar to those described in the recreational section above.

(a) Effects of the Regulation on the Creation or Elimination of Jobs Within the State

The cumulative effects of the changes statewide are estimated to be neutral to job elimination and potentially positive to job creation in California. No significant changes in fishing effort and fishing expenditures to businesses are expected as a direct result of the proposed regulation changes.

(b) Effects of the Regulation on the Creation of New Businesses or the Elimination of Existing Businesses Within the State

The cumulative effects of the changes statewide are expected to be neutral to business elimination and to the creation of businesses in California. No significant changes in fishing

effort and recreational fishing expenditures to businesses are expected as a direct result of the proposed regulation changes.

(c) Effects of the Regulation on the Expansion of Businesses Currently Doing Business Within the State

The cumulative effects of the changes statewide are expected to be neutral to business elimination and to the creation of businesses in California. No significant changes in fishing effort and recreational fishing expenditures to businesses are expected as a direct result of the proposed regulation changes.

(d) Benefits of the Regulation to the Health and Welfare of California Residents

Providing increased fishing opportunities for groundfish encourages recreation, which can have a positive impact on the health and welfare of California residents. Groundfish taken in the sport and commercial fishery and later consumed may have positive human health benefits due to their concentration of omega III fatty acids.

(e) Benefits of the Regulation to Worker Safety

The proposed regulations are not anticipated to impact worker safety conditions.

(f) Benefits of the Regulation to the State's Environment

It is the policy of this state to encourage the conservation, sustainable use, and where feasible, restoration of California's marine living resources for the benefit of all citizens of the state (Section 7050, Fish and Game Code). Benefits of the proposed management actions include increased fishing opportunity, along with the continuation of the reasonable and sustainable management of groundfish resources and the protection of listed and special status species. Adoption of scientifically-based seasons, depth restrictions, recreational bag limits, and commercial trip limits provide for the maintenance of sufficient populations of groundfish to ensure their continued existence.

(g) Other Benefits of the Regulation

This regulation would result in consistency with federal law. The PFMC reviews the status of groundfish regulations biennially. As part of that process, it recommends regulations aimed at meeting biological and fishery allocation goals specified in law or established in the PCGFMP. These recommendations coordinate management of recreational and commercial groundfish in the EEZ (three to 200 miles offshore) off the coasts of Washington, Oregon, and California. These recommendations are reviewed by NOAA Fisheries for legal sufficiency and compliance with the standards of MSA, and the National Environmental Policy Act, and if approved they are subsequently implemented as ocean fishing regulations by NOAA Fisheries.

California's sport fishing regulations need to conform to, or be more restrictive than, federal regulations to ensure that biological and fishery allocation goals are not exceeded and to avoid federal preemption under the MSA.

Informative Digest/Policy Statement Overview

Biennially, the Pacific Fishery Management Council (PFMC) reviews the status of west coast groundfish populations. As part of that process, it recommends groundfish fisheries harvest limits and regulations aimed at meeting biological and fishery allocation goals specified in law or established in the Pacific Coast Groundfish Fishery Management Plan (PCGFMP).

These recommendations coordinate west coast management of recreational and commercial groundfish fisheries in the Exclusive Economic Zone (EEZ) (three to 200 miles offshore) off Washington, Oregon and California. These recommendations are reviewed by the National Oceanic and Atmospheric Administration (NOAA) Fisheries for legal sufficiency and compliance with the standards of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), and other federal laws, and if approved they are subsequently implemented as ocean fishing regulations by NOAA Fisheries.

Regulatory authority for most nearshore stocks is shared jointly between state and federal governments. For consistency, the California Fish and Game Commission (Commission) routinely adopts regulations to bring state law into conformance with federal law for groundfish and other federally managed species. Nearshore stocks are managed based on PFMC-established federal annual catch limits (ACL).

Current regulations establish recreational season lengths, depth constraints, methods of take, and size, bag and possession limits within the five groundfish management areas for all federal groundfish and associated species and special gear restrictions for lingcod and groundfish species in the Rockfish/Cabezon/Greenling complex.

Current state regulations also include trip limits for the commercial cabezon and greenling fisheries.

Summary of Proposed Amendments

The Department of Fish and Wildlife (Department) is proposing the following regulatory changes to be consistent with PFMC recommendations from its June 18, 2020 meeting for federal groundfish regulations in 2021 and 2022. This approach will allow the Commission to adopt state recreational groundfish regulations to timely conform to those taking effect in federal ocean waters in January 2021.

The proposed regulatory changes will implement the following changes:

1. Increase the allowable depth for the recreational groundfish fishery in the Mendocino Groundfish Management Area from 20 to 30 fathoms;
2. Increase the allowable depth for the recreational groundfish fishery in the San Francisco Groundfish Management Area from 40 to 50 fathoms;
3. Increase the allowable depth for the recreational groundfish fishery in the Southern Groundfish Management Area from 75 to 100 fathoms;
4. Increase the recreational bag limit for lingcod from one to two fish in the Mendocino, San Francisco, Central, and Southern Groundfish Management Areas;
5. Increase the recreational bag limit for cabezon from three to 10 fish within the RCG bag limit of 10 fish;

6. Increase the recreational bag limit for canary rockfish from two to 10 fish within the RCG bag limit of 10 fish;
7. Increase the recreational bag limit for black rockfish from three to 10 fish within the RCG bag limit of 10 fish;
8. Decrease the recreational bag limit for vermilion rockfish from 10 to five fish within the RCG bag limit of 10 fish;
9. Add method of take restriction for California scorpionfish;
10. Increase commercial trip limits for cabezon from 500 to 1,000 pounds, and greenling from 250 to 500 pounds every two months;
11. Update authority and reference citations.

Benefits of the Proposed Regulations

The benefits of the proposed regulations are consistency with federal law, sustainable management of groundfish resources and promotion of businesses that rely on recreational and commercial groundfish fishing.

Consistency and Compatibility with Existing Regulations

The proposed regulations are neither inconsistent nor incompatible with existing state regulations. The Legislature has delegated authority to the Commission to adopt fishing regulations (Fish and Game Code, sections 200, 205 and 8587.1). The proposed regulations are consistent with regulations for fishing in marine protected areas (Section 632, Title 14, CCR), with Nearshore Fishery Management Plan regulations (sections 52.00 through 52.10, Title 14, CCR) and with general fishing regulations in Chapters 1, 4 and 6 of Subdivision 1 of Division 1, Title 14, CCR. Commission staff has searched the California Code of Regulations and has found no other state regulations related to the take of groundfish.

Proposed Regulatory Language

Section 27.30, Title 14 CCR, is amended to read:

§27.30. Mendocino Groundfish Management Area.

This Section applies to take and possession of federally-managed groundfish species as defined in Section 1.91, California sheephead, ocean whitefish, and all greenlings of the genus *Hexagrammos*. For specific definitions, applicability, and procedures, see sections 1.91 and 27.20. For size limits, possession limits, and other regulations that apply to individual species, see specific sections beginning with Section 27.60.

(a) The Mendocino Groundfish Management Area means ocean waters between 40° 00' N. lat. (near Cape Mendocino, Humboldt County) and 38° 57.50' N. lat. (at Point Arena, Mendocino County).

(b) Seasons and depth constraints:

(1) January 1 through April 30: Closed.

(2) May 1 through October 31: Take of all species is prohibited seaward of a line approximating the ~~20~~30-fathom~~s in depth as described by general~~ depth contour ~~lines~~ along the mainland coast and along islands and offshore seamounts. The 30-fathom depth contour is defined by straight lines connecting the set of 30-fathom waypoints as adopted in Federal regulations (50 CFR Part 660, Subpart G).

(3) November 1 through December 31: Open for all species with no depth restrictions.

Note: Authority cited: Sections 200, 205, 265 and 702, Fish and Game Code. Reference: Sections 200, 205, 265, 1802 and 7071, Fish and Game Code; 50 CFR Part 660, Subpart G; and 14 CCR 27.20.

Proposed Regulatory Language

Section 27.35, Title 14 CCR, is amended to read:

§27.35. San Francisco Groundfish Management Area.

This Section applies to take and possession of federally-managed groundfish species as defined in Section 1.91, California sheephead, ocean whitefish, and all greenlings of the genus *Hexagrammos*. For specific definitions, applicability, and procedures, see sections 1.91 and 27.20. For size limits, possession limits, and other regulations that apply to individual species, see specific sections beginning with Section 27.60.

(a) The San Francisco Groundfish Management Area means ocean waters between 38° 57.50' N. lat. (at Point Arena, Mendocino County) and 37° 11' N. lat. (at Pigeon Point, San Mateo County).

(b) Seasons and depth constraints (except as provided in subsection (c) below):

(1) January 1 through March 31: Closed.

(2) April 1 through December 31: Take of all species is prohibited seaward of a line approximating the ~~40~~50-fathom depth contour along the mainland coast and along islands and offshore seamounts. The ~~40~~50-fathom depth contour is defined by straight lines connecting the set of ~~40~~50-fathom waypoints as adopted in Federal regulations (50 CFR Part 660, Subpart G).

(c) Leopard shark may be taken or possessed in Drake's Bay, Bolinas Bay, Tomales Bay, Bodega Harbor, and San Francisco Bay year-round.

Note: Authority cited: Sections 200, 205, 265 and 702, Fish and Game Code. Reference: Sections 200, 205, 265, 1802 and 7071, Fish and Game Code; 50 CFR Part 660, Subpart G; and 14 CCR 27.20.

Proposed Regulatory Language

Section 27.45, Title 14 CCR, is amended to read:

§27.45. Southern Groundfish Management Area.

This Section applies to take and possession of federally-managed groundfish species as defined in Section 1.91, California sheephead, ocean whitefish, and all greenlings of the genus *Hexagrammos*. For specific definitions, applicability, and procedures, see sections 1.91 and 27.20. For size limits, possession limits, and other regulations that apply to individual species, see specific sections beginning with Section 27.60.

(a) The Southern Groundfish Management Area means ocean waters between 34˚ 27' N. lat. (at Point Conception, Santa Barbara County) and the U.S./Mexico border. The Cowcod Conservation Areas are special closure areas within the Southern Groundfish Management Area.

(b) Seasons and depth constraints (except as provided in subsection (c) below):

(1) January 1 through the last day in February: Closed, except take of California scorpionfish is prohibited seaward of a line approximating the ~~75~~100-fathom depth contour, defined by connecting the appropriate waypoints adopted in Federal regulations (50 CFR Part 660, Subpart G).

(2) March 1 through December 31: Take of all species is prohibited seaward of a line approximating the ~~75~~100-fathom depth contour along the mainland coast and along islands and offshore seamounts. The ~~75~~100-fathom depth contour is defined by straight lines connecting the set of ~~75~~100-fathom waypoints as adopted in Federal regulations (50 CFR Part 660, Subpart G).

(c) Special exceptions to subsection (b) above:

(1) Regulations that apply to the Cowcod Conservation Areas are specified in Section 27.50.

(2) Leopard shark may be taken or possessed in Newport Bay, Alamitos Bay, Mission Bay, and San Diego Bay year-round.

Note: Authority cited: Sections 200, 205 and 265, Fish and Game Code. Reference: Sections 200, 205, 265, 1802 and 7071, Fish and Game Code; and 50 CFR Part 660, Subpart G.

Proposed Regulatory Language

Section 28.27, Title 14 CCR, is amended to read:

§28.27. Lingcod.

(a) Open areas, seasons, and depth constraints: See Section 27.20 through Section 27.50 for definitions, special closure areas, and exceptions. Take and possession is authorized as follows:
(1) Northern Groundfish Management Area: Open and closed dates and depth constraints as defined by Section 27.25.
(2) Mendocino Groundfish Management Area: Open and closed dates and depth constraints as defined by Section 27.30.
(3) San Francisco Groundfish Management Area: Open and closed dates and depth constraints as defined by Section 27.35.
(4) Central Groundfish Management Area: Open and closed dates and depth constraints as defined by Section 27.40.
(5) Southern Groundfish Management Area: Open and closed dates and depth constraints as defined by Section 27.45.
(6) Cowcod Conservation Areas: Open and closed dates and depth constraints as defined by Section 27.50.
(b) Limit ~~is authorized as follows~~: Two.
~~(1) Northern Groundfish Management Area: Two~~
~~(2) Mendocino Groundfish Management Area: One~~
~~(3) San Francisco Groundfish Management Area: One~~
~~(4) Central Groundfish Management Area: One~~
~~(5) Southern Groundfish Management Area: One~~
(c) Minimum size: 22 inches total length.
(d) Method of take: When angling, gear is restricted to not more than two hooks and one line. For purposes of this section, a hook is a single hook, or double or treble hook with multiple points connected to a common shank.
(e) Fishing rules for lingcod may be changed during the year or in-season by the department under the authority of subsection 27.20(e). See subsection 27.20(f) for additional information.
Note: Authority cited: Sections 200, 205, ~~275, 265,~~ 265, 275, 702 and 8587.1, Fish and Game Code. Reference: Sections 200, 205, 265 and 1802, Fish and Game Code; 50 CFR Part 660, Subpart G; and 14 CCR 27.20.

Proposed Regulatory Language

Section 28.28, Title 14 CCR, is amended to read:

§28.28. Cabezon.

(a) Open areas, seasons, and depth constraints: See Section 27.20 through Section 27.50 for definitions, special closure areas, and exceptions. Take and possession is authorized as follows:
(1) Northern Groundfish Management Area: Open and closed dates and depth constraints as defined by Section 27.25.
(2) Mendocino Groundfish Management Area: Open and closed dates and depth constraints as defined by Section 27.30.
(3) San Francisco Groundfish Management Area: Open and closed dates and depth constraints as defined by Section 27.35.
(4) Central Groundfish Management Area: Open and closed dates and depth constraints as defined by Section 27.40.
(5) Southern Groundfish Management Area: Open and closed dates and depth constraints as defined by Section 27.45.
(6) Cowcod Conservation Areas: Open and closed dates and depth constraints as defined by Section 27.50.
(b) Limit: ~~Three fish,~~10 fish within a Rockfish, Cabezon, and Greenling complex (RCG complex, as defined in Section 1.91) bag limit of 10 fish.
(c) Minimum size: 15 inches total length.
(d) Method of take: When angling, gear is restricted to not more than two hooks and one line. For purposes of this section, a hook is a single hook, or double or treble hook with multiple points connected to a common shank.
(e) Fishing rules for cabezon may be changed during the year or in-season by the department under the authority of subsection 27.20(e) or Section 52.10. See subsection 27.20(f) for additional information.
Note: Authority cited: Sections 200, 205, 265, 702 and 8587.1, Fish and Game Code. Reference: Sections 200, 205, 265, 1802 and 7071, Fish and Game Code; 50 CFR Part 660, Subpart G; and 14 CCR 27.20.

Proposed Regulatory Language

Section 28.54, Title 14 CCR, is amended to read:

§28.54. California Scorpionfish (Sculpin).

(a) Open areas, seasons, and depth constraints: See Section 27.20 through Section 27.50 for definitions, special closure areas, and exceptions. Take and possession is authorized as follows:
(1) Northern Groundfish Management Area: Open and closed dates and depth constraints as defined by Section 27.25.
(2) Mendocino Groundfish Management Area: Open and closed dates and depth constraints as defined by Section 27.30.
(3) San Francisco Groundfish Management Area: Open and closed dates and depth constraints as defined by Section 27.35.
(4) Central Groundfish Management Area: Open and closed dates and depth constraints as defined by Section 27.40.
(5) Southern Groundfish Management Area: Open and closed dates and depth constraints as defined by Section 27.45.
(6) Cowcod Conservation Areas: Open and closed dates and depth constraints as defined by Section 27.50.
(b) Limit: Five.
(c) Minimum size: 10 inches total length.
(d) Method of take: When angling, gear is restricted to not more than two hooks and one line. For purposes of this section, a hook is a single hook, or double or treble hook with multiple points connected to a common shank.
(e) Fishing rules for California scorpionfish may be changed during the year or in-season by the department under the authority of subsection 27.20(e). See subsection 27.20(f) for additional information.
Note: Authority cited: Sections 200, 205, 265, 702, 7071 and 8587.1, Fish and Game Code. Reference: Sections 200, 205, 265, 275, 1802 and 7071, Fish and Game Code; 50 CFR Part 660, Subpart G; and 14 CCR 27.20.

Proposed Regulatory Language

Section 28.55, Title 14 CCR, is amended to read:

§28.55. Rockfish (*Sebastes*).

(a) Open areas, seasons, and depth constraints: See Section 27.20 through Section 27.50 for definitions, special closure areas, and exceptions. Take and possession is authorized as follows:
(1) Northern Groundfish Management Area: Open and closed dates and depth constraints as defined by Section 27.25.
(2) Mendocino Groundfish Management Area: Open and closed dates and depth constraints as defined by Section 27.30.
(3) San Francisco Groundfish Management Area: Open and closed dates and depth constraints as defined by Section 27.35.
(4) Central Groundfish Management Area: Open and closed dates and depth constraints as defined by Section 27.40.
(5) Southern Groundfish Management Area: Open and closed dates and depth constraints as defined by Section 27.45.
(6) Cowcod Conservation Areas: Open and closed dates and depths constraints as defined by Section 27.50. Only Nearshore Rockfish, and Shelf Rockfish, as defined in subsections 1.91(a)(1) and 1.91(a)(3), may be taken and possessed, except as provided below in subsection (b)(1).
(b) Limit: Ten, within the Rockfish, Cabezon, and Greenling complex (RCG complex, as defined in Section 1.91) limit of 10 fish, in any combination of species, except as provided below.
(1) The limit on bronzespotted rockfish, cowcod, and yelloweye rockfish is zero. These species shall not be taken or possessed as part of the RCG limit.
(2)~~ The limit on canary rockfish is two fish, within the RCG bag limit.~~The limit on vermilion rockfish is five fish, within the RCG bag limit.
~~(3) The limit on black rockfish is three fish, within the RCG limit.~~
~~(4)~~(3) In the Cowcod Conservation Areas (see Section 27.50), the limit on slope rockfish, as defined in subsection 1.91(a)(4), is zero. These species shall not be taken or possessed as part of the RCG limit in the Cowcod Conservation Areas.
(c) Size limit: None.
(d) Method of take: When angling, gear is restricted to not more than two hooks and one line. For purposes of this section, a hook is a single hook, or a double or treble hook with multiple points connected to a common shank.
(e) Fishing rules for rockfish may be changed during the year or in-season by the department under the authority of subsection 27.20(e). See subsection 27.20(f) for additional information.
Note: Authority cited: Sections 200, 205, 265, 702, 7071 and 8587.1, Fish and Game Code. Reference: Sections 200, 205, 265, 1802, 7071 and 8585.5, Fish and Game Code; 50 CFR Part 660, Subpart G; and 14 CCR 27.20.

Proposed Regulatory Language

Section 28.65, Title 14 CCR, is amended to read:

§28.65. General.

Except as provided in this article, fin fish may be taken only on hook-and-line or by hand. Any number of hooks and lines may be used in all ocean waters and bays except:
(a) San Francisco Bay, as described in Section 27.00, where only one line with not more than three hooks may be used.
(b) On public piers, no person shall use more than two rods and lines, two hand lines, or two nets, traps or other appliances used to take crabs.
(c) When rockfish (genus *Sebastes*), California scorpionfish (*Scorpaena guttata*), lingcod (*Ophiodon elongatus*), cabezon (*Scorpaenichthys marmoratus*), or kelp or rock greenlings (*Hexagrammos decagrammus* and *Hexagrammos lagocephalus*) are aboard or in possession, where only one line with not more than two hooks may be used pursuant to Sections 28.55, 28.54, 28.27, 28.28 or 28.29, respectively.

. . . [No changes to subsections (d) through (g)]

Note: Authority cited: Sections 200, 205, 265, 270, 275 and 7071, Fish and Game Code. Reference: Sections ~~110,~~ 200, 205, 265, 270, 275 and 8585.5, Fish and Game Code.

Proposed Regulatory Language

Section 150.16, Title 14 CCR, is amended to read:

§150.16. Commercial Take of Nearshore Fishes.

. . . [No changes to subsections (a) through (d)]

(e) Cumulative trip limits for sheephead, cabezon, greenlings of the genus Hexagrammos, California scorpionfish, and subgroups of rockfish.
(1) A cumulative trip limit is the total number of pounds of a species or a species group that may be taken and retained, possessed, or landed by an individual commercial licensee in a cumulative trip limit period without a limit on the number of landings or trips.
(2) Cumulative trip limit periods start at 0001 hours local time, end at 2400 hours local time, and are in two month periods as follows:
(A) January 1 through the last day of February,
(B) March 1-April 30,
(C) May 1-June 30,
(D) July 1-August 31,
(E) September 1-October 31,
(F) November 1-December 31.
(3) Landings toward a cumulative trip limit value for a defined cumulative trip limit period provided in this subsection are summed by an individual's California commercial license number listed on fish receipts submitted to the department pursuant to Section 8043, Fish and Game Code.
(4) Any person landing species for which there is a cumulative trip limit established pursuant to this Section shall keep in their immediate possession copies of any and all reports of landings required by state laws or regulations throughout the cumulative limit period during which a landing occurred and for 15 days thereafter.
(5) Cumulative trip limit values noticed in the Federal Register by the National Marine Fisheries Service for the cumulative trip limit periods for shallow nearshore rockfish, deeper nearshore rockfish, and California scorpionfish apply to each individual California commercial licensee in addition to the federally-defined vessel-based limits. Landings are summed by an individual's California commercial license number listed on fish receipts submitted to the department pursuant to Section 8043, Fish and Game Code.
(6) Cumulative trip limits for sheephead, cabezon and greenlings.
(A) The cumulative trip limit per individual per two-month limit period when fishing is allowed pursuant to Section 150.06, Title 14, CCR, is as follows:

	Sheephead	*Cabezon*	*Greenlings*
January-February	2,000 pounds	~~500~~1,000 pounds	~~250~~500 pounds
March-April	2,000 pounds	~~500~~1,000 pounds	~~250~~500 pounds
May-June	2,400 pounds	~~500~~1,000 pounds	~~250~~500 pounds

July-August	2,400 pounds	~~500~~1,000 pounds	~~250~~500 pounds
September-October	2,400 pounds	~~500~~1,000 pounds	~~250~~500 pounds
November-December	2,400 pounds	~~500~~1,000 pounds	~~250~~500 pounds

(B) The department will evaluate year-to-date catch levels against total allowable catch limits defined in Section 52.10. Based on these data, when the department determines that cumulative trip limits defined in this Section need significant adjustment upward or downward (by 50 percent or more) in order to spread the allowable catches through the open season to the extent possible and prevent early attainment of the annual total allowable commercial catch, the cumulative trip limits defined in this Section may become inoperative and may be replaced with alternative limits as determined by the department. The department may perform these in-season analyses between May and September of each year; and provide notification of changes by October 15 of each year, as described in subsection (e)(6)(C).
(C) The department shall give nearshore fishery permittees no less than 10 days notice of any cumulative trip limit change pursuant to this Section via a notification letter sent to the permittee's address on file with the department.
(D) When allocations, total allowable catches or other catch limits defined in Section 52.10 are reached, and action to close the fishery is taken pursuant to Section 52.10 subsection (b), cumulative trip limits defined in this Section become inoperative.

. . . [No changes to subsection (f)]

Note: Authority cited: Sections 702, 7071, 8587.1 and 8588, Fish and Game Code. Reference: Sections ~~97, 205,~~ 1802, 8585.5, 8586, 8587, 8587.1 and 8588, Fish and Game Code.

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Instructions and Code Citations:
SAM Section 6601-6616

STATE OF CALIFORNIA — DEPARTMENT OF FINANCE

ECONOMIC AND FISCAL IMPACT STATEMENT
(REGULATIONS AND ORDERS)

STD. 399 (Rev. 10/2019)

ECONOMIC IMPACT STATEMENT

DEPARTMENT NAME	CONTACT PERSON	EMAIL ADDRESS	TELEPHONE NUMBER
Fish and Game Commission	Margaret Duncan	margaret.duncan@wildlife.ca.gc	916 704-3215

DESCRIPTIVE TITLE FROM NOTICE REGISTER OR FORM 400	NOTICE FILE NUMBER
Amend 27.30,et al.,T14, CCR, re: Rec.& Comm. Fishing Regs. for Federal Groundfish & Assoc. Species 2021/22	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:

- ☐ a. Impacts business and/or employees
- ☐ b. Impacts small businesses
- ☐ c. Impacts jobs or occupations
- ☐ d. Impacts California competitiveness
- ☐ e. Imposes reporting requirements
- ☐ f. Imposes prescriptive instead of performance
- ☐ g. Impacts individuals
- ☒ h. None of the above (Explain below):

No cost impacts for conformance to Federal rules (w/increased opportunities).

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 _____ (Agency/Department) estimates that the economic impact of this regulation (which includes the fiscal impact) is:

- ☐ 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: _____

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Instructions and Code Citations:
SAM Section 6601-6616

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: _____

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Instructions and Code Citations:
SAM Section 6601-6616

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 ☐ NO

Explain: _____

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 through12 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: _____

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SAM Section 6601-6616

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 _____

_____

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Instructions and Code Citations:
SAM Section 6601-6616

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
DocuSigned by: Dennis Farrell E8B0B535880C4F6...	

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
7/30/2020 DocuSigned by: Melissa A. Miller-Henson 74DED80ABE5A488...	

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

Groundfish Fishery: Proposed Changes for 2021-2022

August 19, 2020

Presented to:

Fish and Game Commission

Presented by:

Kevan Urquhart

Senior Environmental Scientist
Marine Region

Background

- Pacific Fishery Management Council's biennial process was completed in June 2020.
- Changes in management are driven by new stock assessment information.
- Changes to federal regulations are expected in January 2021 for federal waters.
- FGC typically takes conforming regulatory action for state waters.

Cowcod

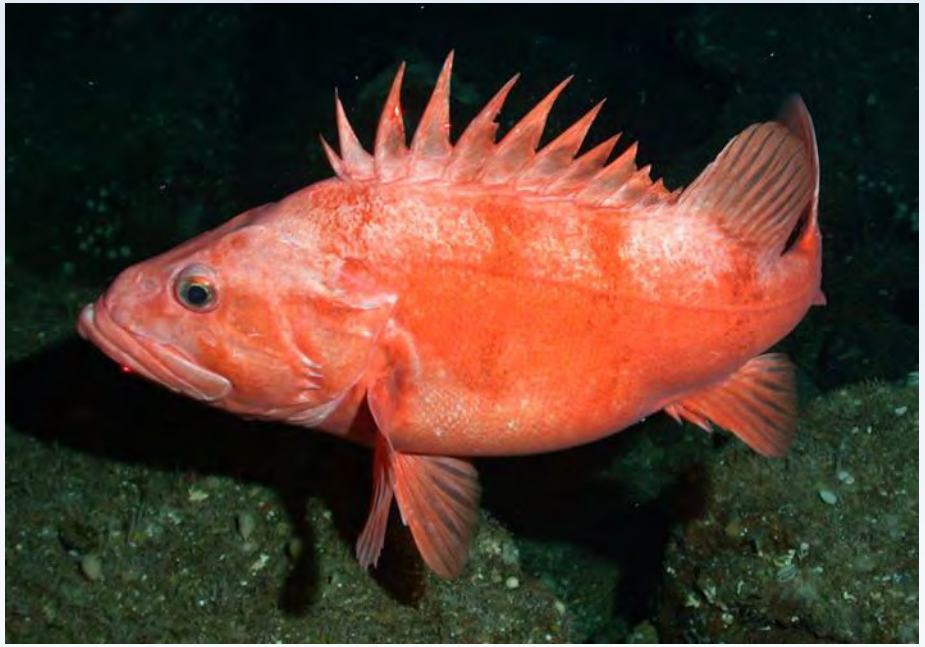

Photo Credit: NMFS

- Good news - Declared rebuilt in 2019 decades ahead of expectations.
- No retention allowed, but increased access for more fishing opportunity at deeper depth.
- CDFW, with assistance from participating CPFVs, plans for additional data collection under a federal EFP in 2021-2022.

Proposed Recreational Depths

Management Area	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Northern	Closed				May 1 – Oct 31 <30 fm						All Depth	
Mendocino	Closed				May 1 – Oct 31 **<30 fm**						All Depth	
San Francisco	Closed			Apr 1 – Dec 31 **<50 fm**								
Central	Closed			Apr 1 – Dec 31 <50 fm								
Southern	Closed		Mar 1 – Dec 31 **<100 fm**									
CCA	Closed		Mar 1 – Dec 31 <40 fm									

fm = fathoms CCA = Cowcod Conservation Area

Recreational Bag Limit Changes

- Remove the sub-bag limits for canary rockfish, black rockfish, and cabezon within the 10-fish daily RCG (Rockfish, Cabezon, Greenling) total bag limit.

Photo credits: CDFW

Vermilion Rockfish Sub-Bag Limit

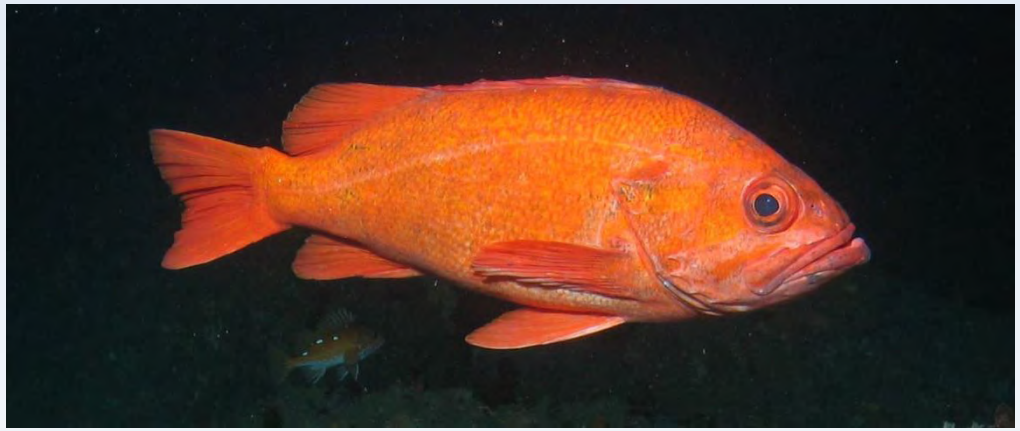

Photo Credit: NMFS

- Recent increases to recreational catch exceeded the federal harvest objective.
- Implement a vermilion 5-fish sub-bag limit within the 10-fish RCG limit to slow sport harvest.
- New stock assessment expected in 2021 for use in 2023-2024.

Regulatory Language Updates

- Update the method of take for California scorpionfish to be consistent with federal regulations and with language already used in state regulations for lingcod and the RCG complex (i.e. angling gear is restricted to not more than two hooks and one line).
- Specify the recreational bag limit of lingcod is two fish statewide, reflecting the change made in 2019.

Proposed Commercial Changes

- Increase commercial trip limits:
  - Cabezon: 1,000 lb each 2-month period.
  - Greenling: 500 lb each 2-month period.

Photo Credits: NMFS-NWFSC & CDFW

Department Recommendations for December

- Adopt proposed changes to Title 14 including:
  - Changes to recreational regulations (§27.30 et. seq.):
    - Depth constraints in three Management Areas.
    - Bag limits for canary, black, and vermilion rockfish, cabezon, and lingcod.
    - Method of take for California scorpionfish.
  - Changes to commercial regulations (§150.16):
    - Increase cabezon and greenling trip limits.

Thank You

Kevan Urquhart,

Senior Environmental Scientist, Supervisor

(707) 494 – 4621

Kevan.Urquhart@wildlife.ca.gov

https://wildlife.ca.gov/Conservation/Marine/Groundfish

PETITION TO LIST
THE PACIFIC LEATHERBACK SEA TURTLE (*DERMOCHELYS CORIACEA*)
AS AN ENDANGERED SPECIES UNDER
THE CALIFORNIA ENDANGERED SPECIES ACT

Photo Credit: Peter Winch

CENTER *FOR* BIOLOGICAL DIVERSITY
AND
TURTLE ISLAND RESTORATION NETWORK

January 9, 2019

FGC – 670.1 (3/94)

NOTICE OF PETITION TO THE STATE OF CALIFORNIA
FISH AND GAME COMMISSION

For action pursuant to Section 670.1, Title 14, California Code of Regulations (CCR) and sections 2072 and 2073 of the Fish and Game Code relating to listing and delisting endangered and threatened species of plants and animals.

I. SPECIES BEING PETITIONED

Common name: Pacific leatherback sea turtle
Scientific name: (*Dermochelys coriacea*)

II. RECOMMENDED ACTION: List as endangered

The Center for Biological Diversity and Turtle Island Restoration Network submit this petition to list the Pacific leatherback sea turtle as endangered throughout its range in California pursuant to the California Endangered Species Act (California Fish and Game Code §§ 2050 *et seq*.). This petition demonstrates that the Pacific leatherback sea turtle clearly warrants listing based on the factors specified in the statute.

III. AUTHOR OF PETITION

Catherine Kilduff
Center for Biological Diversity
1212 Broadway, Suite 800
Oakland, CA 94612
(202) 780-8862
ckilduff@biologicaldiversity.org

I hereby certify that, to the best of my knowledge, all statements made in this petition are true and complete.

Signature: Catherine Kilduff Date: January 9, 2020

The **Center *for* Biological Diversity** is a national, nonprofit conservation organization with more than 1.6 million members and online activists dedicated to the protection of endangered species and wild places.

The **Turtle Island Restoration Network** is a nonprofit conservation organization with over 100 thousand members dedicated to the protection of vulnerable marine species worldwide.

TABLE OF CONTENTS

NOTICE OF PETITION i

EXECUTIVE SUMMARY 1

1. The California Endangered Species Act Listing Process and Standard for Acceptance of a Petition 2

2. Introduction 4

3. Life History 4

   3.1. Species Description 4

   3.2. Taxonomy 6

   3.3. Population Genetics 6

   3.4. Reproduction and Growth 7

   3.5. Diet and Foraging Ecology 7

   3.6. Migration 8

4. Population Trend, Distribution, and Abundance 9

   4.1. Population Trend 9

   4.2. Historical and Current Distribution 10

   4.3. Historical and Current Abundance 10

5. Importance of California Waters for Leatherbacks 11

6. Factors Affecting the Ability of the Population to Survive and Reproduce 13

   6.1. Present or Threatened Modification or Destruction of Its Habitat 13

      6.1.1. Oil and Gas Activities in California 15

      6.1.2. Aquaculture 16

      6.1.3. Coastal Development Throughout the West Pacific Leatherbacks' Range 16

      6.1.4. Entanglement by and Ingestion of Marine Debris 16

6.1.5. Vessel Strikes from Commercial Shipping and Other Boat Traffic 17

6.1.6. Beach Erosion 18

6.2. Overexploitation 19

6.2.1. Fisheries bycatch and entanglement in fishing gear 19

6.2.1.1. California's Pelagic Fisheries Threaten Leatherback Sea Turtles 20

6.2.1.2. Foreign Fishing Threatens Pacific Leatherbacks 21

6.2.2. Harvest of Adults and Eggs at Nesting Beaches 22

6.3. Predation 23

6.3.1. Nest Predation 23

6.4. Disease 23

6.5. Other Natural Events or Human-Related Activities 23

6.5.1. Climate Change 23

6.5.1.1. Ocean Warming Affects Pacific Leatherback Sea Turtles 24

6.5.1.2. Sea Level Rise Affects Nesting Success of Pacific Leatherback Sea Turtles 26

6.5.1.3. Ocean Acidification 27

7. The Degree and Immediacy of Threat 28

8. Inadequacy of Existing Regulatory Mechanisms 28

9. Recommended Future Management and Recovery Actions 29

10. Conclusion 30

11. Literature Cited 32

EXECUTIVE SUMMARY

The Center for Biological Diversity and Turtle Island Restoration Network submit this petition to list the Pacific leatherback sea turtle as endangered throughout its range in California pursuant to the California Endangered Species Act (California Fish and Game Code §§ 2050 et seq.).

The leatherback sea turtle in the Pacific Ocean has declined by more than 90% over the past four decades, primarily as a result of drowning in industrial longline and gillnet fisheries targeting swordfish, sharks and tunas. The primary cause of the leatherback decline, and the greatest threat to its continued existence, is entanglement and drowning in longline fishing gear (Tiwari et al. 2013). Such fishing is largely banned in the waters off the California coast during the spring, summer and fall when leatherbacks are present, making these waters a rare refuge for this highly imperiled species. In October 2019, however, longline fishing off the California Coast began for the first time in decades under an "exempted fishing permit" issued by the Trump administration.

In addition, entanglement in vertical lines of groundfish pots, Dungeness crab traps, and numerous other impacts including marine debris, pollution, shipping, and global warming threaten to render this important area unsafe and unsuitable for leatherbacks. As recently as October 18, 2019, a dead leatherback was found entangled in fishing gear off southern California.

The waters off California comprise one of the most important foraging areas identified for the critically endangered Pacific leatherback sea turtle. Each year from mid-summer through the fall, leatherback sea turtles, having completed a journey of thousands of miles from their nesting beaches in Indonesia, arrive off the U.S. West Coast to feed on seasonably abundant jellyfish in the California Current ecosystem. California has named the Pacific leatherback sea turtle as the official state marine reptile and designated October 15 as Pacific Leatherback Sea Turtle Conservation Day.

Two decades ago in its Recovery Plan for the U.S. Pacific populations of the leatherback turtle, the National Marine Fisheries Services (NMFS) acknowledged that prompt, long-term protection of identified foraging habitat is necessary to prevent the extinction of the species. In a 2007 study, NMFS scientists concluded that "the waters off central California are a critical foraging area for one of the largest remaining Pacific nesting populations." Although leatherback sea turtles have been listed on the federal Endangered Species Act for decades, and California's waters have been designated as critical habitat under the federal Endangered Species Act for seven years, the population of Pacific leatherbacks has not rebounded. In 2016, NMFS named the Pacific leatherback as one of eight marine species most likely to go extinct.

The protection of the leatherback sea turtle under the California Endangered Species Act will complement protections under the federal Endangered Species Act and is essential to ensure the continued existence of this critically endangered species. As one example, state listing will prohibit catch of leatherback sea turtles incidental to fishing; vessels participating in California-managed fisheries may apply for an incidental take permit, which would be required unless a federal incidental take statement exists. This will increase state and federal cooperation in addressing threats to leatherback sea turtles.

Scientific evidence indicates that leatherbacks in the Pacific are in imminent danger of extinction. While leatherbacks in the Western Atlantic Ocean have substantially increased in population abundance because of protections under the federal Endangered Species Act and the designation of critical habitat around the U.S. Virgin Islands, the Pacific leatherback turtles are doing extremely poorly.

The Center for Biological Diversity and Turtle Island Restoration Network request that the California Fish and Game Commission list the Pacific leatherback sea turtle as endangered throughout its range in California pursuant to the California Endangered Species Act (California Fish and Game Code §§ 2050 et seq.).

1. THE CALIFORNIA ENDANGERED SPECIES ACT LISTING PROCESS AND STANDARD FOR ACCEPTANCE OF A PETITION

The California Legislature enacted the California Endangered Species Act recognizing that certain species of plants and animals have become extinct "as a consequence of man's activities, untempered by adequate concern for conservation"; that other species are in danger of, or threatened with, extinction because their habitats are threatened with destruction, adverse modification, or severe curtailment, or because of overexploitation, disease, predation, or other factors; and that "[t]hese species of fish, wildlife, and plants are of ecological, educational, historical, recreational, esthetic, economic, and scientific value to the people of this state, and the conservation, protection, and enhancement of these species and their habitat is of statewide concern" (Cal. Fish & Game Code § 2051 (a)-(c)).

The purpose of the California Endangered Species Act is to "conserve, protect, restore, and enhance any endangered species or any threatened species and its habitat..." (Cal. Fish & Game Code § 2052). To this end, it provides for the listing of species as "threatened" and "endangered." "Threatened species" means 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 (Cal. Fish & Game Code § 2067). "Endangered species" means 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 (Cal. Fish & Game Code § 2062).

The California Fish and Game Commission ("Commission") is the administrative body that makes all final listing decisions, while the California Department of Fish and Game ("Department") is the expert agency that makes recommendations as to which species warrant listing. The listing process may be set in motion either when "any person" petitions the Commission to list a species, or when the Department on its own initiative submits a species for consideration. In the case of a citizen proposal, the California Endangered Species Act sets forth a process for listing that contains several discrete steps.

Upon receipt of a petition to list a species, a 90-day review period ensues during which the Commission refers the petition to the Department, as the relevant expert agency, to prepare a detailed report. The Department's report must determine whether the petition, along with other relevant information possessed or received by the Department, contains sufficient information indicating that listing may be warranted (Cal. Fish & Game Code § 2073.5). During this period interested persons are notified of the petition and public comments are accepted by the Commission (Cal. Fish & Game Code § 2073.3). After receipt of the Department's report, the Commission considers the petition at a public hearing (Cal. Fish & Game Code § 2074). At this time the Commission is charged with its first substantive decision, to determine whether the petition, together with the Department's written report, and comments and testimony received, present sufficient information to indicate that listing of the species "may be warranted," (Cal. Fish & Game Code § 2074.2). This standard has been interpreted by the courts as the amount of information sufficient to "lead a reasonable person to conclude there is a substantial possibility the requested listing could occur." *Natural Resources Defense Council v. California Fish and Game Comm*. 28 Cal.App.4th at 1125, 1129.

If the petition, together with the Department's report and comments received, indicates that listing "may be warranted," then the Commission must accept the petition and designate the species as a "candidate species" (Cal. Fish & Game Code § 2074.2). "Candidate species" means a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that the Commission has formally noticed as being under review by the Department 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 & Game Code § 2068).

Once the petition is accepted by the Commission, a more detailed level of review begins. The Department is given 12 months from the date of the petition's acceptance to complete a full status review of the species and recommend whether such listing "is warranted." Following receipt of the Department's status review, the Commission holds an additional public hearing and determines whether listing of the species "is warranted." If the Commission finds that the species is faced with extinction throughout all or a significant portion of its range, it must list the species as endangered (Cal. Fish & Game Code § 2062). If the Commission finds that the species is likely to become an endangered species in the foreseeable future, it must list the species as threatened (Cal. Fish & Game Code § 2067).

Notwithstanding these listing procedures, the Commission may adopt a regulation that adds a species to the list of threatened or endangered species at any time if the Commission finds that there is any emergency posing a significant threat to the continued existence of the species (Cal. Fish & Game Code § 2076.5).

The California Endangered Species Act is modeled after the federal Endangered Species Act and is intended to provide an additional layer of protection for imperiled species in California. The California Endangered Species Act may be more protective than the federal Endangered Species Act. Fish and Game Code § 2072.3 states:

> To be accepted, a petition shall, at a minimum, include sufficient scientific information that a petitioned action may be warranted. Petitions shall include information regarding the population trend, range, distribution, abundance, and life history of a species, the factors affecting the ability of the population to survive and reproduce, the degree and immediacy of the threat, the impact of existing management efforts, suggestions for future management, and the availability and sources of information. The petition shall also include information regarding the kind of habitat necessary for species survival, a detailed distribution map, and any other factors that the petitioner deems relevant.

2. INTRODUCTION

Leatherback sea turtles are critically endangered in the Pacific and face numerous threats to their continued existence including incidental take by gillnet and longline fisheries, pollution, marine debris, and habitat destruction. Listing the Pacific leatherback sea turtle under the California Endangered Species Act will provide crucial and complementary protection against many of these threats and would aid in ensuring the continued survival and eventual recovery of the species in the Pacific.

This petition reviews the natural history and status of leatherback sea turtles, focusing largely on trends and threats to the critically endangered Pacific population. The petition describes the importance of protecting this population under the California Endangered Species Act and explains why this is crucial for the survival and recovery of the population.

Though the leatherback sea turtle has been federally protected under the Endangered Species Act since 1970 (35 Fed. Reg. 8491), it is still one of the marine animals most at-risk of extinction in the United States. NMFS developed a recovery plan for the Pacific population in 1998 (65 Fed. Reg. 28359). Upon a petition by the Center, NMFS designated critical habitat along the U.S. West Coast in 2012, which include waters off California with sufficient condition, distribution, diversity, abundance and density of prey species necessary to support growth, reproduction, and development of leatherbacks (77 Fed. Reg. 4170). This designation illustrates the importance of waters off California for leatherback foraging success, and the need to conserve those waters through both federal and state efforts. The leatherback sea turtle is listed as endangered also by Oregon and Washington State (Oregon 2018, Sato 2017).

3. LIFE HISTORY

3.1. Species Description

The leatherback sea turtle's slightly flexible, rubbery-textured carapace, for which *D. coriacea* is named, distinguishes the species from other sea turtles (NMFS & USFWS 1998). Leatherbacks are the largest turtle species in the world and the fourth largest living reptile (McClain et al. 2015 p. 39). Although their size varies regionally, the curved carapace length of adult leatherbacks commonly exceeds 1.5 meters (McClain et al. 2015 p. 41). Adult males and females can reach 2 meters in length while weighing up to 900 kilograms (McClain et al. 2015 p. 39). The largest known leatherback by mass was 916 kg (McClain et al. 2015 p. 39). There are body-size differences between mature turtles from the eastern (smaller) and western Pacific (larger) nesting

colonies, which are distinguished on the basis of genetic differentiation discussed in detail below.

The unique characteristics of the leatherback's carapace contribute to broad thermal tolerance in adults and enables the species to forage in water temperatures far lower than the leatherback's core body temperature (NMFS & USFWS 1998 p. 5). Adults have been reported in the Pacific as far north as the Bering Sea in Alaska and as far south as Chile and New Zealand (NMFS & USFWS 1998 p. 5). Previous studies have shown that the core body temperature in adults while in cold waters are several degrees Celsius above ambient, evidence of endothermy (warm blood) in a mostly poikilothermic (cold blood) class, Reptilia (Bostrom et al. 2010). In fact, satellite tagging studies have shown that leatherbacks can dive continuously for several weeks in waters as cold as 0.4ºC (James et al. 2006). Several features such as thermal inertia (due to large body mass and exercise), insulating layer of sub-epidermal fat, countercurrent heat exchangers (in front and back flippers), brown adipose tissue that could generate heat, and high lipid concentration with low freezing point, contribute to extreme cold thermal tolerance (James et al. 2006; Bostrom & Jones 2007; Bostrom et al. 2010).

Leatherbacks have several morphological adaptations advantageous to extraordinary large-scale ocean migrations (Benson et al. 2011), deep dives (Eckert et al. 1989), and sustained residence in the open ocean (NMFS & USFWS 1998 p. 5) (Figure 1). Leatherbacks have strong front flippers that are proportionally longer than those of other sea turtle species and may span up to 270 cm wide in adults (NMFS & USFWS 1998 p. 4). Carapaces of adult leatherbacks are 4 cm thick on average, constituted mainly of tough, oil-saturated connective tissue with seven prominent ridges (NMFS & USFWS 1998 p. 4) (Figure 1). Below the leathery outer skin of the carapace, a quasi-continuous layer of small dermal bones is present (NMFS & USFWS 1998 p. 5).

Leatherbacks have a predominately black coloration with varying degrees of pale spotting that covers the scaleless skin and the sculpted ridges of the carapace (NMFS & USFWS 1998 p. 4) (Figure 1). The underside is often mottled, white to pinkish and black, and the degree of pigmentation is variable (NMFS & USFWS 1998 p. 4). The upper jaw has two tooth-like projections flanked by deep cusps that help in capturing jellyfish, their main food source (NMFS & USFWS 1998 p. 5).

Leatherback hatchlings are mostly black with mottled undersides, and covered with small polygonal bead-like scales. Flippers have a white margin and white scales are present as stripes along the back (Figure 1). In contrast to other sea turtle species, leatherbacks lack claws in both front and rear flippers (NMFS & USFWS 1998 p. 4).

Figure 1. Leatherback sea turtle adult (left) at the Virgin Islands National Park and hatchling at Cape Lookout National Seashore (right). Photo credit: Caroline Rogers (adult leatherback), Sea Turtle Conservancy (hatchling).

3.2. Taxonomy

The generic name *Dermochelys* was introduced by Blainville in 1816 (NMFS & USFWS 1998 p. 4). The specific name c*oriacea* was initially used by Vandelli in 1761 and was later adopted by Linnaeus in 1766 (NMFS & USFWS 1998 p. 4). The species name refers to the unique leathery texture and scaleless skin of adults (NMFS & USFWS 1998 p. 4). The leatherback turtle is the only surviving species of the taxonomic family *Dermochelyidae* (NMFS & USFWS 1998 p. 4). All other sea turtles belong to the family *Cheloniidae* and have bony carapaces plated and covered with horny scutes.

Behavioral, morphological, biochemical and genetic studies have determined that the leatherback bears some relationship to other sea turtles (NMFS & USFWS 1998 p. 4). However, the skeletal morphology of leatherbacks is unique among turtles and karyological studies support the taxonomic classification segregating sea turtle species into two distinct families (Bickham & Carr 1983). For a detailed discussion of taxonomy and synonymy, see Pritchard (1997).

3.3. Population Genetics

Pacific leatherbacks are divided into two genetically distinct eastern and western populations; while both could be present off California, the West Pacific leatherback is far more commonly found feeding in waters off California (Dutton et al. 2007 p. 48). The West Pacific population is known to nest in least at 28 different sites along the tropical shores of Indonesia, Papua New Guinea, the Solomon Islands and Vanuatu. These nesting colonies all share a unique, common haplotype[1] (Dutton et al. 2007). Because of this, plus the lack of differentiation in haplotype frequency among the nesting colonies, the West Pacific population is considered a metapopulation composed of a single genetic stock (*id*.).

[1] A haplotype is a group of genes that tend to be inherited together from a single parent.

3.4. Reproduction and Growth

Leatherbacks reach sexual maturity at ~9-15 years and reproduce seasonally. (Zug & Parham 1996 p. 244; Dutton et al. 2005 p. 191). Mating takes place in the open ocean, and despite being seldom observed, researchers believe that mating occurs in coastal waters adjacent to nesting beaches, based on studies on Atlantic leatherback sea turtles (James et al. 2005 p. 848). Gravid (pregnant) females then migrate to nest on the same tropical shores where they were born.

Over the course of a single nesting season, female leatherbacks lay an average of five nests (Dutton et al. 2007 p. 48; Hitipeuw et al. 2007 p. 30) at an interval of ~9.3-9.5 days (Reina et al. 2002 p. 658). In the West Pacific, leatherback females nest primarily from June to September and lay roughly 85-95 eggs per nest (PFMC & NMFS 2006 p. 66). The typical interval females spend between migrating to foraging and to breeding grounds for female leatherbacks is every two to seven years, based on studies in the Atlantic, but can vary widely in response to ecological conditions in the foraging areas and interannual climate variability such as La Niña / El Niño events, particularly for sea turtles that nest in the eastern Pacific (Dutton et al. 2005 p. 189; Saba et al. 2007 pp. 398, 401).

Leatherbacks prefer to nest on unobstructed, mildly sloped, sandy, continental shores accompanied by deep offshore waters (NMFS & USFWS 1998 p. 15). Leatherback nesting activity, as in other sea turtles, includes a beach landing, a terrestrial crawl to the selected nest site usually above the high tide line, excavation of a body pit and nest chamber, egg-laying, filling and concealing the hole, and return to the sea (NMFS & USFWS 1998 p. 15). From landing to surf reentry, the total sequence lasts between 80 and 140 minutes (NMFS & USFWS 1998 p. 15).

Hatchling sex depends on the temperature of the nest environment during the 55-75 day incubation period (NMFS & USFWS 1998 p. 15). Studies have found the pivotal temperature to be 29.4° C with females becoming increasingly dominant with increasing temperature (Binckley et al. 1998). Once hatched, leatherback hatchlings cooperatively tunnel out of the submerged nest (NMFS & USFWS 1998 p. 15). This process typically begins in the evening and goes on for several days (NMFS & USFWS 1998 p. 15). Leatherback hatchlings measure approximately 5.64 cm and weigh an average of 41.2 g (NMFS & USFWS 1998 p. 15).

3.5. Diet and Foraging Ecology

Leatherback sea turtles typically feed on marine invertebrates including jellyfish (cnidarians, specifically medusae and siphonophores) and tunicates (pyrosomas and salps) (Bjorndal et al. 1997 p. 209; Wallace et al. 2006). Gelatinous zooplankton, known to develop in aggregations in temperate and boreal latitudes, is the preferred prey of leatherbacks (Houghton et al. 2006). While foraging in the pelagic, leatherbacks are known to exploit convergence zones and areas of upwelling waters where aggregations of prey commonly occur, such as off California (Benson et al. 2007b).

Nematocysts from deep water siphonophores found in leatherback stomach samples suggest that foraging at depth is likely (Den Hartog 1979 p. 6). Leatherbacks can dive in excess of 1,200 meters deep and over one hour in duration (Houghton et al. 2006), yet most recorded leatherback

dives range between 50 and 200 meters (Houghton et al. 2006 p. 2568). Leatherbacks spend most of their time at sea submerged and display patterns of continual diving that suggest frequent surveying of the water column for gelatinous prey (Houghton et al. 2006).

Dense aggregations of jellies (scyphomedusae) are common in the summer and fall months throughout the nearshore regions from Central California to Northern Oregon (Graham et al. 2010). Oceanographic retention zones and upwelling shadows, such as those in the neritic waters off Central California, are particularly favorable habitat for leatherback prey (Graham et al. 2010). Leatherbacks are most frequently observed feeding on *Chrysaora fuscescens*, *Chrysaora colorata*, and *Aurelia* spp. which are especially common in retention areas between Point Reyes and Monterey Bay, California (Benson et al. 2007b p. 345). Leatherback predation on high densities of readily-captured jellyfish results in high energy intake at a certain time of the year, consistent with sea turtles gaining weight while in that location (Heaslip et al. 2012).

Studies have shown a positive relationship between leatherback abundance in neritic waters off California and the average annual Northern Oscillation Index (NOI) (Benson et al. 2007b p. 345). Years of positive NOI values appear to correspond with conditions favorable to upwelling along the California coast. This upwelling leads to phytoplankton and zooplankton (including jellyfish) production, which in turn draws in leatherbacks (Benson et al. 2007b p. 345).

3.6. Migration

Leatherbacks spend nearly their entire lives in the ocean's pelagic zone (*i.e.,* the water column). Some females may forage year-round in tropical habitats near nesting beaches; others undertake a lengthy migration to exploit temperate foraging habitats like that off central California (Benson et al. 2011; Lontoh 2014). The latter turtles forage in temperate waters except during the nesting season, when gravid female leatherbacks migrate to tropical beaches to lay eggs (NMFS & USFWS 2013).

The details of lengthy leatherback migrations were largely unknown until recently when researchers discovered distinct migratory corridors followed by the West Pacific leatherback population (Benson et al. 2007a, 2011). Those West Pacific leatherbacks that embark on a trans-Pacific migration to the temperate continental shelf of the U.S. West Coast forage on the seasonally abundant aggregations of gelatinous zooplankton (Benson et al. 2007b p. 345; Block et al. 2011 p. 87; Bailey et al. 2012 p. 739) (see Figure 2). Here, coastal upwelling creates a highly productive and dynamic ecosystem that they efficiently exploit (Benson et al. 2007b). The leatherbacks that forage in California have greater body size than tropical foragers (Benson et al. 2011; Lontoh 2014).

The eastern Pacific population occurs along the coast of California and exhibits some overlap in distribution with the western Pacific population (Tiwari et al. 2013). Eastern Pacific leatherbacks are known to migrate south from the shores of Mexico, Costa Rica and Nicaragua, where they nest, through the Galapagos to feeding sites throughout the southeast Pacific off South America's West Coast (Shillinger et al. 2008 p. 1410; Block et al. 2011 p. 87; Bailey et al. 2012 p. 740).

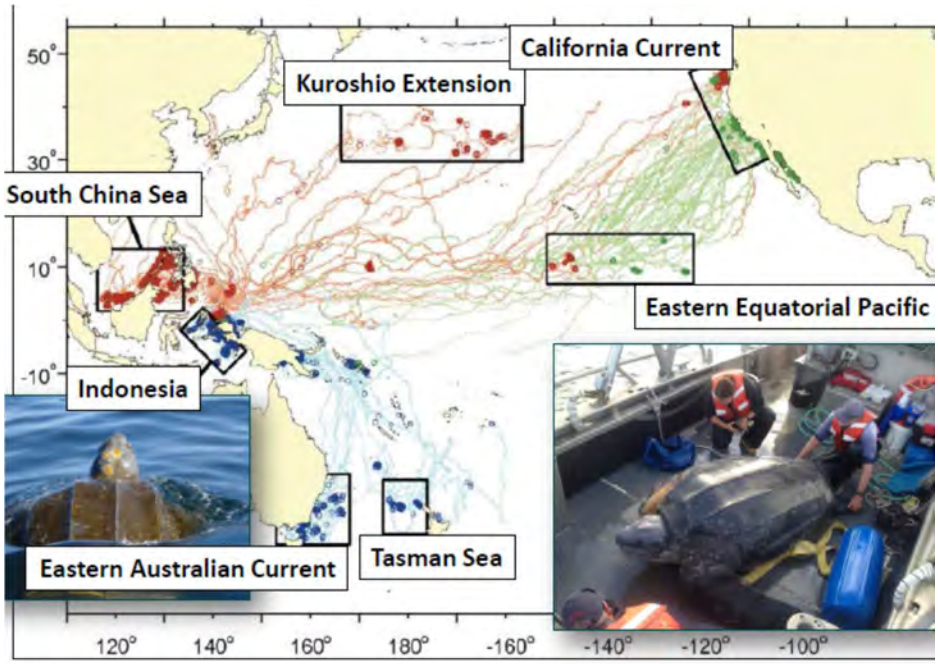

Figure 2. West Pacific leatherback sea turtles' migration and areas of primary foraging habitat (Data source: Benson et al. 2011; photo credit: NMFS 2017a).

4. POPULATION TREND, DISTRIBUTION, AND ABUNDANCE

4.1. Population Trend

The critically endangered West Pacific leatherback turtle population has suffered a catastrophic decline over the last three decades. This population faces extinction mainly as a result of incidental bycatch in commercial and artisanal fisheries, overharvest of eggs and killing of adults at nesting beaches, as well as commercial and residential development on nesting beaches (Kaplan 2005; Tapilatu et al. 2013).

In the Pacific Ocean, leatherback populations have drastically plummeted at all major nesting beaches resulting in more than 95% decline in leatherbacks from the eastern and western populations combined over the last 30 years (Spotila et al. 2000; Tapilatu et al. 2013). If current trends continue, Pacific leatherbacks are predicted to go extinct within the next few decades (Spotila et al. 2000; Tapilatu et al. 2013).

The number of Pacific leatherback sea turtles in California waters has declined consistently with the decline observed in the Pacific population. Scott Benson, NMFS staff and author of *Large-scale movements and high-use areas of western Pacific leatherback turtles*, in 2015 estimated the number of Pacific leatherbacks in California waters from 2005–2014 averaged 54 individuals annually (Benson, *pers. comm.* 2015). The prior estimate, using data from 1990-2003, indicated an annual average of 178 leatherback sea turtles off California (Benson et al. 2007b).

4.2. Historical and Current Distribution

Leatherbacks have the largest geographic range of any living marine reptile, spanning the temperate and tropical waters in all oceans (Hays et al. 2004; James et al. 2006; Benson et al. 2007a, 2011). Adults have been reported in the Pacific as far north as the Bering Sea in Alaska and as far south as Chile and New Zealand (NMFS & USFWS 1998 p. 5).

West Pacific leatherbacks are a highly migratory species and are known to swim over 10,000 km within a single year (Benson et al. 2007a, 2011; Shillinger et al. 2008). The incomparable migratory ability is made possible by the leatherback's morphological adaptations noted above. These adaptations equip leatherbacks for sustained residence at sea and enable them to traverse enormous ocean basins such as the Pacific (Benson et al. 2007a, 2011).

While there exists a small probability that a stranded leatherback off California could be from the eastern Pacific population, satellite tagging studies and genetic analyses of tissue samples thus far (e.g., of stranded leatherbacks on California beaches or incidentally caught in the California swordfish drift gillnet fishery) indicate that individuals foraging in waters off California originate from nesting beaches in the West Pacific (Benson et al. 2007b, 2011 p. 6; Dutton et al. 2007; Harris et al. 2011; Bailey et al. 2012 p. 739).

4.3. Historical and Current Abundance

The Pacific leatherback population has declined dramatically in abundance from historical levels. Population declines have been documented at nesting beaches throughout the Indo-Pacific region (Chan & Liew 1996; Spotila et al. 2000; Hitipeuw et al. 2007; NMFS & USFWS 2013). The total West Pacific leatherback population was estimated in 2007 to include 2,700-4,500 breeding females with 1,100-1,800 female leatherbacks nesting annually (Dutton et al. 2007 pp. 47, 51). More recently, deriving abundance estimates from nest counts gives a conservative West Pacific population estimate of 562 nesting females (NMFS 2017b p. 108). There are expected to be half that amount by 2040, which is too small a population to recover (Tiwari et al. 2013; Wallace et al. 2013).

One of the leatherback's most important nesting areas in the West Pacific (at Terengganu, Malaysia) was virtually eradicated by the mid-1990s from fisheries interactions on the high seas and around Malaysia plus egg exploitation, with nesting populations representing less than 2% of the levels recorded in the 1950s (Chan & Liew 1996). The nesting population in this region declined from 3,103 female leatherbacks estimated in 1968 to only two nesting females in 1994 (Chan & Liew 1996). Currently, leatherback nesting in this region may be close to extirpation (Chan 2006).

The only remaining major nesting areas for the West Pacific leatherback population, which migrates across the Pacific to feed on the rich aggregations of jellyfish off the U.S. West Coast (Benson et al. 2007a, 2011), are on the Bird's Head Peninsula beaches of Jamursba-Medi and Wermon in the Indonesian province of Papua (Hitipeuw et al. 2007; Tapilatu & Tiwari 2007). Yet even at these beaches, leatherback nesting has declined significantly over the last thirty years and no recovery has been observed despite protection efforts of nesting areas initiated in 1992 (Hitipeuw et al. 2007). Counts of leatherbacks at nesting beaches in the West Pacific indicate

that the population has been declining at a rate of almost six percent per year since 1984 (Tapilatu et al. 2013).

At one of these remaining leatherback rookeries, Jamursba-Medi, studies estimated that 300-900 female leatherbacks nested annually in 2004, down from 1,000-3,000 prior to 1985 (Hitipeuw et al. 2007 p. 31). The leatherback population on Jamursba-Medi continued to decline after 1993, when scientists first began to consistently record data (Hitipeuw et al. 2007 p. 31). Yet the population has not collapsed to the extent of others in the Pacific basin (Hitipeuw et al. 2007 p. 31).

5. IMPORTANCE OF CALIFORNIA WATERS FOR LEATHERBACKS

The waters off the coasts of California, Oregon, and Washington within the California Current ecosystem comprise one of the most important foraging areas for leatherback sea turtles in the eastern North Pacific Ocean (Benson et al. 2007b; Harris et al. 2011 p. 333). In this region, coastal upwelling creates a dynamic and highly productive ecosystem, ideal for foraging adults (Benson et al. 2007b; Graham et al. 2010). In California, leatherbacks typically forage seasonally, from July to November, on large aggregations of jellyfish (*Scyphomedusae*) along the central coast when sea surface temperatures are 14-17ºC (Benson et al. 2007b p. 345).

Leatherbacks' presence off California is strongly related to seasonal upwelling that spatially drives food availability. The California Current ecosystem exhibits stronger seasonal upwelling between Point Conception and Cape Mendocino between July and October (Huyer 1983 p. 267). Previous studies have shown that leatherback distribution and occurrence in waters off California have been linked to sea surface temperature of 15-16ºC during late summer and early fall (Starbird et al. 1993). For example, sightings of leatherback turtles are often reported in Monterey Bay during August by recreational boaters, whale-watching operators, and researchers (Benson et al. 2007b p. 338). The greatest densities of leatherbacks off central California consistently have been found where upwelling creates favorable habitat for jellyfish production, their main prey (Benson et al. 2007b p. 337).

In the 1998 Recovery Plan, NMFS stated that "the waters off the west coast of the United States may represent some of the most important foraging habitat in the entire world for the leatherback turtle" (NMFS & USFWS 1998 p. 14). Studies have documented substantial numbers of leatherbacks from West Pacific nesting beaches traveling thousands of miles to feed on seasonally abundant aggregations of jellyfish in the California Current ecosystem (Benson et al. 2007b p. 346). The significance of these waters as foraging grounds for West Pacific leatherback cannot be overstated (Benson et al. 2007b p. 346).

Protection of foraging grounds off California is crucial to conserve leatherback turtles. From 1963 to 2016, there have been 151 reported leatherback sea turtle strandings along the U.S. West Coast, including Alaska, Washington, Oregon and California (Eguchi et al. 2017a). From 2013 to 2017, six leatherbacks stranded on the U.S. West Coast, and all occurred in California (NMFS 2018a). This is consistent with the historical trends, which show that nearly all stranded leatherback sea turtles with evidence of human interaction strand in California (Eguchi et al. 2017a, Figure 3). Successful conservation efforts for leatherback turtles must include protecting migration corridors and reducing/eliminating threats in foraging areas off California (Figure 4).

Studies have highlighted that waters off central California are a critical foraging area for one of the largest remaining Pacific nesting populations (Benson et al. 2007b p. 346). Therefore, protecting foraging leatherback sea turtles off California waters from lethal threats such as oil spills, ship strikes and incidental bycatch in commercial and recreational fisheries is of critical importance for the survival and recovery of the species.

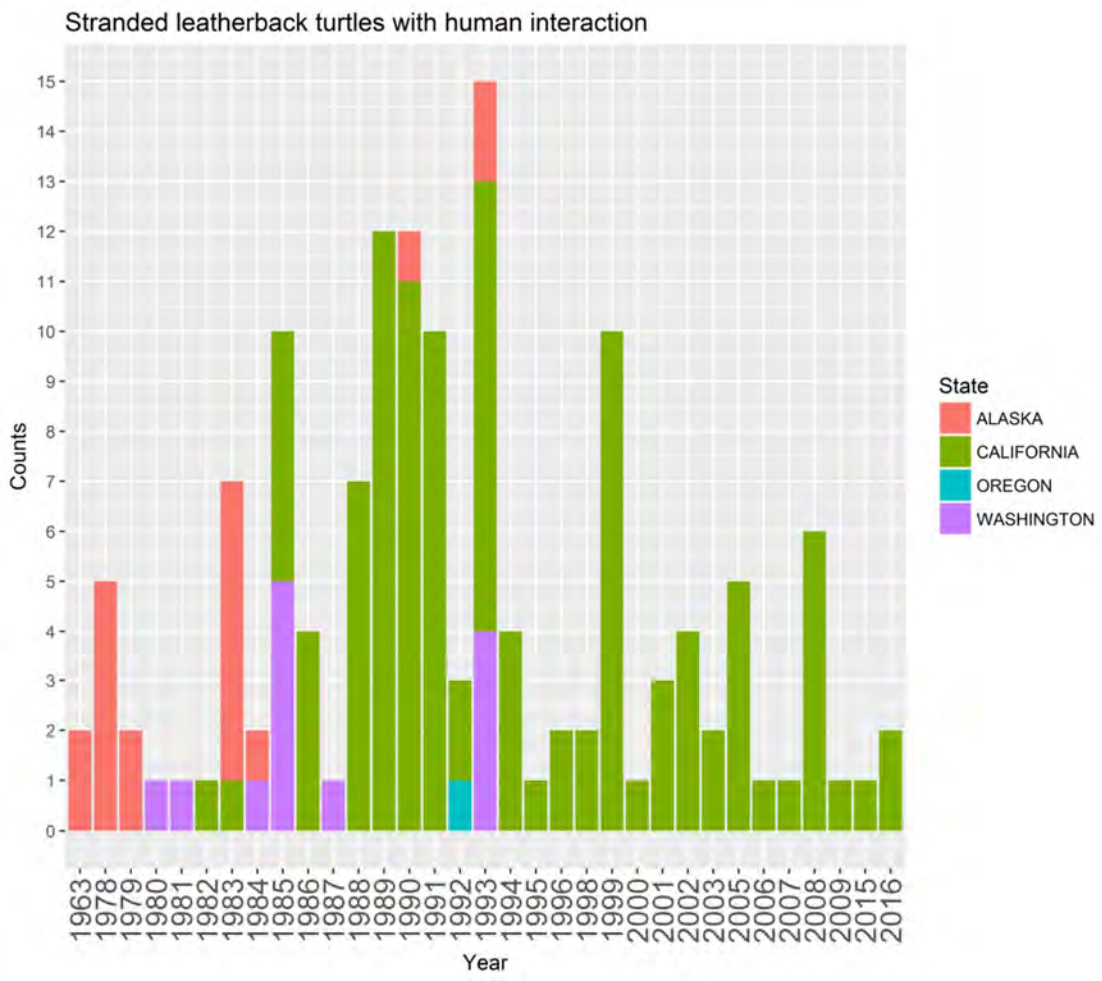

Figure 3. The number of stranded leatherback turtles (excluding those released alive) along the U.S. West Coast from 1963 through 2016. Years without stranding records were omitted from the plot to make it concise (Source: Eguchi et al. 2017a).

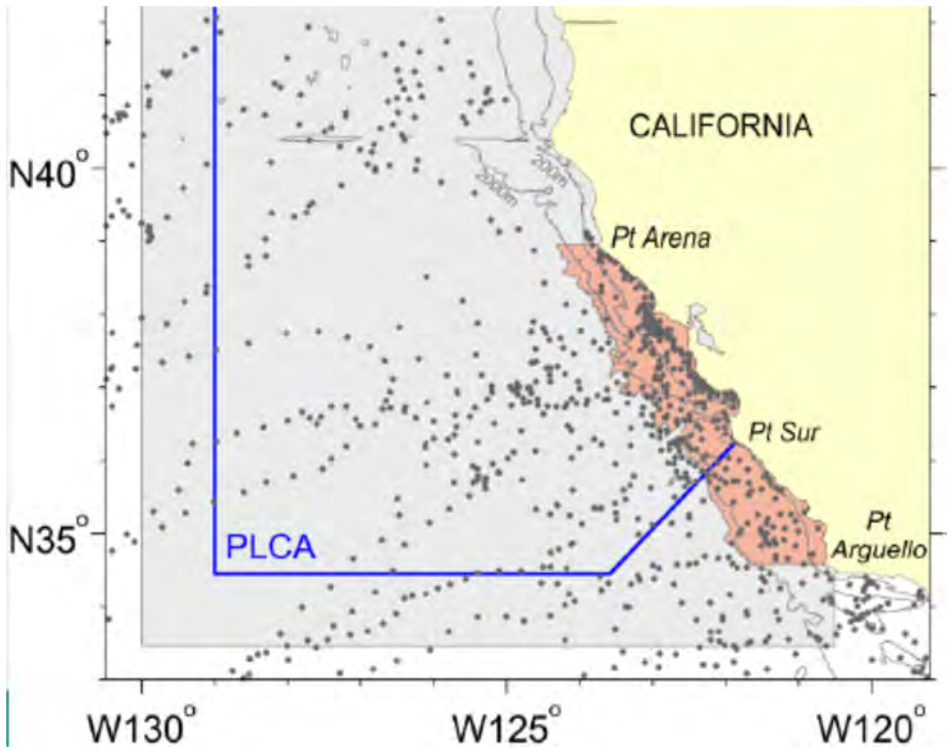

Figure 4. California distribution map of leatherback sea turtles. Black dots are leatherback sea turtle telemetry data. Pink area indicates the leatherback sea turtle critical habitat designation in California (not pictured: critical habitat in Oregon and Washington). "PLCA" is the Pacific Leatherback Conservation Area that excludes the drift gillnet fishery for three months each year (Source: NMFS 2017a).

6. FACTORS AFFECTING THE ABILITY OF THE POPULATION TO SURVIVE AND REPRODUCE

6.1. Present or Threatened Modification or Destruction of Its Habitat

West Pacific leatherbacks expend tremendous time and energy migrating to and along the California coast to forage on jellyfish, demonstrating the importance of this habitat. Among 37 adult leatherbacks tagged in coastal waters off California, the majority moved north and spent time in areas off northern California and Oregon before moving towards the equatorial eastern Pacific, then eventually westward, presumably towards West Pacific Ocean nesting beaches (Benson et al. 2011). While in coastal waters off California these leatherbacks are highly vulnerable to anthropogenic impacts.

Most threats to leatherback sea turtles occur in nearshore marine areas. The cumulative impact of anthropogenic activities on leatherback sea turtles are higher nearshore and within the national marine sanctuaries (Maxwell et al. 2013, Figure 5). Because California maintains jurisdiction offshore to 3 nm – wherein occurs the vast majority of human activities in the marine environment (e.g., fishing, swimming, boating) – it is uniquely situated to mitigate these threats.

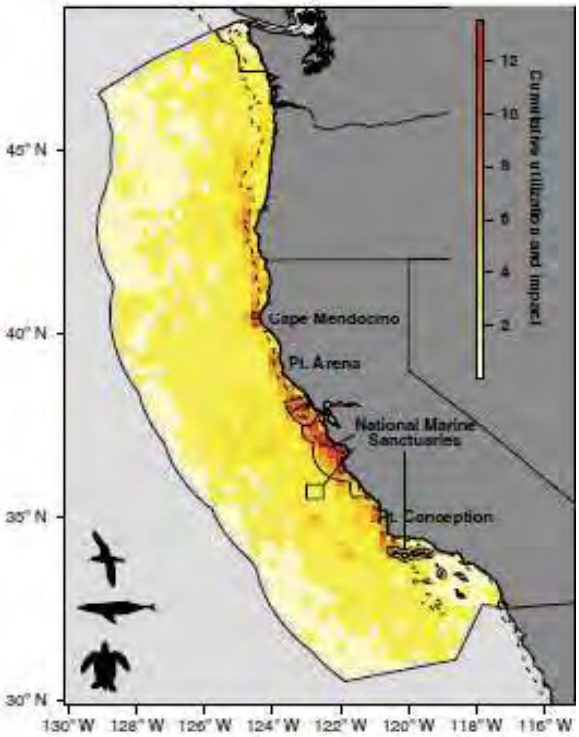

Figure 5. Combined tracking data and cumulative impact data (underlying human stressors weighted by species vulnerability) for leatherback sea turtles, marine mammals and seabirds (Source: Maxwell et al. 2013).

In recognition of the magnitude of coastal impacts, state activities, brochures, maps, and educational resources emphasize actions to protect habitats in California's nearshore coastal zone used by leatherbacks. For example, the California Coastal Commission has active public education and outreach efforts focused on coastal beaches and waters, including an "Adopt-a-Beach" program and "California Coastal Cleanup Day" that annually draws tens of thousands of participants; the California Department of Fish and Game is actively involved in implementing the state's Marine Life Protection Act and the identification of Marine Protected Areas. *Id.* Yet California has established none of these measures on the basis of criteria specifically intended to improve leatherback sea turtle survival.

In part because no state measures specifically protect leatherback prey quality or density, the federal government identified California's offshore waters between the 200- and 3000-meter isobaths from Point Arena to Point Sur, and waters between the coastline and the 3000-meter isobath from Point Sur to Point Arguello, as leatherback critical habitat. *Id.* at 4183, 4186-87. Areas of coastal upwelling produce abundant and dense aggregations of leatherback prey; thus it is critically important to not only protect leatherback prey in these areas but also the sea turtles' ability to get to the prey from hundreds of miles away.

Leatherbacks and their preferred prey are in danger from oil and gas extraction activities on and around the California Coast, aquaculture facilities, coastal development, entanglement by and ingestion of marine debris, and beach erosion. Leatherbacks are also in immediate danger from overexploitation by fisheries, primarily through entanglement and ingestion of marine debris. The State of California is in a unique situation to protect leatherbacks from these threats, which are discussed in greater detail below.

6.1.1. Oil and Gas Activities in California

Juvenile and adult leatherback sea turtles may encounter oil, tar, and spill-related chemicals in the water column, at the surface, and through contaminated prey. Such exposure can lead to declining red blood cell counts and increased white blood cell counts; impaired ability to regulate the internal balance of salt and water; and sloughing of the skin that can lead to infection (NMFS 2003 at 40-43). Sea turtles inhale very deeply before diving and thus can inhale large concentrations of toxic fumes at the surface of an oiled area, which in turn can lead to respiratory impairment (NMFS 2003 at 40). Because sea turtles generally do not avoid oil-contaminated areas, they are very vulnerable to harmful contact with oil and its byproducts. Turtles are particularly prone to ingest oil and tar. Sea turtles are known to indiscriminately ingest tar balls that are about the size of their normal prey. Ingested tar interferes with digestion, sometimes leading to starvation, and can cause buoyancy problems, rendering the turtle more vulnerable to predation and less able to forage. In addition, tar and oil remain in the digestive system for several days, increasing the turtle's absorption of toxins (NMFS 2003 at 39-40).

Oil spills also affect sea turtles in less direct ways. Oil spills can reduce food availability, and ingestion of contaminated food can expose turtles to harmful hydrocarbons. Oil exposure may render turtles more vulnerable to fibropapilloma, a condition that can degrade the turtle's overall health and interfere with feeding and other behaviors (NMFS 2003 at 44). The potential impacts from oil spills are particularly troubling given the highly imperiled status of leatherback sea turtles.

Oil spill response also presents hazards to sea turtles. Approximately 54% (9,198 mi^2 [23,822 km^2]) of the designated critical habitat in California (16,910 mi^2 [43,797 km^2]) is located within the Pre-Approval Zone for use of dispersants in response to an oil spill. Dispersants and dispersed oil in the water column are of equal concern in terms of negative impacts to leatherbacks. Sea turtles may be exposed to dispersants and dispersed oil as they swim and feed in the water column. Leatherback sea turtles migrate over large areas to feed on aggregations of jellyfish, sea nettles, and salps in late summer close to shore (77 FR 4170). They spend over 75% of the time in the upper 5 m (16 ft) of the water column (NMFS 2012), which potentially exposes them to floating oil and dispersant spray. The peak concentration of chemically dispersed oil and dispersants will occur in the top few meters of the water column (typically <33 ft [10 m]) immediately after application of dispersants.

While surfacing to breathe, sea turtles can breathe in fumes from or ingest dispersants and dispersed oil. Monitoring data have indicated that the use of the Corexit dispersants killed up to 25% of all organisms living 500 feet below the surface in areas where the dispersant was used. In sea turtles, dispersants contain components that can interfere with lung function, respiration, digestion, excretion, and salt gland function to a degree "similar to the empirically demonstrated

effects of oil alone" (NMFS 2003). According to the Minerals Management Service, dispersant components absorbed by sea turtles can affect their organs and interfere with digestion, excretion, and respiration (MMS 2007). Burning oil at the surface, another potential response to oil spills, can directly harm turtles at the surface, particularly those that are trapped in algae mats, and indirectly harm turtles by causing lung irritation from smoke and formation of ingestible, sinking globs of oil (*id.*).

6.1.2. Aquaculture

The growth of aquaculture off California threatens to obstruct leatherback sea turtle's migration to coastal waters by entangling them in fixed gear. Leatherbacks have been recorded entangled in aquaculture gear several times in the Atlantic (Hamelin et al. 2017 p. 635). Leatherback sea turtles have front flippers that are proportionately larger when compared to similar species, which may make them more vulnerable (NMFS 2012 p. 6). Longlines used in mussel aquaculture are a documented source of mortality to leatherback sea turtles (Price et al. 2017 p. 19, 32). In addition, the federal government has described aquaculture as an activity that may adversely impact leatherback sea turtles' migratory pathway to nearshore waters off the U.S. West Coast. 77 Fed. Reg. 4191. Off California in particular, the 100-acre mussel aquaculture facility six miles offshore poses an entanglement risk to leatherback sea turtles (NMFS 2012 p. 6).

6.1.3. Coastal Development Throughout the West Pacific Leatherbacks' Range

As human populations expand throughout the tropical Pacific at unprecedented rates, commercial and residential development on beachfront property increasingly encroaches on leatherback habitat (NMFS & USFWS 1998 p. 21, 2013). Recreational and commercial use of nesting beaches, litter and other debris on beaches and in the ocean, and the general harassment of turtles all degrade leatherback habitat (NMFS & USFWS 1998 p. 21). Plus, the increased human presence near leatherback habitat tends to increase the direct harvest of leatherbacks and their eggs (*id.*).

6.1.4. Entanglement by and Ingestion of Marine Debris

The entanglement in and ingestion of marine debris constitutes a serious and widespread threat to the leatherback populations (NMFS & USFWS 1998 p. 24; Schuyler et al. 2014 p. 132). Leatherbacks are easily entangled in abandoned fishing gear, lines, ropes, and nets (NMFS & USFWS 1998 p. 24). Leatherbacks also commonly mistake plastic bags, plastic sheets, balloons, latex products, and other refuse for jellyfish, their preferred prey (NMFS & USFWS 1998 p. 24; Bugoni et al. 2001; Nelms et al. 2016). Mortality from marine debris threatens the leatherback population throughout the Pacific including the nesting population at Jamursba-Medi (Hitipeuw et al. 2007 p. 34).

Mrosovsky et al. (2009) estimated that approximately one-third of all adult leatherbacks autopsied from 1968 to 2007 had ingested plastic. Plastic ingestion can interfere with laying eggs through obstruction (Plot and Georges 2010). The ingestion of marine debris can cause

suffocation by clogging the esophagus of leatherbacks or lead to forms of poisoning (NMFS & USFWS 1998 p. 24; Nelms et al. 2016).

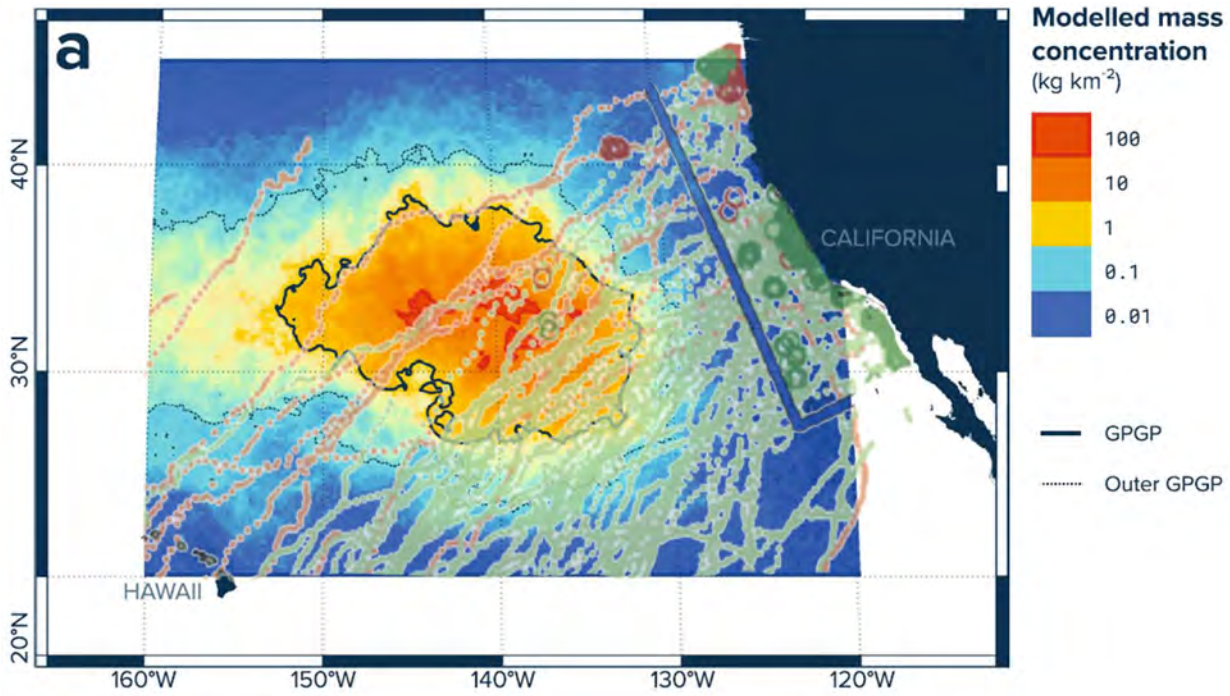

Figure 6. Great Pacific garbage patch modelled plastic concentration (kg km^{-2}) and leatherback turtle migratory routes (green and red dots). (Image credit: The Ocean Cleanup Foundation; leatherback telemetry data from Benson et al. 2011).

6.1.5. Vessel Strikes from Commercial Shipping and Other Boat Traffic

Stranding records provide only a minimum of information about the magnitude of the threat of vessel strikes to leatherback sea turtles. From 1989 through 2014 there have been 12 reported incidents of vessel struck leatherback sea turtles in California, but this is an underestimate because carcasses that sink or strand in an area where they cannot be detected go unreported or unobserved (NMFS 2017c). NMFS has concluded:

> It is impossible to know how many leatherbacks have been affected by ship strikes because it is likely that animals are not seen or their bodies are destroyed as a result of either blunt force trauma or getting caught in a ship's propellers. Large whales, due to their size, are much more likely to be seen after an interaction with a ship; leatherbacks average six feet in length while the large whales . . . may range in size from 40 to 90 feet in length.

(*id.* at 58). Given that NMFS has identified the waters off central California as an important foraging area for leatherbacks during the summer and fall, it is likely that they are affected by ship traffic in that area.

Table 1. Reported incidents of vessel-struck leatherback sea turtles in California 1989-2014 (NMFS 2017c at 58-59).

Year	Month	Day	Location	County
2005	9	16	Beached	Marin
2008	8	9	Floating in Water	San Luis Obispo
2005	8	21	Beached	San Francisco
2001	4	30	Floating in Water	Monterey
1998	10	2	Beached	San Francisco
1990	9	29	Beached	Marin
1990	1	13	Beached	Santa Barbara
1989	6	27	Floating in Water	Los Angeles
1989	8	22	Beached	Marin
1989	7	10	Beached	Los Angeles
1989	10	3	Beached	San Mateo
1989	9	23	Beached	San Mateo

6.1.6. Beach Erosion

Many leatherback nesting beaches are subject to seasonal or storm related erosion and accretion (Hitipeuw et al. 2007 pp. 28, 30). From August through October at Jamursba-Medi, high surf and strong currents erode large numbers of unhatched nests (Hitipeuw et al. 2007 p. 34). At this time of year, only a fraction of the beach at Jamursba-Medi remains between the high water mark and the forest, while some stretches of beach can end up completely eroded (Hitipeuw et al. 2007 p. 34). In April, as nesting begins to increase at Jamursba-Medi, the pattern reverses and sand accretion returns beaches up to 65 meters wide by late August (Hitipeuw et al. 2007 p. 34). Such a delicate balance puts leatherback nesting habitat at serious risk from global climate change. Erosion already destroys an estimated 45% of leatherback nests at Jamursba-Medi, including 80% of the nests at Warmamedi (Hitipeuw et al. 2007 p. 30). At nearby Wermon, 11% of the observed nests were lost to the high tides in 2003-2004 (Hitipeuw et al. 2007 p. 30). As sea levels continue to rise, the leatherback's fragile habitat will only become more at risk of destruction from wave-induced erosion (Van Houtan & Bass 2007).

6.2. Overexploitation

6.2.1. Fisheries bycatch and entanglement in fishing gear

The leatherback's expansive migrations over ocean basins expose the species to a gauntlet of threats from fisheries. Their large pectoral flippers and active behavior make leatherbacks particularly vulnerable to entanglement in fishing gear (James et al. 2005 p. 197). Once entangled, leatherbacks usually continue to try to swim, exhausting themselves until they eventually drown unless surfaced (James et al. 2005 p. 199). In addition, prolonged periods of forced submergence trigger severe metabolic acidosis, which often drains the turtle's strength so significantly that it is unable to recover. As a result, many leatherbacks do not survive even when surfaced before they have drowned (Work & Balazs 2010 p. 422).

Incidental take in fisheries threatens the entire Pacific leatherback population where active and abandoned driftnets and longlines have a long history of entangling and killing leatherbacks (NMFS & USFWS 1998 p. 24). During the 1990s, gillnet and longline fisheries killed at least 1,500 leatherbacks annually in the Pacific (Spotila et al. 2000 p. 530). Off the U.S. West Coast, leatherbacks have been incidentally caught in drift gillnets off California, Oregon and Washington, longlines off California and Hawaii (NMFS & USFWS 1998 p. 24), groundfish pot gear off California in 2008 (Eguchi et al. 2017a, Jannot et al. 2011), and crab trap gear in 2016 (NMFS 2018a; released alive). Recently a leatherback sea turtle was found dead (entangled) on October 18th in unidentified fishing gear, just a few miles off the coast between Malibu and Ventura in Southern CA by NMFS scientists (DFW, *pers. comm.* 2019).

The groundfish pot fishery shows well the difficulty in monitoring and mitigating catch of West Pacific leatherbacks in U.S. West Coast fisheries. Extrapolating from the observer coverage rate of approximately 3%, this produces an estimate of 35 individuals caught by the groundfish pot fleet during the 2006-10 period (Eguchi et al. 2017a). This extrapolation, however, results in large uncertainty regarding the actual interactions based on only a single bycatch incident in all U.S. west coast groundfish fisheries in the 14 years of observation (2002-2015). Conclusive statements about leatherback turtle bycatch in this fishery cannot be made without more data on the fishery (bycatch or no bycatch) and on the overlap between the fishery and leatherback turtles. Because the population consists of so few individuals, and is declining rapidly, even rare instances of leatherback bycatch necessitates measures to reduce deaths (*id.* p. 19).

In addition to the leatherbacks that are directly observed in fishing gear, some leatherbacks strand with evidence of fishing gear entanglements. Of all the strandings of dead leatherback sea turtles since 1963, five indicated evidence of fishery interactions (1993, 1998, 2003, 2008, and 2015), and all five were found in central and southern California (*id.*). Stranding records are based on discoveries of turtles, which underrepresents the total number stranded and gives little information about where the fishery gear entanglement occurred. Nevertheless, it shows the persistence of the fishing gear threat to leatherbacks in California.

Interactions of fisheries with leatherback sea turtles off California, Oregon, and Washington, have a particularly large impact to the population based on the likelihood that the turtles are adult females. Based on aerial surveys conducted off central California from 1990-2003, the majority of leatherbacks observed were larger subadults or adults (Benson et al. 2007). The sex ratio of

the West Pacific population is unknown, but researchers that have captured leatherbacks in-water off central California have documented that approximately 2 out of 3 leatherbacks were females (~66 percent) (*id.*). Thus, for management purposes NMFS has assumed that fisheries interact with adult female leatherback sea turtles off California (NMFS 2018b p. 52). Given the current estimate of 562 adult nesting leatherbacks in the West Pacific population (NMFS 2017b), any interaction with an adult female is significant to the population.

6.2.1.1. California's Pelagic Fisheries Threaten Leatherback Sea Turtles

Both drift gillnets and longline fishing for swordfish, tuna, and sharks off California interact with and threaten the persistence of leatherback sea turtles. Observed captures of leatherback sea turtles in the drift gillnet and longline fisheries coincide with the leatherback's seasonal foraging in the neritic waters off the U.S. West Coast (Benson et al. 2007b p. 4). All of the leatherback takes in the California/Oregon drift gillnet fishery occurred from September to January, with the majority of the takes occurring in October (NMFS Biological Opinion 2004 p. 182). Similarly, leatherback takes in the former West Coast-based longline fishery also occurred in October and November (NMFS 2004 p. 182).

Based on studies showing that ocean fronts and eddies attract both swordfish and leatherback sea turtles into the same areas, fishing gear interactions will continue to be problematic in California leatherback habitat (Scales et al. 2018; Hazen et al. 2018). Unless effective mitigation measures are implemented, the diversity of pelagic fishing gears proposed for use off California present a real and persistent threat to leatherback sea turtles.

The California drift gillnet fishery has been the primary threat to leatherback sea turtles off of California in recent decades. Between 1990 and 2001, twenty-three leatherbacks were observed taken in the drift gillnet fishery (PFMC & NMFS 2006 p. 121). Of the twenty-three taken, sixteen leatherbacks died from their capture, constituting a mortality rate of 70% (PFMC & NMFS 2006 p. 122). These observed interactions, when added to interactions with the longline fishery, led to an estimate of up to 60 annual leatherback takes for the drift gillnet and West Coast longline fisheries (NMFS 2004 pp. 202, 203).

In 2000, an Endangered Species Act section 7 consultation and biological opinion concluded that the incidental leatherback mortality in the California/Oregon drift gillnet fishery would jeopardize the survival and recovery of the endangered leatherback (PFMC & NMFS 2006 p. 159). In 2001, the drift gillnet fishery was consequently prohibited between August 15th and November 15th annually in the area where most leatherback interactions occurred (81 Fed. Reg. 70660). The seasonally closed area, designated the "Pacific Leatherback Conservation Area," spans diagonally from Pt. Sur to a point due west of Pt. Conception, out to 129º west longitude and north to 45º north latitude (PFMC & NMFS 2006 p. 122).

Since management measures to reduce leatherback interactions were put in place in 2001 (the Pacific Leatherback Conservation Area), two leatherbacks were observed taken and released alive in the California drift gillnet fishery, one in 2009 and one in 2012 (NMFS 2013). In 2013, NMFS issued a biological opinion on the continued authorization of the West Coast drift gillnet

fishery anticipating incidental interactions with ten leatherback sea turtles over a five-year period, including up to seven lethal interactions (*id*.).

These anticipated interactions with the drift gillnet fishery will have a population-level impact; NMFS scientists have determined that any more than one leatherback mortality per seven years will delay the population's recovery (Curtis et al. 2015). As mentioned above, almost all of the leatherbacks foraging off the U.S. West Coast are from the Jamursba-Medi's nesting population of females (Benson et al. 2011 p. 6) (Figure 2).

In part due to the impacts of the fishery on leatherback sea turtles, in September 2018, the California Governor signed a bill that would phase-out the use drift gillnets over four years (S.B. 1017). The Department will notify fishermen of their eligibility for the transition program when funding is available (14-Z Cal. Regulatory Notice Reg. 532, 533, Apr. 5, 2019).

Highly migratory species longline fisheries are currently prohibited in the U.S. Exclusive Economic Zone, but industry efforts to introduce longlines, buoy gear and linked buoy gear to catch pelagic fish like swordfish to the U.S. West Coast continue. Recently a number of longline vessels that land catch in California ports have organized as the California Pelagic Fisheries Association (NMFS 2016). Members have expressed interest in fishing in the future as part of a California-based fishery (*id.*). The Pacific Fishery Management Council discussed authorizing a shallow-set longline fishery under the Highly Migratory Species Fishery Management Plan as recently as the November 2019 meeting, but delayed the agenda item until the Highly Migratory Species Management Team reported on three questions from the Council. In April 2019 NMFS issued exempted fishing permits to use the gear in the Exclusive Economic Zone off California (84 Fed. Reg. 20,108 (May 8, 2019)).

The history of longlines provides evidence that this gear is a threat to the persistence of leatherback sea turtles. In Pacific longline fisheries, 27% of captured leatherbacks are estimated killed (Kaplan 2005). In 2000, pelagic longlines in the Pacific captured an estimated 20,000 leatherbacks, resulting in the mortality of an estimated 1,000-3,200 leatherbacks (Lewison et al. 2004).

6.2.1.2. Foreign Fishing Threatens Pacific Leatherbacks

Leatherbacks are also highly vulnerable to threats from fishing gear near their nesting habitats (PFMC & NMFS 2006 p. 122; NMFS & USFWS 2013; Tapilatu 2017 p. 131). In the West Pacific Ocean, illegal fishing occurs in the waters off Indonesia's most important nesting beaches and communities in the area have reported dead leatherbacks entangled in fishing nets and marine debris (Hitipeuw et al. 2007 p. 34). In addition, the waters adjacent to Jamursba-Medi are increasingly being targeted by national and foreign fishing fleets (Lewison et al. 2004 p. 225).

Many countries' commercial fleets operate in areas beyond national jurisdiction (ABNJ) and interact with leatherback sea turtles. From 1989-2015, 331 leatherback interactions were reported by 16 countries that operate in the West and Central Pacific Ocean (ABNJ 2017). Based on these reports NMFS estimated that the total leatherback interactions were approximately 6620 – or 245 annually – for those 16 countries that participated in the ABNJ exercise in 2017 (NMFS 2019;

Table 2). Other estimates of leatherback interactions are higher, with two estimating that between 200 and 700 leatherbacks are caught annually in the North Pacific Ocean (*id*.).

Table 2. Summary of estimated interactions of leatherback sea turtles in the North Pacific Ocean (Source: NMFS 2019 p. 255).

Source	Estimate	Time Frame	Annual Average
Beverly and Chapman 2008	200-640 juveniles and adults	Annually	200-640
Lewison et al. 2004	1,000-3,200	Year 2000	1,000-3,200
ABNJ 2017	6,620	1989-2015	245
Peatman et al. 2018	9,923 median	2003-2017	709

International measures to reduce the threat of shallow-set longline fisheries to leatherback sea turtles may not be working as well as hoped. For example, the Western and Central Pacific Fisheries Commission (WCPFC) considered in 2008 that the threat to sea turtles was sufficiently severe to warrant the adoption of a measure specifically requiring mitigation to reduce sea turtle mortality from longline interactions (CMM 2008-03); there is no evidence to suggest that those threats have appreciably diminished (ABNJ 2017). One reason for this is that though approximately 20% of the fishing effort uses shallow-set longlines, analysis indicates that <1% of fishing effort is subject to mitigation (*id*.). Each country establishes and enforces their definition of "shallow-set," creating flexibility in the conservation measure that weakens its effectiveness (*id.*).

Even if all shallow-set longlines were compliant with CMM 2008-03, the conservation benefits would be less than if the Commission reduced mortality and interactions in deep-set longlines (NMFS 2017d). First, sea turtle mortality reductions would be greater if measures applied to deep-set longlines because sea turtles caught in deep sets have a higher probability of asphyxiation (*id*.). Second, reducing overall interactions would have a larger benefit in the deep-set fishery because there are four times as many deep-set hooks set as shallow-set hooks. Even though shallow-set longlines are more likely to interact with leatherback sea turtles, the scale of the deep-set longline fishery means that the maximum interaction reduction possible through mitigation is greater than the maximum reduction possibly obtained with shallow-set mitigation (*id*.).

Low observer coverage hinders creation of measures specific to mitigating leatherback sea turtle interactions and mortality in longlines in the North Pacific Ocean (ABNJ 2018 p. 10). To detect relatively rare bycatch events requires close to 100% observer coverage; yet in the North Pacific Ocean, longline coverage is between 1.0-4.5% (*id*.).

6.2.2. Harvest of Adults and Eggs at Nesting Beaches

The harvest of leatherbacks and/or their eggs at nesting and marine environments constitutes a widespread threat to these turtles in the tropical Pacific (NMFS & USFWS 1998, 2013 pp. 21,

23). Historically, female leatherbacks have been severely harvested at their nesting beaches and have been subjected to harvest at sea (NMFS & USFWS 1998 p. 21). Leatherbacks are harvested for subsistence on West Pacific islands (PFMC & NMFS 2006 p. 71) and in the eastern Pacific, leatherback meat can still be found for sale on occasion in local Chilean, Peruvian, and Mexican markets (NMFS & USFWS 1998 p. 23).

Across the Pacific, leatherback populations have yet to recover from years of historical egg harvests that depleted recruitment of their populations (Hitipeuw et al. 2007 p. 23). Population declines are exacerbated by the removal of large juveniles and mature individuals while the persistent harvest of eggs inhibits the recruitment of the next generation of leatherbacks (NMFS & USFWS 1998 p. 21). A large-scale leatherback egg harvest persisted on Jamursba-Medi during the 1980s where 50,000-75,000 eggs were observed taken weekly by several boats in 1984 and 1985 (NMFS & USFWS 1998 p. 23). Incidental mortality from fishing along with the severe harvest of leatherback eggs are the two major factors responsible for the collapse of the Pacific leatherback population (PFMC & NMFS 2006 p. 67).

6.3. Predation

6.3.1. Nest Predation

At some nesting beaches, predation upon leatherback eggs by feral pigs and other animals can be a serious problem (Hitipeuw et al. 2007 p. 30). Jamursba-Medi suffers from extensive egg predation from wild pigs, resulting in the destruction of an estimated 14%-93% of leatherback nests (Hitipeuw et al. 2007 p. 34). At nearby Wermon, feral pigs and dogs accounted for the destruction of 17.5% of the observed nests in 2003-04 (Hitipeuw et al. 2007 p. 30). Elsewhere in the Pacific, leatherback nests are destroyed by predation from domestic animals and wild species including rats, mongoose, birds, monitor lizards, snakes, crabs, ants and other invertebrates (NMFS & USFWS 1998).

6.4. Disease

The first leatherback with the tumor-forming disease fibropapillomatosis was seen in Mexico on the Pacific coast in 1997 (Huerta et al. 2002). Likely caused by a herpesvirus (Ene et al. 2005), internal and external tumors (fibropapillomas) may grow large enough to hamper swimming, vision, feeding, and potential escape from predators (Herbst 1994). Other sea turtle species are more commonly afflicted.

6.5. Other Natural Events or Human-Related Activities

6.5.1. Climate Change

Global warming represents perhaps the greatest long-term threat to the leatherback sea turtle's survival. Conservation gains for the species coming from reductions in fisheries bycatch and protection in nesting beaches may be offset by inundation of nesting beaches from rising sea levels and increased storminess; reduction in hatching success and skewed sex ratios due to warmer nesting temperatures; and declines in ocean productivity from warming waters and ocean acidification. Each of these impacts is briefly described below.

6.5.1.1. Ocean Warming Affects Pacific Leatherback Sea Turtles

The global oceans are warming rapidly and at unprecedented magnitude (IPCC 2013). The average global temperature across land and ocean surfaces in 2016 was +0.94ºC (1.69ºF) above the 20th century average of 13.9ºC (57.0ºF) (NCEI 2017). The year 2017 was the third warmest year on record and 2018 is also expected to be among the warmest (NCEI 2017). Most of this record in average global temperatures is attributed to record warmth in the global oceans. Since 1955, the global oceans have absorbed over 90% of the excess heat trapped by greenhouse gas emissions (Levitus et al. 2012).

Notably, the largest increases in global ocean temperature have occurred in the upper ocean where primary production is concentrated and appears to be affecting global ocean productivity (Behrenfeld et al. 2006). Global ocean temperatures have increased by 0.31 °C on average in the upper 300 m during the past 60 years (1948-1998) with some ocean basins experiencing even greater warming (Levitus et al. 2000). Significant global declines in net primary production between 1997-2005 were attributed to reduced nutrient enhancement due to ocean surface warming (Behrenfeld et al. 2006).

Ocean warming has already affected the California Current System, the main foraging area for leatherbacks in the Northeast Pacific. The temperature of the upper 100m of the southern California Current System increased by 1.2-1.6ºC between the 1950s and 1990s (Roemmich & McGowan 1995), a trend that continued through the late 1990s (Lynn et al. 1997), mid 2000s (Peterson et al. 2006) and mid 2010s (Peterson et al. 2015). This surface warming is weakening the upwelling of nutrient-rich waters off the California coast. Surface warming causes increased stratification of the water column by intensifying the density differences between the warmer surface layer and deeper, cold, nutrient-rich layer (Behrenfeld et al. 2006). Surface warming is also associated with the deepening of the thermocline (i.e. a deepening of warmer waters) in coastal regions of the California Current System in the last 50 years (Palacios 2004). In short, stronger thermal stratification and a deepening of the thermocline inhibit cool, nutrient-rich waters from being upwelled leading to lower productivity and less prey for leatherback turtles.

Warming ocean waters are already having measurable negative effects on marine turtles and their habitat, including leatherback turtles. Water temperature is an important factor determining quality of foraging areas, phenology, and nesting success of leatherback turtles. Even small changes in ambient temperature outside the natural range can substantially disrupt population growth.

Foraging areas of leatherbacks within the California Current System are affected by warming. The California Current System runs along the west coast of North America from southern British Columbia to northern Baja California and is already affected by ocean warming and changes in the El Niño Southern Oscillation (ENSO) events (Di Lorenzo et al. 2005; Jacox et al. 2016; Frischknecht et al. 2017). The main foraging habitat of leatherbacks in California waters is part of the California Current System (Block et al. 2011; NMFS & USFWS 2013 p. 7). This highly productive coastal upwelling ecosystem relies on seasonal, wind-driven upwelling of deep, cold, nutrient-rich water to the surface layer that drives phytoplankton and zooplankton production (Huyer 1983). This system is highly sensitive to changes in the strength and timing of seasonal

upwelling that can drive changes in ocean primary productivity and prey availability for leatherback turtles.

Disruption of coastal upwelling in the California Current System due to warming anomalies can affect the distribution and availability of plankton, including key leatherback prey species. Slackening of upwelling-favorable winds coupled with the northward transport of warm water results in weakening of coastal upwelling along the California coast (Bograd et al. 2009), leading to lower plankton productivity and less jellyfish (Roemmich & McGowan 1995; Ruzicka et al. 2012), the primary prey of leatherbacks. Delays in the onset of upwelling can also have severe ecosystem consequences in the pelagic food change within the California Current System (Fisher et al. 2015). For example, a month delay in the onset of spring upwelling during the warm conditions of 2005 resulted in reduced nutrient levels, lower primary production (Thomas & Brickley 2006) and reduced biomass of zooplankton (Mackas et al. 2006) accompanied by low recruitment of rocky intertidal organisms (Barth et al. 2007) and breeding failures of seabirds (Sydeman et al. 2006).

Warming anomalies and reduced upwelling in the California Current System have also resulted in marked ecological effects including decreased productivity and altered ecosystem structure. Between 1951 and 1993, macrozooplankton off the California coast declined by 80% due to surface water warming up to 1.5°C (Roemmich & McGowan 1995). The composition of coastal and pelagic forage species, including euphausiid and larval fish assemblages, has also shifted (Brinton & Townsend 2003). The decreased productivity of the California Current System due to ocean warming has also affected the distribution and productivity of the seabird community (Hyrenbach & Veit 2003) and prey availability for sea lions causing unusual pup mortality (Leising et al. 2015 p. 60). Similarly, availability of leatherback prey is potentially reduced during warming anomalies and reduced upwelling when these turtles are foraging in waters of California and Oregon during spring and summer (Benson et al. 2007b).

Phenology shifts in leatherback turtles are already happening due to changes in sea surface temperature (Neeman et al. 2015). Changes of water temperature in foraging grounds delays the timing of the nesting season in some nesting beaches of the Central Atlantic and the eastern Pacific (Neeman et al. 2015). It is likely that leatherback turtles spend substantially more time in foraging grounds when prey distribution and availability is disrupted during warming conditions (Neeman et al. 2015 p. 121).The implications of delaying nesting seasons on hatchling success and survival for leatherbacks nesting in the West Pacific require further study. Yet, if the current trend (~0.3 day/yr) of delayed nesting season in the eastern Pacific (e.g., Playa Grande, Costa Rica) holds in the future, nesting females will experience increasingly adverse conditions for hatching success (Robinson et al. 2014).

Reproductive success of leatherback turtles in nesting areas of the Pacific also is affected by global warming. A study of Eastern Pacific nesting leatherback turtles found significantly reduced reproductive output in El Niño years (Reina et al. 2009; Santidrián Tomillo et al. 2012), conditions that are likely to become more common with global warming (Saba et al. 2012). Studies of Atlantic leatherbacks have also documented changing distributions of the species as the climate warms (Patino-Martinez et al. 2011). A study predicting severity of the threat of global warming to leatherback sea turtles found that incubation temperatures would be high

enough to induce uncoordinated movement in adults, leading them to leave some regions (Dudley and Porter 2014).

Skewing of sex ratios driven by warming temperatures at nesting beaches are more prevalent given the temperature-dependent nature of egg development (Davenport 1997). The effects of global warming on sea turtle sex ratios has been studied for green, loggerheads, hawksbill, and leatherbacks sea turtles (Hays et al. 2003; Fuller et al. 2013; Hawkes et al. 2013; Santidrián Tomillo et al. 2014; Laloë et al. 2016). In Pacific leatherbacks, high temperatures in nesting beaches at Playa Grande in Costa Rica already are producing 70-90% females and experts predict that 100% of hatchlings will be females (or there will be major hatching failures) with continuing warming (Santidrián Tomillo et al. 2014). Increasing nest temperatures also are taking a toll on West Pacific nesting populations. At Jamursba-Medi in Indonesia, where California/Oregon leatherbacks nest, reduced hatching success has been documented with hatch rates of protected nests of 50-85% until 2003 and only 10-15% in 2004-2006 (Tapilatu & Tiwari 2007). Reduction of hatching success has likely contributed in part to the long term decline in this important nesting leatherback population (Tapilatu et al. 2013).

In sum, warmer foraging waters and nesting beach temperatures already are adversely affecting leatherback sea turtles both in U.S. waters off California and throughout the Pacific. These impacts are severe and currently ocean warming represents an unmanaged threat to the continued viability of the species. Unfortunately, ocean warming is not the only climate change-related threat to leatherbacks. Sea level rise will inundate nesting beaches while ocean acidification affects the pelagic food web upon which leatherbacks are dependent.

6.5.1.2. Sea Level Rise Affects Nesting Success of Pacific Leatherback Sea Turtles

The last and fifth assessment report (AR5) of the Intergovernmental Panel on Climate Change (IPCC) predicts that global mean sea level is "likely" to rise between 0.52 to 0.98 m on average by 2100 under the highest emission scenario (Church et al. 2013; IPCC 2013). Current and less conservative climate models predict that sea levels have actually increased at a much higher rate in the 20th century (e.g., 1.2 mm/year in 1901-1990 and 3.0 mm/year in 1993-2010) (Hay et al. 2015). Experts estimate that the magnitude of future sea-level rise, given the higher contribution of the loss of Greenland and Antarctic ice sheets (Rignot et al. 2011), is estimated to be much higher with a likely range of 0.7-1.2 m by 2100 (Horton et al. 2014). In fact, Antarctica alone can potentially contribute to more than one meter of sea-level rise by the end of the century if emissions continue at the current levels (DeConto & Pollard 2016). Multiple positive feedback mechanisms including reduced surface albedo, loss of buttressing ice shelves, increasing and lowered ice surface altitude will accelerate the rate and magnitude of sea level rise (Hansen et al. 2006).

Sea-level rise will inundate low-lying beaches where sand depth is a limiting factor for leatherbacks. Leatherback turtles are particularly vulnerable to sea level rise due to their tendency to nest in the cooler tide zone of beaches (Patino-Martinez et al. 2014). Flooded nesting sites will decrease available nesting habitat (Fuentes et al. 2009; Von Holle et al. 2019). In addition to inundating nesting sites, climate will also affect nesting success of leatherbacks due to the increase in the severity of storms and changes in the prevailing currents that could lead to

increased beach erosion and loss of suitable nesting habitat (Fuentes & Abbs 2010). Moreover, sea level rise is likely to promote more shoreline stabilization activities that will further increase the loss of potential nesting habitat (NMFS & USFWS 2013 p. 46). The capacity of female leatherbacks to occupy new nesting habitat will determine whether this species adapts to rapid sea level rise. Thus, sea level rise must be viewed as a significant long-term threat to the survival of the species.

6.5.1.3. Ocean Acidification

The California Current system is already affected by ocean acidification (Hauri et al. 2009, 2013; Gruber et al. 2012; Feely et al. 2017), potentially disrupting the food web on which leatherbacks rely for foraging (Ruzicka et al. 2012 p. 29). Ocean acidification can be an indirect threat to leatherbacks in foraging areas because their primary prey (jellyfish) belongs to a complex food web (Ruzicka et al. 2012 p. 29) where several taxa are highly vulnerable to acidic conditions. Phytoplankton, pteropods, shelled zooplankton, euphausiids, and larvae of invertebrates and fish are all potential prey for small and large jellyfish (Ruzicka et al. 2012 p. 29). Some of these groups (e.g., pteropods) are known to be highly susceptible to ocean acidification within the California Current system (Bednaršek & Ohman 2015; Hodgson et al. 2018). A decline in jellyfish production can affect food availability for leatherbacks along the U.S. West Coast during summer and autumn, when dense aggregations of jellyfish historically have been present (Graham et al. 2010; Benson et al. 2007b).

Ocean acidification is directly related to the increase in atmospheric CO_2 emissions globally. Atmospheric CO_2 concentrations reached average annual levels of over 406.5 parts per million (ppm) globally in 2017 (NASA Global Climate Change 2018), which is higher than at any point during the last 800,000 years (Lüthi et al. 2008). Over the past 200 years, the global oceans have absorbed approximately 25% of the anthropogenic CO_2 released to the atmosphere (Canadell et al. 2007; IPCC 2014). Anthropogenic CO_2 emissions from burning fossil fuels, cement production, and land use increased globally at a rate of 10.3 giga tones of CO_2 equivalent per year (GtC yr^{-1}) from 2006 to 2015 (Le Quéré et al. 2016), reaching over 40 $GtCO_2$ in 2015 (Rogelj et al. 2016). Approximately 2.6 GtC yr^{-1} (i.e., 26% of total emissions) entered the global oceans in the last decade (Le Quéré et al. 2016).

As the global oceans uptake the excess of CO_2, seawater chemistry profoundly changes and the oceans become more acidic (Orr et al. 2005; Fabry et al. 2008; Fabry 2009; Doney et al. 2009; Gattuso & Hansson 2011; Carter et al. 2016, 2017). The average pH of the global surface ocean has already decreased by 0.1 units (from 8.2 to 8.1 pH units) which represent a 30 % increase acidity and a 10% decrease in carbonate ion concentration in comparison with pre-industrial levels (Feely et al. 2004; Caldeira & Wickett 2005; Orr et al. 2005; Cao & Caldeira 2008; Doney et al. 2009; Byrne et al. 2010). Once anthropogenic CO_2 enters the oceans it is impossible to remove it and the global oceans may require thousands of years to naturally return to a higher pH state (Solomon et al. 2009).

Changes in ocean chemistry due to increasing absorption of carbon dioxide concentration emitted by human activities is unprecedented in the geological record (Honisch et al. 2012). The oceans are becoming acidic at a rate faster than they have in the past ~300 million years, a period that includes three major mass extinctions (Zeebe 2012; Hönisch et al. 2012). The current change

in seawater chemistry is an order of magnitude faster than what occurred 55 million years ago during Paleocene-Eocene Thermal Maximum, which is considered to be the closest analogue to the present, when 96% of marine species went extinct (Zeebe 2012; Hönisch et al. 2012). Long term monitoring and modeling studies of waters across the Pacific West Coast of the United States show a clear pH decline over the past decades (Beman et al. 2011; Friedrich et al. 2012; Chan et al. 2016, 2017; Feely et al. 2016, 2017). In fact, anthropogenic ocean acidification already exceeds the natural variability on regional scales and is detectable in several Pacific regions (Friedrich et al. 2012; McLaughlin et al. 2015; Takeshita et al. 2015).

In sum, climate change is expected to alter the abundance and distribution of leatherback sea turtle prey via changes to ocean acidity.

7. THE DEGREE AND IMMEDIACY OF THREAT

Indicate the immediacy of the threat and the magnitude of loss or rate of decline that has occurred to the present or is expected to occur without protective measures.

Pacific leatherback sea turtles are in such dire straits that the National Marine Fisheries Service named them one of eight "Species in the Spotlight" that are most at-risk of extinction. With only around 550 annually nesting adult, female West Pacific leatherbacks left, every individual in waters off California is significant.

Without additional California protective measures, federal government efforts to introduce longlines to the West Coast exclusive economic zone (EEZ) are likely to continue. As discussed above, NMFS has issued a Longline Exempted Fishing Permit to target swordfish and other highly migratory species (HMS) in the West Coast EEZ. 84 Fed. Reg. 20,108. This controversial permit allowed deep-set and shallow-set longline fishing inside the West Coast EEZ, even though state law banned this type of fishing method. *See* Cal. Fish & Game Code § 9028. NMFS anticipated that the exempted fishing proposed would capture two leatherback sea turtles; the risk of an interaction is relatively high because fishing will occur during a time and in the area encompassed by the Pacific Leatherback Conservation Area (NMFS 2018b). Despite the predicted interactions, the federal government has denied the California Coastal Commission's request to review of the EFP application under the Coastal Zone Management Act. (Kuipers 2019).

8. INADEQUACY OF EXISTING REGULATORY MECHANISMS

Despite protections both domestically and internationally, Pacific leatherback sea turtle populations continue to decline. The suite of federal environmental conservation actions includes the Endangered Species Act's identification of critical habitat and prohibition on take, national marine sanctuaries, and fishing restrictions in the Pacific Leatherback Conservation Area. Nonetheless, these protections have not sufficiently mitigated the cumulative impact of anthropogenic activities on leatherback sea turtles (Maxwell et al. 2013). In particular, anthropogenic activity around the central coast of California has high cumulative impacts on leatherback sea turtles (*id.*). Leatherback sea turtles are more vulnerable to ocean pollution, shipping, and fishing than other protected species off the coast of California (*id.*). Protections remain inadequate.

Fisheries remains the primary threat to leatherback sea turtles despite a suite of national and international laws designed to protect them, as discussed in detail above. Obstacles to overcome include monitoring and aggregating bycatch data over the large geographic area that West Pacific leatherbacks migrate. That in turn contributes to the problem that fisheries managers lack data to justify discouraging fishing to the degree needed to save Pacific leatherback sea turtles.

Plastic pollution remains largely unmitigated. The amount of plastic debris entering the ocean is expected to increase by an order of magnitude by 2025 (Iverson 2019). A large coastal population and a high waste production per capita means that the United States, and likely California specifically, impacts total marine debris in the global ocean (*id.*). Regulations to address this issue on the scale at which it is growing do not yet exist (*id*.).

Fishing nets make up almost half of the plastic pollution by size in the Great Pacific Garbage Patch alone (Lebreton et al. 2018). In the United States, the largest sources of derelict fishing gear are gillnets and crab pots (Iverson 2019). While efforts in Washington and California are underway to retrieve derelict pots at the end of the season, these efforts are limited compared to the scale of the problem, do not include measures to prevent gear loss, and do not mitigate the impact of gear loss by requiring use of biodegradable materials.

Climate change remains an existential threat to leatherback sea turtles, as well as other marine animals, due to the inadequacy of regulatory mechanisms in controlling emissions of carbon dioxide. As stated above, unless carbon dioxide emissions are significantly reduced in the near-term future, global warming and the related threat of ocean acidification are likely to pose a serious threat to the critically endangered leatherback sea turtle.

9. RECOMMENDED FUTURE MANAGEMENT AND RECOVERY ACTIONS

Management actions in California can address threats to the leatherback sea turtle such as plastic pollution, fisheries, aquaculture, and climate change. All these threats, as discussed above, can and should be mitigated at the State level.

Recommendations for the management and recovery of the Pacific leatherback sea turtle include, at a minimum:

- California Department of Fish and Wildlife protects leatherback sea turtles as an endangered species under the California Endangered Species Act;

- California Department of Fish and Wildlife prepares a recovery plan for Pacific leatherback sea turtles pursuant to Cal. Fish & Game Code § 2079.1, including management efforts aimed at reducing toxins in the habitat and impacts from ocean warming and acidification.

- California Department of Fish and Wildlife improves monitoring of leatherback sea turtle abundance and population trends;

- California Department of Fish and Wildlife increases coordination and management with other governments – such as the National Park Service, National Marine Sanctuaries, Department of Defense, and others – to research movements of leatherback sea turtles off the U.S. West Coast;

- California Department of Fish and Wildlife and the California Fish and Game Commission manage California fisheries to reduce interactions (gear modifications, limited soak time for fixed gears, time and area closures, etc.);

- California Department of Fish and Wildlife encourages the Pacific Fisheries Management Council (PFMC) to address continued bycatch of endangered sea turtles and adopt practices to avoid sea turtle entanglements, including phasing out current gear associated with entanglements, particularly in federal gillnet, longline, and pot fisheries;

- California Department of Fish and Wildlife, working with the California Fish and Game Commission, sets a hard limit on the incidental capture of leatherback sea turtles in California-managed fisheries that historically have interacted with leatherback sea turtles or by analogy to fishing gear that has interacted with leatherback sea turtles, and require 100% observer coverage or electronic monitoring to accurately enforce the limit;

- California Department of Fish and Wildlife utilizes existing legal and regulatory frameworks to minimize local contributors to ocean acidification (*e.g.,* eutrophication); and

- The governor declares a climate emergency and takes all necessary action to set California on a path to full decarbonization of our economy by no later than 2045 (for example, banning the sale of new fossil fuel vehicles by 2030 and requiring the generation of all electricity from carbon-free sources by 2030).

We look forward to discussing additional state actions that can protect leatherback sea turtles.

10. CONCLUSION

The Pacific leatherback sea turtle is an iconic California treasure. The State Legislature recognized as much by designating it as the official marine reptile. Cal. Govt. Code § 422.5. The 2012 Pacific Leatherback Sea Turtle Act describes the leatherback sea turtle as "a central component of California's natural heritage and marine biodiversity."[2] The California Legislature, Governor, and citizens honor and celebrate California's leatherbacks during Pacific leatherback sea turtle day every October 15. Cal. Govt. Code § 7593.5. It is imperative that California afford every protection to save the leatherback from extinction.

As detailed above, in conformance with the requirements of Cal. Code Regs., tit. 14, § 670.1, this petition presents scientific information regarding the Pacific leatherback's life history,

[2] AB 1776, § 1(b), available at https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201120120AB1776.

population trend, range, distribution, abundance, kind of habitat necessary for survival, factors affecting the ability to survive and reproduce, degree and immediacy of threat, impact of existing management efforts, suggestions for future management, availability of sources and information, and detailed distribution maps.[3] That information clearly demonstrates that the Pacific leatherback sea turtle is eligible for and warrants listing under CESA based on the factors specified in the statute and implementing regulations.

The California Endangered Species Act would bestow additional protections and safeguards to leatherback sea turtles. In addition to these protections, the designation would increase the visibility of the leatherback sea turtle's plight state-wide and nationally.

[3] Information on suggestions for future management and availability of sources and information are contained in the Management Recommendations and References sections *infra*.

11. LITERATURE CITED

Copies of references cited in the petition are either linked to websites below or included as files on a disk accompanying a hard copy of the petition sent to the Commission.

ABNJ. 2017. Joint Analysis of Sea Turtle Mitigation Effectiveness. WCPFC-SC13-2017/EB-WP-10. Rarotonga, Cook Islands, 9-17 August 20.

ABNJ. 2018. Workshop Proceeding: WCPFC Bycatch Mitigation Problem-Solving. 28 – 30 May 2018 NOUMÉA, NEW CALEDONIA.

Bailey H, Benson SR, Shillinger GL, Bograd SJ, Dutton PH, Eckert SA, Morreale SJ, Paladino FV, Eguchi T, Foley DG. 2012. Identification of distinct movement patterns in Pacific leatherback turtle populations influenced by ocean conditions. Ecological Applications **22**:735–747.

Barth JA, Menge BA, Lubchenco J, Chan F, Bane JM, Kirincich AR, McManus MA, Nielsen KJ, Pierce SD, Washburn L. 2007. Delayed upwelling alters nearshore coastal ocean ecosystems in the northern California current. Proceedings of the National Academy of Sciences **104**:3719–3724.

Bednaršek N, Ohman M. 2015. Changes in pteropod distributions and shell dissolution across a frontal system in the California Current System. Marine Ecology Progress Series **523**:93–103.

Behrenfeld MJ, O'Malley RT, Siegel DA, McClain CR, Sarmiento JL, Feldman GC, Milligan AJ, Falkowski PG, Letelier RM, Boss ES. 2006. Climate-driven trends in contemporary ocean productivity. Nature **444**:752–755.

Beman JM, Chow C-E, King AL, Feng Y, Fuhrman JA, Andersson A, Bates NR, Popp BN, Hutchins DA. 2011. Global declines in oceanic nitrification rates as a consequence of ocean acidification. Proceedings of the National Academy of Sciences **108**:208–213.

Benson SR. 2015. Email to Mark Delaplaine, California Coastal Commission, and Peter Dutton, NMFS, dated September 28, 2015, Re: leatherback sea turtle trends, neritic zone, CA.

Benson SR et al. 2011. Large-scale movements and high-use areas of western Pacific leatherback turtles, *Dermochelys coriacea*. Ecosphere **2**:art84.

Benson SR, Dutton PH, Hitipeuw C, Samber B, Bakarbessy J, Parker D. 2007a. Post-Nesting Migrations of Leatherback Turtles (Dermochelys coriacea) from Jamursba-Medi, Bird's Head Peninsula, Indonesia. Chelonian Conservation and Biology **6**:150–154.

Benson SR, Forney KA, Harvey JT, Carretta JV, Dutton PH. 2007b. Abundance, distribution, and habitat of leatherback turtles (Dermochelys coriacea) off California, 1990−2003. Fishery Bulletin **105**:337–347.

Bickham JW, Carr JL. 1983. Taxonomy and Phylogeny of the Higher Categories of Cryptodiran Turtles Based on a Cladistic Analysis of Chromosomal Data. Copeia **1983**:918–932.

Binckley CA, Spotila JR, Wilson KS, Paladino FV. 1998. Sex Determination and Sex Ratios of Pacific Leatherback Turtles, Dermochelys coriacea. Copeia **1998**:291–300.

Bjorndal KA, Lutz PL, Musick JA. 1997. Foraging ecology and nutrition of sea turtles. The biology of sea turtles **1**:199–231.

Block BA et al. 2011. Tracking apex marine predator movements in a dynamic ocean. Nature **475**:86–90.

Bograd SJ, Schroeder I, Sarkar N, Qiu X, Sydeman WJ, Schwing FB. 2009. Phenology of coastal upwelling in the California Current. Geophysical Research Letters **36**. Available from http://doi.wiley.com/10.1029/2008GL035933 (accessed May 31, 2018).

Bostrom BL, Jones DR. 2007. Exercise warms adult leatherback turtles. Comparative Biochemistry and Physiology Part A: Molecular & Integrative Physiology **147**:323–331.

Bostrom BL, Jones TT, Hastings M, Jones DR. 2010. Behaviour and Physiology: The Thermal Strategy of Leatherback Turtles. PLOS ONE **5**:e13925.

Brinton E, Townsend A. 2003. Decadal variability in abundances of the dominant euphausiid species in southern sectors of the California Current. Deep Sea Research Part II: Topical Studies in Oceanography **50**:2449–2472.

Bugoni, L., Krause, L. and Petry, M.V., 2001. Marine debris and human impacts on sea turtles in southern Brazil. Marine pollution bulletin, 42(12), pp.1330-1334.

Byrne RH, Mecking S, Feely RA, Liu X. 2010. Direct observations of basin-wide acidification of the North Pacific Ocean. Geophysical Research Letters **37**:L02601. Available from http://onlinelibrary.wiley.com/doi/10.1029/2009GL040999/abstract (accessed September 8, 2015).

Caldeira K, Wickett ME. 2005. Ocean model predictions of chemistry changes from carbon dioxide emissions to the atmosphere and ocean. Journal of Geophysical Research: Oceans **110**:C09S04.

Canadell JG, Quéré CL, Raupach MR, Field CB, Buitenhuis ET, Ciais P, Conway TJ, Gillett NP, Houghton RA, Marland G. 2007. Contributions to accelerating atmospheric CO2 growth from economic activity, carbon intensity, and efficiency of natural sinks. Proceedings of the National Academy of Sciences **104**:18866–18870.

Cao L, Caldeira K. 2008. Atmospheric CO_2 stabilization and ocean acidification. Geophysical Research Letters **35**. Available from http://doi.wiley.com/10.1029/2008GL035072 (accessed October 24, 2015).

Carter, B.R., Feely, R.A., Mecking, S., Cross, J.N., Macdonald, A.M., Siedlecki, S.A., Talley, L.D., Sabine, C.L., Millero, F.J., Swift, J.H. and Dickson, A.G., 2017. Two decades of Pacific anthropogenic carbon storage and ocean acidification along Global Ocean Ship-based Hydrographic Investigations Program sections P16 and P02. Global Biogeochemical Cycles. Available from http://onlinelibrary.wiley.com/doi/10.1002/2016GB005485/full (accessed March 10, 2017).

Carter BR, Frölicher TL, Dunne JP, Rodgers KB, Slater RD, Sarmiento JL. 2016. When can ocean acidification impacts be detected from decadal alkalinity measurements? Global Biogeochemical Cycles **30**:2015GB005308.

Chan E-H. 2006. Marine turtles in Malaysia: On the verge of extinction? Aquatic Ecosystem Health & Management **9**:175–184.

Chan EH, Liew HC. 1996. Decline of the leatherback population in Terengganu, Malaysia, 1956-1995. Chelonian Conservation and Biology **2**:196–203.

Chan F et al. 2016. The West Coast Ocean Acidification and Hypoxia Science Panel: Major Findings, Recommendations, and Actions. Page 40. California Ocean Science Trust, Oakland, California. Available from http://westcoastoah.org/wp-content/uploads/2016/04/OAH-Panel-Key-Findings-Recommendations-and-Actions-4.4.16-FINAL.pdf.

Chan, F., Barth, J.A., Blanchette, C.A., Byrne, R.H., Chavez, F., Cheriton, O., Feely, R.A., Friederich, G., Gaylord, B., Gouhier, T. and Hacker, S., 2017. Persistent spatial structuring of coastal ocean acidification in the California Current System. Scientific Reports 7:2526.

Church, J.A., Clark, P.U., Cazenave, A., Gregory, J.M., Jevrejeva, S., Levermann, A., Merrifield, M.A., Milne, G.A., Nerem, R.S., Nunn, P.D. and Payne, A.J., 2013. Sea-level rise by 2100. Science **342**:1445–1445.

Climate Action Tracker. 2017. Improvement in warming outlook as India and China move ahead, but Paris Agreement gap still looms large | Climate Action Tracker. Available from https://climateactiontracker.org/publications/improvement-warming-outlook-india-and-china-move-ahead-paris-agreement-gap-still-looms-large/ (accessed January 08, 2020).

CMM 2008-03, Conservation and Management of Sea Turtles, Western and Central Pacific Fisheries Commission, https://www.wcpfc.int/doc/cmm-2008-03/conservation-and-management-sea-turtles.

Curtis, K.A., Moore, J.E. and Benson, S.R., 2015. Estimating limit reference points for western Pacific leatherback turtles (*Dermochelys coriacea*) in the US west coast EEZ. PloS one, 10(9), p.e0136452.

Davenport J. 1997. Temperature and the life-history strategies of sea turtles. Journal of Thermal Biology **22**:479–488.

DeConto RM, Pollard D. 2016. Contribution of Antarctica to past and future sea-level rise. Nature **531**:591–597.

Den Hartog J. 1979. Notes On the Food of Sea Turtles: Eretmochelys Imbrica Ta (Linnaeus) and Dermochelys Coriacea (Linnaeus). Netherlands Journal of Zoology **30**:595–611.

DFW. 2019. Email from Ryan Bartling to the Dungeness Crab Whale Working Group. Dated October 25, 2019. Re: Whales: Pre-season Risk Assessment - update.

Di Lorenzo E, Miller AJ, Schneider N, McWilliams JC. 2005. The Warming of the California Current System: Dynamics and Ecosystem Implications. Journal of Physical Oceanography **35**:336–362.

Doney SC, Fabry VJ, Feely RA, Kleypas JA. 2009. Ocean Acidification: The Other CO_2 Problem. Annual Review of Marine Science **1**:169–192. Available from http://www.annualreviews.org/eprint/QwPqRGcRzQM5ffhPjAdT/full/10.1146/annurev.marine.010908.163834 (accessed January 19, 2015).

Dudley, P.N. and Porter, W.P., 2014. Using empirical and mechanistic models to assess global warming threats to leatherback sea turtles. Marine Ecology Progress Series, 501, pp.265-278.

Dutton PH, Hitipeuw C, Zein M, Benson SR, Petro G, Pita J, Rei V, Ambio L, Bakarbessy J. 2007. Status and Genetic Structure of Nesting Populations of Leatherback Turtles (Dermochelys coriacea) in the Western Pacific. Chelonian Conservation and Biology **6**:47–53.

Dutton DL, Dutton PH, Chaloupka M, Boulon RH. 2005. Increase of a Caribbean leatherback turtle Dermochelys coriacea nesting population linked to long-term nest protection. Biological Conservation **126**:186–194.

Eckert SA, Eckert KL, Ponganis P, Kooyman GL. 1989. Diving and foraging behavior of leatherback sea turtles (Dermochelys coriacea). Canadian Journal of Zoology **67**:2834–2840.

Eguchi, T., C. Fahy, J. Jannot, K. Somers, and E. Ward. 2017a. 2016 Leatherback sea turtle estimated bycatch reporting requirements as set out in the NMFS Biological Opinion for the continuing authorization of the Pacific Coast groundfish fisheries. National Marine Fisheries Service, SWFSC, La Jolla, CA 92039. http://www.pcouncil.org/wp-content/uploads/2017/03/F5a_NMFS_Rpt3_ElectricOnly_Leatherback_Turtle_rpt_2017_Apr2017BB.pdf.

Eguchi, T., Benson, S.R., Foley, D.G. and Forney, K.A., 2017b. Predicting overlap between drift gillnet fishing and leatherback turtle habitat in the California Current Ecosystem. Fisheries oceanography, 26(1), pp.17-33.Ene, A., Su, M., Lemaire, S., Rose, C., Schaff, S., Moretti, R., Lenz, J. and Herbst, L.H., 2005. Distribution of chelonid fibropapillomatosis-associated herpesvirus variants in Florida: molecular genetic evidence for infection of turtles following recruitment to neritic developmental habitats. Journal of Wildlife Diseases, 41(3), pp.489-497.

Fabry VJ. 2009. Ocean acidification at high latitudes: the bellweather. Oceanography **22**:160.

Fabry VJ, Seibel BA, Feely RA, Orr JC. 2008. Impacts of ocean acidification on marine fauna and ecosystem processes. ICES Journal of Marine Science: Journal du Conseil **65**:414–432.

Feely R, Alin S, Carter B, Bednarsek N. 2017. Determination of the Anthropogenic Carbon Signal in the Coastal Upwelling Region Along the Washington-Oregon-California Continental Margin. Salish Sea Ecosystem Conference. Available from http://cedar.wwu.edu/ssec/2016ssec/climate_change_ocean_acidification/37.

Feely, R.A., Alin, S.R., Carter, B., Bednaršek, N., Hales, B., Chan, F., Hill, T.M., Gaylord, B., Sanford, E., Byrne, R.H. and Sabine, C.L., 2016. Chemical and biological impacts of ocean acidification along the west coast of North America. Estuarine, Coastal and Shelf Science **183**:260–270.

Feely RA, Sabine CL, Lee K, Berelson W, Kleypas J, Fabry VJ, Millero FJ. 2004. Impact of anthropogenic CO2 on the CaCO3 system in the oceans. Science **305**:362–366.

Fisher JL, Peterson WT, Rykaczewski RR. 2015. The impact of El Niño events on the pelagic food chain in the northern California Current. Global Change Biology **21**:4401–4414, https://ir.library.oregonstate.edu/downloads/6395w891m (last accessed January 8, 2020).

Friedrich, T., Timmermann, A., Abe-Ouchi, A., Bates, N.R., Chikamoto, M.O., Church, M.J., Dore, J.E., Gledhill, D.K., Gonzalez-Davila, M., Heinemann, M. and Ilyina, T., 2012. Detecting regional anthropogenic trends in ocean acidification against natural variability. Nature Climate Change **2**:167–171.

Frischknecht M, Münnich M, Gruber N. 2017. Local atmospheric forcing driving an unexpected California Current System response during the 2015-2016 El Niño: CalCS Response to the 2015-2016 El Niño. Geophysical Research Letters **44**:304–311.

Fuentes M, Limpus C, Hamann M, Dawson J. 2009. Potential impacts of projected sea-level rise on sea turtle rookeries. Aquatic Conservation: Marine and Freshwater Ecosystems **20**:132–139.

Fuentes MMPB, Abbs D. 2010. Effects of projected changes in tropical cyclone frequency on sea turtles. Marine Ecology Progress Series **412**:283–292.

Fuller W, Godley B, Hodgson D, Reece SE, Witt M, Broderick A. 2013. Importance of spatio-temporal data for predicting the effects of climate change on marine turtle sex ratios. Mar Ecol Prog Ser **488**:267–274.

Gattuso J-P, Hansson L. 2011. Ocean Acidification. Oxford University Press, Oxford, UK. Available from http://www.academia.edu/download/54606973/The_ocean_revealed_ENG.pdf#page=67 (accessed January 8, 2020).

Graham TR, Harvey JT, Benson SR, Renfree JS, Demer DA. 2010. The acoustic identification and enumeration of scyphozoan jellyfish, prey for leatherback sea turtles (*Dermochelys coriacea*), off central California. ICES Journal of Marine Science **67**:1739–1748.

Gruber N, Hauri C, Lachkar Z, Loher D, Frölicher TL, Plattner G-K. 2012. Rapid Progression of Ocean Acidification in the California Current System. Science **337**:220–223.

Hamelin, K.M., James, M.C., Ledwell, W., Huntington, J. and Martin, K., 2017. Incidental capture of leatherback sea turtles in fixed fishing gear off Atlantic Canada. Aquatic Conservation: Marine and Freshwater Ecosystems, 27(3), pp.631-642.

Hansen J. 2012. Declaration of Dr. James E. Hansen. Case No. 161109273. Available from https://www.ourchildrenstrust.org/s/JHansen_ORDec_.pdf (accessed January 8, 2020).

Hansen J, Sato M, Ruedy R, Lo K, Lea DW, Medina-Elizade M. 2006. Global temperature change. Proceedings of the National Academy of Sciences **103**:14288–14293.

Harris HS, Benson SR, Gilardi KV, Poppenga RH, Work TM, Dutton PH, Mazet JAK. 2011. Comparative health assessment of western pacific leatherback turtles (dermochelys coriacea) foraging off the coast of california, 2005–2007. Journal of Wildlife Diseases **47**:321–337.

Harrison, A.L., Costa, D.P., Winship, A.J., Benson, S.R., Bograd, S.J., Antolos, M., Carlisle, A.B., Dewar, H., Dutton, P.H., Jorgensen, S.J. and Kohin, S., Mate, B., Robinson, P.W., Schaefer, K.M, Shaffer, S.A., Shillinger, G.L., Simmons, S.E., Weng, K.C., Gjerde, K.M., and Block, B.A., 2018. The political biogeography of migratory marine predators. Nature Ecology & Evolution **2**: 1571–1578, available at https://rdcu.be/5J90.

Hauri C, Gruber N, Plattner G-K, Alin S, Feely RA, Hales B, Wheeler PA. 2009. Ocean Acidification in the California Current System. Oceanography. Available from http://agris.fao.org/agris-search/search.do?recordID=DJ2012089494 (accessed March 8, 2016).

Hauri C, Gruber N, Vogt M, Doney SC, Feely RA, Lachkar Z, Leinweber A, McDonnell AMP, Munnich M, Plattner G-K. 2013. Spatiotemporal variability and long-term trends of ocean acidification in the California Current System. Biogeosciences **10**:193–216.

Hawkes LA, McGowan A, Godley BJ, Gore S, Lange A, Tyler CR, Wheatley D, White J, Witt MJ, Broderick AC. 2013. Estimating sex ratios in Caribean hawksbill turtles: testosterone levels and climate effects. Aquatic Biol **18**:9–19.

Hay CC, Morrow E, Kopp RE, Mitrovica JX. 2015. Probabilistic reanalysis of twentieth-century sea-level rise. Nature **517**:481–484.

Hays GC, Houghton JDR, Isaacs C, King RS, Lloyd C, Lovell P. 2004. First records of oceanic dive profiles for leatherback turtles, Dermochelys coriacea, indicate behavioural plasticity associated with long-distance migration. Animal Behaviour **67**:733–743.

Hays GC, Broderick AC, Glen F, Godley BJ. 2003. Climate change and sea turtles: a 150-year reconstruction of incubation temperatures at a major marine turtle rookery. Global Change Biology **9**:642–646.

Hazen, E.L., Scales, K.L., Maxwell, S.M., Briscoe, D.K., Welch, H., Bograd, S.J., Bailey, H., Benson, S.R., Eguchi, T., Dewar, H. and Kohin, S., 2018. A dynamic ocean management tool to reduce bycatch and support sustainable fisheries. Science advances, 4(5), p.eaar3001.

Heaslip, S.G., Iverson, S.J., Bowen, W.D. and James, M.C., 2012. Jellyfish support high energy intake of leatherback sea turtles (Dermochelys coriacea): video evidence from animal-borne cameras. PloS one, 7(3), p.e33259.

Herbst, L.H. 1994. Fibropapillomatosis of marine turtles. Annual Review of Fish Diseases. 4:389-425.

Hitipeuw, C., Dutton, P.H., Benson, S., Thebu, J. and Bakarbessy, J., 2007. Population status and internesting movement of leatherback turtles, Dermochelys coriacea, nesting on the northwest coast of Papua, Indonesia. Chelonian Conservation and Biology, 6(1), pp.28-36.

Hodgson EE, Kaplan IC, Marshall KN, Leonard J, Essington TE, Busch DS, Fulton EA, Harvey CJ, Hermann A, McElhany P. 2018. Consequences of spatially variable ocean acidification in the California Current: Lower pH drives strongest declines in benthic species in southern regions while greatest economic impacts occur in northern regions. Ecological Modelling **383**:106–117.

Hönisch, B., Ridgwell, A., Schmidt, D.N., Thomas, E., Gibbs, S.J., Sluijs, A., Zeebe, R., Kump, L., Martindale, R.C., Greene, S.E. and Kiessling, W., 2012. The geological record of ocean acidification. Science **335**:1058–1063.

Horton BP, Rahmstorf S, Engelhart SE, Kemp AC. 2014. Expert assessment of sea-level rise by AD 2100 and AD 2300. Quaternary Science Reviews **84**:1–6.

Houghton JDR, Doyle TK, Wilson MW, Davenport J, Hays GC. 2006. Jellyfish aggregations and leatherback turtle foraging patterns in a temperate coastal environment. Ecology **87**:1967–1972.

Huerta, P., H. Pineda, A. Aguirre, T. Spraker, L. Sarti, and A. Barragán. 2002. First confirmed case of fibropapilloma in a leatherback turtle (*Dermochelys coriacea*), p. 193. In A. Mosier, A. Foley, and B. Brost (ed.), Proceedings of the 20th Annual Symposium on Sea Turtle

Biology and Conservation. National Oceanic and Atmospheric Administration technical memorandum NMFS-SEFSC-477. U.S. Department of Commerce, Washington, D.C.

Huyer A. 1983. Coastal upwelling in the California current system. Progress in Oceanography **12**:259–284.

Hyrenbach KD, Veit RR. 2003. Ocean warming and seabird communities of the southern California Current System (1987–98): response at multiple temporal scales. Deep Sea Research Part II: Topical Studies in Oceanography **50**:2537–2565.

IPCC. 2014. Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Barros, V.R., C.B. Field, D.J. Dokken, M.D. Mastrandrea, K.J. Mach, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

IPCC. 2013. Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate ChangeStocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Iverson, A.R., 2019. The United States requires effective federal policy to reduce marine plastic pollution. Conservation Science and Practice, p.e45.

Jacox MG, Hazen EL, Zaba KD, Rudnick DL, Edwards CA, Moore AM, Bograd SJ. 2016. Impacts of the 2015-2016 El Niño on the California Current System: Early assessment and comparison to past events: 2015-2016 El Niño Impact in the CCS. Geophysical Research Letters **43**:7072–7080.

James MC, Davenport J, Hays GC. 2006. Expanded thermal niche for a diving vertebrate: A leatherback turtle diving into near-freezing water. Journal of Experimental Marine Biology and Ecology **335**:221–226.

James MC, Eckert SA, Myers RA. 2005. Migratory and reproductive movements of male leatherback turtles (<Emphasis Type="Italic">Dermochelys coriacea</Emphasis>). Marine Biology **147**:845–853.

Jannot, J., Heery, E., Bellman, M.A., and J. Majewski. 2011. Estimated bycatch of marine mammals, seabirds, and sea turtles in the US west coast commercial groundfish fishery, 2002-2009. West Coast Groundfish Observer Program. National Marine Fisheries Service, NWFSC, 2725 Montlake Blvd E., Seattle, WA 98112.

Kaplan IC. 2005. A risk assessment for Pacific leatherback turtles (Dermochelys coriacea). Canadian Journal of Fisheries and Aquatic Sciences **62**:1710–1719.

Kuipers, K. 2019. Letter from Letter from Keelin Kuipers, Acting Director, Office for Coastal Management, to Mark Delaplaine, California Coastal Commission (Mar. 28, 2019).

Laloë J-O, Esteban N, Berkel J, Hays GC. 2016. Sand temperatures for nesting sea turtles in the Caribbean: Implications for hatchling sex ratios in the face of climate change. Journal of Experimental Marine Biology and Ecology **474**:92–99.

Le Quéré C et al. 2016. Global Carbon Budget 2016. Earth System Science Data **8**:605–649.

Lebreton, L., Slat, B., Ferrari, F., Sainte-Rose, B., Aitken, J., Marthouse, R., Hajbane, S., Cunsolo, S., Schwarz, A., Levivier, A. and Noble, K., 2018. Evidence that the Great Pacific Garbage Patch is rapidly accumulating plastic. Scientific reports, 8(1), p.4666.

Leising AW, Schroeder ID, Bograd SJ, Peterson WT, Brodeur RD, Santora JA, Sydeman WJ, Street H. 2015. State of the California Current 2014–15: Impacts of the warm-water "Blob" **56**:38.

Levitus S et al. 2012. World ocean heat content and thermosteric sea level change (0–2000 m), 1955–2010. Geophysical Research Letters **39**. Available from http://onlinelibrary.wiley.com/doi/10.1029/2012GL051106/abstract (accessed August 15, 2017).

Levitus S, Antonov JI, Boyer TP, Stephens C. 2000. Warming of the World Ocean. Science **287**:2225–2229.

Lewison RL, Crowder LB. 2007. Putting Longline Bycatch of Sea Turtles into Perspective. Conservation Biology **21**:79–86.

Lewison RL, Freeman SA, Crowder LB. 2004. Quantifying the effects of fisheries on threatened species: the impact of pelagic longlines on loggerhead and leatherback sea turtles. Ecology letters **7**:221–231.

Lontoh, D.N., 2014. Variation in tissue stable isotopes, body size, and reproduction of western Pacific leatherback turtles. San José State University, available at http://islandora.mlml.calstate.edu/islandora/object/islandora%3A2279/datastream/OBJ/download/Variation_in_tissue_stable_isotopes__body_size__and_reproduction_of_western_Pacific_leatherback_turtles.pdf.

Lüthi D et al. 2008. High-resolution carbon dioxide concentration record 650,000–800,000 years before present. Nature **453**:379–382. Available from http://www.nature.com/nature/journal/v453/n7193/full/nature06949.html (accessed September 8, 2015).

Lynn RJ et al. 1997. The State of the California Current, 1997-1998: Transition to El Niño Conditions. Available from http://calhoun.nps.edu/handle/10945/43400 (accessed May 31, 2018).

Mackas DL, Peterson WT, Ohman MD, Lavaniegos BE. 2006. Zooplankton anomalies in the California Current system before and during the warm ocean conditions of 2005. Geophysical Research Letters **33**. Available from http://doi.wiley.com/10.1029/2006GL027930 (accessed May 31, 2018).

Maxwell, S.M., Hazen, E.L., Bograd, S.J., Halpern, B.S., Breed, G.A., Nickel, B., Teutschel, N.M., Crowder, L.B., Benson, S., Dutton, P.H. and Bailey, H., 2013. Cumulative human impacts on marine predators. Nature communications, 4, p.2688.

McClain CR et al. 2015. Sizing ocean giants: patterns of intraspecific size variation in marine megafauna. PeerJ **3**:e715.

McLaughlin, K., Weisberg, S.B., Dickson, A.G., Hofmann, G.E., Newton, J.A., Aseltine-Neilson, D., Barton, A., Cudd, S., Feely, R.A., Jefferds, I.W. and Jewett, E.B., 2015. Core

Principles of the California Current Acidification Network: Linking Chemistry, Physics, and Ecological Effects. Oceanography **25**:160–169.

Mrosovsky, N., Ryan, G.D. and James, M.C., 2009. Leatherback turtles: the menace of plastic. Marine pollution bulletin, 58(2), pp.287-289.

NASA Global Climate Change. 2018. Carbon dioxide concentration | NASA Global Climate Change. Available from https://climate.nasa.gov/vital-signs/carbon-dioxide (accessed May 30, 2018).

NCEI. 2017. Global Climate Report - Annual 2016 | State of the Climate | National Centers for Environmental Information (NCEI). Available from https://www.ncdc.noaa.gov/sotc/global/201613 (accessed August 15, 2017).

Neeman N, Robinson NJ, Paladino FV, Spotila JR, O'Connor MP. 2015. Phenology shifts in leatherback turtles (Dermochelys coriacea) due to changes in sea surface temperature. Journal of Experimental Marine Biology and Ecology **462**:113–120.

Nelms, S.E., Duncan, E.M., Broderick, A.C., Galloway, T.S., Godfrey, M.H., Hamann, M., Lindeque, P.K. and Godley, B.J., 2016. Plastic and marine turtles: a review and call for research. ICES Journal of Marine Science, 73(2), pp.165-181.

NMFS. 2018a. Email with Excel sheet attachment from Dan Lawson, NMFS Protected Resources Division, to Catherine Kilduff, Senior Attorney, Center for Biological Diversity (June 12, 2018) (on file with author).

NMFS. 2018b. Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion on Consideration of an Exempted Fishing Permit to Fish with Longline Gear in the West Coast Exclusive Economic Zone, NMFS Consultation Number: 2018-9553.

NMFS. 2017a. NMFS-WCR Updates, Pacific Offshore Cetacean Take Reduction Team Meeting, June 15, 2017.

NMFS. 2017b. Biological and Conference Opinion on the Proposed Implementation of a Program for the Issuance of Permits for Research and Enhancement Activities on Threatened and Endangered Sea Turtles. FPR-2017-9230, Dec. 21, 2017.

NMFS. 2017c. E Endangered Species Act Section 7(a)(2) Biological Opinion, for the regulatory codification of Traffic Separation Schemes near the ports of Los Angeles/Long Beach and San Francisco/Oakland. SWR-2013-9813, Feb. 23, 2017.

NMFS. 2017d. Discussion Paper on Improving Sea Turtle Mitigation in the WCPO. WCPFC-TCC13-2017-DP-08, 27 September – 3 October 2017, Pohnpei, Federated States of Micronesia.

NMFS. 2016. Species in the spotlight : priority actions, 2016-2020. Pacific leatherback turtle, *Dermochelys coriacea*. https://repository.library.noaa.gov/view/noaa/11874.

NMFS. 2013. Biological opinion on the continued management of the drift gillnet fishery under the FMP for U.S. West Coast fisheries for highly migratory species. NOAA, National Marine Fisheries Service, Southwest Region, Protected Resources Division.

NMFS. 2012a. Final Biological Report, Final Rule to Revise the Critical Habitat Designation for Leatherback Sea Turtles. Available from

http://www.cio.noaa.gov/services_programs/prplans/pdfs/ID127_%20leatherback_criticalhabitat_biological.pdf (accessed May 3, 2019).

NMFS. 2012b. Letter from Rodney McInnis, NMFS Regional Administrator, to Colonel Mark Toy, U.S. Army Corps of Engineers, Los Angeles District, regarding KZO Sea Fanns' proposed mariculture project off the San Pedro shelf of California, dated May 3, 2012.

NMFS. 2004. Endangered Species Act Section 7 Consultation Biological Opinion. Adoption of (1) proposed Highly Migratory Species Fishery Management Plan; (2) continued operation of Highly Migratory Species fishery vessels under permits pursuant to the High Seas Fishing Compliance Act; and (3) Endangered Species Act regulation on the prohibition of shallow longline sets east of the 150 West longitude.

NMFS, USFWS. 2013. Leatherback sea turtle (Dermochelys coriacea) 5-year review: Summary and evaluation. Page 93. National Marine Fisheries Service, Office of Protected Resources and U.S. Fish and Wildlife Service Southeast Region, Silver Spring, Maryland and Jacksonville, Florida. Available from https://repository.library.noaa.gov/view/noaa/17029 (accessed August 28, 2018).

NMFS, USFWS. 1998. Recovery Plan for U.S. Pacfic Populations of the Leatherback Turtle (Dermochelys coriacea). Page 76. National Marine Fisheries Service, Washington DC.

Oregon. 2018. Threatened, Endangered, and Candidate Fish and Wildlife Species, Department of Fish and Wildlife. https://www.dfw.state.or.us/wildlife/diversity/species/threatened_endangered_candidate_list.asp (last accessed May 7, 2019).

Orr JC et al. 2005. Anthropogenic ocean acidification over the twenty-first century and its impact on calcifying organisms. Nature **437**:681–686.

Palacios DM. 2004. Long-term and seasonal trends in stratification in the California Current, 1950–1993. Journal of Geophysical Research **109**. Available from http://doi.wiley.com/10.1029/2004JC002380 (accessed May 31, 2018).

Patino-Martinez J, Marco A, Quiñones L, Hawkes L. 2011. A potential tool to mitigate the impacts of climate change to the caribbean leatherback sea turtle. Global Change Biology **18**:401–411.

Patino-Martinez J, Marco A, Quiñones L, Hawkes LA. 2014. The potential future influence of sea level rise on leatherback turtle nests. Journal of Experimental Marine Biology and Ecology **461**:116–123.

Peterson W, Robert M, Bond N. 2015. The warm Blob continues to dominate the ecosystem of the northern California Current. PICES Press **23**:44.

Peterson B, Emmett R, Ralston S, Forney KA, Road S, Cruz S, Benson S, Road S, Landing M. 2006. The state of the california current, 2005–2006: warm in the north, cool in the south **47**:46.

PFMC. 2018. Decision Summary Document, Pacific Fishery Management Council, Sept. 7-12, 2018. https://www.pcouncil.org/wp-content/uploads/2018/09/0918_Decision_Summary_DocumentV2.pdf (last accessed May 3, 2019).

PFMC, NMFS. 2006. Management of the drift gillnet fishery exempted fishing permit and / or regulatory amendment draft environmental assessment, regulatory impact review & regulatory flexibility analysis. Page 194. PACIFIC FISHERY MANAGEMENT COUNCIL AND NATIONAL MARINE FISHERIES SERVICE SOUTHWEST REGION, Portland, OR: U.S. Available from https://www.pcouncil.org//bb/2006/0306/J3a_Att1_Mar06_BB.pdf (accessed May 24, 2018).

Plot, V. and Georges, J.Y., 2010. Plastic debris in a nesting leatherback turtle in French Guiana. Chelonian Conservation and Biology, 9(2), pp.267-270.

Price, C.S., E. Keane, D. Morin, C. Vaccaro, D. Bean, and J.A. Morris, Jr. 2016. Protected Species & Longline Mussel Aquaculture Interactions. NOAA Technical Memorandum NOS NCCOS 211. 85 pp.

Pritchard PC. 1982. Nesting of the leatherback turtle, Dermochelys coriacea in Pacific Mexico, with a new estimate of the world population status. Copeia:741–747.

Pritchard PC. 1997. Evolution, Phylogeny, and Current Status. Page 28 The Biology of Sea Turtles, Volume I, Peter L. Lutz, John A. Musick. Available from https://books.google.com/books?id=QNRBDwAAQBAJ&lpg=PT14&ots=yC1cODzEK_&lr&pg=PT14#v=onepage&q&f=false (accessed January 8, 2020).

Reina RD, Spotila JR, Paladino FV, Dunham AE. 2009. Changed reproductive schedule of eastern Pacific leatherback turtles Dermochelys coriacea following the 1997–98 El Niño to La Niña transition. Endangered Species Research 7:155–161.

Reina RD, Mayor PA, Spotila JR, Piedra R, Paladino FV, Montgomery WL. 2002. Nesting Ecology of the Leatherback Turtle, Dermochelys coriacea, at Parque Nacional Marino Las Baulas, Costa Rica: 1988–1989 to 1999–2000. Copeia **2002**:653–664.

Rignot E, Velicogna I, van den Broeke MR, Monaghan A, Lenaerts JTM. 2011. Acceleration of the contribution of the Greenland and Antarctic ice sheets to sea level rise: ACCELERATION OF ICE SHEET LOSS. Geophysical Research Letters **38**:n/a-n/a.

Robinson N, Valentine S, Santidrián Tomillo P, Saba V, Spotila J, Paladino F. 2014. Multidecadal trends in the nesting phenology of Pacific and Atlantic leatherback turtles are associated with population demography. Endangered Species Research **24**:197–206.

Roemmich D, McGowan J. 1995. Climatic Warming and the Decline of Zooplankton in the California Current. Science **267**:1324–1326.

Rogelj J, Schaeffer M, Friedlingstein P, Gillett NP, van Vuuren DP, Riahi K, Allen M, Knutti R. 2016. Differences between carbon budget estimates unravelled. Nature Climate Change **6**:245–252.

Ruzicka JJ, Brodeur RD, Emmett RL, Steele JH, Zamon JE, Morgan CA, Thomas AC, Wainwright TC. 2012. Interannual variability in the Northern California Current food web structure: Changes in energy flow pathways and the role of forage fish, euphausiids, and jellyfish. Progress in Oceanography **102**:19–41.

Saba VS, Stock CA, Spotila JR, Paladino FV, Santidrián Tomillo P. 2012. Projected response of an endangered marine turtle population to climate change. Nature Climate Change **2**:814–820.

Saba VS, Santidrián Tomillo P, Reina RD, Spotila JR, Musick JA, Evans DA, Paladino FV. 2007. The effect of the El Niño Southern Oscillation on the reproductive frequency of eastern Pacific leatherback turtles. Journal of Applied Ecology **44**:395–404.

Santidrián Tomillo P, Oro D, Paladino FV, Piedra R, Sieg AE, Spotila JR. 2014. High beach temperatures increased female-biased primary sex ratios but reduced output of female hatchlings in the leatherback turtle. Biological Conservation **176**:71–79.

Santidrián Tomillo P, Saba VS, Blanco GS, Stock CA, Paladino FV, Spotila JR. 2012. Climate Driven Egg and Hatchling Mortality Threatens Survival of Eastern Pacific Leatherback Turtles. PLOS ONE **7**:e37602.

Sato, C. L. 2017. Periodic status review for the Leatherback Sea Turtle in Washington. Washington Department of Fish and Wildlife, Olympia, Washington. 20+iii pp.

Scales, K.L., Hazen, E.L., Jacox, M.G., Castruccio, F., Maxwell, S.M., Lewison, R.L. and Bograd, S.J., 2018. Fisheries bycatch risk to marine megafauna is intensified in Lagrangian coherent structures. Proceedings of the National Academy of Sciences, p.201801270.

Schuyler Q, Hardesty BD, Wilcox C, Townsend K. 2014. Global Analysis of Anthropogenic Debris Ingestion by Sea Turtles. Conservation Biology **28**:129–139.

Shillinger GL et al. 2008. Persistent Leatherback Turtle Migrations Present Opportunities for Conservation. PLOS Biology **6**:e171.

Solomon S, Plattner G-K, Knutti R, Friedlingstein P. 2009. Irreversible climate change due to carbon dioxide emissions. Proceedings of the national academy of sciences **106**:1704–1709.

Spotila JR, Reina RD, Steyermark AC, Plotkin PT, Paladino FV. 2000. Pacific leatherback turtles face extinction. Nature **405**:529.

Starbird C, Baldridge A, Harvey J. 1993. Seasonal occurrence of leatherback sea turtles(Dermochelys coriacea) in the Monterey Bay region, with notes on other sea turtles, 1986-1991. California Fish and Game **79**:54–62.

Sydeman WJ, Bradley RW, Warzybok P, Abraham CL, Jahncke J, Hyrenbach KD, Kousky V, Hipfner JM, Ohman MD. 2006. Planktivorous auklet *Ptychoramphus aleuticus* responses to ocean climate, 2005: Unusual atmospheric blocking? Geophysical Research Letters **33**. Available from http://doi.wiley.com/10.1029/2006GL026736 (accessed May 31, 2018).

Takeshita Y, Frieder CA, Martz TR, Ballard JR, Feely RA, Kram S, Nam S, Navarro MO, Price NN, Smith JE. 2015. Including high-frequency variability in coastal ocean acidification projections. Biogeosciences **12**:5853–5870.

Tapilatu RF. 2017. Status of sea turtle populations and its conservation at Bird's Head Seascape, Western Papua, Indonesia. Biodiversitas, Journal of Biological Diversity **18**:129–136.

Tapilatu RF, Dutton PH, Tiwari M, Wibbels T, Ferdinandus HV, Iwanggin WG, Nugroho BH. 2013. Long-term decline of the western Pacific leatherback, *Dermochelys coriacea* : a globally important sea turtle population. Ecosphere **4**:art25.

Tapilatu RF, Tiwari M. 2007. Leatherback Turtle, Dermochelys coriacea, Hatching Success at Jamursba-Medi and Wermon Beaches in Papua, Indonesia. Chelonian Conservation and Biology **6**:154–158.

Thomas AC, Brickley P. 2006. Satellite measurements of chlorophyll distribution during spring 2005 in the California Current. Geophysical Research Letters **33**. Available from http://doi.wiley.com/10.1029/2006GL026588 (accessed May 31, 2018).

Tiwari, M., Wallace, B.P. & Girondot, M. 2013. *Dermochelys coriacea* (West Pacific Ocean subpopulation). The IUCN Red List of Threatened Species 2013: e.T46967817A46967821. http://dx.doi.org/10.2305/IUCN.UK.2013-2.RLTS.T46967817A46967821.en

Van Houtan KS, Bass OL. 2007. Stormy oceans are associated with declines in sea turtle hatching. Current Biology **17**:R590–R591.

Von Holle, B., Irish, J.L., Spivy, A., Weishampel, J.F., Meylan, A., Godfrey, M.H., Dodd, M., Schweitzer, S.H., Keyes, T., Sanders, F. and Chaplin, M.K., 2019. Effects of future sea level rise on coastal habitat. The Journal of Wildlife Management, 83(3), pp.694-704.

Wallace BP, Tiwari, M. & Girondot, M. 2013. *Dermochelys coriacea*. The IUCN Red List of Threatened Species: e.T6494A43526147; 10.2305/IUCN.UK.2013-2.RLTS.T6494A43526147.en

Wallace BP, Kilham SS, Paladino FV, Spotila JR. 2006. Energy budget calculations indicate resource limitation in Eastern Pacific leatherback turtles. Marine Ecology Progress Series **318**:263–270.

Witt MJ et al. 2011. Tracking leatherback turtles from the world's largest rookery: assessing threats across the South Atlantic. Proceedings of the Royal Society of London B: Biological Sciences **278**:2338–2347.

Witt MJ et al. 2009. Aerial surveying of the world's largest leatherback turtle rookery: A more effective methodology for large-scale monitoring. Biological Conservation **142**:1719–1727.

Work TM, Balazs GH. 2010. Pathology and distribution of sea turtles landed as bycatch in the Hawaii-based North Pacific pelagic longline fishery. Journal of Wildlife Diseases **46**:422–432.

Zeebe RE. 2012. History of Seawater Carbonate Chemistry, Atmospheric CO2, and Ocean Acidification. Annual Review of Earth and Planetary Sciences **40**:141–65.

Zug G, Parham J. 1996. Age and growth in leatherback turtles, Dermochelys coriacea (Testudines: Dermochelyidae): a skeletochronological analysis. Chelonian Conservation and Biology **2**:244–249.

State of California
Department of Fish and Wildlife

Original signed version on file
Received June 2, 2020

Memorandum

Date: June 2, 2020

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

From: Charlton H. Bonham
Director

Subject: **Submission of Evaluation of the Pacific Leatherback Sea Turtle Petition (Dermochelys coriacea)**

On January 23, 2020, The Center for Biological Diversity and Turtle Island Restoration Network (Petitioners) submitted a Petition (Petition) to the Fish and Game Commission (Commission) to list the Pacific leatherback sea turtle (*Dermochelys coriacea*) as endangered pursuant to the California Endangered Species Act (CESA). On February 3, 2020, the Commission referred the Petition to the California Department of Fish and Wildlife (Department) for a 120-day Petition Evaluation.

On February 7, 2020 the Department requested 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. The extension changed the due date for the Department's evaluation to June 3, 2020.

The Department is submitting this Petition Evaluation for public review and Commission consideration at the August Commission meeting. If you have any questions or need additional information, please contact Dr. Craig Shuman, Marine Regional Manager, at (916) 373-5491.

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Natural Resources Agency
Department of Fish and Wildlife

REPORT TO THE FISH AND GAME COMMISSION

EVALUATION OF A PETITION FROM CENTER FOR BIOLOGICAL DIVERSITY AND TURTLE ISLAND RESTORATION NETWORK TO LIST PACIFIC LEATHERBACK SEA TURTLE (*DERMOCHELYS CORIACEA*) AS ENDANGERED UNDER THE CALIFORNIA ENDANGERED SPECIES ACT

Photo Credit National Marine Fisheries Service

Prepared by
California Department of Fish and Wildlife

May 2020

Table of Contents

Executive Summary ii
Section 1. Introduction 1
1.1 Candidacy Evaluation 1
1.2 Petition History 3
1.3 Overview of Pacific Leatherback Sea Turtle Ecology 4
Section 2. Sufficiency of Scientific Information to Indicate the Petitioned Action May Be Warranted 6
2.1 Population Trend 6
2.2 Geographic Range 6
2.3 Distribution 7
2.4 Abundance 10
2.5 Life History 11
2.6 Kind of Habitat Necessary for Survival 12
2.7 Factors Affecting the Ability to Survive and Reproduce 13
2.8 Degree and Immediacy of Threat 24
2.9 Impact of Existing Management Efforts 25
2.10 Suggestions for Future Management 26
2.11 Detailed Distribution Map 28
2.12 Sources and Availability of Information 30
Section 3. Recommendation to the Commission 31
Literature Cited 32

Executive Summary

On January 23, 2020, The Center for Biological Diversity and Turtle Island Restoration Network (Petitioners) submitted a Petition (Petition) to the Fish and Game Commission (Commission) to list the Pacific leatherback sea turtle (*Dermochelys coriacea*) as endangered pursuant to the California Endangered Species Act (CESA), Fish and Game Code Section 2050 *et seq*.

The Commission referred the Petition to the California Department of Fish and Wildlife (Department) on February 3, 2020, in accordance with Fish and Game Code Section 2073. (Cal. Reg. Notice Register 2019, No. 15-Z, p. 575.) Pursuant to Fish and Game Code Section 2073.5 and Section 670.1, subdivision (d)(1), of Title 14 of the California Code of Regulations, the Department prepared this Petition Evaluation Report (Petition Evaluation). The purpose of the Petition Evaluation is to assess the scientific information in the Petition in relation to other relevant and available scientific information possessed or received by the Department during the evaluation period, and to recommend to the Commission whether the Petition contains sufficient information to indicate the petitioned action may be warranted, and should be accepted and considered.

After reviewing the Petition and other relevant information, the Department determined the following:

- Population Trend. The Petition contains sufficient information on population trends of the Pacific leatherback sea turtle to suggest a declining population trend.
- Range. The Petition contains sufficient information on the Pacific leatherback sea turtle's current and historic geographic range.
- Distribution. The Petition contains sufficient scientific information on Pacific leatherback sea turtle distribution and the Department has provided additional details on the California distribution.
- Abundance. The Petition contains sufficient scientific information on Pacific leatherback sea turtle abundance to indicate a decline in abundance.
- Life History. The Petition contains sufficient information on the known life history and ecology of the Pacific leatherback sea turtle to show that the species is susceptible to anthropogenic impacts.
- Kind of Habitat Necessary for Survival. The Petition contains sufficient information regarding habitats necessary for Pacific leatherback sea turtle survival.
- Factors Affecting the Ability to Survive and Reproduce. The Petition contains sufficient information to indicate that the long-term survival of the Pacific

leatherback sea turtle is threatened by a number of ongoing and future threats such as habitat modification and loss, incidental take, and other factors.

- Degree and Immediacy of Threat. The Petition discusses the low numbers of Pacific leatherback sea turtles and the primary threat of entanglement and drowning in longline fishing gear, as well as other threats. Though many of these threats do not exist in California, the Petition contains sufficient information to indicate that threats to the long-term survival of the Pacific leatherback sea turtle will continue or potentially worsen in the future.
- Impact of Existing Management Efforts. The Petition describes the inadequacy of existing regulatory mechanisms for protecting the Pacific leatherback sea turtle from threats to its long-term survival. The Petition contains sufficient information on the impact of existing management efforts, and supplemental information on the impact of existing management efforts is provided in this Petition Evaluation.
- Suggestions for Future Management. The Petition provides sufficient management suggestions that may aid in conserving the Pacific leatherback sea turtle.
- A Detailed Distribution Map. The Petition contains a detailed map of only a portion of the distribution of the Pacific leatherback sea turtle. A more comprehensive map of Pacific leatherback sea turtle distribution is provided in this Petition Evaluation.
- Availability and Sources of Information. The Petition contains sufficient information on the availability and sources of information used in the Petition.

The Department's Petition Evaluation is focused on the scientific information provided in the Petition as well as additional scientific information the Department possesses, or has knowledge of, regarding Pacific leatherback sea turtle populations.

In completing its Petition Evaluation, the Department finds there is sufficient information to indicate the petitioned action may be warranted and recommends the Commission accept and consider the Petition.

Section 1. Introduction

1.1 Candidacy Evaluation

The Commission has the authority to list a native species or subspecies as threatened or endangered under CESA. (Fish & G. Code, §§ 2062, 2067, 2070.) The listing process is the same for species and subspecies. (Fish & G. Code, §§ 2070-2079.1.)

CESA sets forth a two-step process for listing a species as threatened or endangered. First, the Commission determines whether to designate a species as a candidate for listing by evaluating whether the petition provides "sufficient information to indicate that the petitioned action may be warranted." (Fish & G. Code, § 2074.2, subd. (e)(2).) If the petition is accepted for consideration, the second step requires the Department to produce, within 12 months of the Commission's acceptance of the petition, a peer reviewed report based upon the best scientific information available that advises the Commission on whether the petitioned action is warranted. (Fish & G. Code, § 2074.6.) Finally, the Commission, based on that report and other information in the administrative record, then determines whether the petitioned action to list the species as threatened or endangered is warranted. (Fish & G. Code, § 2075.5.)

A petition to list a species under CESA must include "information regarding the population trend, range, distribution, abundance, and life history of a species, the factors affecting the ability of the population to survive and reproduce, the degree and immediacy of the threat, the impact of existing management efforts, suggestions for future management, and the availability and sources of information. The petition shall also include information regarding the kind of habitat necessary for species survival, a detailed distribution map, and any other factors that the petitioner deems relevant." (Fish & G. Code, § 2072.3; see also Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1).) The range of a species for the Department's petition evaluation and recommendation is the species' California range. (*Cal. Forestry Assn. v. Cal. Fish and Game Com.* (2007) 156 Cal.App.4th 1535, 1551.)

Within ten days of receipt of a petition, the Commission must refer the petition to the Department for evaluation. (Fish & G. Code, § 2073.) The Commission must also publish notice of receipt of the petition in the California Regulatory Notice Register. (Fish & G. Code, § 2073.3.) Within 90 days of receipt of the petition (or 120 days if the Commission grants an extension), the Department must evaluate the petition on its face and in relation to other relevant information and submit to the Commission a written evaluation report with one of the following recommendations:

- Based upon the information contained in the petition, there is not sufficient information to indicate that the petitioned action may be warranted, and the petition should be rejected; or

- Based upon the information contained in the petition, there is sufficient information to indicate that the petitioned action may be warranted, and the petition should be accepted and considered.

(Fish & G. Code, § 2073.5, subds. (a)-(b).) The Department's candidacy recommendation to the Commission is based on an evaluation of whether the petition provides sufficient scientific information relevant to the petition components set forth in Fish and Game Code Section 2072.3 and the California Code of Regulations, Title 14, Section 670.1, subdivision (d)(1).

In *Center for Biological Diversity v. California Fish and Game Commission* (2008) 166 Cal.App.4th 597, the California Court of Appeals addressed the parameters of the Commission's determination of whether a petitioned action should be accepted for consideration pursuant to Fish and Game Code Section 2074.2, subdivision (e), resulting in the species being listed as a candidate species. The court began its discussion by describing the standard for accepting a petition for consideration previously set forth in *Natural Resources Defense Council v. California Fish and Game Commission* (1994) 28 Cal.App.4th 1104:

> As we explained in *Natural Resources Defense Council*, "the term 'sufficient information' in section 2074.2 means that amount of information, when considered with the Department's written report and the comments received, that would lead a reasonable person to conclude the petitioned action may be warranted." The phrase "may be warranted" "is appropriately characterized as a 'substantial possibility that listing could occur.'" "Substantial possibility," in turn, means something more than the one-sided "reasonable possibility" test for an environmental impact report but does not require that listing be more likely than not.

(*Center for Biological Diversity*, *supra*, 166 Cal.App.4th at pp. 609-10 [internal citations omitted].) The court acknowledged that "the Commission is the finder of fact in the first instance in evaluating the information in the record." (*Id.* at p. 611.) However, the court clarified:

> [T]he standard, at this threshold in the listing process, requires only that a substantial possibility of listing could be found by an objective, reasonable person. The Commission is not free to choose between

> conflicting inferences on subordinate issues and thereafter rely upon those choices in assessing how a reasonable person would view the listing decision. Its decision turns not on rationally based doubt about listing, but on the absence of any substantial possibility that the species could be listed after the requisite review of the status of the species by the Department under [Fish and Game Code] section 2074.6. (*Ibid*.)

1.2 Petition History

On January 23, 2020, the Petitioner submitted the Petition to the Commission. On February 3, 2020, the Commission referred the Petition to the Department for evaluation. On February 7, 2020, the Department requested a 30-day extension of the 90-day Petition evaluation period. The Commission approved the extension request at its February 21, 2020 meeting. The Department submitted this Petition Evaluation to the Commission on June 2, 2020.

The Department evaluated the scientific information presented in the Petition as well as other relevant information the Department possessed at the time of review. The Department did not receive new information from the public during the Petition Evaluation period pursuant to Fish and Game Code Section 2073.4. Pursuant to Fish and Game Code Section 2072.3 and Section 670.1, subdivision (d)(1), of Title 14 of the California Code of Regulations, the Department evaluated whether the Petition included sufficient scientific information regarding each of the following petition components to indicate whether the Petitioned action may be warranted:

- Population trend;
- Range;
- Distribution;
- Abundance;
- Life history;
- Kind of habitat necessary for survival;
- Factors affecting the ability to survive and reproduce;
- Degree and immediacy of threat;
- Impact of existing management efforts;
- Suggestions for future management;
- Availability and sources of information; and
- A detailed distribution map.

1.3 Overview of Pacific Leatherback Sea Turtle Ecology

The Pacific leatherback sea turtle (leatherback, *Dermochelys coriacea*) is the largest turtle species in the world and fourth largest living marine reptile (McClain et al. 2015 p. 39). Although their size varies regionally, the curved carapace length of adult Pacific leatherbacks commonly exceeds 1.5 meters (McClain et al. 2015 p. 41). Adult males and females can reach 2 meters in length while weighing up to 900 kilograms (McClain et al. 2015 p. 39). There are body-size differences between mature turtles from the eastern (smaller) and western Pacific (larger) nesting colonies, which are distinguished on the basis of genetic differentiation discussed in detail below. The unique characteristics of the leatherback's carapace contribute to broad thermal tolerance in adults and enables the species to forage in water temperatures far lower than the leatherback's core body temperature (National Marine Fisheries Service (NMFS) & United States Fish and Wildlife Service (USFWS) 1998 p. 5). Adults have been reported in the Pacific as far north as the Bering Sea in Alaska and as far south as Chile and New Zealand (NMFS & USFWS 1998).

Previous studies have shown that the core body temperature in adults while in cold waters are several degrees Celsius above ambient, evidence of endothermy (warm blood) in a mostly poikilothermic (cold blood) class, Reptilia (Bostrom et al. 2010). Leatherbacks have several morphological adaptations advantageous to large-scale ocean migrations (Benson et al. 2011), deep dives (Eckert et al. 1989), and sustained residence in the open ocean (NMFS & USFWS 1998). Leatherbacks have strong front flippers that are proportionally longer than those of other sea turtle species and may span up to 270 centimeters wide in adults (NMFS & USFWS 1998).

Leatherbacks have a predominately black coloration with varying degrees of pale spotting that covers the scaleless skin and the sculpted ridges of the carapace (NMFS & USFWS 1998). The underside is often mottled, white to pinkish and black, and the degree of pigmentation is variable (NMFS & USFWS 1998). Leatherback hatchlings are mostly black with mottled undersides and covered with small polygonal bead-like scales. Flippers have a white margin and white scales are present as stripes along the back. In contrast to other sea turtle species, leatherbacks lack claws in both front and rear flippers (NMFS & USFWS 1998).

The generic name *Dermochelys* was introduced by Blainville in 1816 (NMFS & USFWS 1998). The specific name *coriacea* was initially used by Vandelli in 1761 and was later adopted by Linnaeus in 1766 (NMFS & USFWS 1998). The species name refers to the unique leathery texture and scaleless skin of adults (NMFS & USFWS 1998). The leatherback turtle is the only surviving species of the taxonomic family Dermochelyidae (NMFS & USFWS 1998).

Western Pacific leatherback feed in waters off California (Dutton et al. 2007). The western Pacific population is known to nest in at least 28 different sites along the tropical shores of Indonesia, Papua New Guinea, the Solomon Islands, and Vanuatu. Eastern Pacific leatherbacks nest on beaches in Mexico, Costa Rica, and Nicaragua. Leatherbacks prefer to nest on unobstructed, mildly sloped, sandy, continental shores adjacent to deep offshore waters (NMFS & USFWS 1998). These nesting colonies all share a common haplotype, a group of genes that tend to be inherited together from a single parent. (Dutton et al. 2007).

Section 2. Sufficiency of Scientific Information to Indicate the Petitioned Action May Be Warranted

The Petition components are evaluated below, with respect to Fish and Game Code Section 2072.3 and Section 670.1, subdivision (d)(1), of Title 14 of the California Code of Regulations.

2.1 Population Trend

2.1.1 Scientific Information in the Petition

The Petition discusses leatherback population trends under the "Population Trend" section on page 9. The Petition indicates that Pacific leatherback sea turtles are facing extinction due to incidental bycatch in commercial and artisanal fisheries, overharvest of eggs, and killing of adults at nesting beaches, as well as commercial and residential development on nesting beaches (Kaplan 2005; Tapilatu et al. 2013). The Petition states that this has resulted in a decline of more than 95% in leatherbacks from the eastern and western populations combined over the last 30 years (Spotila et al. 2000; Tapilatu et al. 2013).

2.1.2 Conclusion

Scientific information on Pacific leatherback population trends is consistent with that shown in the Petition. NMFS indicates that western Pacific leatherback sea turtles have declined by more than 80% since the 1980s and are anticipated to decline by 96% by 2040 (NMFS 2016). The Petition contains sufficient information on population trends of the Pacific leatherback sea turtle to suggest a declining population trend.

2.2 Geographic Range

2.2.1 Scientific Information in the Petition

Information regarding the leatherback geographic range appears on pages 10 through 13 of the Petition and is discussed further here. However, for purposes of Petition Evaluation, "range" is limited to the species' California range. (*Cal. Forestry Assn. v. Cal. Fish and Game Com.*, supra, 156 Cal. App. 4th at p. 1551.)

The Petition indicates that the Pacific leatherback sea turtle has the largest geographic range of any living marine reptile, spanning the temperate and

tropical waters throughout the Pacific Ocean (Hays et al. 2004; James et al. 2006; Benson et al. 2007a, Benson et al. 2011). Adults have been reported in the Pacific as far north as the Bering Sea in Alaska and as far south as Chile and New Zealand (NMFS & USFWS 1998). In California, Pacific leatherback sea turtles are known to occur.

2.2.2 Conclusion

Given that Pacific leatherback sea turtles are found throughout the Pacific Ocean, the Petition includes sufficient information to describe the Pacific leatherback sea turtle's worldwide geographic range and additional information on the California range is described in Distribution below.

2.3 Distribution

2.3.1 Scientific Information in the Petition

The Petition discusses current and historical leatherback distribution on pages 10 and 11. The Petition indicates Pacific leatherbacks' presence off California is strongly related to seasonal upwelling that spatially drives food availability. Previous studies have shown that leatherback distribution and occurrence in waters off California have been linked to sea surface temperature of 15-16º Celsius during late summer and early fall (Starbird et al. 1993). The Petition notes that leatherback sightings are often reported in Monterey Bay during August by recreational boaters, whale-watching operators, and researchers (Benson et al. 2007b). The greatest leatherback densities off central California have consistently been found where upwelling creates favorable habitat for jellyfish production, their main prey (Benson et al. 2007b). The Petition provides a map of Pacific leatherback sea turtles' known occurrence offshore portions of California on page 13 (Petition Figure 4, included here as Figure 1).

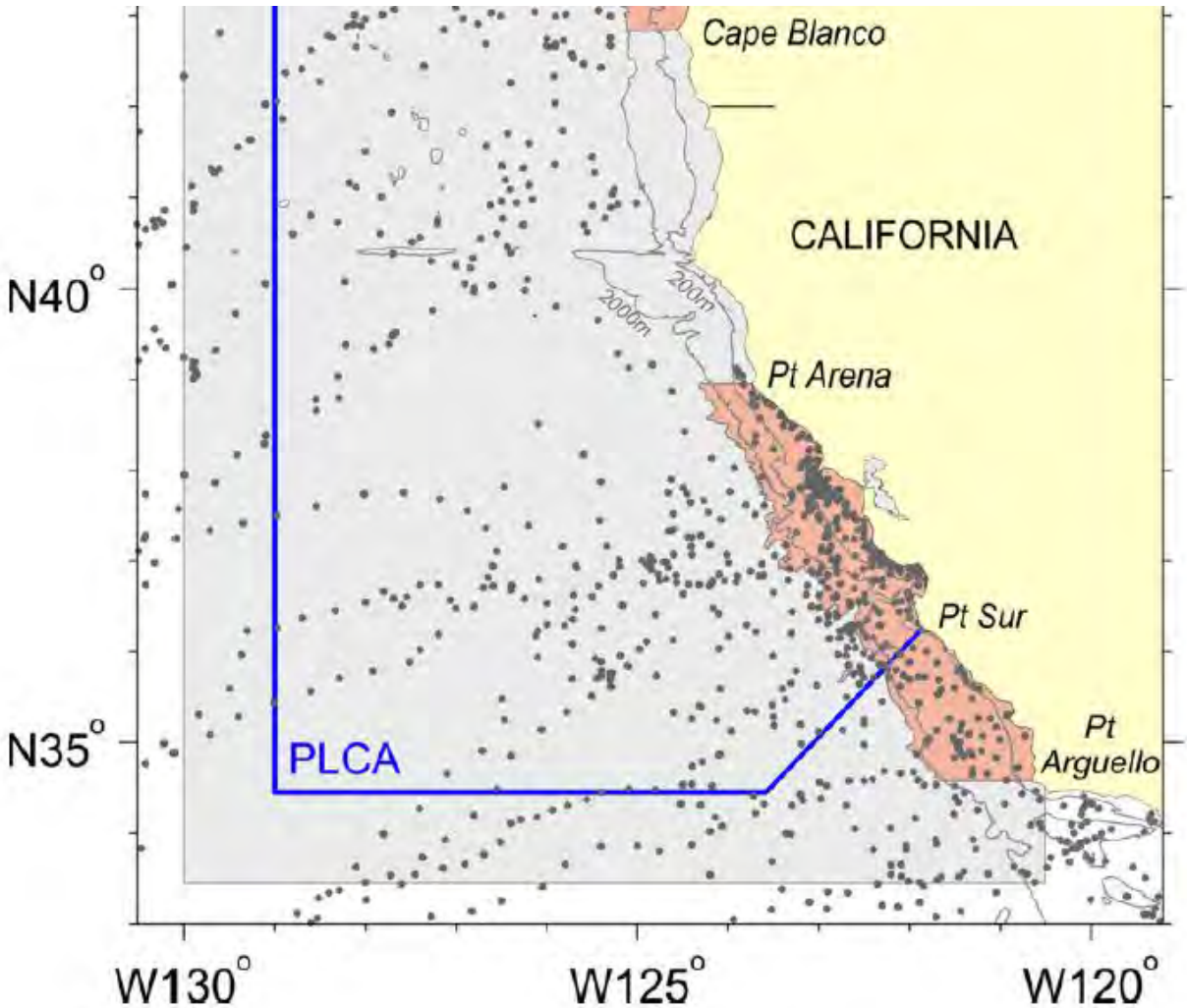


Figure 1. Pacific leatherback sea turtle distribution map from the Petition. Black dots are leatherback sea turtle telemetry data. Pink area indicates the leatherback sea turtle critical habitat designation in California. "PLCA" is the Pacific Leatherback Conservation Area that excludes the drift gillnet fishery for three months each year (NMFS 2017a, in Petition, Figure 4).

2.3.2 Other Relevant Scientific Information

A review of primary literature found that genetic studies have identified three distinct stocks of leatherback sea turtles in the Pacific: an eastern Pacific stock that nests primarily in Mexico and Costa Rica; a western Pacific stock that nests primarily in the Papua Barat, Indonesia, Papua New Guinea, Solomon Islands, and Vanuatu; and a Malaysian stock that nests primarily in Malaysia (Benson et al. 2011). Between July and November, western Pacific stocks migrate to the U.S. Exclusive Economic Zone off the coasts of Washington, Oregon, and California to forage on large aggregations of jellyfish (*Scyphomedusae*) in the California Current ecosystem (Figure 2; Benson et al. 2011; Curtis et al. 2015).

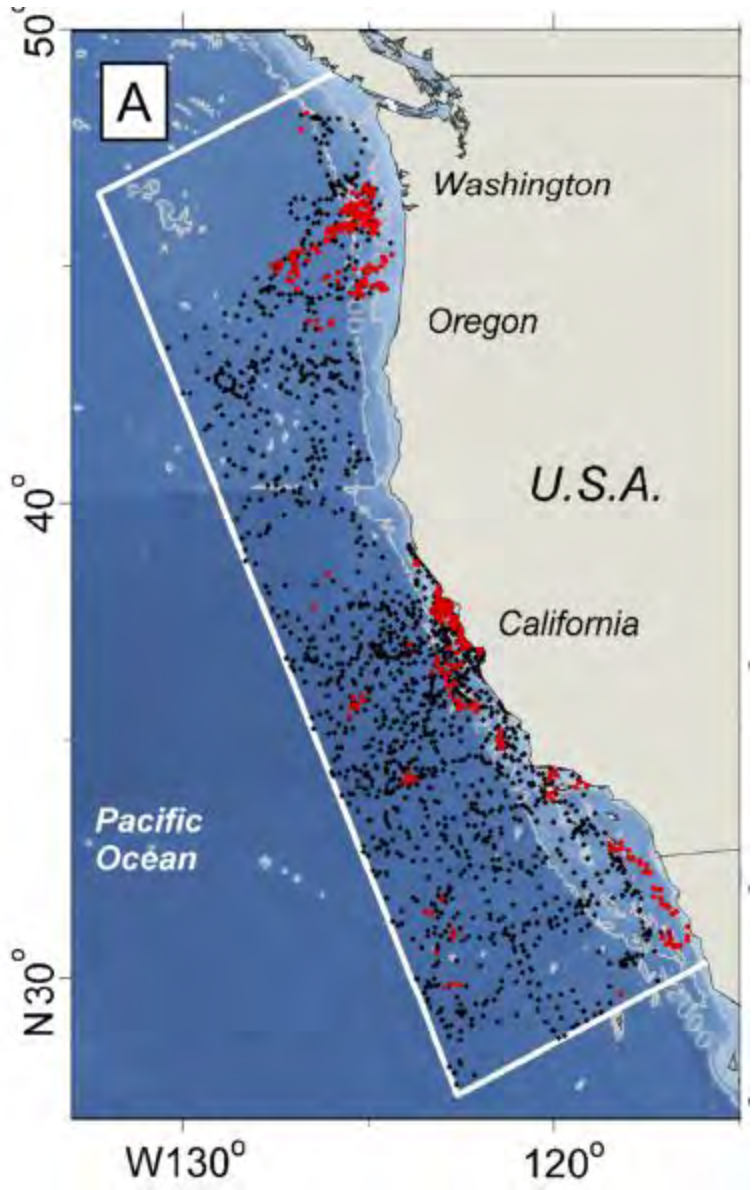


Figure 2. Distribution of western Pacific leatherback sea turtles based on telemetry data of 40 individuals. Red dots represent area restricted search (ARS), the behavior of remaining in an area once an animal encounters prey. Black dots represent transit. (From Benson et al. 2011).

2.3.3 Conclusion

The information provided in the Petition on distribution of the Pacific leatherback sea turtle is consistent with other information available to the Department from occurrence records. While the Petition focuses on the Pacific Leatherback Conservation Area, the Department has provided additional information on the statewide distribution.

2.4 Abundance

2.4.1 Scientific Information in the Petition

The Petition discusses leatherback abundance on pages 9 and 10. The Petition states that the critically endangered Pacific leatherback turtle population has suffered a catastrophic decline over the last three decades. In the Pacific Ocean, leatherback populations have declined at all major nesting beaches resulting in a more than 95% decline from the eastern and western populations combined over the last 30 years (Spotila et al. 2000; Tapilatu et al. 2013). The Petition states that the total western leatherback population was estimated in 2007 to include 2,700-4,500 breeding females with 1,100-1,800 female leatherbacks nesting annually (Dutton et al. 2007). More recently, deriving abundance estimates from nest counts gives a conservative western Pacific population estimate of 562 nesting females (NMFS 2017b). For California, Scott Benson, NMFS, estimated the number of western Pacific leatherbacks in California waters from 2005–2014 averaged 54 individuals annually (Benson, pers. comm. 2015). The prior estimate, using data from 1990-2003, indicated an annual average of 178 western Pacific leatherback sea turtles off California (Benson et al. 2007b).

2.4.2 Other Relevant Scientific Information

Further review of primary literature and personal communication with Scott Benson, NMFS, show a continued trend of decreasing abundance in western Pacific leatherback populations. A study of the long-term western Pacific leatherback population decline found a continual and significant long-term nesting decline of 5.9% per year at primary western Pacific beaches from 1984 to 2011 (Tapilatu et al. 2013). A separate study assessing the population-level impacts of western Pacific leatherback turtle interactions in the Hawaii-based shallow-set longline fishery documented a continual 6.1% annual nesting decline of western Pacific leatherbacks from 2001-2017 (Martin et al. 2020). The current estimated number of western Pacific leatherbacks that forage in California waters annually is approximately 50 turtles, with an approximate annual decline of 5.6% since 1990 (Benson, *pers. comm.* 2020b).

2.4.3 Conclusion

The Petition contains sufficient scientific information on Pacific leatherback sea turtle abundance to indicate the continuing declines in abundance in both the entirety of its range and across the species' range in California.

2.5 Life History

2.5.1 Scientific Information in the Petition

The Petition discusses leatherback life history on pages 4 through 9 and states that Pacific leatherbacks are divided into two genetically distinct eastern and western populations. However, as discussed in section 2.3.2, three distinct stocks exist in the Pacific (Benson et al. 2011). Western Pacific leatherback populations are the most common found feeding in waters off California (Dutton et al. 2007). The Petition discusses species description, taxonomy, population genetics, reproduction and growth, diet and foraging ecology, and migration.

The Petition describes the Pacific leatherback sea turtle as the largest turtle species in the world and fourth largest living reptile (McClain et al. 2015). Pacific leatherbacks are a pelagic and endothermic species that forage in Pacific Ocean waters as far north as the Bering Sea in Alaska and as far south as Chile and New Zealand (NMFS & USFWS 1998). Pacific Leatherbacks reach sexual maturity at approximately 9-15 years and reproduce seasonally from June to September (Zug and Parham 1996; Dutton et al. 2005; PFMC & NMFS 2006). Over the course of a single mating season, female Pacific leatherbacks lay an average of five nests at an interval of approximately 9.3-9.5 days (Reina et al. 2002). Pacific Leatherbacks prefer to nest on unobstructed, mildly sloped, sandy, continental shores accompanied by deep offshore waters (NMFS & USFWS 1998). Nesting does not occur on the U.S. west coast. Hatchling sex depends on the temperature of the nest environment during the 55- to 77-day incubation period (NMFS & USFWS 1998), with females becoming increasingly dominant with increasing temperature (Binckley et al. 1998).

The Petition describes how Pacific leatherback sea turtles typically feed on marine invertebrates including jellyfish, tunicates, and other gelatinous zooplankton (Bjorndal et al. 1997; Houghton et al. 2006; Wallace et al. 2006). Pacific leatherbacks are known to exploit convergence zones and areas of upwelling waters where aggregations of prey commonly occur, such as off California (Benson et al. 2007b). Pacific leatherbacks spend most of their time submerged at sea and display patterns of continual diving that suggests frequent surveying of the water column for gelatinous prey (Houghton et al. 2006). Dense aggregation of jellies (*scyphomedusae*) are common in the summer and fall months throughout the nearshore regions from central California to Northern Oregon (Graham et al. 2010). Oceanographic retention

zones and upwelling shadows, such as those in the neritic waters (the shallow ocean near a coast and overlying the continental shelf) off central California, are particularly favorable habitat for leatherback prey (Graham et al. 2010).

The Petition describes the migration patterns of Pacific leatherbacks and how the turtles spend nearly their entire lives in the ocean's pelagic zone (i.e. The water column). Some females may forage year-round in tropical habitats near nesting beaches while others undertake a lengthy migration to exploit temperate foraging habitats like that off central California (Benson et al. 2011; Lontoh 2014). Western Pacific leatherbacks that embark on a trans-Pacific migration to the temperate continental shelf on the U.S. West Coast forage on the seasonally abundant aggregations of gelatinous zooplankton (Bailey et al. 2012; Benson et al. 2007b; Block et al. 2011). Eastern Pacific leatherbacks are known to migrate south from the shores of Mexico, Costa Rica, and Nicaragua, where they nest, through the Galapagos to feeding sites throughout the southeast Pacific off South America's West Coast (Bailey et al. 2012; Block et al. 2011; Shillinger et al. 2008).

2.5.2 Conclusion

The Petition presents sufficient information on the known life history of the Pacific leatherback sea turtle to indicate some elements may render it particularly vulnerable to anthropogenic impacts.

2.6 Kind of Habitat Necessary for Survival

2.6.1 Scientific Information in the Petition

The Petition describes necessary habitat components for the survivability of Pacific leatherbacks on pages 7 through 26. Pacific leatherbacks are a highly migratory species and are known to swim over 10,000 km within a single year (Benson et al. 2007a, Benson et al. 2011; Shillinger et al. 2008). The Petition states that quality foraging areas and nesting grounds are vital habitats for Pacific leatherback survival. The federal government identified California's offshore waters between the 200- and 3000-meter isobaths from Point Sur to Point Arguello, as Pacific leatherback critical habitat (50 CFR 226). The waters off the coasts of California, Oregon, and Washington within the California Current Ecosystem comprise one of the most important foraging habitats in the entire world for western Pacific leatherback populations (Benson et al. 2007b; Harris et al. 2011; NMFS & USFWS 1998). The greatest western Pacific leatherback densities off central California have been found where upwelling creates a favorable habitat for jellyfish production (Benson et al.

2007b). A positive relationship exists between western Pacific leatherback abundance in neritic waters off California and the average Northern Oscillation Index (NOI) (Benson et al. 2007b). Years with positive NOI values appear to correspond with conditions favorable to upwelling along the California Coast. Upwelling leads to phytoplankton and zooplankton (including jellyfish) production, which in turn draws leatherbacks (Benson et al. 2007b). A study on eastern Pacific nesting leatherback turtles found significantly reduced reproductive output during El Niño years (Reina et al. 2009; Santidrián Tomillo et al. 2012). The petition states that previous studies have shown that western Pacific leatherback distribution and occurrence in waters off California have been linked to sea surface temperature of 15-16º Celsius during late summer and early fall.

The Petition describes how nesting sites for western Pacific leatherbacks include at least 28 different sites along the tropical shores in Indonesia, Papua New Guinea, the Solomon Islands, and Vanuatu while the eastern Pacific leatherbacks nest on the shores of Mexico, Costa Rica, and Nicaragua. Leatherbacks prefer to nest on unobstructed, mildly sloped, sandy, continental shores accompanied by deep offshore waters (NMFS & USFWS 1998). The Petition states anthropogenic activity related to fishing, marine debris, pollution, shipping, coastal development, and beach erosion are the greatest factors involved in Pacific leatherback habitat degradation. The Petition emphasizes that successful conservation efforts must include protecting migration corridors and reducing/eliminating the threats mentioned above in Pacific leatherback foraging and nesting areas.

2.6.2 Conclusion

The Petition presents sufficient information regarding the kind of habitat necessary for Pacific leatherback sea turtle survival, including information suggesting the importance of foraging areas of the west coast of the U.S.

2.7 Factors Affecting the Ability to Survive and Reproduce

2.7.1 Scientific Information in the Petition

The Petition discusses the factors affecting Pacific leatherback sea turtle ability to survive and reproduce on pages 13 through 27 in Section 6. The Petition identifies the following factors as threats to Pacific leatherback: (1) modification or destruction of habitat; (2) overexploitation; (3) predation; (4) disease; and (5) other natural events or anthropogenic activities. These factors are discussed separately below.

2.7.1.1 Modification or destruction of habitat:

The Petition indicates most threats to Pacific leatherback foraging areas and nesting sites occur in nearshore marine areas, where the vast majority of human activities (e.g. fishing, swimming, boating) occur in the marine environment. The Petition indicates that Pacific leatherbacks and their preferred prey are in danger from oil and gas extraction activities on and around the California coast, aquaculture facilities, coastal development, entanglement by and ingestion of marine debris, vessel strikes from commercial shipping/other boat traffic, and beach erosion.

Oil and Gas Activities

The Petition describes the general impacts oil and gas activities have on sea turtle populations observed in the United States and implies oil and gas activities off California can similarly impact Pacific leatherback populations. The Petition states that because sea turtles generally do not avoid oil-contaminated areas, they are very vulnerable to harmful contact with oil and its byproducts. The Petition states that sea turtles are known to indiscriminately ingest tar balls that are about the size of their prey. Ingested tar interferes with digestion, sometimes leading to starvation and buoyancy problems, rendering the turtle more vulnerable to predation and less able to forage. Furthermore, the Petition states that juvenile and adult leatherbacks exposed to oil, tar, and spill-related chemicals in the water column can exhibit declining red blood cell counts and increased white blood cell counts, impaired osmoregulation, and sloughing of skin that can lead to infection. The Petition also states that oil spills reduce food availability, and ingestion of contaminated food can expose turtles to harmful hydrocarbons and toxins. The petition describes that oil spill response also presents hazards to sea turtles as oil dispersants contain components that can interfere with lung function, respiration, digestion, excretion, and salt gland function. Lastly, the Petition notes that burning oil at the surface, another potential response to oil spills, can directly harm turtles at the surface.

Aquaculture

The Petition states that the growth of aquaculture off California threatens to obstruct Pacific leatherback sea turtle migration to coastal waters by entangling them in fixed gear. Longlines used in mussel aquaculture are a documented source of mortality to Pacific leatherbacks (Price et al. 2016). In addition, the Petition notes the federal government has described

aquaculture as an activity that may adversely impact leatherback sea turtle migratory pathways to nearshore waters off the U.S. West Coast (77 Fed. Reg. 4191). The petition states that off California in particular, a 100-acre mussel aquaculture facility six-miles offshore poses an entanglement risk to Pacific leatherback sea turtles (NMFS 2012). Further information on this aquaculture facility can be found in section 2.7.2.

Coastal Development Throughout the West Pacific Leatherback's Range

The Petition indicates that as human populations expand throughout the tropical Pacific at unprecedented rates, commercial and residential development on beachfront property increasingly encroaches on Pacific leatherback habitat (NMFS & USFWS 1998, 2013). Recreational use of nesting beaches, litter, and other debris on beaches and in the ocean, and the general harassment of turtles all degrade nesting habitat (NMFS & USFWS 1998). The Petition states that the increased human presence near nesting habitat tends to increase the direct harvest of leatherbacks and their eggs (NMFS & USFWS 1998). Additional information specific to the California coast can be found in Section 2.7.2.

Entanglement by and Ingestion of Marine Debris

The Petition indicates that the entanglement by, and ingestion of, marine debris constitutes a serious and widespread threat to the Pacific leatherback populations (NMFS & USFWS 1998; Schuyler et al. 2014). Pacific leatherbacks are easily entangled in abandoned fishing gear, lines, ropes, and nets (NMFS & USFWS 1998). Pacific leatherbacks also commonly mistake plastic bags, plastic sheets, balloons, latex products, and other refuse for jellyfish, their preferred prey (NMFS & USFWS 1998; Bugoni et al. 2001; Nelms et al. 2016). The Petition states that the mortality from marine debris threatens the Pacific leatherback population throughout the Pacific (Hitipeuw et al. 2007).

Vessel Strikes from Commercial Shipping and Other Boat Traffic

The Petition identifies vessel strikes from commercial shipping and other boat traffic as a threat to the Pacific leatherback and its pelagic habitat. From 1989 through 2014, there have been 12 reported incidents of vessel struck Pacific leatherbacks in California, but the Petition states that this is an underestimate because carcasses that sink or strand in an area where they cannot be detected go unreported or unobserved (NMFS 2017c).

Given that NMFS has identified the waters off central California as an important foraging habitat for Pacific leatherbacks during the summer and fall, the Petition states it is likely that they are affected by ship traffic in that area.

Beach Erosion

The Petition states that many leatherback nesting beaches are subject to seasonal or storm-related erosion and accretion (Hitipeuw et al. 2007). The Petition provides an example from beaches in Indonesia, where from August through October at Jamursba-Medi, high surf and strong currents erode large numbers of unhatched nests. Erosion destroys an estimated 45% of western Pacific leatherback nests at Jamursba-Medi, including 80% of nests at Warmamedi (Hitipeuw et al. 2007). At nearby Wermon, 11% of observed nests were lost to high tides in 2003-2004 (Hitipeuw et al. 2007). The Petition states that as sea levels continue to rise, the Pacific leatherback's fragile habitat will only become more at risk of destruction from wave-induced erosion (Van Houtan & Bass 2007). Additional information specific to the California coast can be found in Section 2.7.2.

2.7.1.2 Overexploitation:

The Petition indicates that leatherbacks, with their large pectoral flippers and active behavior, are vulnerable to entanglement in fishing gear (James et al. 2005). The Petition states that incidental take in fisheries threatens the entire Pacific leatherback population where active and abandoned driftnets and longlines have a long history of entangling and killing turtles (NMFS & USFWS 1998). The Petition states that during the 1990s, gillnet and longline fisheries killed at least 1,500 Pacific leatherbacks annually in the Pacific (Spotila et al. 2000). Off the U.S. West Coast, Pacific leatherbacks have been incidentally caught in drift gillnets off California, Oregon and Washington, on longlines off California and Hawaii (NMFS & USFWS 1998; released alive), in groundfish pot gear off California in 2008 (Eguchi et al. 2017, Jannot et al. 2011; released alive), and in crab trap gear in 2016 (NMFS 2018; released alive). The Petition notes that the groundfish pot fishery demonstrates the difficulty in monitoring and mitigating catch of Pacific leatherbacks in U.S. West Coast fisheries. The Petition notes that conclusive statements about Pacific leatherback bycatch in the groundfish pot fishery cannot be made without more data on the fishery and on the overlap between the fishery and leatherback sea turtles. The Petition states that the interaction of fisheries with Pacific

leatherbacks off California, Oregon, and Washington have a particularly large impact on the population based on the likelihood that the turtles are adult females and any interaction with an adult female is significant to the population (Benson et al. 2007b; Benson et al. 2011). Further review of primary literature indicates that capture studies off central California during 2000-2005 found that 67.5% (27/40) of foraging Pacific leatherbacks were female, although the study did not conclude generally that all Pacific leatherback interactions occurring in fisheries off the coasts of California, Oregon, and Washington were likely female turtles (Benson et al. 2007b; Benson et al. 2011).

California's Pelagic Fisheries

The Petition also indicates that both drift gillnets and longline fishing for swordfish, tuna, and sharks off California interact with and threaten the persistence of Pacific leatherbacks. Observed captures of Pacific leatherbacks in the drift gillnet and longline fisheries coincide with their seasonal foraging in the neritic waters off the U.S. Coast (Benson et al. 2007b). The Petition states that fishing gear interactions will continue to be problematic in California Pacific leatherback habitat and that unless effective mitigation measures are implemented, the diversity of pelagic fishing gears proposed for use off California present a real and persistent threat to leatherback sea turtles.

The Petition states that the California drift gillnet fishery has been the primary threat to Pacific leatherback sea turtles off California in recent decades. In 2013, NMFS issued a biological opinion on the continued authorization of the West Coast drift gillnet fishery anticipating incidental interactions with ten Pacific leatherback sea turtles over a five-year period (NMFS 2013). The Petition states that the anticipated interactions with the drift gillnet fishery will have a population level impact and that NMFS scientists have determined that any more than one leatherback mortality per seven years will delay the population's recovery. However, it is unclear how the source (Curtis et al 2015) relates to the formal NMFS Biological Opinion. More information on California drift gill net fishery (DGN) regulations can be found in section 2.7.2.

The Petition also identified the highly migratory longline fisheries, which are currently prohibited in the U.S. Exclusive Economic Zone, to be a threat to Pacific leatherbacks off California. The Petition claims that industry efforts have focused on introducing longlines, buoy gear and

linked buoy gear to catch pelagic fish off the U.S. West Coast. In 2019, NMFS issued exempted fishing permits to use longline gear in the Exclusive Economic Zone off California (84 Fed. Reg. 20,108 (May 8, 2019)). The Petition states that in Pacific longline fisheries, 27% of captured Pacific leatherbacks are estimated killed, and that the history of longlines provides evidence that this gear is a threat to the persistence of Pacific leatherback sea turtles. However, further review of the statement and source show longline-caused mortality to be 5% and 12% for the eastern and western Pacific population respectively (Kaplan 2005). Further information regarding the deep-set buoy gear and longline fisheries off California can be found in section 2.7.2.

Foreign Fishing Threats

The Petition also states that leatherbacks are highly vulnerable to threats from foreign fishing gear near their nesting habitats (NMFS & USFWS 2013; PFMC & NMFS 2006; Tapilatu 2017). In the western Pacific Ocean, illegal fishing occurs in the waters off Indonesia's most important nesting beaches and communities in the area have reported dead Pacific leatherbacks entangled in fishing nets and marine debris (Hitipeuw et al. 2007).

2.7.1.3 Disease and predation:

The Petition lists fibropapillomatosis as a disease that afflicts leatherback sea turtles. The tumor-forming disease, likely caused by a herpesvirus (Ene et al. 2005), may form internal and external tumors (fibropapillomas) large enough to hamper swimming, feeding, and potential escape from predators (Herbst 1994).

The Petition also identifies predation, and the harvest of adults and eggs at nesting beaches, as a threat to Pacific leatherback sea turtle survivability and reproduction. Historically, female leatherbacks have been harvested at their nesting beaches and at sea (NMFS & USFWS 1998). In addition, the Petition states that across the Pacific, leatherback populations have yet to recover from years of historical egg harvests that depleted recruitment of their populations (Hitipeuw et al. 2007). Leatherback nests are also destroyed by predation from domestic animals and wild species, including rats, mongoose, birds, monitor lizards, snakes, dogs, feral pigs, crabs, ants, and other invertebrates (Hitipeuw et al. 2007; NMFS & USFWS 1998). The Petition states that mortality from fishing along with the severe harvest of Pacific leatherback eggs are two major factors responsible for

the collapse of the Pacific leatherback population (PFMC & NMFS 2006). Additional information specific to the California coast can be found in Section 2.7.2.

2.7.1.4 Other factors:

The Petition indicates other natural events and/or human-related activities affect the ability of the Pacific leatherback to survive and reproduce, and are discussed below:

Climate Change and Ocean Warming Effects

The Petition states that climate change and global warming represent perhaps the greatest long-term threat to Pacific leatherback survival. The Petition describes ocean warming having measurable negative effects on leatherbacks and their habitat as ocean warming inhibits cool, nutrient-rich waters from being upwelled, leading to lower productivity, less prey, and poorer quality foraging areas for leatherback turtles (Roemmich & McGowan 1995; Ruzicka et al. 2012). The Petition states warming anomalies and reduced upwelling in the California Current System have also resulted in marked ecological effects including decreased productivity and altered ecosystem structure.

The Petition also states that phenology shifts in leatherback turtles are already happening due to changes in sea surface temperature (Neeman et al. 2015). Changes of water temperature in foraging grounds delays the timing of the nesting season in some beaches of the Central Atlantic and the Eastern Pacific (Neeman et al. 2015). It is likely that leatherback turtles spend more time in foraging grounds when prey distribution and availability is disrupted during warming conditions (Neeman et al. 2015 p. 121). The Petition notes that the implications of delayed nesting seasons on hatchling success and survival for Pacific leatherbacks nesting in the west Pacific require further study.

The Petition states that the reproductive success of Pacific leatherback turtles in nesting areas of the Pacific is affected by global warming. A study of eastern Pacific nesting leatherback turtles found significantly reduced reproductive output in El Niño years (Reina et al. 2009; Santidrián Tomillo et al. 2012), conditions that are likely to become more common with global warming (Saba et al. 2012). A study predicting severity of the threat of global warming to leatherback sea turtles found that incubation

temperatures would be high enough to induce uncoordinated movement in adults, leading them to leave some regions (Dudley and Porter 2014).

The Petition states that the skewing of sex ratios driven by warming temperatures at nesting beaches are more prevalent given the temperature-dependent nature of egg development (Davenport 1997). In Pacific leatherbacks, high temperatures in nesting beaches at Playa Grande in Costa Rica already are producing 70-90% females and experts predict that 100% of hatchling will be females (or there will be major hatchling failures) with continuing warming (Santidrián Tomillo et al. 2014). At Jamursba-Medi in Indonesia, where California/Oregon Pacific leatherbacks nest, reduced hatching success has been documented with hatch rates of protected nests that were 50-85% until 2003 and 10-15% in 2004-2006 (Tapilatu & Tiwari 2007). The Petition states that the reduction of hatching success and skewing of sex ratios has likely contributed in part to the long-term decline in this important nesting leatherback population (Tapilatu et al. 2013).

Sea Level Rise and Ocean Acidification

The Petition also states that sea level rise will affect nesting success of Pacific leatherback sea turtles. Sea level rise will inundate low-lying beaches where sand depth is a limiting factor for leatherbacks. Flooded nesting sites will decrease the available nesting habitat (Fuentes et al. 2009; Von Holle et al. 2019). In addition, the Petition states that climate change will also affect the nesting success of leatherbacks due to the increase in the severity of storms and changes in the prevailing currents that could lead to increased beach erosion and loss of suitable nesting habitat (Fuentes & Abbs 2010). The capacity of female leatherbacks to occupy new nesting habitat will determine whether this species adapts to rapid sea level rise.

The Petition discusses ocean acidification as a current threat to Pacific leatherback sea turtles. Ocean acidification is directly related to the increase in atmospheric CO_2 emissions globally. As the global oceans uptake the excess of CO_2, seawater chemistry changes and the oceans become more acidic (Carter et al. 2016, 2017; Doney et al. 2009; Fabry 2009; Fabry et al. 2008; Gattuso & Hansson 2011; Orr et al. 2005). The California Current System is already affected by ocean acidification (Freely et al. 2017; Gruber et al. 2012; Hauri et al. 2009), potentially disrupting the food web on which leatherbacks rely for foraging (Ruzicka et al. 2012). The

Petition states that ocean acidification can be an indirect threat to leatherbacks in foraging areas because their primary prey (jellyfish) belongs to a complex food web (Ruzicka et al. 2012) where several taxa are highly vulnerable to acidic conditions. A decline in jellyfish production can affect food availability for leatherbacks along the U.S. West Coast during summer and autumn, when dense aggregations of jellyfish historically have been present (Graham et al. 2010; Benson et al. 2007b).

2.7.2 Other Relevant Scientific Information

Aquaculture

The Petition states that a 100-acre mussel aquaculture project located approximately 7 miles from the shoreline in the San Pedro Basin and 3.1 miles northeast of the oil platform Edith is a potential risk to Pacific leatherbacks foraging off California, and cites a 2012 NMFS consultation letter to the U.S. Marine Corps of Engineers. Further investigation supports the statement, as consultation with CDFW environmental scientists in the Marine Aquaculture Program and Senior Environmental Scientist, Cassidy Teufel, with the California Coastal Commission confirmed the facility and infrastructure of the project was installed and is currently in place (Ray, *pers. comm*. 2020; Teufel, *pers. comm.* 2020). However, due to several compliance issues, the facility closed in 2019 with the remaining infrastructure in poor repair. Loose and broken anchor lines remain an entanglement risk to marine mammals and reptiles. The final disposition of the facility and remaining infrastructure is pending on the results of an auction scheduled to take place in 2020. The NMFS consultation letter and email correspondence with Scott Benson stated that leatherback sea turtle sightings and interactions are rare south of Point Conception (NMFS 2012; Benson, *pers. comm.* 2020a). Telemetry data indicates Pacific leatherbacks primarily use the southern California Bight (Point Conception to San Diego) for transiting with occasional foraging activity, though the region is not a significant foraging area (Benson et al 2011).

California's Pelagic Fisheries

The Petition describes how, in 2001, to reduce the impact of California's pelagic fisheries on Pacific leatherback populations, California implemented restrictions closing the DGN fishery between August 15 and November 15 in an area designated as the Pacific Leatherback Conservation Area. The seasonally closed area is located where, and closed when, most Pacific leatherback interactions have historically occurred. In 2018, California enacted

a DGN Transition Program with the goal of reducing bycatch and enabling a sustainable swordfish fishery. The Transition Program enables permittees to voluntarily surrender their DGN permit and DGN gear in exchange for monetary compensation.

The Petition also describes the threat of the reintroduction of longlines and establishment of deep-set buoy gear in the Exclusive Economic Zone off California, as seen by the exempted fishing permits (EFPs) issued by NMFS in 2019 (84 FR 20108). Further review of the action shows that deep-set buoy gear EFPs were issued in 2018 and 2019, while longline EFPs were issued April 24, 2019 but have since been retracted due to court order. Further mitigation measures required in the EFPs included 100 percent observer coverage during activities, night setting of shallow-set longlines, specified no fishing areas (Figure 3), and ceasing of activities if two Pacific leatherback interactions or one Pacific leatherback mortality occur (84 FR 20108). As noted above, the longline EFPs have been rescinded. To date, no interactions between deep-set buoy gear and Leatherback sea turtles have occurred.

Figure 3. Coastwide view of the no fishing zone listed in the deep-set buoy gear and longline exempted fishing permits. Figure taken from NMFS 2019.

2.7.3 Conclusion

Although the Petition contained a few inaccuracies, the information contained in the petition, and additional information in the Department's possession, is sufficient to indicate that existing factors are adversely impacting the ability of Pacific Leatherback sea turtle to survive and reproduce.

2.8 Degree and Immediacy of Threat

2.8.1 Scientific Information in the Petition

The degree and immediacy of threat to the Pacific leatherback sea turtle is discussed in the following sections of the Petition: “Executive Summary” on pages 1 and 2; “Population Trend, Distribution, and Abundance” on pages 9 through 11; “Importance of California Waters for Leatherbacks” on pages 11 through 13; “Factors Affecting the Ability of the Population to Survive and Reproduce” on pages 13 through 28; and “The Degree and Immediacy of Threat” on page 28. The Petition states that there are only approximately 550 annually nesting adult female western Pacific leatherbacks, and that every individual in waters off California is significant. The Petition indicates that the primary threat to Pacific leatherbacks is entanglement and drowning in longline fishing gear. Other significant threats to Pacific leatherbacks include: oil and gas activities in California; aquaculture; coastal development throughout the western Pacific leatherback’s range; entanglement by and ingestion of marine debris; vessel strikes from commercial shipping and other boat traffic; beach erosion; overexploitation from California’s pelagic fisheries and foreign fishing; disease and predation; and changes associated with the effects of climate change and ocean warming.

2.8.2 Conclusion

The Petition contains sufficient information on the degree and immediacy of threats to the Pacific leatherback sea turtle to suggest a threat to its continued survival.

2.9 Impact of Existing Management Efforts

2.9.1 Scientific Information in the Petition

The Petition discusses the impact of existing management efforts under the following sections: “Executive Summary” on page 1, “California’s Pelagic Fisheries Threaten Leatherback Sea Turtles” on page 20 and 21, and “Inadequacy of Existing Regulatory Mechanisms” on page 28 and 29. The petition states that despite protections both domestically and internationally, Pacific leatherback populations continue to decline. Federal environmental conservation actions include the Endangered Species Act’s identification of critical habitat and prohibition on take, national marine sanctuaries, and fishing restrictions in the Pacific Leatherback Conservation Area. California management efforts include closure of the “Pacific Leatherback Conservation Area” between August 15th and November 15th since 2001 (PFMC & NMFS 2006). The petition states that California’s introduction of longlines to the U.S. West Coast poses a threat to Pacific leatherbacks, given the history of longline fisheries and leatherback interactions. However, no such introduction within the U.S. EEZ has occurred (see section 2.7.2 on exempted fishing permits). The Petition states that since 2001, two Pacific leatherbacks were observed taken and released alive in the California drift gillnet fishery, one in 2009 and one in 2012 (NMFS 2013). Further information regarding federal management practices can be found in section 2.9.2. Information on the California drift gill net fishery and exempted fishing permits issued in April 2019 can be found in section 2.7.2.

The Petition states that international measures to reduce the threat of shallow-set longline fisheries to Pacific leatherback sea turtles may not be working as well as hoped. Many countries’ commercial fishing fleets operate in areas beyond national jurisdiction and interact with Pacific leatherback sea turtles. For example, the Western and Central Pacific Fisheries Commission (WCPFC) considered in 2008 that the threat to sea turtles was severe enough to warrant the adoption of a measure specifically requiring mitigation to reduce sea turtle mortality from longline interactions (CMM 2008-03); but there is no evidence to suggest that those threats have appreciably diminished (ABNJ 2017).

In summary, the Petition states that fisheries remain the primary threat to Pacific leatherback sea turtles despite a suite of national and international laws designed to protect them, as discussed in detail above. Plastic pollution remains largely unmitigated, and regulations to address this issue on the scale at which it is growing do not yet exist (Iverson 2019). Climate change remains an existential threat to Pacific leatherbacks, as well as other marine animals, due to the inadequacy of regulatory mechanisms to control emissions of carbon dioxide.

2.9.2 Other Relevant Scientific Information

NOAA and the U.S. Fish and Wildlife Service have joint jurisdiction for sea turtles. Federal environmental conservation actions include listing leatherback sea turtles under the Endangered species Act, which makes it illegal to/attempt to harass, harm, pursue, hunt, shoot, kill, or trap federally listed species (NOAA n.d.). The recovery plan for U.S. Pacific leatherback populations includes protecting turtles on nesting beaches, protecting nesting and foraging habitats, reducing bycatch in commercial and recreational fisheries, reducing the effects of entanglement in and ingestion of marine debris, working with international partners to protect turtles in foreign waters, and supporting research with conservation projects consistent with recovery plans (NOAA n.d.). For example, in the U.S., importation of shrimp harvested in a manner that adversely impacts sea turtles is prohibited, a fisheries observer program monitors bycatch from commercial and recreational fisheries, and several sea turtle stranding and recovery programs exist with the goal of improving the survivability of sick, injured, and entangled sea turtles (NOAA n.d.).

2.9.3 Conclusion

Although the Petition does not fully describe all existing federal management measures, information in the Petition regarding population and abundance may indicate existing measures are not fully adequate.

2.10 Suggestions for Future Management

2.10.1 Scientific Information in the Petition

The Petition suggests future management actions for the recovery of the Pacific leatherback sea turtle on pages 29 through 30. The Petition recommends the following specific actions:

- California Department of Fish and Wildlife protects leatherback sea turtles as an endangered species under the California Endangered Species Act;
- California Department of Fish and Wildlife prepares a recovery plan for Pacific leatherback sea turtles pursuant to Cal. Fish & Game Code § 2079.1, including management efforts aimed at reducing toxins in the habitat and impacts from ocean warming and acidification;
- California Department of Fish and Wildlife improves monitoring of leatherback sea turtle abundance and population trends;
- California Department of Fish and Wildlife increases coordination and management with other governments – such as the National Park Service, National Marine Sanctuaries, Department of Defense, and others – to research movements of leatherback sea turtles off the U.S. West Coast;
- California Department of Fish and Wildlife and the California Fish and Game Commission manage California fisheries to reduce interactions (gear modifications, limited soak time for fixed gears, time and area closures, etc.);
- California Department of Fish and Wildlife encourages the Pacific Fisheries Management Council (PFMC) to address continued bycatch of endangered sea turtles and adopt practices to avoid sea turtle entanglements, including phasing out current gear associated with entanglements, particularly in federal gillnet, longline, and pot fisheries;
- California Department of Fish and Wildlife, working with the California Fish and Game Commission, sets a hard limit on the incidental capture of leatherback sea turtles in California-managed fisheries that historically have interacted with leatherback sea turtles or by analogy to fishing gear that has interacted with leatherback sea turtles, and require 100% observer coverage or electronic monitoring to accurately enforce the limit;
- California Department of Fish and Wildlife utilizes existing legal and regulatory frameworks to minimize local contributors to ocean acidification (e.g., eutrophication); and
- The governor declares a climate emergency and takes all necessary action to set California on a path to full decarbonization of our economy by no later than 2045 (for example, banning the sale of new fossil fuel vehicles by 2030 and requiring the generation of all electricity from carbon-free sources by 2030).

The Department notes that on the first bullet, the Fish and Game Commission and not the Department has the authority to list a species under the California Endangered Species Act. In the second to last bullet, the Department notes

that it is unclear what existing legal and regulatory frameworks exist within Department authority could minimize contributors to ocean acidification.

2.10.2 Conclusion

The Petition provides sufficient management suggestions that may aid in conserving the Pacific leatherback sea turtle.

2.11 Detailed Distribution Map

2.11.1 Scientific Information in the Petition

The Petition provides a map detailing a portion of the Pacific leatherback range in California, although it does not provide a map detailing the entire distribution of Pacific leatherback populations. Pages 9 and 13 of the Petition provide maps showing Pacific leatherback sea turtle telemetry data. The Petition text does, however, describe the distribution of the Pacific leatherbacks.

2.11.2 Other Relevant Scientific Information

As noted in section 2.2.1, the Pacific leatherback sea turtle has the largest geographic range of any living marine reptile, spanning the temperate and tropical waters in all oceans (Benson et al. 2007a, 2011; Hays et al. 2004; James et al. 2006). NMFS provides a map of this pan-oceanic distribution on their website (Figure 4). The occurrence of Pacific leatherback sea turtles within California State Waters is extremely limited in comparison to their entire range. A study by Curtis et al. provided a distribution map, specifically of western Pacific leatherback populations (Figure 5).

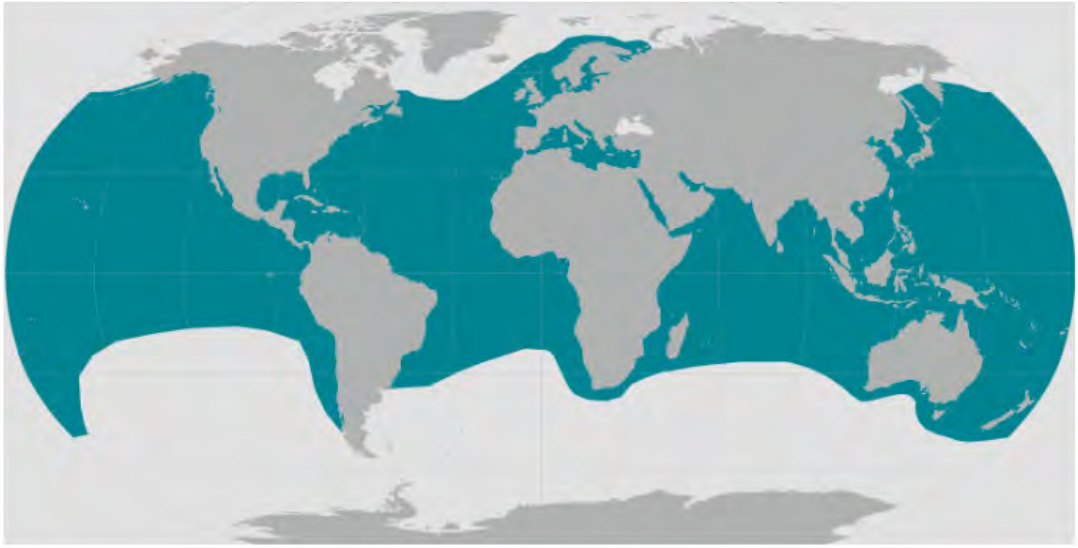


Figure 4. World map providing approximate representation of the leatherback turtle's range (https://www.fisheries.noaa.gov/species/leatherback-turtle; accessed 14 February 2020)

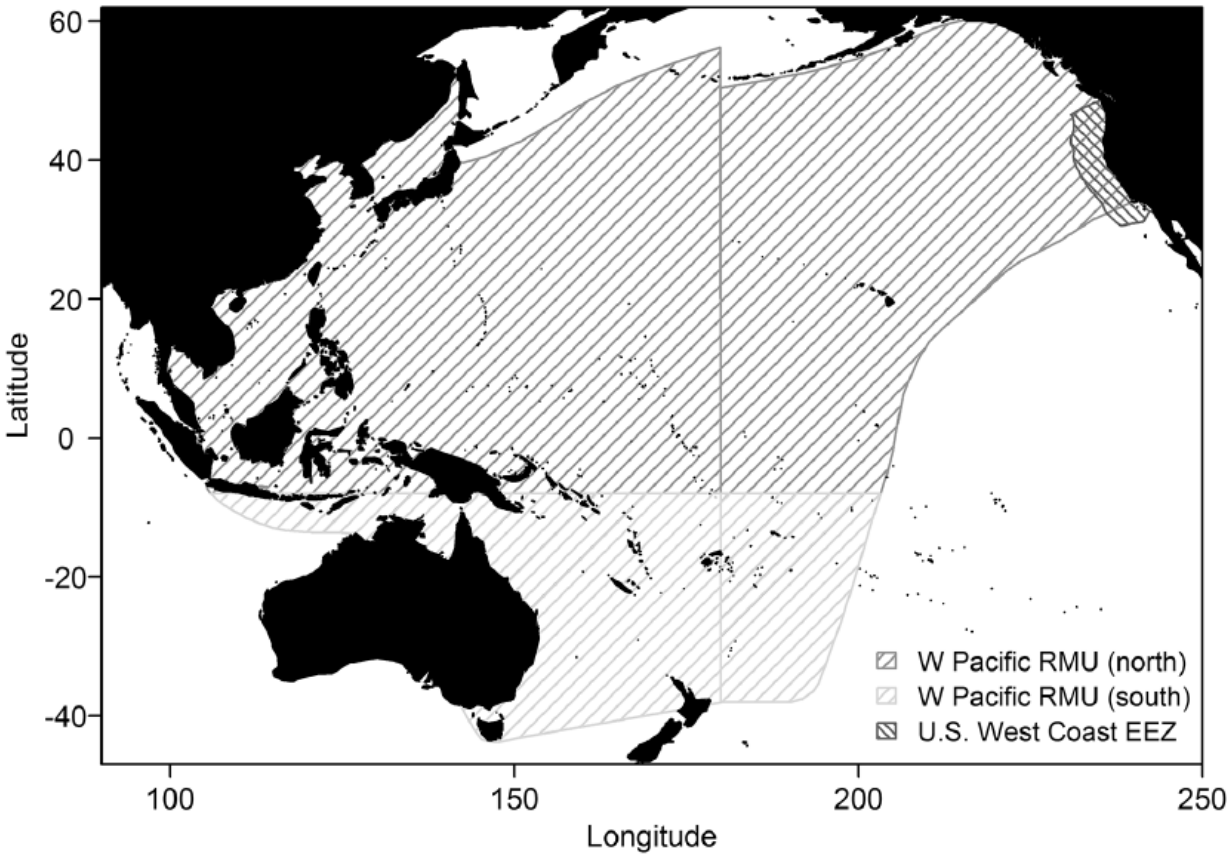


Figure 5. World distribution of western Pacific leatherback sea turtles. Figure taken from Curtis et al. 2015.

2.11.3 Conclusion

The Petition provides a map that illustrates only a portion of Pacific leatherback sea turtle California distribution. A more comprehensive map of Pacific leatherback sea turtle distribution, which is consistent with the Petition text description, is provided in this petition evaluation.

2.12 Sources and Availability of Information

2.12.1 Scientific Information in the Petition

The “Literature Cited” section of the Petition is on pages 32 through 44. Information sources cited in the Petition include published literature and other sources. The Petitioner provided electronic copies of these documents to the Department.

2.12.2 Other Relevant Scientific Information

The Department used additional sources of scientific information cited in this Petition Evaluation document.

2.12.3 Conclusion

The Petition provides sufficient available sources of information to inform whether the petitioned action may be warranted.

Section 3. Recommendation to the Commission

In completing its Petition Evaluation, the Department has determined the Petition provides sufficient scientific information to indicate that the Petitioned action may be warranted for Pacific leatherback sea turtle. Therefore, the Department recommends the Commission accept the Petition for further consideration under CESA.

Literature Cited

ABNJ. 2017. Joint Analysis of Sea Turtle Mitigation Effectiveness. WCPFC-SC13_2017/EBWP-10. Rarotonga, Cook Islands, 9-17 August 20.

Bailey, H., S. R. Benson, G. L. Shillinger, S. J. Bograd, P. H. Dutton, S. A. Eckert, S. J. Morreale , F. V. Paladino, T. Eguchi, and D. G. Foley. 2012. Identification of distinct movement patterns in Pacific leatherback turtle populations influenced by ocean conditions. Ecological Applications 22:735–747.

Benson, S. R. 2015. Email to Mark Delaplaine, California Coastal Commission, and Peter Dutton, NMFS, dated September 28, 2015, Re: leatherback sea turtle trends, neritic zone, CA.

Benson, S. R. 2020a. Email to Scott Benson, National Oceanic and Atmospheric Administration, dated March 20, 2020.

Benson, S. R. 2020b. Phone Conversation with Scott Benson, National Oceanic and Atmospheric Administration, dated March 16, 2020.

Benson, S. R., P. H. Dutton, C. Hitipeuw, B. Samber, J. Bakarbessy, and D. Parker. 2007a. Post-Nesting Migrations of Leatherback Turtles (*Dermochelys coriacea*) from Jamursba-Medi, Bird's Head Peninsula, Indonesia. Chelonian Conservation and Biology 6:150–154.

Benson, S. R., K. A. Forney, J. T. Harvey, J. V. Carretta, and P. H. Dutton. 2007b. Abundance, distribution, and habitat of leatherback turtles (*Dermochelys coriacea*) off California, 1990−2003. Fishery Bulletin 105:337–347.

Benson, S. R., T. Harueguchi, D. G. Foley, K. Forney, H. Bailey, C. Hitipeuw, B. P. Samber, R. F. Tapilatu, V. Rei, P. Ramohia, J. Pita, and P. H. Dutton. 2011. Large-scale movements and high-use areas of western Pacific leatherback turtles, *Dermochelys coriacea*. Ecosphere 2:art84.

Binckley, C A., J. R. Spotila, K. S. Wilson, and F. V. Paladino. 1998. Sex Determination and Sex Ratios of Pacific Leatherback Turtles, *Dermochelys coriacea*. Copeia 1998:291–300.

Bjorndal, K. A., P. L. Lutz, and J. A. Musick. 1997. Foraging ecology and nutrition of sea turtles. The biology of sea turtles 1:199–231.

Block, B. A, I. D. Jonsen, S. J. Jorgensen, A. J. Winship, S. A. Shaffer, S. J. Bograd, E. L. Hazen, D. G. Foley, G. A. Breed, A. L. Harrison, J. E. Ganong, A. Swithenbank,

M. Castleton, H. Dewar, B. R. Mate, G. L. Shillinger, K. M. Schaefer, S. R. Benson, M. J. Weise, R. W. Henry, and D. P. Costa. 2011. Tracking apex marine predator movements in a dynamic ocean. Nature 475:86–90.

Bostrom, B. L., T. T. Jones, M. Hastings, and D. R. Jones. 2010. Behavior and Physiology: The Thermal Strategy of Leatherback Turtles. PLOS ONE 5:e13925

Bugoni, L., L. Krause, and M. V. Petry. 2001. Marine debris and human impacts on sea turtles in southern Brazil. Marine pollution bulletin, 42(12), pp.1330-1334.

Carter, B. R., R. A. Feely, S. Mecking, J. N. Cross, A. M. Macdonald, S. A. Siedlecki, L. D. Talley, C. L. Sabine, F. J. Millero, J. H. Swift, and A. G. Dickson. 2017. Two decades of Pacific anthropogenic carbon storage and ocean acidification along Global Ocean Ship-based Hydrographic Investigations Program sections P16 and P02. Global Biogeochemical Cycles. Available from http://onlinelibrary.wiley.com/doi/10.1002/2016GB005485/full (accessed March 10, 2017).

Carter, B. R., T. L. Frölicher, J. P. Dunne, K. B. Rodgers, R. D. Slater, and J. L. Sarmiento. 2016. When can ocean acidification impacts be detected from decadal alkalinity measurements? Global Biogeochemical Cycles 30:2015GB005308.

Curtis, K. A., J. E. Moore, and S. R. Benson. 2015. Estimating limit reference points for western Pacific leatherback turtles (*Dermochelys coriacea*) in the US west coast EEZ. PloS one, 10(9), p.e0136452.

Davenport, J. 1997. Temperature and the life-history strategies of sea turtles. Journal of Thermal Biology 22:479–488.

Doney, S. C., V. J Fabry, R. A Feely, and J. A. Kleypas. 2009. Ocean Acidification: The Other CO 2 Problem. Annual Review of Marine Science 1:169–192. Available from http://www.annualreviews.org/eprint/QwPqRGcRzQM5ffhPjAdT/full/10.1146/annurev.marine.010908.163834 (accessed January 19, 2015).

Dudley, P. N. and W. P. Porter. 2014. Using empirical and mechanistic models to assess global warming threats to leatherback sea turtles. Marine Ecology Progress Series, 501, pp.265-278.

Dutton, D. L., P. H. Dutton, M. Chaloupka, and R. H. Boulon. 2005. Increase of a Caribbean leatherback turtle *Dermochelys coriacea* nesting population linked to long-term nest protection. Biological Conservation 126:186–194.

Dutton, P. H., C. Hitipeuw, M. Zein, S. R. Benson, G. Petro, J. Pita, V. Rei, L. Ambio, and J. Bakarbessy. 2007. Status and Genetic Structure of Nesting Populations of Leatherback Turtles (*Dermochelys coriacea*) in the Western Pacific. Chelonian Conservation and Biology 6:47– 53.

Eckert, S. A., K. L. Eckert, P. Ponganis, and G. L. Kooyman. 1989. Diving and Foraging Behavior of Leatherback Sea Turtles (*Dermochelys coriacea*). Canadian Journal of Zoology 67:2834-2840.

Eguchi, T., C. Fahy, J. Jannot, K. Somers, and E. Ward. 2017. 2016 Leatherback sea turtle estimated bycatch reporting requirements as set out in the NMFS Biological Opinion for the continuing authorization of the Pacific Coast groundfish fisheries. National Marine Fisheries Service, SWFSC, La Jolla, CA 92039. http://www.pcouncil.org/wpcontent/uploads/2017/03/F5a_NMFS_Rpt3_ElectricOnly_Leatherback_Turtle_rpt_2017_Apr2017BB.pdf.

Ene, A, M. Su, S. Lemaire, C. Rose, S. Schaff, R. Moretti, J. Lenz, and L. H. Herbst. 2005. Distribution of chelonid fibropapillomatosis-associated herpesvirus variants in Florida: molecular genetic variance for infection of turtles following recruitment to neritic developmental habitats. 41(3): 489- 97.

Fabry, V. J. 2009. Ocean acidification at high latitudes: the bellweather. Oceanography 22:160.

Fabry, V. J., B. A. Seibel, R. A. Feely, J. C. Orr. 2008. Impacts of ocean acidification on marine fauna and ecosystem processes. ICES Journal of Marine Science: Journal du Conseil 65:414–432.

Feely, R., S. Alin, B. Carter, and N. Bednarsek. 2017. Determination of the Anthropogenic Carbon Signal in the Coastal Upwelling Region Along the Washington-Oregon-California Continental Margin. Salish Sea Ecosystem Conference. Available from http://cedar.wwu.edu/ssec/2016ssec/climate_change_ocean_acidification/37.

Fuentes, M. M. P. B. and D. Abbs. 2010. Effects of projected changes in tropical cyclone frequency on sea turtles. Marine Ecology Progress Series 412:283–292.

Fuentes, M., C. Limpus, M. Hamann, J. Dawson. 2009. Potential impacts of projected sea-level rise on sea turtle rookeries. Aquatic Conservation: Marine and Freshwater Ecosystems 20:132– 139.

Gattuso. J-P. and L. Hansson. 2011. Ocean Acidification. Oxford University Press, Oxford, UK. Available from

http://www.academia.edu/download/54606973/The_ocean_revealed_ENG.pdf#page=67 (accessed January 8, 2020).

Graham, T. R., J. T. Harvey, S. R. Benson, J. S. Renfree, and D. A. Demer. 2010. The acoustic identification and enumeration of scyphozoan jellyfish, prey for leatherback sea turtles (*Dermochelys coriacea*), off central California. ICES Journal of Marine Science 67:1739–1748.

Gruber, N., C. Hauri, Z. Lachkar, D. Loher, T. L. Frölicher, and G-K. Plattner. 2012. Rapid Progression of Ocean Acidification in the California Current System. Science 337:220–223.

Harris, H. S., S. R. Benson, K. V. Gilardi, R. H. Poppenga, T. M. Work, P. H. Dutton, and J. A. K. Mazet. 2011. Comparative health assessment of western pacific leatherback turtles (*Dermochelys coriacea*) foraging off the coast of California, 2005–2007. Journal of Wildlife Diseases 47:321–337.

Hauri, C., N. Gruber, G-K. Plattner, S. Alin, R. A. Feely, B. Hales, and P. A. Wheeler. 2009. Ocean Acidification in the California Current System. Oceanography. Available from http://agris.fao.org/agris-search/search.do?recordID=DJ2012089494 (accessed March 8, 2016).

Hays, G. C., J. D. R. Houghton, C. Isaacs, R. S. King, C. Lloyd, and P. Lovell. 2004. First records of oceanic dive profiles for leatherback turtles, *Dermochelys coriacea*, indicate behavioural plasticity associated with long-distance migration. Animal Behaviour 67:733–743.

Herbst, L. H. 1994. Fibropapillomatosis of marine turtles. Annual Review of Fish Diseases. 4:389-425.

Hitipeuw, C., P. H. Dutton, S. Benson, J. Thebu, and J. Bakarbessy. 2007. Population status and internesting movement of leatherback turtles, *Dermochelys coriacea*, nesting on the northwest coast of Papua, Indonesia. Chelonian Conservation and Biology, 6(1), pp.28-36.

Houghton, J. D.R., T. K. Doyle, M. W. Wilson, J. Davenport, and G. C. Hays. 2006. Jellyfish aggregations and leatherback turtle foraging patterns in a temperate coastal environment. Ecology 87:1967–1972.

Iverson, A. R. 2019. The United States requires effective federal policy to reduce marine plastic pollution. Conservation Science and Practice, pp. 45.

James, M. C., J. Davenport, and G. C. Hays. 2006. Expanded thermal niche for a diving vertebrate: A leatherback turtle diving into near-freezing water. Journal of Experimental Marine Biology and Ecology 335:221–226.

James, M. C., S. A. Eckert, and R. A. Myers. 2005. Migratory and reproductive movements of male leatherback turtles (*Dermochelys coriacea*). Marine Biology 147:845–853.

Jannot, J., E. Heery, M. A. Bellman, and J. Majewski. 2011. Estimated bycatch of marine mammals, seabirds, and sea turtles in the US west coast commercial groundfish fishery, 2002-2009. West Coast Groundfish Observer Program. National Marine Fisheries Service, NWFSC, 2725 Montlake Blvd E., Seattle, WA 98112.

Kaplan, I. C. 2005. A risk assessment for Pacific leatherback turtles (*Dermochelys coriacea*). Canadian Journal of Fisheries and Aquatic Sciences 62:1710–1719.

Lontoh, D. N. 2014. Variation in tissue stable isotopes, body size, and reproduction of western Pacific leatherback turtles. San José State University, available at http://islandora.mlml.calstate.edu/islandora/object/islandora%3A2279/datastream/OBJ/download/Variation_in_tissue_stable_isotopes__body_size__and_reproduction_of_western_Pacific_leatherback_turtles.pdf.

Martin, S. L., Z. Siders, T. Eguchi, B. Langseth, R. Ahrens, and T. T. Jones. 2020. Assessing the population-level impacts of North Pacific loggerhead and western Pacific leatherback turtle interactions in the Hawaii-based shallow-set longline fishery. U.S. Dept. of Commerce, NOAA Technical Memorandum NOAA-TM-NMFS-PIFSC-95, 183 p. doi:10.25923/ydp1-f891

McClain, C. R., M. A. Balk, M. C. Benfield, T. A. Branch, C. Chen, J. Cosgrove, A. D. M. Dove, L. C. Gaskins, R. R. Helm, F. G. Hochberg, F. B. Lee, A. Marshall, S. E. McMurray, C. Schanche, S. N. Stone, and A. D. Thaler. 2015. Sizing ocean giants: patterns of intraspecific size variation in marine megafauna. PeerJ 3:e715.

Neeman, N., N. J. Robinson, F. V. Paladino, J. R. Spotila, and M. P. O'Connor. 2015. Phenology shifts in leatherback turtles (*Dermochelys coriacea*) due to changes in sea surface temperature. Journal of Experimental Marine Biology and Ecology 462:113–120.

Nelms, S. E., E. M. Duncan, A. C. Broderick, T. S. Galloway, M. H. Godfrey, M. Hamann, P. K. Lindeque, and B. J. Godley. 2016. Plastic and marine turtles: a review and call for research. ICES Journal of Marine Science, 73(2), pp.165-181.

NMFS. 2012. Letter from Rodney McInnis, NMFS Regional Administrator, to Colonel Mark Toy, U.S. Army Corps of Engineers, Los Angeles District, regarding KZO Sea Farms' proposed mariculture project off the San Pedro shelf of California, dated May 3, 2012.

NMFS. 2013. Biological opinion on the continued management of the drift gillnet fishery under the FMP for U.S. West Coast fisheries for highly migratory species. NOAA, National Marine Fisheries Service, Southwest Region, Protected Resources Division.

NMFS. 2016. Species in the spotlight : priority actions, 2016-2020. Pacific leatherback turtle, *Dermochelys coriacea*. https://repository.library.noaa.gov/view/noaa/11874.

NMFS. 2017a. NMFS-WCR Updates, Pacific Offshore Cetacean Take Reduction Team Meeting, June 15, 2017.

NMFS. 2017b. Biological and Conference Opinion on the Proposed Implementation of a Program for the Issuance of Permits for Research and Enhancement Activities on Threatened and Endangered Sea Turtles. FPR-2017-9230, Dec. 21, 2017.

NMFS. 2017c. E Endangered Species Act Section 7(a)(2) Biological Opinion, for the regulatory codification of Traffic Separation Schemes near the ports of Los Angeles/Long Beach and San Francisco/Oakland. SWR-2013-9813, Feb. 23, 2017.

NMFS. 2017d. Discussion Paper on Improving Sea Turtle Mitigation in the WCPO. WCPFCTCC13-2017-DP-08, 27 September – 3 October 2017, Pohnpei, Federated States of Micronesia.

NMFS. 2018. Email with Excel sheet attachment from Dan Lawson, NMFS Protected Resources Division, to Catherine Kilduff, Senior Attorney, Center for Biological Diversity (June 12, 2018) (on file with author).

NMFS. 2019. Consideration of an exempted fishing permit to fish with longline gear in the west cost Exclusive Economic Zone. NOAA, National Marine Fisheries Service, West Coast Region. Available from https://www.regulations.gov/document?D=NOAA-NMFS-2019-0048-0005 (accessed March 23, 2020).

NMFS and USFWS. 1998. Recovery Plan for U.S. Pacfic Populations of the Leatherback Turtle (*Dermochelys coriacea*). Page 76. National Marine Fisheries Service, Washington DC.

NMFS and USFWS. 2013. Leatherback sea turtle (*Dermochelys coriacea*) 5-year review: Summary and evaluation. Page 93. National Marine Fisheries Service, Office of Protected Resources and U.S. Fish and Wildlife Service Southeast Region, Silver Spring, Maryland and Jacksonville, Florida. Available from https://repository.library.noaa.gov/view/noaa/17029 (accessed August 28, 2018).

NOAA. n.d. Leatherback turtle conservation and management. Retrieved from https://www.fisheries.noaa.gov/species/leatherback-turtle#conservation-management (accessed March 24,2020).

Orr, J. C., V. J. Fabry, O. Aumont, L. Bopp, S. C. Doney, R. A. Feely, A. Gnanadesikan, N. Gruber, A. Ishida, F. Joos, R. M. Key, K. Lindsay, E. Maier-Reimer, R. Matear, P. Monfray, A. Mouchet, R. G. Najjar, G-K. Plattner, K. B. Rodgers, C. L. Sabine, J. L. Sarmiento, R. Schlitzer, R. D. Slater, I. J. Totterdell, M-F. Weirig, Y. Yamanaka, and A. Yool. 2005. Anthropogenic ocean acidification over the twenty-first century and its impact on calcifying organisms. Nature 437:681–686.

PFMC and NMFS. 2006. Management of the drift gillnet fishery exempted fishing permit and / or regulatory amendment draft environmental assessment, regulatory impact review & regulatory flexibility analysis. Page 194. Pacific Fishery Management Council And National Marine Fisheries Service Southwest Region, Portland, OR: U.S. Available from https://www.pcouncil.org//bb/2006/0306/J3a_Att1_Mar06_BB.pdf (accessed May 24, 2018).

Price, C. S., E. Keane, D. Morin, C. Vaccaro, D. Bean, and J. A. Morris Jr. 2016. Protected Species & Longline Mussel Aquaculture Interactions. NOAA Technical Memorandum NOS NCCOS 211. 85 pp.

Ray, J. 2020. Email correspondence with James Ray, California Department of Fish and Wildlife, dated March 20, 2020.

Reina, R. D., P. A. Mayor, J. R. Spotila, R. Piedra, F. V. Paladino, and W. L. Montgomery. 2002. Nesting Ecology of the Leatherback Turtle, *Dermochelys coriacea*, at Parque Nacional Marino Las Baulas, Costa Rica: 1988–1989 to 1999–2000. Copeia 2002:653–664.

Reina, R. D., J. R. Spotila, F. V. Paladino, and A. E. Dunham. 2009. Changed Reproductive Schedule of Eastern Pacific Leatherback Turtles *Dermochelys coriacea* Following the 1997– 98 El Niño to La Niña Transition. Endangered Species Research 7: 155-161.

Roemmich, D. and J. McGowan. 1995. Climatic Warming and the Decline of Zooplankton in the California Current. Science 267:1324–1326.

Ruzicka, J. J., R. D. Brodeur, R. L. Emmett, J. H. Steele, J. E. Zamon, C. A. Morgan, A. C. Thomas, and T. C. Wainwright. 2012. Interannual variability in the Northern California Current food web structure: Changes in energy flow pathways and the role of forage fish, euphausiids, and jellyfish. Progress in Oceanography 102:19–41.

Saba, V. S., C. A. Stock, J. R. Spotila, F. V. Paladino, and P. Santidrián Tomillo. 2012. Projected response of an endangered marine turtle population to climate change. Nature Climate Change 2:814– 820.

Santidrián Tomillo, P., D. Oro, F. V. Paladino, R. Piedra, A. E. Sieg, and J. R. Spotila. 2014. High beach temperatures increased female-biased primary sex ratios but reduced output of female hatchlings in the leatherback turtle. Biological Conservation 176:71–79.

Santidrián Tomillo, P., V. S. Saba, G. S. Blanco, C. A. Stock, F. V. Paladino, and J. R. Spotila. 2012. Climate Driven Egg and Hatchling Mortality Threatens Survival of Eastern Pacific Leatherback Turtles. PLoS ONE 7(5): e37602. doi:10.1371/journal.pone.0037602

Schuyler, Q., B. D. Hardesty, C. Wilcox, and K. Townsend. 2014. Global Analysis of Anthropogenic Debris Ingestion by Sea Turtles. Conservation Biology 28:129–139.

Shillinger, G. L., D. M. Palacios, H. Bailey, S. J. Bograd, A. M. Swithenbank, P. Gaspar, B. P. Wallace, J. R. Spotila, F. V. Paladino, R. Piedra, S. A. Eckert, and B. A. Block. 2008. Persistent Leatherback Turtle Migrations Present Opportunities for Conservation. PLOS Biology 6:e171.

Spotila, J. R., R. D. Reina, A. C. Steyermark, P. T. Plotkin, and F. V. Paladino. 2000. Pacific leatherback turtles face extinction. Nature 405:529.

Starbird, C., A. Baldridge, and J. Harvey. 1993. Seasonal occurrence of leatherback sea turtles (*Dermochelys coriacea*) in the Monterey Bay region, with notes on other sea turtles, 1986-1991. California Fish and Game 79:54–62.

Tapilatu, R. F. 2017. Status of sea turtle populations and its conservation at Bird's Head Seascape, Western Papua, Indonesia. Biodiversitas, Journal of Biological Diversity 18:129–136.

Tapilatu, R. F., P. H. Dutton, M. Tiwari, T. Wibbels, H. V. Ferdinandus, W. G. Iwanggin, and B. H. Nugroho. 2013. Long-term decline of the western Pacific

leatherback, *Dermochelys coriacea* : a globally important sea turtle population. Ecosphere 4:art25.

Tapilatu, R. F. and M. Tiwari. 2007. Leatherback Turtle, *Dermochelys coriacea*, Hatching Success at Jamursba-Medi and Wermon Beaches in Papua, Indonesia. Chelonian Conservation and Biology 6:154–158.

Teufel, C. 2020. Email correspondence with Cassidy Teufel, California Coastal Commission, dated March 20, 2020.

Van Houtan, K. S. and O. L. Bass. 2007. Stormy oceans are associated with declines in sea turtle hatching. Current Biology 17:R590–R591.

Von Holle, B., J. L. Irish, A. Spivy, J. E Weishampel, A. Meylan, M. H. Godfrey, M. Dodd, S. H. Schweitzer, T. Keyes, F. Sanders, and M. K. Chaplin. 2019. Effects of future sea level rise on coastal habitat. The Journal of Wildlife Management, 83(3), pp.694-704.

Wallace, B. P., S. S. Kilham, F. V. Paladino, and J. R. Spotila. 2006. Energy budget calculations indicate resource limitation in Eastern Pacific leatherback turtles. Marine Ecology Progress Series 318:263–270.

Zug, G. and J. Parham. 1996. Age and growth in leatherback turtles, *Dermochelys coriacea* (Testudines: Dermochelyidae): a skeletochronological analysis. Chelonian Conservation and Biology 2:244–249.

Pacific Leatherback Sea Turtle (*Dermochelys coriacea*)
CESA Petition Evaluation

Photo Credit National Marine Fisheries Service

19 August 2020

Presented to:

California Fish and Game Commission

Presented by:

John Ugoretz

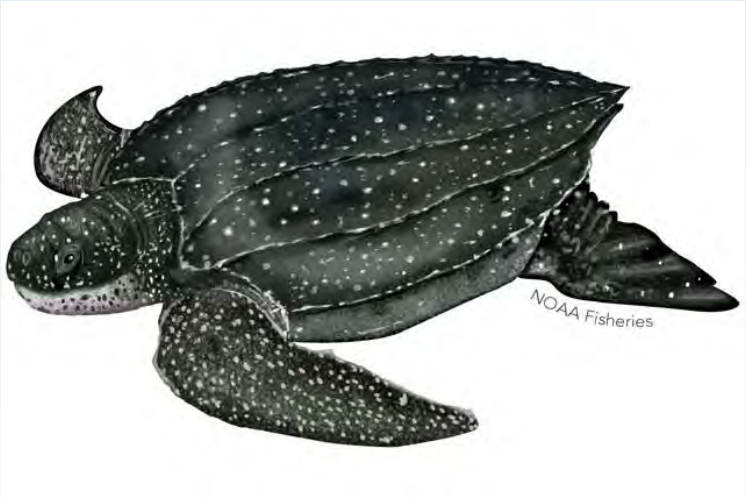
Pelagic Fisheries Program Manager
Marine Region

Listing History

- Federal ESA
  - June 1970: listed endangered
- California ESA
  - January 2020: Petition submitted to Commission
  - February 2020: Petition received by CDFW
    - 30-day extension approved
  - June 2020: Department Evaluation received by Commission

Species Description

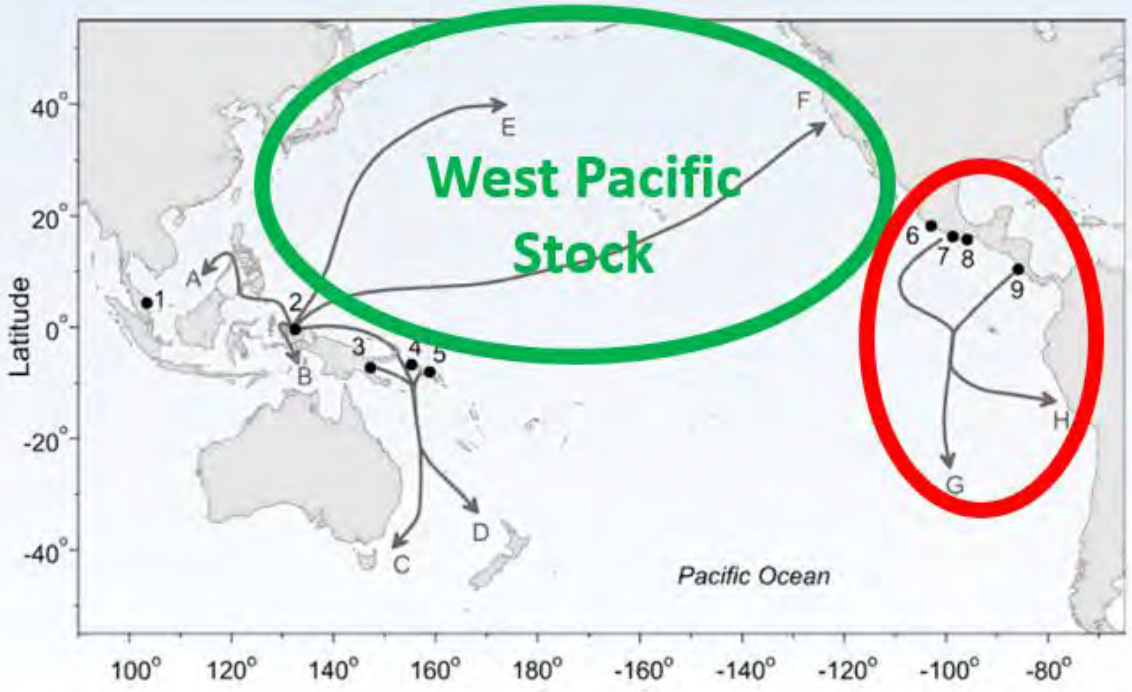
- Largest sea turtle species (1.5-2 m, 900 kg)
- Black color, adults scaleless
- Soft ridged carapace, large flippers
- Size differences between nesting colonies



Source: https://www.fisheries.noaa.gov/species/leatherback-turtle#overview

Range

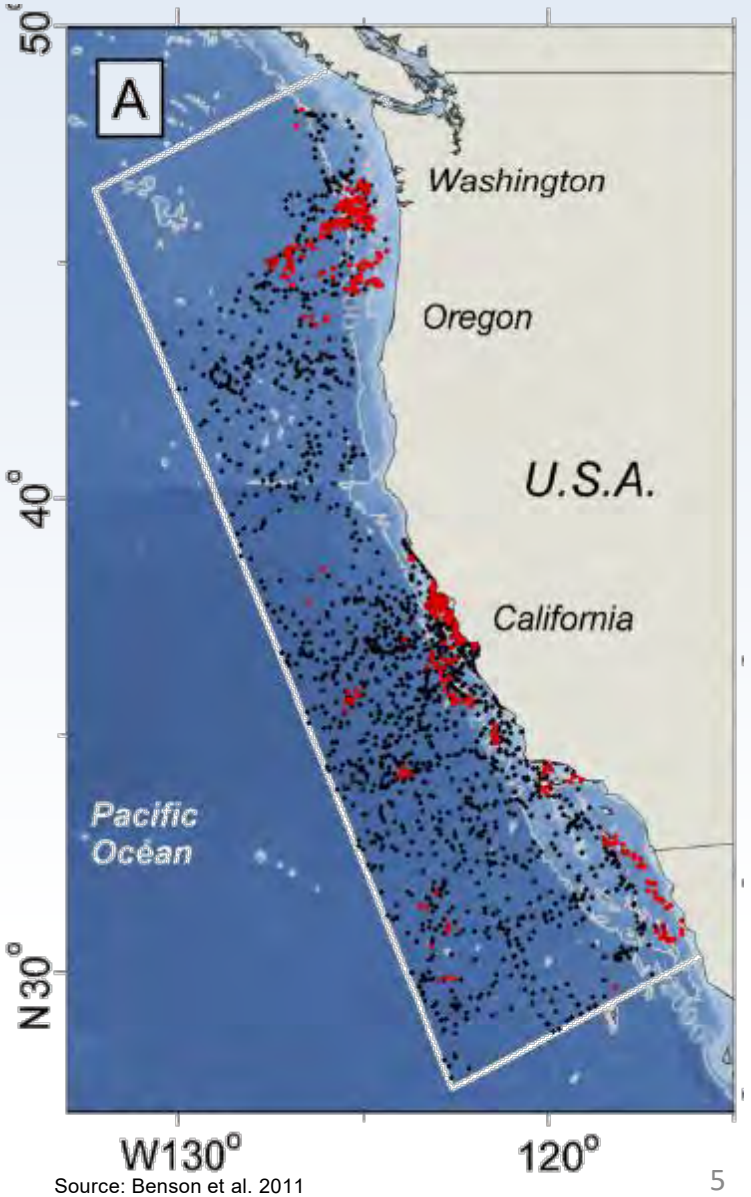
- 3 distinct Pacific stocks
  - Eastern Pacific
  - Western Pacific
  - Malaysian
- West Pacific stock migrates to North America west coast
  - Forage July-November



Source: Benson et al. 2015

California Range

- CA-OR border to U.S.-Mexico border
  - Concentrated sightings since 1990 – central California between July-November
- Presence related to seasonal upwelling
  - Food availability: favorable habitat for prey (jellyfish)



Source: Benson et al. 2011

Necessary Habitat

- Highly migratory species
  - Ability to transit large areas needed
- Quality foraging areas
  - CA Current Ecosystem critical habitat
  - Pt. Arena to Pt. Arguello critical habitat
  - Favorable upwelling conditions
  - SST of 15-16 Celsius
- Quality nesting beaches (Does not nest in U.S.)
  - Unobstructed and mildly sloped
  - Pristine and sandy
  - Continental shores with deep offshore waters

Population Status/Trends

- 95% population decline in last 30 years[1]
  - 2001-2017: annual 6.1% decline in nesting population[2]

- California foraging Pacific leatherbacks
  - 2005-2014: estimated annual average 178 turtles[3]
  - Current: estimated 50 turtles[3]
  - 5.6% annual decline since 1990[4]

[1] Dutton et al., 2007 and Benson et al., 2017
[2] Martin et al., 2020
[3] Benson, NMFS, Pers. Coms.
[4] Tapilatu et al., 2013

Threats Stated in Petition

- Oil and gas activities
- Aquaculture
- Coastal development
- Entanglement/ingestion of marine debris
- Vessel strikes
- Beach erosion
- Disease and egg predation
- Climate Change
- Fishing threats

Existing Management

- United States
  - Federal Endangered Species Act protection
  - Federal Pacific Leatherback Conservation Area: August 15-November 15
  - California Drift Gill Net Transition Program
  - California Risk Assessment and Mitigation Program (RAMP)
- International
  - Western and Central Pacific Fisheries Commission 2008 measure (CMM 2008-03)

Petition Proposed Future Management

- Listing under CESA
- Develop a recovery plan
- Improved monitoring
- Increased coordination with other governments and agencies
- Further reduce fishing gear interactions
- Set a hard limit on incidental leatherback capture
- Governor declaration of climate emergency
- Support policy changes that minimize climate change/ocean acidification effects
- Encourage Pacific Fisheries Management Council to address bycatch and adopt practices to avoid entanglements, including phasing out gear associated with entanglements

Conclusion and Recommendation

- All leatherback populations listed as federally endangered
- Pacific leatherback populations declining
- Petitioned action may be warranted
- Department recommends **Commission accept Petition for further consideration under CESA**

Source: https://biologicaldiversity.org/w/news/press-releases/petition-seeks-california-endangered-species-protections-leatherback-sea-turtles-2020-01-09/

Thank You

John Ugoretz
Program Manager
Pelagic Fisheries and Ecosystem Program
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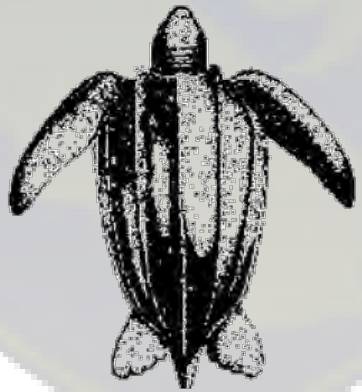
John.ugoretz@wildlife.ca.gov



Source:https://www.fws.gov/northflorida/SeaTurtles/Turtle%20Factsheets/leatherback-sea-turtle.htm

From: Bill Modi [redacted]
Sent: Sunday, July 12, 2020 10:39 PM
To: FGC <FGC@fgc.ca.gov>
Subject: grant Pacific leatherback endangered status

Nesting sites are being developed.
Animals are caught in fishing nets.
Eggs and meat are eaten in the developing world.
Floating plastic ensnares them.
Chemical pollution impairs normal physiology.

Bill Modi
[redacted]

From: [redacted]
Sent: Thursday, August 6, 2020 10:03 AM
To: FGC <FGC@fgc.ca.gov>
Subject: Advance Pacific Leatherbacks to Candidacy as Endangered Species

Dear California Fish and Game Commission,

I'm writing to ask you to please grant a full status review for Pacific leatherback sea turtles under the California Endangered Species Act. These sea turtles need protection as they swim and feed off California's coast. As the largest turtle in the world and the state's marine reptile, leatherbacks deserve a fighting chance at recovery.

As you know, the waters off California's coasts are important foraging areas for leatherbacks. They help keep the ocean healthy and delight California tourists and locals who look for them in Monterey Bay and off the Farallones. But reports of leatherbacks becoming entangled in fishing gear — the main threat to the species — have become increasingly common. Listing leatherbacks under the California Endangered Species Act will help the state better manage activities that harm these animals and provide a backstop to the potentially weakened federal Endangered Species Act.

For all these reasons, I urge you to accept the California Department of Fish and Wildlife's recommendation for advancing Pacific leatherback turtles to candidacy as an endangered species and take all necessary actions to conserve these amazing creatures.

Sincerely,
Carol Barrette
[redacted]

CALIFORNIA FISH AND GAME COMMISSION PETITIONS FOR REGULATION CHANGE - ACTION

Revised 8/10/2020

FGC - California Fish and Game Commission DFW - California Department of Fish and Wildlife WRC - Wildlife Resources Committee MRC - Marine Resources Committee

Grant: FGC is willing to consider the petitioned action through a process Deny: FGC is not willing to consider the petitioned action Refer: FGC needs more information before deciding whether to grant or deny

Tracking No.	Date Received	Name of Petitioner	Subject of Request	Short Description	Referred Date	Referred to	FGC Receipt Scheduled	FGC Action Scheduled	Staff Recommendation	Marine, Wildlife, or Admin?
2018-013(b)	9/19/2018	Mike McCorkle	Commercial ridgeback prawn authorized fishing hours	Allow Ridgeback Prawn to be only taken by trawl from sunrise to sunset at noted on monthly calendar.	2/6/2018	DFW	12/12-13/2018	2/6/2018	DENY based on DFW recommendations and suggested management actions as reflected in DFW memo received 8/5/2020.	Marine
2020-001	1/20/2020	Keith Rootsaert	Emergency regulation for increased take of purple urchin in Monterey	Request for an emergency rulemaking to add Section 29.12, to increase the recreational daily bag limit of purple sea urchin at Tanker's Reef in Monterey.	4/16/2020	DFW	2/21/2020	6/24-25/2020	GRANT, in part, for consideration in a regular rulemaking based on DFW recommendations with specific measures and requirements as reflected in DFW memo (see DFW memo	Marine

Tracking Number: (2020-001)

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: Keith Rootsaert
   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: Section 200 and 205, Fish and Game Code

Overview (Required) - Summarize the proposed changes to regulations:

Request to add Section 29.12, Title 14, CCR, as follows:

§ 29.12. Sea Urchin

(a) The daily bag limit for sea urchin taken while skin or SCUBA diving at Tanker's Reef and the Doc Ricketts Marine Conservation Area in Monterey County is forty (40) gallons.

(b) Tanker's Reef is defined as the area between the following coordinates:
36°36'4.54"N, 121°53'13.47"W;
36°36'19.70"N, 121°53'13.45"W;
36°36'42.67"N, 121°52'20.15"W; and
36°36'20.33"N, 121°52'4.06"W.

(c) Edward F. Ricketts SMCA is bounded by straight lines connecting the following points in the order listed:[3] 36°36.50'N 121°53.37'WCoordinates:
36°36.50'N 121°53.37'W, 36°37.25'N 121°53.78'W, and 36°37.10'N 121°54.09'W,then the mean high tide line along the coast back to the breakwater of Monterey Harbor.

(d) There is no possession limit for sea urchin.

Authority cited: Sections 200 and 205, Fish and Game Code.
Reference: Sections 200 and 205, Fish and Game Code.

3. **Rationale (Required) -** Describe the problem and the reason for the proposed change: The urchin barren problem in the central coast was brought before the Commission previously and was publicly noticed as 2019-003. Petition 2019-003 is referenced as justification for this petition. I believe that the denial of this petition by CDFW was not based on objective scientific criteria. The primary reason for denial was due to Southern sea otters at the site, which is not a factual condition and a miscalculation. The second reason for denial was because this was not considered an emergency, even though this opinion was shared by Sonke Mastrup, CDFW. The emergency condition designation was perhaps more subjective, so I am submitting this as a regular rulemaking petition.

   It has been a year since this matter was brought before the commission and the condition has only worsened and become more desperate. Reef Check data shows that the number of purple urchins on the Monterey Peninsula have doubled in 2019 from 10 urchins /m^2 to 21 urchins/m^2. There is a new cohort of urchins in the 2cm size class. An experiment conducted by Reef Check California reveal that removing only purple urchins is insufficient to restore kelp and red urchins must be removed as well for kelp restoration. This is no longer a single species issue and that is significantly different from what was proposed previously. It is time to ask for regulatory language change again, but for a larger area to preserve what little kelp remains in Monterey Bay.

SECTION II: Optional Information

4. **Date of Petition:** 1-20-20

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): 29.12
   ☐ 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** 2019-003
   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: April 2020

9. **Supporting documentation:** Identify and attach to the petition any information supporting the proposal including data, reports and other documents: See submitted FG-1 2019-003

10. **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: See submitted FG-1 2019-003

11. **Forms:** If applicable, list any forms to be created, amended or repealed:

n/a

SECTION 3: FGC Staff Only

Date received: Click here to enter text.

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 Commission
PETITION TO THE CALIFORNIA FISH AND GAME COMMISSION FOR REGULATION CHANGE
FGC 1 (NEW 10/23/14) Page 1 of 2

RECEIVED CALIFORNIA

2018 SEP 19 PM 12:55

Tracking Number: (2018-013)

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, 1416 Ninth Street, Suite 1320, Sacramento, CA 95814 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: Click here to enter text. MIKE McCARKLE SCTA
   Address: Click here to enter text
   Telephone number: Click here
   Email address: Click here to er

2. **Rulemaking Authority (Required) -** Reference to the statutory or constitutional authority of the Commission to take the action requested: ~~Click here to enter text.~~ Sections 8591, 8841, & 8842 added by petitioner via email on 10/9/2018 (attached)

3. **Overview (Required) -** Summarize the proposed changes to regulations: Click here to enter text. Add - RIDGE BACK PRAWN MAY ONLY be TAKEN by TRAWL FROM SUN RISE TO SUNSET AS NOTED ON MONTHLY CALENDER

4. **Rationale (Required) -** Describe the problem and the reason for the proposed change: Click here to enter text. OVER FISHING IS TAKING PLACE by BOATS FISHING 24 HRS. A DAY SOME TIMES UP TO 36 HRS STRAIGHT. THIS IS TAKING PLACE ON AREAS OF SMALL SHRIMP

SECTION II: Optional Information By ONLY ALOWING DAYLIGHT HRS. OF FISHING THIS COULD CUT THE EFFORT IN HALF, which would SAVE A LOT OF SMALL SHRIMP FROM BEING TAKEN. MOST RB SHRIMP FISHERMEN SUPPORT THIS CHANGE

5. **Date of Petition:** Click here to enter text. 9-14-18

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): ADD to current Regs.
   - ☐ 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** Click here to enter text.
   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: THE SHRIMP ARE being OVERFISHED AND ARE NOT RAMPING TULL GROTH.

10. **Supporting documentation:** Identify and attach to the petition any information supporting the proposal including data, reports and other documents: Click here to enter text.

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: Click here to enter text. NONE

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: Click here to enter text.

RECEIVED
CALIFORNIA
FISH AND GAME
COMMISSION
2018 SEP 13 12:55

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

From: McCorkle Fishing Enterprises
Sent: Tuesday, October 9, 2018 3:50 PM
To: Ashcraft, Susan@FGC
Cc: FGC
Subject: Re: Ridgeback Prawn Petition to Fish and Game Commission

Susan,
I would like to add to our petition on Ridge back prawn the following code sections, 8591, 884`1 and 8842.

Mike Mccorkle , Southern Ca. Trawlers assn.

On 10/4/2018 7:05 PM, Ashcraft, Susan@FGC wrote:

Dear Mike,

I mentioned in my last email that I would send you a separate message regarding your recently submitted petition to limit the fishing hours for ridgeback prawn fishing from sunrise to sunset. There is some information that needs to be revised before we can accept it as complete and schedule it for receipt by the Commission at their October meeting.

In Section 1 of the petition, there is a part to fill in Authority (Part 2 of Section 1). I noticed that you identified the *regulation* section you wish to change in Title 14, CCR. However, this section requires that you identify the specific law (either in legislatively enacted code or in the state constitution) that would allow the change you request. In other words, the law that authorized the Commission to adopt regulations governing ridgeback prawn in the first place, and authorizes them to make the changes you request. You started at a good point, by looking at the existing regulations. Each regulations section includes a list of laws (or Fish and Game Code sections) that those regulations cite to for authority. You referenced Section 120.3 of Title 14 CCR. That regulation cites **Sections 710.7, 711, 713, 1050, 8591, 8841, and 8842** of the Fish and Game Code. I have provided a link to the Fish and Game Code below.

You can look up the cited sections to identify which one(s) give the Commission authority to make the change you re requesting. Or you could just stop by the Department of Fish and Wildlife office in Santa Barbara, and they have a printed book copy of the whole Fish and Game Code that you can use to review the sections I listed above to identify which apply.

If you want to try doing it online, the link for Fish and Game Code is:
https://leginfo.legislature.ca.gov/faces/codesTOCSelected.xhtml?tocCode=FGC

On the right side above the list of code sections there is a drop down menu for "Code" and then you can type in the "Section" number.

Once you decide which sections you'd like to list, please send an email to FGC@fgc.ca.gov (with a cc to me) with the list, and in the email request that we add the list to Section 1 of your petition.

Thanks so much Mike, and just give me a call if you have questions or if you need assistance with completing your petition.

Best regards,

Susan

Susan Ashcraft
Marine Advisor
California Fish and Game Commission
1416 9th Street, Room 1320
Sacramento, CA 95814
Office: (916) 653-1803
Cell: (650) 222-9036

State of California
Department of Fish and Wildlife

M e m o r a n d u m

Date: August 4, 2020

Original signed copy on file; received August 5, 2020

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

From: Charlton H. Bonham
Director

Subject: Response to Petition #2020-001: Re: Increase Bag Limit of Purple Urchins in Monterey County

Background

On April 16, 2020, the California Fish and Game Commission (Commission) referred Petition #2020-001 to the California Department of Fish and Wildlife (Department) for review and recommendation. The petitioner requests a change to recreational fishing regulations concerning allowable take levels of red and purple sea urchins in sections 29.05 and 29.06, Title 14, California Code of Regulations. Current provisions provide for a daily bag limit of 35 individuals (subsection 29.05(a) and 29.06(a), Title 14, CCR), and possession limit (subsection 29.06(c), Title 14, CCR).

The petition proposes to increase the recreational bag limit and abolish the possession limit for red and purple sea urchins at two locations in Monterey County. Specifically, the petitioner proposes to add a new regulation (subsection 29.12) to increase the bag limit from 35 individuals per diver per day to 40 gallons per diver per day, with no possession limit at Tanker's Reef and within the Edward F. Ricketts State Marine Conservation Area.

The petitioner has made subsequent informal modifications to the original petition since its referral from the Commission. At its June 2020 meeting, the Commission asked the Department to include the informal modifications as part of its petition review.

Department Evaluation

The Department has reviewed the above referenced petition and subsequent informal revisions by the applicant and determined that a regulation change is warranted through a regular rulemaking for Tanker's Reef. Specifically the Department recommends abolishing the current bag limit of 35 individuals per day and establishing no bag limit for the take of red and purple urchins by hand or with manually operated hand-held tools at Tanker's Reef. The Department also recommends including a sunset date of three years. This regulatory change, in combination with non-regulatory performance criteria, will allow the Department to evaluate the efficacy of a community led effort to remove urchins in situ as an effective method of kelp forest restoration.

The Department does not support any increased take or recreational sea urchin control efforts inside any marine protected areas at this time, including within the Edward F. Ricketts State Marine Conservation Area and the Lovers Point – Julia Platt State Marine Reserve because these areas have been designed to minimize human disturbances and serve as reference sites to fished areas in the region. Allowing unlimited recreational take of urchin in these areas could impact co-occurring species and ongoing monitoring studies.

The Department also does not support increasing the bag limit from 35 individuals to 40 gallons due to concerns that the specific limit introduces unnecessary complexity without adding any benefit based on recent studies.

If you have any questions or need additional information, please contact Sonke Mastrup, Environmental Program Manager telephone at (916) 799-0398, or via email at Sonke.Mastrup@wildlife.ca.gov.

ec: Stafford Lehr, Deputy Director
Wildlife and Fisheries Branch
Stafford.Lehr@Wildlife.ca.gov

Craig Shuman D. Env., Regional Manager
Marine Region
Craig.Shuman@wildlife.ca.gov

Mike Stefanak, Assistant Chief
Law Enforcement Division
Mike.Stefanak@wildlife.ca.gov

Sonke Mastrup, Program Manager
Marine Region
Sonke.Mastrup@wildlife.ca.gov

Kirsten Ramey, Program Manager
Marine Region
Kirsten.ramey@wildlife.ca.gov

Joanna Grebel, Senior Environmental Scientist
(Supervisor)
Marine Region
Joanna.Grebel@wildlife.ca.gov

State of California
Department of Fish and Wildlife

M e m o r a n d u m

Date: July 23, 2020

Original signed copy on file;
received August 5, 2020

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

From: Charlton H. Bonham
Director

Subject: Response to Petition #2018-013: Add a Provision to Reduce Trawl Effort in the Ridgeback Prawn Trawl Fishery

Background

In December 2018, the California Fish and Game Commission (Commission) referred Petition #2018-013 to the California Department of Fish and Wildlife (Department) for review and recommendation. The petitioner requests a change to commercial Ridgeback Prawn trawl regulations in section 120.3, Title 14, California Code of Regulations specifying that trawling for Ridgeback Prawn only be allowed from sunrise to sunset as noted on the monthly calendar. The petition proposes to add this regulation to address stated concerns with "overharvest of small shrimp by vessels fishing 24 hrs a day and sometimes 36 hrs straight" and states that the proposed change could reduce trawl effort by 50 percent.

Since the petition was referred to the Department, an Enhanced Status Report (ESR) for the fishery was completed and on February 18, 2020, Marine Region staff held a meeting with eight members of the Southern California Trawl Association, which included the petitioner and seven other Ridgeback Prawn trawl participants. At this meeting, the Department discussed concerns raised in the petition and shared findings of the ESR that highlights the need for research and development of effective bycatch reduction devises (BRDs) to reduce bycatch in the fishery.

Department Evaluation

To evaluate the petitioners request, the Department conducted a review and analysis of available Department landings/logbook data and NOAA observer data for Ridgeback Prawn in 2017 and 2018. The data indicate that some trawling occurs at night but that vessels are not actively fishing for 24 to 36 hrs. Department logbook data indicated that 10% of reported trawl tows occurred at night (i.e. between 9 pm and 6 am), and Department logbook and landings data indicated that when fishing for consecutive days, vessels return to port each day to offload catch. NOAA observer data contains additional information not captured in vessel logbooks, including trip departure and return times (i.e. trip duration, including transit time). Upon examining

the observer data, the Department found no evidence of vessels fishing around the clock; however, there were a subset of trips that returned to port later at night.

Of the ten vessels observed, representing 84 trips, trip duration was commonly 16-18 hours. Departure times were commonly between 3-4 am; return times ranged from 3-11 pm and comprised two peaks (e.g., an evening return time; 3-4 pm, and a night return time; 8-11 pm), suggesting that some vessels occasionally fish longer, but not throughout the night.

As for the concern of overharvest of small Ridgeback Prawn, the Department does not have data on the size of Ridgeback Prawn landed to corroborate the petitioner's concern. The size of Ridgeback Prawn landed has been identified as a data need in the ESR to monitor recruitment and the age structure of the catch.

Recommendation & Next Steps

Considering the limited number of nighttime trawling events, other management strategies will likely be more effective for addressing concerns raised in the petition regarding excessive effort. Participants at the February 18th meeting conveyed alternative options for reducing effort, which included trip catch limits, exploring options for a limited entry fishery, a possible ban on weekend fishing, and standardizing trawl net and door configurations. In addition, the ESR identifies other management and data needs for the fishery that should be raised with the fleet, including development of effective BRDs, improved clarity of existing regulations, and collecting size frequency of catch. The Experimental Fishing Permit Program currently in development will provide the framework for collaborative research to test and develop effective BRDs that are specifically designed for the Ridgeback Prawn fishery.

The Department recommends the Commission reject the specific request in the petition to specify the time when Ridgeback Prawn fishing is allowed. As identified in the ESR, the Department agrees that effort reductions may be necessary and intends to scope alternative effort control measures and management needs identified in the ESR with all fishery participants. The results of the scoping will be provided to the Commission along with any identified recommendations and next steps.

If you have any questions or need additional information, please contact Tom Mason by telephone at (562) 417-2791, or via email at Tom.Mason@wildlife.ca.gov.

ec: Stafford Lehr, Deputy Director
Wildlife and Fisheries Branch
Stafford.Lehr@Wildlife.ca.gov

Craig Shuman D. Env.

Regional Manager
Marine Region
Craig.Shuman@wildlife.ca.gov

Mike Stefanak, Assistant Chief
Law Enforcement Division
Mike.Stefanak@wildlife.ca.gov

Sonke Mastrup
Environmental Program Manager
Marine Region
Sonke.Mastrup@wildlife.ca.gov

From: Johanna van de Woestijne
Sent: Monday, June 22, 2020 03:00 PM
To: FGC <FGC@fgc.ca.gov>
Subject: I support Petition 2020-001

Warning: This email originated from outside of CDFW and should be treated with extra caution.

Dear California Fish and Game Commission,

I started making a documentary last year about kelp forest losses on the California Coast and especially in Monterey Bay. This year the situation is dire and completely different from the North Coast kelp forest losses. Please support Petition 2020-001 and allow volunteer divers and professional marine biologists work together in removing and smashing purple and red urchins at a rate of up to or over 40 gallons per diver per day. The red and purple urchins are continuing to wipe out kelp forests, which are critical to our fisheries and livelihoods of fishermen and dive shop operators too.

In the north coast, the kelp is annual, and the situation is dire. But in Monterey Bay, more diversity of kelp is still available for regrowth and as reservoirs of parent populations for annual kelp. The rocky outcroppings under water in Monterey are like islands for kelp. If we remove the urchins and keep doing so, the kelp can come back. This research and management should all be conducted scientifically and under the supervision of biologists who are keeping records of the actions. This will ensure that as we move forward, management is evidence based.

We don't really want renegade divers smashing urchins randomly. Petition 2020-001 will allow us to move forward with evidence based management that can be adjusted to the results.

Johanna van de Woestijne, MD
Managing Member
www.CoriolisFilms.com

Nicholas Ta culling urchins with Franciscanus.
Photo by Kate Vylet Photography

CENTRAL CALIFORNIA URCHIN REMOVAL AND KELP RESTORATION

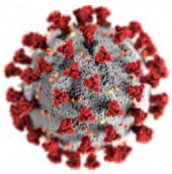
DIVE PLAN

RECREATIONAL DIVER URCHIN CULLING AND KELP RESTORATION IN MONTEREY CALIFORNIA

By Keith Rootsaert

GIANT GIANT KELP RESTORATION PROJECT

INCLUDES UPDATE FOR COVID-19 DIVING CONDITIONS



Petition Before the Fish and Game Commission

On February 21, 2019 Keith Rootsaert submitted Petition 2020-001 to the Fish and Game Commission along with maps showing locations of high urchin density and low kelp density at two sites in south Monterey Bay. The Petition seeks to increase recreational diver bag limits to 40 gallons per diver per day and allow the removal of purple and red urchins. On April 16, 2020 The Fish and Game Commission referred petition 2020-001 to the California Department of Fish and Wildlife for review and to come before the Commission at the June 24, 2020 meeting.

There are many different parties involved in the department review:

California Department of Fish and Wildlife, CDFW, will do their due diligence and review and verify data. They would then prepare a recommendation to the Commission of changes to sportfishing regulations.

Reef Check California, RCCA, will develop a scientific Monitoring Plan to evaluate the effects of urchin removal on these sites using Reef Check Certified divers.

Giant Giant Kelp Restoration, G2KR, has developed a Dive Plan, this document, and will direct the volunteer diver effort on the sites.

All three of these work products must be in agreement at the outset and cooperation between all the parties can continue as the project progresses.

Timeline

FGC Meeting, April 16 – Petition 2020-001 Granted for Consideration

G2KR Dive Plan submitted, May 14

CDFW site observations, review data, draft language.

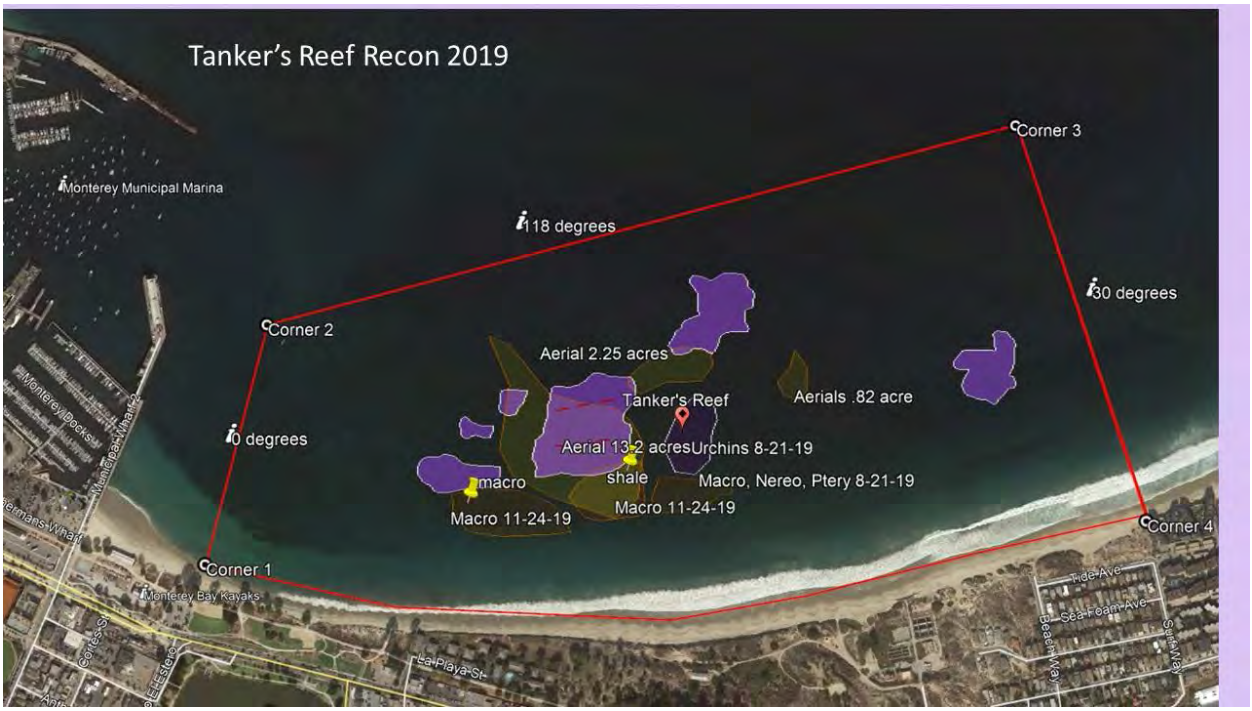
RCCA Scientific Monitoring Plan

Revised Dive Plan submitted, June 19

FGC Meeting, June 24

Site Selection

1. <u>Tanker's Reef</u>



Tanker's Reef has in past years been a giant kelp forest (*Macrocystis pyrifera)* of about 20 acres. The shifting sands of the south Monterey Bay expose and cover the shale reef closest to shore and bull kelp recruited there in the summer of 2017 and again in 2019. The substrate is marked by round holes dug into the shale by urchins and shale boring clams and these holes seem to promote the growth of bull kelp, giant kelp, and *Pterygophora sp.* on this reef at the close of 2019. There is no kelp canopy on the reef this spring.

Tanker's reef has the unique feature of not being in a Marine Protected Area, yet still having great access and parking for divers. The site is just offshore from a long wide sandy beach with no nearshore tidepools or protected areas that might be disturbed or trampled by increased use. It is immediately adjacent to the Monterey Municipal Marina at the south end of the bay that is normally in the wave shadow of Point Pinos and also behind the San Carlos Breakwater jetty. This area is diveable in all but the most severe conditions from boat or from shore, normally 50 weeks out of the year. The urchin barren is a shallow 30 to 40 feet-depth which makes it an easy, safe recreational dive. Because the reef is surrounded by sand, and urchins do not tend to traverse sand, the area, once cleared, should not be repopulated quickly by migrating urchins from the nearest adjacent reef over half a mile away.

While this site is well suited to urchin removal, the reef substrate is very different from any other sites in Monterey and may not inform removal and restoration elsewhere. Because there is not kelp on this site presently this is a lower priority than the next site.

2A Edward Rickett's State Marine Conservation Area

This site is the most popular dive site on the west coast of north America, thousands of scuba divers first learned at this beach and on weekends there are usually hundreds of divers here. There are two dive shops within a block and there is ample parking. There are two public restrooms serving this area, including showers. -Boats from the marina frequently begin their trip into the bay at the breakwater jetty. Emergency services and state lifeguards serve this area as well as the US Coast Guard stationed on the other side of the jetty. This area is diveable in all but the most severe conditions from boat or from shore, normally 50 weeks out of the year.

The substrate consists of a jetty made of quarried granite boulders and natural granite reef formations with an abundance of sand between granite outcroppings. Commissioner Murray asked at the April FGC meeting if urchin removal in the State Marine Conservation Area (SMCA) was going to delay approval of petition 2020-001, could we exclude it from this effort? My response was that the SMCA must be included because that is where the last remaining kelp is. Data shows that the kelp forest in the SMCA is in severe decline. There are high urchin densities in the urchin barrens just offshore and they are eating the remaining live kelp in a thin strip close to shore. Because this site has hard granite reefs, it is more typical of the majority of the Monterey Peninsula and Big Sur coastline, so lessons learned here could be attempted with more confidence of success on granite substrates.

2B Lovers Point State Marine Reserve

The Lovers Cove SMR is proposed as an alternate to the Edward Ricketts SMCA site due to MLPA rules that does not specifically allow for kelp restoration in a SMCA. We believe that adaptive management of the MPAs is required by the MLPA goals and should be allowed. However, the Department is considering that work in the SMCA is not allowed due to California Code PRC § 36710 (c). However, PRC § 36710 (a) expressly allows restoration activities in a SMR.

> In a **state marine reserve**, it is unlawful to injure, damage, take, or possess any living, geological, or cultural marine resource, except under a permit or specific authorization from the managing agency for research, restoration, or monitoring purposes. While, to the extent feasible, the area shall be open to the public for managed enjoyment and study, the area shall be maintained to the extent practicable in an undisturbed and unpolluted state. Access and use for activities including, but not limited to, walking, swimming, boating, and diving may be restricted to protect marine resources. Research, restoration, and monitoring may be permitted by the managing agency. Educational activities and other forms of non-consumptive human use may be permitted by the designating entity or managing agency in a manner consistent with the protection of all marine resources PRC §36710(a).

Lovers Cove has historically been a lot of things: a bath house, a tea garden, Hopkins Marine Station, and the city dump. Presently it is a beautiful beach, park, and tourist attraction. In 2017 the thick kelp canopy in the cove disappeared and an urchin barren is now found through the entire cove. There is only one remaining kelp stand remaining near the entrance to the cove. The plan is to restore the kelp on the west side of this SMR that was added in 2007 to the Hopkins Marine Reserve that has long term data sets on the east side of this site. The lone remaining kelp hopefully can re-seed the cove.

State Marine Conservation Area Issue -

We recognize that removing invertebrates in a SMCA is prohibited by Marine Protected Area rules. But the rules also allow for restoration activities and the areas are intended to be adaptively managed. The diverse kelp forest ecosystems of 2013 are today denuded of species due to an explosive overpopulation of urchins. Monterey's last giant kelp forests, critical habitat for the Southern sea otter, is under attack and immediate intervention is required. CDFW has denied work in MPAs for years and has allowed little human interference in these sites, despite an abundance of long-term data showing the precipitous decline of kelp. While the fishing regulations remain unchanged, the nearshore fishery is declining because there is not kelp for fish recruitment. The urchin barrens expand because the crustose coralline algae is a settlement cue for even more urchins. The inconvenient truth is that the last remaining kelp is under threat and the only way proposed to defend it is by this immediate intervention.

There are three Reef Check survey sites within the SMCA boundary and despite the huge effort of citizen scientists to survey and monitor this habitat and share this information with CDFW, the demise of this marine habitat garners no attention and the same 10 rockfish fishing rule applies every year. In the opinion of many hard-working volunteer divers, our work and timely warnings are ignored.

Southern Sea Otter Issue

There was some concern by Commissioners that the Southern Sea Otter is within this range and a California Environmental Quality Act (CEQA) review would be needed for the exception. Sea otters and divers have cohabitated in this area without incident for decades. Studies clearly show otters do not eat urchins in the urchin barrens and this project to remove urchins and restore kelp will only be of benefit to the threatened sea otter and improve their foraging success in a healthy kelp forest.

Dive and Monitoring Planning

Urchin Barren Assessment

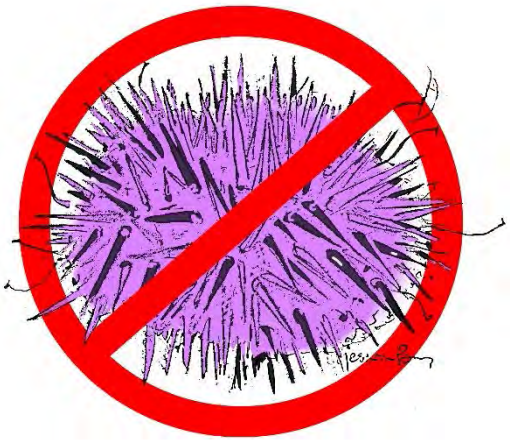
Scheduled for May 15, a PVC quadrat suspended by fishing line to a GoPro Hero4 and dropped by fishing pole to the bottom at GPS recorded locations. These videos will be captured and reviewed to count urchins, substrate type, algae, and holes in the shale. The location and density data will be used by a computer program to make a heat map of urchin and kelp density and substrate types and features. The heat map will be available at the start of urchin removal activities.

Scientific Monitoring Plan

Reef Check California and G2KR will coordinate activities so that pre-removal monitoring of the site can be performed and areas for urchins to be removed and areas of control are identified. Together they will deploy navigational buoys for the project. RCCA will obtain permission from the Monterey Bay National Maine Sanctuary which has authority over the submerged lands of the project. Several passes may be necessary to reduce urchin density to prescribed numbers. When the sites are cleared of excess urchins and kelp is restored Reef Check will continue annual monitoring. We are meeting with the scientific and educational stakeholders separately to develop collaborative experiments. Proposed projects include passive netting, urchinomics, and portable giant kelp seeding.

Diver Qualifications and Training

Recreational scuba divers routinely dive at these sites. Removal activities are in shallow water and are accessible to the lowest diver certification level. There is some task loading that divers encounter when they work underwater and count urchins and there are new skills to learn. We may require an Advanced Open Water Certification or require a certain number of logged dives to ensure diver safety. We are developing a PADI and SSI diver certification so that dive shops that are struggling to reopen after the recent economic downturn will be able to train and be guides for recreational divers. The training materials are under development but includes: Safety, navigation, noninvasive culling techniques, counting, & reporting. Additional training will be available to current Reef Check certified divers.



This work will require a California Sportfishing license and all divers in the program will be required to process an annual or day license and their GO number will recorded in our database. We have raised $1330 and we will raise more to pay for fishing licenses for students and military, a large local constituency.

The plan is to direct diving activity through the G2kr.com website and local dive shops. While it is possible for divers to exercise their fishing license legally within the project area, we will reach out to those individuals as we encounter them and seek to train and coordinate their efforts with the group.

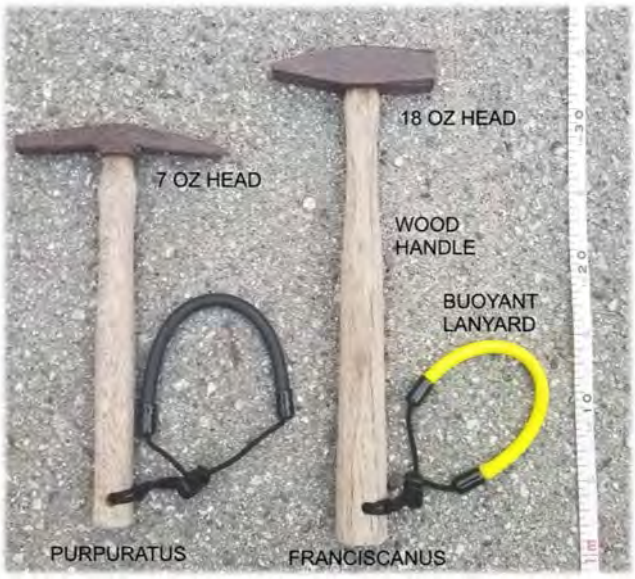
Dive Effort Organization

Divers will register with the G2KR.com website and verify their California Sportfishing license. Registered divers will attend training by dive shop instructors and dive masters to learn the method of removal. They will reserve time slots on an online calendar to go with their two or three person buddy team to the urchin barren navigation buoy and cull along a compass bearing. As they go along hammering urchins they will record how many of each species they culled. At the conclusion of their dive they will exit the water. By this method the divers will not aggregate on the beach or at the surface. Divers will follow the guidance of the RCCA DCB Covid 19 dive procedures. When funding becomes available underwater acoustical positioning devices, underwater drones, aerial drones, and high resolution mapping will be developed.

Method of Removal

The method of removal is to cull the urchins with a pointy hammer. The original petition calls for removing urchins, putting them in kayaks, taking them to shore and throwing them in the dump but that was before they allowed culling urchins at Caspar Cove. In speaking with Josh Russo of Waterman's Alliance, it is much safer and efficient to cull the urchins then to haul them out of the water and the logistics are much simpler too. With Covid 19 making social distancing a necessity plans had to change to adapt to this new circumstance. We have culled over 21,000 urchins on the Reef Check Urchin Experiment and we have some experience with this.

Divers will cull urchins with 12” long wooden hammers. The 7oz hammer (Purpuratus) and the 18oz (Franciscanus) feature an elastic colored lanyard. The lanyard will help prevent divers from losing them and if they are lost the lanyard will stick out of the sand and aid in recovery. The hammers will be sold through local dive shops and the G2KR.com store.



Invertebrate Species to Remove

The Petition makes the distinction of seeking the removal of both purple and red urchins. Other species of urchins are not commonly found at the proposed sites. Divers will be instructed to cull only the purple and red species. Special care will be taken to not impact other species or the substrate they reside in. If divers find urchins on brittle invertebrates such as colonial sand tube worms or bryozoans the urchins will be removed and smashed on bare rock or sand. We will instruct divers to not remove urchins from cracks because they are consuming drift and not exhibiting kelp-destroying behaviors. The length of the hammer will also restrict scraping deep in cracks and potentially hurting other inverts. The reason we are removing red urchins in addition to purple urchins is because on the RCCA Urchin Experiment red urchins were found to triple their density when purples were culled.

Diver Data Recording

Divers will record how many of each species they cull. Divers will be trained to use an underwater slate to tally the total number of both red and purple urchins. Divers will be advised to stop culling if they were to reach any limit imposed by CDFW. The petition calls for 40 gallons per diver per day. The number of individual urchins would not be attainable by even the most efficient diver by this method. Divers will report back to the G2KR.com website how many red and purple urchins they culled and their dive time so we can record work rates and award fabulous prizes. CDFW is welcome to collect data and all data collected by G2KR.com and RCCA will be shared with CDFW.

Objectives and Measurement of Success

The plan is to clear the reef of urchins to a density proven to allow kelp to recruit and thrive on the reef. This is a continuation of the Reef Check threshold density experiment at Lovers Point. Instead of having small reefs of graduated densities to see which ones can sustain kelp, this project clears the barren and then checks the density of urchins in the places where kelp subsequently recruited and the density of places where kelp was not successful. The two approaches to threshold density should yield a better understanding of kelp dynamics and determine the most effective ways to be successful at restoring kelp.

We consider success where we have reduced the average density to less than 1 urchin per meter 2 and kelp is recruiting and increasing in stipe density year to year. If this experimental project is not successful at restoring kelp, we will be the first to tell CDFW and FGC can change the rules back.

Scientific Studies in Progress

We are pursuing other science contributions from new and ongoing studies at UCSC, the University of Oregon, CSUMB, and Moss Landing Marine Labs. We will deploy drones above and below the water and further the advancement of those technologies. Our volunteer science educator will make the project data available to educators and create lessons aligned with California's Next Generation Science Standards.

Scalability and Next Projects.

With lessons learned from this project we aspire to preserve additional threatened kelp forests. There are several sites under consideration, all within Marine Protected Areas of varying types. If this project is successful, we will ask for permission from the CDFW and the FGC to replicate this project at various locations in Monterey, Northern California and the Northern Channel Islands.

Site Selection:

1. Tanker's Reef – Not in an MPA

2A. Edward F. Ricketts State Marine Conservation Area

2B. Lovers Cove State Marine Reserve

From: Doc Anes
Sent: Thursday, August 6, 2020 04:37 PM
To: FGC <FGC@fgc.ca.gov>
Cc
Subject: Comment on adoption of Petition 2020-001

Warning: This email originated from outside of CDFW and should be treated with extra caution.

Dear Members of the California Fish and Game Commission,

I am writing to ask you to adopt Petition 2020-001 in its entirety.
Please Help Save Kelp in Central California.

I applaud your movement toward approval of urchin culling in the Monterey area. The recommended action, permitting work at Tankers' Reef alone, is a good start but it is not enough. Adoption of both proposed sites per the petition will produce better science because:

1) Tankers' Reef is shale, whereas 99% of the rest of the region is granite bottom. Shale is soft and kelp cannot stay attached to it as long as on granite.

2) Tankers' Reef has no kelp now and historically has hosted kelp inconsistently. Urchin culling there will encourage kelp to return for a season, but is unlikely to foster a persistent kelp forest. We already have good data indicating that culling urchins on granite can foster kelp regrowth. Urchin culling on shale cannot tell us how to organize volunteers to regrow kelp on granite. Culling may require a different extent of urchin thinning, different frequency of diving maintain that thinned density, etc. We should have a study site on a granite bottom.

3) We need to cull urchins in order to start restoration of giant kelp forests on granite reefs around the Monterey Peninsula, which are accessible only within marine protected areas.

Your action will be a good start. We hope this is the beginning of a collaboration and dialogue between the department, the commission, the recreational diving community and concerned interests like fishers and seaside businesses.Â To prevent the eradication of giant kelp forests throughout the region, we should begin an inclusive process, featuring

dialogue with stakeholders, that will lead to a comprehensive plan to preserve and restore them.

Today, vast areas covered by sea urchins have replaced many Central and Southern California kelp forests. Almost nothing can survive in these depleted urchin barrens. Food and habitat for sea otters and other kelp forest creatures disappears as whole ecosystems collapse. We have an endangered species list. We should be giving even greater attention to endangered ecosystems, like giant kelp forests.

Thank you for taking time to read these comments,

Doc Anes
San Diego , CA

CALIFORNIA FISH AND GAME COMMISSION - NONREGULATORY REQUESTS - ACTION

Revised 8/11/2020

FGC: California Fish and Game Commission | DFW: California Department of Fish and Wildlife | WRC: Wildlife Resources Committee | MRC: Marine Resources Committee

Date Received	Subject	Short Description	Name/ Organization of Requestor	Category	Recommendation
6/24/2020	Sea otters	Concerned about sea otters not being allowed to be present along parts of California and asked for a vote on this issue.	Robert van de Hoek, Ballona Institute	Marine	This request is outside FGC and DFW authority and should be directed to the US Fish and Wildlife Service. No action recommended.

From: brandon barney <[redacted]>
Sent: Thursday, August 6, 2020 4:58 PM
To: FGC <FGC@fgc.ca.gov>; Flores Miller, Rebecca@Wildlife <Rebecca.FloresMiller@wildlife.ca.gov>
Cc: Frimodig, Adam@Wildlife <Adam.Frimodig@wildlife.ca.gov>; Ashcraft, Susan@FGC <Susan.Ashcraft@fgc.ca.gov>
Subject: Sustainable Ocean Harvest, LLC's Revised Kelp Harvest Plan

Warning: This email originated from outside of CDFW and should be treated with extra caution.

Dear Rebecca:

Sustainable Ocean Harvest, LLC hopes that the California Department of Fish and Wildlife will recommend our revised kelp harvest plan.
Will be happy to make any necessary or recommended modifications to our plan if you have any.

With gratitude,

Brandon Scott Barney
Founder and Director of Research
Primary Ocean
[redacted]

"Saving our planet, lifting people out of poverty, advancing economic growth... these are one and the same fight. We must connect the dots between climate change, water scarcity, energy shortages, global health, food security and women's empowerment. Solutions to one problem must be solutions for all."
-Ban Ki-moon, Secretary-General of the United Nations

Sustainable Ocean Harvest, LLC
Southern California *Macrocystis pyrifera* Sustainable Harvest Plan 2020-2024

Executive Summary **3**
Methodology for All Sustainable Harvesting Activities 4
Sustainable Harvesting Methodology 4
Harvester Name and Contact 4
Harvesting Records 4
Harvesting Vessel 4
Harvesting Operation 4
Projected Total Annual Harvest Requirement 5
Landing Method 5
Landing Address 5
Transport to Facility 5
Repetitive Harvest Avoidance 5
Bull Kelp (Nereocystis) Avoidance 5
Sea Otter Rafting Avoidance 5
MPA Compliance 6
Marine Life Breeding Cycles 6
Proposed Open Beds for Sustainable Wild Harvest 7
Bed Descriptions 7
Administrative Bed Status 7
Intended Use of Harvested Kelp 7
Estimated Harvesting Frequency per Bed 7
Projected Monthly Tonnage 7
Projected Annual Tonnage 7
Projected 5-year Tonnage 7
Appendix I: Business Plan Executive Summary 8
Appendix II: Current Status of the Kelp Beds Identified in the Plan 9

Executive Summary

In accordance with the regulations for mechanical harvesters of giant kelp (*Macrocystis pyrifera*) [Sections 165(c)(6) and 165.5(b)(2), Title 14, California Code of Regulations], Sustainable Ocean Harvest, LLC (SOH) submits this giant kelp harvest plan (KHP) for the open and/or leasable administrative giant kelp beds: 29, 30, 31, 32, 114 and 117 to the California Fish and Game Commission for the purpose of articulating the manner and extent of its projected sustainable giant kelp harvesting activities in Southern California for the five year period 2020-2024.

SOH giant kelp harvesting will occur in open beds only. All giant kelp beds described in this document will be utilized according to operational needs, giant kelp composition, and the health of the giant kelp bed. SOH is committed to sustainable harvesting consistent with state regulations and environmental values. SOH's sustainable harvesting will not exceed the regulated harvesting depth of four feet. SOH will avoid harvesting the same areas of giant kelp beds to ensure that the giant kelp has an adequate opportunity to regrow. SOH will only harvest the canopy and will not harvest the reproductive material and therefore will not "take" the giant kelp. SOH shall maintain its boats and equipment. Accurate state approved kelp weighing scales will be used. SOH shall maintain harvesting records. SOH shall not disturb eel or surf grass. SOH shall not harvest in marine conservation areas. SOH shall not harvest bull kelp. SOH shall avoid sea otter rafting sites when harvesting. SOH shall not harvest areas of kelp beds with bull kelp.

SOH is a wholly owned subsidiary of a giant kelp company Primary Ocean Producers Holdings, LLC, (POPH). The United States Department of Energy - through an Advanced Research Projects Agency-Energy grant - is funding POPH, with partners, to test a state-of-the-art marine biomass cultivation structure in the ocean in California. The goal of the Department of Energy's MacroSystems project is to develop the necessary technology and machinery, and enable future production for very high-volume applications, including for low carbon bioenergy. MacroSystems will reduce long term demand for wild giant kelp because it will enable the availability of significant quantities of cultivated giant kelp.

SOH's parent company, POPH, completed a giant kelp farm siting and kelp persistence analysis utilizing a dozen databases, including NOAA World Ocean Atlas and CalCOFI databases and conducted a thorough review of existing Southern California kelp bed data. These data will ensure the sustainability of SOH's harvesting strategy. POPH's long term giant kelp supply will be produced by MacroSystems and similar cultivation systems, so SOH's harvests will be limited.

Methodology for All Sustainable Harvesting Activities

Sustainable Harvesting Methodology

SOH will rent and/or customize workboats for the sustainable mechanical harvest of giant kelp, *Macrocystis pyrifera*, from coastal kelp beds in Southern California. SOH will harvest from Fish and Wildlife designated "open" kelp beds, according to demand, environmental conditions, and kelp canopy conditions. SOH will harvest in a manner consistent with regulations. SOH will not exceed the maximum harvesting depth to protect the kelp beds. SOH will avoid harvesting the same areas of kelp beds to ensure that the kelp has an adequate opportunity to regrow. SOH shall maintain its license, and all of its weighing scales in good working order. SOH shall maintain harvesting records. SOH shall not disturb eel or surf grass. SOH shall not harvest in marine conservation areas. SOH shall not harvest bull kelp. POP shall avoid sea otter rafting sites when harvesting.

Harvester Name and Contact

Sustainable Ocean Harvest, LLC. / Alex Nguyen / 24011 FM 1097 W Montgomery, TX 77356

Harvesting Records

SOH shall keep harvesting landing records in triplicate using "Kelp Harvester's Monthly Report" forms which shall show the weight of each harvest, name and address of harvester, the Department of Fish and Wildlife kelp harvester number, the report period, royalty rate, balance of advance deposit (applicable to leased beds), royalty rate amount due and dates of landing, the administrative kelp bed number where plants were harvested. Primary Ocean will work with the giant kelp commercial harvesters and the Department of Fish and Wildlife and private remote sensing companies to improve the quality of the data on giant kelp beds.

Harvesting Vessel

SOH does not currently own or rent a harvesting vessel. However, we plan to develop a harvesting vessel similar to The Cultured Abalone's "Ocean Harvest."

Harvesting Operation

SOH does not currently have an independently developed harvesting operational plan. We plan to follow the approved methodologies that we have studied that have been described in giant kelp wild harvest plans that have been approved by the California Department of Fish and Wildlife. For example, some abalone industry kelp harvesters operate custom built hydraulic cutting systems that use modified agricultural equipment to cut kelp with articulating blades that operate approximately 18 inches submerged below the surface while the vessel is piloted at low speeds along the margin of the kelp canopy. In this system, which we intend to follow, cut kelp is lifted from the sea surface by a belt similar to an escalator in its function. The kelp is deposited into a net bag that can hold one ton wet kelp. After loading, the net bag is knotted to close the opening, then moved aft on the vessel into the cargo hold. This process of cutting and bagging is conducted until the desired amount of kelp has been harvested. Harvesting operations are done at slow speeds and in calm conditions. Operation of the harvesting vessel and harvesting equipment generally requires one captain and one crew, but SOH may have additional observers present for research purposes to research advanced precision cutting technology developed by MacroSystems.

Projected Total Annual Harvest Requirement

Less than 1,900 wet tons of kelp per year, harvested variously from a combination of the beds described below on the basis of conditions and availability.

Landing Method

The bags filled with kelp will be weighed and recorded during unloading using a high quality scale used in normal fishery activities at the time of landing. Total tonnage is recorded by date and location of harvest and provided to California Fish and Wildlife along with royalty payments at month end in accordance with California kelp harvesting Regulations.

Landing Address

SOH currently does not lease a landing facility, but the likely landing address for SOH's weighing and landing activities is Berth 58, 2303 Signal Street, San Pedro, CA 90731.

Transport to Facility

Net bags filled with giant kelp will be transported directly into the SOH facility using a vessel crane and shore side lifting equipment, most likely a forklift, at the proposed facility at AltaSea in San Pedro or a similar facility in Santa Barbara or Ventura.

Repetitive Harvest Avoidance

Repetitive harvest is avoided using the system utilized by other kelp harvesters: a combination of visual spotting and overlays of prior harvesting tracks on GPS/chartplotting equipment. We will harvest on calm days with moderate tides, and cut from the margin of the bed, so that the kelp plants are not pulled from the base/holdfast. Our goal is to focus impact on cutting the canopy on the surface. SOH will also benefit from state-of-the-art precision harvesting technology developed by POPH and its MacroSystems partners. SOH will not over harvest giant kelp beds.

Bull Kelp (Nereocystis) Avoidance

All bull kelp is avoided in our harvesting operations. Kelp canopies with greater than 10% of bull kelp are avoided and tagged for future reference using GPS.

Sea Otter Rafting Avoidance

Sea otters are known to raft alone and in groups in kelp farms, so any areas where sea otters are seen are avoided. SOH kelp harvesting vessels will operate at very slow speeds so there is low risk to sea otters.

MPA Compliance

No kelp will be harvested from MPAs and MPAs will be avoided using GPS technology.

Marine Life Breeding Cycles

No kelp will be harvested from any kelp bed during any time period if kelp researchers recommend avoiding harvest for environmental reasons including issues related to the lifecycle of important marine life. Dr. Michael Graham, Moss Landing Marine Laboratories and Co-Editor/Managing Editor Journal of Phycology, indicated that the University of Santa Barbara Casselle Lab (and other laboratories) could provide SOH with some recommendations to enhance the sustainability of our harvesting operations based on their large-scale field-based monitoring program of kelp forests in the California current ecosystem. Their goals include assessing long-term changes due to climate and anthropogenic impacts and SOH will follow their recommendations regarding the timing of our harvests to avoid coinciding with any marine lifecycle events.

Proposed Open Beds for Sustainable Wild Harvest

SOH will harvest from each of the administrative giant kelp beds 29, 30, 31, 32, 114 or 117. SOH needs the ability to sustainably wild harvest from these open and leasable beds whenever business or research needs or kelp canopy conditions require. SOH shall maintain harvesting records, shall not disturb eel or surf grass, shall not harvest in marine conservation areas, shall not harvest bull kelp, shall avoid sea otter rafting sites when harvesting and shall not harvest areas of kelp beds with bull kelp and giant kelp.

Bed Descriptions

Bed 29: Refugio to Gato Creek, the “El Capitan” bed
Bed 30: Molino to Refugio, the “Tajiguas” bed
Bed 31: Alegria to Molino, the “Gaviota” bed,
Bed 32: Point Conception to Alegria, the “Cojo” bed, except the western portion, the Cojo SMR no-take MPA
Bed 114: Southern side of Santa Rosa island, except the eastern portion containing the MPA, South Point SMR
Bed 117: Southern side of San Miguel Island, from Cardwell Pt. to Pt. Bennett.

Administrative Bed Status

All beds described are listed as “open” by the California Department of Fish and Game.

Intended Use of Harvested Kelp

Commercial sales and research and development of giant kelp bioproducts for a range of industries including cosmetics, biomedical and agricultural use.

Estimated Harvesting Frequency per Bed

Harvesting will focus on sustainability. Anticipated harvest frequency is up to approximately five tons per week under normal conditions, but we may harvest more frequently. This estimate is based on estimates of the biomass produced by each kelp bed and will change based on the condition of the beds, so we will not harvest areas that we have recently harvested and will avoid any areas of beds that cannot be sustainably harvested.

Projected Monthly Tonnage

Bed 29: 0-26 tons; Bed 30: 0-26 tons; Bed 31: 0-26 tons
Bed 32: 0-26 tons; Bed 33: 0-26 tons
Bed 114: 0-26 tons; Bed 117: 0-26 tons

Projected Annual Tonnage

Bed 29: 0-312 tons; Bed 30: 0-312 tons; Bed 31: 0-312 tons
Bed 32: 0-312 tons; Bed 33: 0-312 tons
Bed 114: 0-312 tons; Bed 117: 0-312 tons

Projected 5-year Tonnage

Bed 29: 0-1,560 tons; Bed 30: 0-1,560 tons; Bed 31: 0-1,560 tons
Bed 32: 0-1,560 tons; Bed 33: 0-1,560 tons
Bed 114: 0-1,560 tons; Bed 117: 0-1,560 tons

Appendix I: Business Plan Executive Summary

Sustainable Ocean Harvest, LLC, shall conduct a sustainable harvest of wild giant kelp off Southern California. Sustainable Ocean Harvest supplies its harvest to its parent company which produces organic agricultural inputs used by farmers to increase plant health. Sustainable Ocean Harvest, LLC is a wholly owned subsidiary of Primary Ocean. Primary Ocean's business is currently focused on delivering environmentally friendly solutions to growers and farmers, particularly organic farmers, in California. Primary Ocean is a vertically integrated seaweed biotech and sustainability company. Born from U.S. Department of Energy ARPA-E funded seaweed cultivation research, Primary Ocean is pursuing its immediate commercialization strategy in the agricultural inputs market with plant health products for conventional and organic farmers in California and worldwide. Primary Ocean possesses a portfolio of seaweed processing technologies for the production of organic agricultural inputs (biostimulants), organic cosmetic extracts, and organic feed products, and will continue pursuing a technology road map to include the production of dietary supplements, and organic compounds for bioplastics, biotextiles, medical applications, and biofuels. Primary Ocean is a leading environmental startup creating jobs in California.

Primary's proprietary agricultural products reduce water, fertilizer, and pesticide requirements, regenerate eroded soils and greatly improve farmers' crop yields, quality, and profits in both conventional and organic farming systems. In head to head trials, independent research indicates Primary Ocean's organic agricultural biostimulant products are performing best in class within the environmentally key agricultural inputs market.

Primary Ocean is a partner to a world class seaweed cultivation research project funded by the federal government. The University of California Santa Barbara and Irvine campuses are also key partners with teams funded with millions of dollars in research funding. European (Ocean Rainforest and Hortimare) and South American companies (Patagonia Seaweeds) who are leading in seaweed cultivation in their regions also as key project managers and partners. We are working to develop advanced seaweed cultivation technologies across the full lifecycle of seaweed including genetics, hatchery, seeding, cultivation, and precision harvesting as a member of the MacroSystems Project. Our team consists of the leading experts for giant kelp cultivation and offshore kelp cultivation and we are working to birth an industry of seaweed farming in California with the support of the department of energy. Our data, research, technology will be shared with the state and other companies so that we can develop a seaweed cultivation industry in California that leads the world.

Seaweed cultivation technologies will provide environmental services including carbon drawdown, ocean acidification mitigation, ecosystem development, and ocean regeneration.
Primary Ocean's potential environmental impacts has been recently covered in Bloomberg, Washington Post, National Geographic, Undercurrent and in the documentary film, "*They Say It Can't Be Done*." Primary Ocean's ownership and executive team consists of the most diverse team in the seaweed industry in California including black and brown investors and executives. Primary's wild harvest activities are intended to provide critical redundancy in supply and to enable product research and development and sales while seaweed cultivation research and the regulatory framework for seaweed farming to be created.

Appendix II: Current Status of the Kelp Beds Identified in the Plan

Sustainable Ocean Harvest, LLC and its parent company Primary Ocean Producers, Holdings, LLC are committed to the sustainable use of marine resources in California. Prior to the development of its kelp harvest plans, Primary consults MBC Aquatics aerial overflight data, satellite data, university researchers, NOAA databases, United States Department of Agriculture surveys, and California Department of Fish and Wildlife databases. Primary supports continued adaptive management of California's giant kelp beds and plan to work with all stakeholders to provide real time data on any of our harvesting operations, including cutting edge satellite data, collected from high resolution satellite networks that have recently been developed by Planet.com based in Silicon Valley. These satellite photographs can be a low cost augmentation to the aerial overflight data provided by MBC Aquatics and inform real time adaptive management decisions.

Primary Ocean was contracted by the Department of Energy Advanced Research Projects Agency MacroSystem team to co-design and site large scale kelp farms. Our team's system was designed and dimensioned for the geographic and environmental characteristics of Southern California where Primary Ocean conducted kelp farm siting analysis. We modeled the productivity of our proposed kelp farms using historical productivity data on nearby natural beds, including the beds in our current mechanical harvest plan. Our research has found that the kelp beds in Southern California are currently in a relatively healthy state and small scale additional harvest would have no adverse impacts. Primary Ocean has had direct conversations, regarding our harvesting plans with the leading industry experts on sustainable Southern California giant kelp bed harvesting, including Doug Bush from the Cultured Abalone and Dale Glantz, the former Director of Kelco's harvesting operations. Primary Ocean is committed to following in the footsteps of successful long term sustainable mechanical harvester practices and recognizes the uncertain impacts of climate change.

Primary Ocean developed relationships with the academic experts on local kelp beds to help inform the sustainability of our plans, so we created an NSF I-Corps proposal to evaluate methane mitigating seaweed based animal feeds with the University of California Santa Barbara researcher Dr. Robert Miller. Dr. Miller leads the Santa Barbara Coastal Long Term Ecological Research (SBC LTER) program, a highly interdisciplinary effort to understand the dynamics of California's giant kelp forest ecosystems, and one of 28 NSF-supported LTER sites across the nation. Dr. Robert Miller also leads the Southern California Bight Marine Biodiversity Observation Network (SCB MBON), funded by NASA, the Bureau of Ocean Energy Management (BOEM), and NOAA, part of a national and global MBON network seeking a better understanding of marine biodiversity. Dr. Tom Bell, also of the University of California Santa Barbara joined Primary Ocean's NSF proposal after Dr. Robert Miller and is also one of the key technology partners of our seaweed cultivation team. Dr. Tom Bell's 2019 "*Three decades of variability in California's giant kelp forests from the Landsat satellites*." These giant kelp bed researchers are working everyday to understand the beds and we listen to their findings and will adjust our plans accordingly.

STAFF SUMMARY FOR FEBRUARY 21, 2020
For Background Purposes Only

17. RECREATIONAL TAKE OF PURPLE SEA URCHIN EMERGENCY

Today's Item **Information ☐** **Action ☒**

Discuss and consider adopting emergency regulations concerning recreational take of purple sea urchin at Caspar Cove, Mendocino County.

Summary of Previous/Future Actions

• Adopted emergency regulations	Apr 18-19, 2018; Ventura
• Adopted regular rulemaking	Feb 6, 2019; Sacramento
• MRC vetting	Nov 5, 2019; MRC, Sacramento
• **Today's adoption hearing**	**Feb 21, 2020; Sacramento**

Background

Since 2014, FGC and DFW have been tracking a combination of environmental and biological stressors in the nearshore waters across northern California. The nearshore conditions have led to the near collapse of the bull kelp forest ecosystem and significant declines in the corresponding species that the kelp ecosystem supports, including red sea urchin and red abalone. Already weakened by environmental stressors and a severely limited kelp food source, an exploding purple sea urchin population has outcompeted red sea urchin and red abalone for the remaining kelp, ultimately leading to the widespread starvation and death of abalone and the collapse of both fisheries; recovery of these fisheries will not be possible without the eventual recovery of bull kelp forests and the return of sufficient food to support survival and reproduction.

In 2018, based on a DFW findings that volatile and adverse conditions on the north coast posed an emergency situation for resident abalone populations and the kelp forest ecosystem upon which they rely, FGC adopted emergency regulations to raise the daily bag limit for purple sea urchin from 35 individual urchin to 20 gallons per person, per day, taken only while skin-diving or SCUBA diving in state waters off Sonoma and Mendocino counties. Seen as part of a broader collaborative process, the regulation helped to facilitate citizen science efforts and initiate a coordinated approach to kelp ecosystem recovery on the north coast (Exhibit 1).

In Feb 2019, FGC adopted a regular rulemaking that further increased the daily recreational take limit of purple sea urchin to 40 gallons in the waters off Sonoma, Mendocino, and Humboldt counties (Exhibit 2). The intent of the higher 40 gallons limit was to promote the continued involvement of recreational divers in efforts to restore the severely-impacted kelp forest ecosystems in northern California, and contribute more greatly to reduction efforts without adversely affecting the long-term health of the purple sea urchin population.

DFW coordinated with divers to monitor recreational harvest events in 2018 and 2019. While some events were successful at moving large volumes of purple sea urchin, DFW has reported that recreational divers often found removing and transporting 40 gallons of urchin to shore to be unattainable, and that removing that volume put diver safety at risk due to regional ocean conditions. Environmental conditions have continued to deteriorate in northern California, and

divers remain committed to testing alternative methods that might increase the expected benefits to the kelp ecosystem and the species that rely upon it from removing larger amounts of purple urchin.

DFW is requesting that FGC take emergency action to amend Section 29.06 of Title 14 to temporarily remove the daily bag limit and expand authorized recreational take methods for purple sea urchin in a discrete geographic area in Mendocino County, specifically an area offshore of Caspar Headlands State Beach known as Caspar Cove (exhibits 3 and 4). The proposed regulations are intended to explore and evaluate whether intensified removals may promote the recovery of kelp and the associated species that it supports (Exhibit 3). Recreational take of purple sea urchin in Caspar Cove would be allowed only by hand or with manually operated handheld tools.

If adopted today, the new regulations are expected to take effect on or around Mar 2 and continue for 180 days, during which time DFW and partners intend to monitor and evaluate effectiveness by comparing ecosystem recovery in the recreational removal area to similar nearby areas with commercial take and/or no purple urchin removal efforts.

California Environmental Quality Act (CEQA)

DFW has determined that the proposed action falls within the statutory exemption under Public Resources Code Section 21080(b)(4) (Exhibit 5). The statutory exemption, which is repeated in Section 15359 of the CEQA guidelines, applies to actions necessary to prevent or mitigate an emergency. DFW has also determined that, under CEQA guidelines in Section 15061, the proposed action falls within categorical exemptions class 7 and 8 as related to agency actions to protect natural resources and the environment (exhibits 6 and 7); FGC staff agrees these exemptions are applicable.

As to the exceptions to categorical exemptions set forth in CEQA guidelines in Section 15300.2, including the prospect of unusual circumstances and related effects, FGC staff's review was guided by the Supreme Court of California's recent decision in *Berkeley Hillside Preservation v. City of Berkeley.* FGC staff has reviewed all of the available information possessed by FGC relevant to the issue and does not believe adopting the regulations poses any unusual circumstances that would constitute an exception to the categorical exemptions set forth above. Compared to the activities that fall within Class 7 and Class 8 generally, which include the given example of wildlife preservation activities such as the effort here, there is nothing unusual about the proposed regulations. In addition, even if there were unusual circumstances, no potentially significant effects on either project-specific or cumulative bases are expected.

In considering emergency action, FGC must determine the magnitude of potential harm, the existence of a crisis situation, the immediacy of the need, and whether the anticipation of harm has a basis firmer than simple speculation. All available information indicates that conditions in the kelp ecosystem have continued to decline and extraordinary measures must be taken immediately to help restore the important habitat for the benefit of a myriad species that rely upon it. DFW will provide an overview at the meeting (Exhibit 11).

Significant Public Comments

Ten commenters submitted emails to express support for the emergency action. Representative emails are included as exhibits 8-10. In addition to supporting the emergency action, one commenter advocates for other measures to address the problem, including using drones, site selection by volunteers, and hiring unemployed commercial urchin divers for removal efforts.

Recommendation

FGC staff: Adopt the proposed emergency action as recommended by DFW, recognizing the essential nature of DFW and partner monitoring of outcomes to help determine effectiveness of the strategy.

DFW: Temporarily remove the daily bag limit for recreational take of purple sea urchin in Caspar Cove, Mendocino County.

Exhibits

1. Staff summary from Apr 18-19, 2018 FGC meeting (for background only)
2. Staff summary from Feb 6, 2019 FGC meeting (for background only)
3. DFW memo transmitting proposed emergency statement, received Feb 10, 2020
4. Draft emergency statement
5. DFW memo transmitting notice of exemption under CEQA, received Feb 10, 2020
6. Draft CEQA notice of exemption
7. CEQA notice of exemption attachment
8. Email from Madeleine Russo, received Jan 31, 2020
9. Email from Captain Dan Walsh, received Feb 5, 2020
10. Email from Doug Jung, received Feb 9, 2020
11. DFW presentation (*added Feb 18, 2020*)

Motion/Direction

Moved by _____ and seconded by _____ that the Commission 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.

The Commission further determines, based on the record, pursuant to sections 15061(a), 15307, and 15308 of Title 14, that the proposed action is exempt from the California Environmental Quality Act as an action necessary to prevent or mitigate an emergency and as an action to protect natural resources and the environment.

The Commission further determines, pursuant to Section 399 of the Fish and Game Code, that adopting this regulation is necessary for the immediate conservation, preservation, or protection of birds, mammals, fish, amphibians, or reptiles, including but not limited to their nests or eggs.

Therefore, the Commission adopts the emergency regulation to amend Section 29.06.

State of California
Department of Fish and Wildlife

M e m o r a n d u m

Original on file,
received August 5, 2020

Date: August 4, 2020

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

From: Charlton H. Bonham
Director

Subject: **Agenda Item for the August 19, 2020, Fish and Game Commission Meeting Re: Request for Notice Authorization Re: Amendments to Recreational Sea Urchin Regulations for Caspar Cove and Tanker's Reef**

The California Department of Fish and Wildlife (Department) requests the Fish and Game Commission (Commission) authorize publication of notice of its intent to consider amendments to existing regulations in Section 29.15, Title 14, California Code of Regulations (CCR) to remove the daily recreational bag limit for the take of sea urchins at Tanker's Reef, Monterey County, and Caspar Cove, Mendocino County.

Unlimited take of purple sea urchin is currently allowed in Caspar Cove, Mendocino County through an emergency rule filed in March 2020, with a pending readoption that will extend the amendment to December 2020. Due to the impact of the COVID-19 pandemic, effort to take urchins in Caspar Cove has been minimal and a standard rulemaking is required to allow data collection and conservation activities to continue within Caspar Cove. The Department has evaluated Petition #2020-001 and agrees that removal of the daily recreational bag limit for red and purple urchins at Tanker's Reef may promote kelp recovery and allow for further evaluation of kelp restoration techniques.

This proposed action would extend the recreational urchin removal activities at Caspar Cove and, in response to a petition for regulatory change, would allow for a community led urchin removal effort at Tanker's Reef in Monterey. Options that will be included for Commission consideration in the proposed rulemaking will be a sunset date of three years and the possible inclusion of both red and purple urchins at Tanker's Reef.

In conjunction with the proposed regulations, the Department will work closely with the petitioner and other partners to establish specific performance criteria to evaluate the efficacy of the proposed activity at Tanker's Reef.

If you have any questions or need additional information, please contact Dr. Craig Shuman, Marine Regional Manager at (916) 373-5491. The public notice for this rulemaking should identify Environmental Scientist, Anthony Shiao, as the Department's point of contact for this rulemaking. His contact information is

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Memorandum

Date: August 5, 2020

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

From: Mark Gold, Executive Director
California Ocean Protection Council

Craig Shuman, Marine Region Manager
California Department of Fish and Wildlife

Paul Michel, Superintendent PM
Monterey Bay National Marine Sanctuary

Subject: **Joint Agency Comments Re: Proposed Amendments to Recreational Sea Urchin Regulations at Tanker Reef, Monterey County.**

The California Department of Fish and Wildlife (Department) has requested the Fish and Game Commission (Commission) authorize publication of notice of its intent to consider amendments to existing regulations in Title 14, California Code of Regulations (CCR) to exempt sea urchins taken by hand and hand-held tools from any recreational bag limit at Tanker Reef, Monterey County.

The Department worked closely with the Ocean Protection Council (OPC) and Monterey Bay National Marine Sanctuary (MBNMS) to evaluate Petition #2020-001 and develop the proposed regulatory change. Research suggests that suppressing urchin grazer pressure by in-water culling may promote localized algal community and kelp regrowth if sufficient focused effort can be sustained and ocean conditions are conducive to algal recovery. However, there is uncertainty about potential ecological impacts of these methods and the efficacy of community-led approaches. While the role of sea urchins in kelp forest deforestation is well documented, purple and red sea urchins are native species in California and their widescale eradication is neither feasible nor desirable. The state and sanctuaries are interested in better understanding how urchin control, either by removal or in-water culling, can strategically support kelp restoration at key locations through promoting natural recovery or in combination with kelp out-planting methods.

Consistent with this approach, the Department has been working with partners to better understand how in-water urchin culling might be used as a restoration tool for kelp. In August 2018, the Department issued a Scientific Collection Permit to Reef Check California (RCCA) to identify a threshold population density of purple sea urchins at which giant kelp can re-establish at Lover's Point, Monterey County. In February 2020, the Commission adopted an emergency regulation to remove the recreational bag limit for purple sea urchins taken by hand and hand-

held tools inside Caspar Cove, Mendocino County. This emergency regulation was designed to provide a science-based assessment of the efficacy of in-water purple urchin culling by recreational divers as a kelp restoration tool and is being monitored by RCCA with funding from OPC[1]. In addition, project partners have developed a self-reporting tool through which divers at Caspar Cove can quantify and report key metrics (e.g., estimated number of urchins smashed, dive time, geographic area covered).

OPC and MBNMS will not oppose the proposed regulatory amendment at Tanker Reef provided the outcomes explicitly inform future management and the petitioners can address the concerns outlined in this joint agency memorandum. To achieve this, the petitioner is requested to: 1) evaluate the efficacy of community-led in-water urchin culling activities and report findings; and 2) evaluate the potential ecological impacts from in-water urchin culling methods.

To ensure relevant information is incorporated into this regulatory amendment, we support the recommended sunset date of three years, at which time data collected by the petitioner will be evaluated prior to considering extension and/or broader application of these methods.

Evaluating the efficacy of community led in-water urchin culling

The petitioner and other proponents must establish a monitoring program that is sufficient to monitor key metrics necessary to determine the effectiveness of the proposed restoration effort including, at a minimum, urchin density, benthic invertebrate and algal community composition at treatment (culling) and control sites before, during, and after culling occurs. Monitoring should also document dive community effort (e.g., estimated number of urchins culled/dive hours). In addition, proponents should have a transparent plan for managing and reporting data to the appropriate agencies, including but not limited to CDFW, OPC, and MBNMS. Extensive state staff resources are currently committed to evaluating urchin control efforts for kelp restoration on the north coast, prohibiting significant involvement in this effort. However, staff from the Department, OPC, and MBNMS will be available to work with the petitioner and other partners to establish a monitoring plan, specific performance criteria, and a data management and reporting framework to evaluate the efficacy of urchin culling. In addition, Department and MBNMS staff will collaborate to provide oversight to independently verify monitoring results and ecological changes at Tanker Reef, as time and budget permit.

Evaluating ecological impacts from in-water urchin culling methods

- *Direct impacts to the seabed and non-target organisms*

  In-water culling of urchins typically involves use of hand tools, such as a hammer, screwdriver, or similar implement to break the urchin test with a striking or jabbing action. The extent to which these actions have negative impacts on reef substrate,

[1]At the February 2020 Council Meeting, OPC provided $500k to RCCA working with commercial urchin divers to evaluate purple urchin removal as a kelp restoration tool. This funding also includes effectiveness monitoring of in-water culling of purple urchin by recreational divers at Caspar Cove, Mendocino County.

associated habitat, or sessile organisms is unknown and should be evaluated before broader application of such methods. Understanding potential alterations to the seabed is also a high priority.

MBNMS and CDFW are currently developing a collaborative study using a variety of handheld tools to evaluate the potential impacts of urchin culling on the reef substrate, associated habitat, and sessile organisms. The results of this study are unlikely to be available prior to the potential adoption of the proposed regulatory amendment; however, as results become available, we may recommend they be incorporated into the activities at Tanker Reef and any associated long-term regulations. In addition, we recommend that any monitoring protocol used at Tanker Reef incorporate observations of direct and indirect impacts to non-target organisms.

- *Disturbance to sea otters*

  Southern Sea otters are fully protected species under California state law and listed as threatened under the Endangered Species Act. Based on discussions between CDFW (Office of Oil Spill Prevention and Response), U.S. Fish and Wildlife Service, U.S. Geological Survey and Monterey Bay Aquarium, culling of urchins in barrens at Tanker Reef is not expected to impact sea otters due to loss of potential prey. Increased and concentrated boat traffic and surface activity at Tanker Reef was identified as a potential source of disturbance to sea otters. However, the proposed activity is not expected to increase boat traffic as most diving will occur from shore and therefore disturbance to sea otters is unlikely. In addition, 2019 sea otter survey data[2] indicated sea otter use of this area was low with no observations of otters on Tanker Reef. However, we recommend petitioners work with local partners to track otter observations and potential impacts to sea otters.

If you have any questions or need additional information, please contact Dr. Craig Shuman, Marine Regional Manager at (916) 373-5491.

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[2] U.S. Geological Survey 2019 sea otter survey data provide to CDFW Office of Oil Spill Prevention and Response

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State of California
Department of Fish and Wildlife

Original on file,
received July 16, 2020

Memo randum

Date: July 13, 2020

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

From: Charlton H. Bonham
Director

Subject: **Five-Year Species Review of Kenwood Marsh checkerbloom**

The California Department of Fish and Wildlife (Department) has prepared the attached Five-Year Species Review of Kenwood Marsh checkerbloom for the Fish and Game Commission (Commission) pursuant to the California Endangered Species Act (CESA). Pursuant to Fish and Game Code, section 2077, subdivision (a), the Department has prepared this Five-Year Species Review to evaluate whether conditions that led to the original listing of Kenwood Marsh checkerbloom are still present.

In completing this Five-Year Species Review, the Department finds there is sufficient scientific information to indicate that the conditions that led to the original listing of Kenwood Marsh checkerbloom as endangered are still present. The scientific information available to the Department indicates that Kenwood Marsh checkerbloom remains in serious danger of extinction in all of its range due to one or more causes. Therefore, the Department recommends no change to the status of Kenwood Marsh checkerbloom.

The Department requests that the following item be added to the Commission's August 19-20, 2020 meeting agenda:

- **Kenwood Marsh checkerbloom**
  Receive the Department's Five-Year Species Review of Kenwood Marsh checkerbloom (*Sidalcea oregana* ssp. *valida*), a native plant listed as endangered under CESA. (Pursuant to Section 2077, Fish and Game Code)

If you have questions or need additional information, please contact Isabel Baer, Environmental Program Manager, Native Plant Program, Habitat Conservation Planning Branch at (916) 203-3193, or by e-mail at Isabel.Baer@wildlife.ca.gov.

Enclosure

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State of California
Natural Resources Agency
Department of Fish and Wildlife

REPORT TO THE FISH AND GAME COMMISSION

FIVE-YEAR SPECIES REVIEW OF KENWOOD MARSH CHECKERBLOOM (*Sidalcea oregana* ssp. *valida*)

August 2020

Kenwood Marsh checkerbloom, CDFW photo by Raffica La Rosa

Charlton H. Bonham, Director
Department of Fish and Wildlife

TABLE OF CONTENTS

I. EXECUTIVE SUMMARY 1
II. INTRODUCTION 2
A. Five-Year Species Review 2
B. Listing and Status Review History 2
C. Notifications and Information Received 3
III. BIOLOGY 3
A. Taxonomic and Physical Description 3
B. Life History and Ecology 3
C. Habitat Necessary for Species Survival 5
i. Vegetation Communities 5
ii. Geology and Soils 6
iii. Climate and Hydrology 6
IV. DISTRIBUTION AND ABUNDANCE 7
A. Range and Distribution 7
B. Population Trend and Abundance 12
V. THREATS AND SURVIVAL FACTORS 12
A. Factors Affecting Ability to Survive and Reproduce 12
B. Degree and Immediacy of Threats 14
VI. MANAGEMENT AND RECOVERY 14
A. Impact of Existing Management Efforts 14
i. Erecting Fence Exclosures 14
ii. Removal of Thatch 15
iii. Conservation Seed Storage 15
iv. Reintroduction of Plants at Kenwood Marsh (2004-present) 15
B. Recommendations for Management Activities and Other Recommendations for Recovery of the Species 16
VII. RECOMMENDATION TO THE COMMISSION 17
VIII. Sources 17
A. Literature Cited 17
B. In Litteris 19
C. Personal Communication 20
IX. LIST OF FIGURES 20
X. LIST OF TABLES 20
XI. LIST OF APPENDICES 20

I. EXECUTIVE SUMMARY

Kenwood Marsh checkerbloom (*Sidalcea oregana* ssp. *valida* Greene) is currently listed as endangered under the California Endangered Species Act. Pursuant to Fish and Game Code, section 2077, subdivision (a), the California Department of Fish and Wildlife (Department) has prepared this Five-Year Species Review to evaluate whether conditions that led to the original listing of Kenwood Marsh checkerbloom are still present. This review is based on the best scientific information currently available to the Department regarding each of the components listed under Section 2072.3 of the Fish and Game Code and Section 670.1, subdivisions (d) and (i)(1)(A), of Title 14 of the California Code of Regulations. In addition, this document contains a review of the identification of habitat that may be essential to the continued existence of the species, and the Department's recommendations for management activities and other recommendations for recovery of the species (Fish & G. Code, § 2077, subd. (a)).

Kenwood Marsh checkerbloom is a long-lived perennial herb in the mallow family (Malvaceae) and is about 1 m (3.3 ft) tall with pink flowers. This species is endemic to (exists only in) California, and its range appears to be restricted to eastern Sonoma County in Kenwood Marsh and Knights Valley. When Kenwood Marsh checkerbloom was state-listed as an endangered species in 1982, it was known from only three sites in marshes adjacent to grasslands that top ancient sandstone and river deposits. All three sites are on privately owned land, and since 2001, the species has been confirmed as extant at only one site. This site in Kenwood Marsh produced only 16 flowering plants in 2019. Due to its very small population size, Kenwood Marsh checkerbloom is vulnerable to several threats and is at risk of extinction.

At the time of listing in 1982, the Department described one major threat to the survival and reproduction of Kenwood Marsh checkerbloom: present or threatened modification or destruction of its habitat. The destruction of habitat came in the form of agricultural conversion to vineyards and pasture, plus the urbanization of areas adjacent to Kenwood, CA. Today, the last three documented populations are isolated and surrounded by vineyards or residences. This isolation likely eliminates the ability of the species to move in response to climate change and also increases the chance that random events will extirpate any small population. Kenwood Marsh checkerbloom relies on wetland habitat and is therefore susceptible to changes in hydrology from agriculture, water diversion, and climate change.

Landowner actions to protect the species from grazing and mowing have contributed to the survival of the one confirmed extant population of Kenwood Marsh checkerbloom in Kenwood Marsh. Kenwood Marsh checkerbloom has benefited from coordination between the landowner, the U.S. Fish and Wildlife Service, the University of California Botanical Garden, volunteers, and the Department to collect seeds for long-term conservation, perform activities to reduce competition from nearby vegetation, and reintroduce the species into nearby suitable habitat. The Department recommends the re-initiation of reintroduction efforts, with an additional goal of quantifying the genetic diversity of the remaining natural population, the cultivated plants that the reintroductions are drawn from, and the seed-banked seeds in long-term storage, with the purpose of applying this knowledge of the remaining genetic diversity to maximize the genetic diversity of the plants used in reintroduction efforts.

In completing this Five-Year Species Review for Kenwood Marsh checkerbloom, the Department finds there is sufficient scientific information to indicate that the conditions that led to the listing of Kenwood Marsh checkerbloom as endangered are still present, and recommends no change to its status at this time.

II. INTRODUCTION

A. FIVE-YEAR SPECIES REVIEW

This Five-Year Species Review addresses Kenwood Marsh checkerbloom (*Sidalcea oregana* ssp. *valida* Greene), which is designated as an endangered species under the California Endangered Species Act (CESA) (Fish and G. Code, § 2050 et seq.; Cal. Code Regs. tit. 14 § 670.2, subd. (a)(20)(D)). This subspecies will be referred to as a species throughout this document for ease of reference. Upon a specific appropriation of funds by the Legislature, the California Department of Fish and Wildlife (Department) shall, or if other funding is available, in the absence of a specific appropriation, may, review species listed as endangered or threatened under CESA every five years to determine if the conditions that led to the original listing are still present (Fish and G. Code, § 2077, subd. (a)). Kenwood Marsh checkerbloom is also listed as endangered under the Federal Endangered Species Act. Pursuant to Fish and Game Code, section 2077, subdivision (b), the United States Department of the Interior, U.S. Fish and Wildlife Service (USFWS) was contacted in an effort to coordinate this review with their five-year review process, which was last completed in 2019 (Bainbridge, pers. comm. 2019a; USFWS 2019).

Using the best scientific information available to the Department, this Five-Year Species Review includes information on the following components pursuant to the Fish and Game Code, sections 2072.3 and 2077, subdivision (a) and of Title 14, California Code of Regulations, section 670.1, subdivision (d): species' population trend(s), range, distribution (including a detailed distribution map), abundance, life history, factors affecting the species' ability to survive and reproduce, the degree and immediacy of threats, the impact of existing management efforts, the availability and sources of information, identified habitat essential for the continued existence of the species, and the Department's recommendations for future management activities and other recovery measures to conserve, protect, and enhance the species.

B. LISTING AND STATUS REVIEW HISTORY

On November 5, 1981, the Fish and Game Commission voted to list Kenwood Marsh checkerbloom as endangered and protected under the Native Plant Protection Act (NPPA) (Fish and G. Code, § 1900 et seq.), effective January 17, 1982 (Cal. Reg. Notice Register 81, No. 51).

In 1984, plants listed as endangered under the NPPA were newly designated as endangered under CESA and added to the CESA list of endangered plants (Cal. Code Regs., tit. 14, § 670.2, subd. (a)(20)(D); Fish and G. Code, § 2062). At the time of listing, the main threat to the species was identified as modification and/or destruction of habitat due to human-related activities (e.g., agricultural conversions and urbanization).

On October 22, 1997, the USFWS listed Kenwood Marsh checker-mallow (synonym of Kenwood Marsh checkerbloom) as endangered under the authority of the federal Endangered Species Act.

The last 5-year species review was conducted by the Department in 1987. This current Five-Year Species Review was prepared by Dr. Raffica La Rosa, in the Department's Habitat Conservation Planning Branch, Native Plant Program.

C. Notifications and Information Received

On November 26, 2019, the Department notified persons who had expressed their interest in CESA actions in writing to the Commission and had provided contact information to the Commission (Fish and G. Code, § 2077(a)). The e-mail notification included a link to the Department's dedicated web page for five-year species reviews of threatened and endangered species at https://www.wildlife.ca.gov/Conservation/CESA/Five-Year-Reviews.

III. BIOLOGY

A. Taxonomic and Physical Description

Kenwood Marsh checkerbloom is a perennial herb that forms a thick fleshy root and can grow to about 1 m (3.3 ft) tall (Munz and Keck 1959; Hill 2012). The lower stem has bristles that are 1-1.5 mm long (Hill 2012). The leaves are palmately lobed; at the base of the plant, the leaves typically have 5-7 shallow lobes and further up the branches, the leaves have 3-5 deep lobes (Fig. 1). The flowers are pink, each with five petals 10-15 mm long and a fused column of stamens. The flowers form dense clusters that are 2-6 cm (0.8-2.4 in) long at the ends of the branches, with the youngest flowers near the tips. (CDFG 1981, 1987)

There are currently five recognized subspecies of *Sidalcea oregana*, which collectively are found across northern California. These subspecies are distinguishable by their flower density, length of flower clusters, and density of bristles on the stems (Hill 2012). Three of the subspecies are rare and imperiled in California (CNPS 2019b), but Kenwood Marsh checkerbloom is the only one that is state-listed. The subspecies became distinct relatively recently, therefore the evolutionary relationships between subspecies is still difficult to discern (Andreasen and Baldwin 2003). The closest relative of Kenwood Marsh checkerbloom may be the coast checkerbloom (*S. oregana* ssp. *eximia*), which grows in Humboldt County (CDFG 1987); their distributions do not overlap.

B. Life History and Ecology

Almost all that is known about the life history and ecology of Kenwood Marsh checkerbloom is the result of studying the Deerfield Ranch Winery population in Kenwood Marsh (Table 1). The plants are likely long-lived if conditions are suitable, but are difficult to track annually (Symonds, pers. comm. 2020). There is anecdotal evidence that isolated individuals cannot produce seeds (Parsons, pers. comm. 2019), which suggests that Kenwood Marsh checkerbloom relies on pollinators to move pollen between at least two genetically dissimilar plants for seeds to be produced. If true, this would have negative implications for the survival of populations with extremely low numbers of individuals, especially if they are genetically very similar.

The Department has no information on pollinators of Kenwood Marsh checkerbloom, but the closely related Oregon checkerbloom (*Sidalcea oregana* ssp. *spicata*), a species with similar floral characteristics to Kenwood Marsh checkerbloom, was observed to be pollinated by bumble bees (*Bombus* spp.), bee flies (Bombyliidae, Diptera), and skipper butterflies (Hesperiidae, Lepidoptera) (Ashman and Stanton 1991). Kenwood Marsh checkerbloom may attract a similar suite of pollinators because these pollinators are typically generalists that visit many species of plants and could possibly pollinate other checkerbloom species. Ashman and Stanton (1991) also observed visits from a solitary oligolectic bee (*Diadasia nigrafrons*) to Oregon checkerbloom. This is a bee that specializes on pollen from only one or a few plant

species. There is no evidence that this species of solitary bee visits Kenwood Marsh checkerbloom, but there may be other solitary bee species that interact with Kenwood Marsh checkerbloom in a similar way.

Seeds from Kenwood Marsh checkerbloom drop from the plant, and it is not known how long they can remain viable in the soil seedbank. In the spring, many seeds that were produced in the previous year may germinate (Symonds, pers. comm. 2020), but the seedlings must compete with the surrounding vegetation. In a nursery setting without competition, plants have produced flowers after just one year of growth (Symonds, pers. comm. 2019). Once a plant is established and has produced a substantial rootstock, it may better withstand interannual fluctuations of precipitation and competition from surrounding vegetation, but a large rootstock would likely not withstand sustained changes, such as prolonged droughts.

Kenwood Marsh checkerbloom occurs in freshwater wetlands that have a history of grazing (CDFG, in litt. 1999). If grazers are present, plants are susceptible to damage at any time of year. Grazers may eat the vegetative or reproductive portions of the plant or could damage the roots that are sometimes exposed and vulnerable to trampling (Symonds, pers. comm. 2020). Grazers may also help to reduce the surrounding vegetation that may compete with Kenwood Marsh checkerbloom for resources, so their net benefit is unknown.

(a) **(b)**

FIGURE 1. Photos of Kenwood Marsh checkerbloom (a) vegetative plant and (b) flowers. Photos by Kate Symonds (left) and Josh Hull (right).

TABLE 1. Populations of Kenwood Marsh checkerbloom (*Sidalcea oregana* ssp. *valida*).

EO[1]	Population	Status	Last Monitored	Ownership	Parcel[2]	Land use category[3]
1	Deerfield Ranch Winery	Extant, but low numbers	2019[4]	Private	050-240-32	Industrial - Winery
1	Kenwood Marsh-West	Unknown	1998[1]	Private	050-240-06	Agricultural - Pasture
2	Knights Valley	Unknown	2001[5]	Private	120-110-12	Agricultural - Vineyard

[1] Element Occurrence, (CNDDB 2019)
[2] Assessor's Parcel Number
[3] Taken from county parcel ownership data
[4] (La Rosa, pers. obs. 2019)
[5] (Cooley, in litt. 2001)

C. HABITAT NECESSARY FOR SPECIES SURVIVAL

Kenwood Marsh checkerbloom occurs on the edges of freshwater marshes (Munz and Keck 1959) and does not persist in areas that are inundated for extended periods (USFWS 2013). It currently exists in pockets of habitat surrounded by vineyards that were planted or expanded in the 1990s. The three Kenwood Marsh checkerbloom populations are recorded as two occurrences in the CNDDB, one occurrence (two populations) in Kenwood Marsh and one occurrence (one population) in Knights Valley (Table 1; CNDDB 2019).

i. VEGETATION COMMUNITIES

Sonoma County has not yet been mapped to species alliances using the California Vegetation Classification System (CNPS 2019a), but the Sonoma County Agricultural Preservation & Open Space District produced a fine scale vegetation and habitat map of Sonoma County which identified vegetation types using the National Vegetation Classification System (NVCS) and a combination of landscape imagery from 2013 and ground truthing (SCAPOSD 2017). The habitat types that were identified in the vicinity of Kenwood Marsh checkerbloom populations were classified to the scale of macrogroups, which are vegetation classifications of intermediate rank that are defined by a combination of diagnostic plant species that can reflect regional differences (FGDC 2008). The three Kenwood Marsh checkerbloom populations are at the interface of the Western North American Freshwater Marsh Macrogroup and the California Annual and Perennial Grassland Vegetation Macrogroup, a combination that is relatively uncommon in the county (Modeled Species Habitat, Fig. 2). Suitable habitat for Kenwood Marsh checkerbloom within Sonoma County based on vegetation type was modeled by Habitat Conservation Planning Branch staff. Suitable species habitat was defined as Western North American Freshwater Marsh Macrogroup that is adjacent to, and within 30.5 m (100 ft) of, California Annual and Perennial Grassland Macrogroup. The total modeled species habitat was 973 ha (2404 acres) (Fig. 2), which is only about 0.23% of the total area of Sonoma County.

Other naturally occurring NVCS vegetation types within approximately 100 m (328 ft) of all of the populations are the *Quercus lobata* Alliance, the Vancouverian Riparian Deciduous Forest Group, and either the Southwestern North American Riparian Evergreen and Deciduous Woodland Group or the Southwestern North American Riparian/Wash Scrub Group. Groups describe sets of diagnostic plants more narrowly defined than macrogroups, and alliances are narrower still (FGDC 2008).

Broadly, the species associated with the Kenwood Marsh checkerbloom have likely shifted over the past 40 years from changes in hydrology, adjacent land use, and grazing regime. The subpopulations within the Deerfield Ranch Winery population also differ in soil moisture and light availability. The associated species that have been observed with one or more populations since the time of listing include: creeping St. John's wort (*Hypericum anagalloides*), hardstem bulrush (*Schoenoplectus acutus* var. *occidentalis*), Himalayan blackberry (*Rubus armeniacus*), pennyroyal (*Mentha pulegium*), rush (*Juncus* sp.), sedges (*Carex* spp.), slough sedge (*Carex obnupta*) or valley sedge (*Carex barbarae*), smartweed (*Polygonum* sp.), sneezeweed (*Helenium puberulum*), teasel (*Dipsacus* sp.), velvetgrass (*Holcus lanatus*), and willows (*Salix* spp.) including arroyo willow (*Salix lasiolepis*) (Guggolz and Guggolz 1986; USFWS 2007; USFWS 2009; CNDDB 2019; Symonds pers. comm. 2019; USFWS 2019).

ii. Geology and Soils

Both marshes that support Kenwood Marsh checkerbloom overlay relatively young geological substrates from the Pleistocene Epoch of the Quaternary Period that are less than two million years old (CDOC 2010). The underlaying rock is composed of deposits of sandstone, shale, gravel, and other alluvial deposits from ancient bodies of water (CDOC 2010). Figure 2 overlays the potential suitable habitat of Kenwood Marsh checkerbloom based on vegetation type with the geologic deposits that are associated with the known sites (Appendix A). The overlap of these two components, vegetation and geology, predict the areas that might support Kenwood Marsh checkerbloom or be suitable for reintroductions.

The soils of both marshes share characteristics of texture, mixing, and cation activity (Appendix B). The soil series Huichica and Los Robles that underlie Kenwood Marsh and Knights Valley, respectively, are both described as having fine-loamy texture with mixed topsoil and superactive cation activity (Soil Survey Staff 2019).

iii. Climate and Hydrology

Kenwood Marsh checkerbloom grows in a Mediterranean climate that is characterized by hot, dry summers and cool, wet winters. Based on 30 years of temperature and precipitation data between 1981-2010, gathered from local weather stations near the natural populations, the estimated annual rainfall total is between 89-104 cm (35-41 in) (PRISM Climate Group 2004). The estimated monthly average high/low temperatures range from 13.9°/3.3°C (57°/38°F) in December and January to 31.1°/12.2°C (88°/54°F) in July (PRISM Climate Group 2004). Plants bloom June-September during the driest months of the year when the average monthly rainfall is less than 1 cm (0.4 in) and the average high/low temperature is 30.0°/11.7°C (86°/53°F).

Kenwood Marsh checkerbloom occurs around 120 m (400 ft) elevation (Hill 2012) in areas that are gently sloped (1-5 degrees) (Esri 2019), and where water runoff and permeability is typically slow (Soil Survey Staff 2001, 2003). In 1993, the State Water Resources

Control Board, Division of Water Rights determined that Kenwood Marsh was fed by both surface and groundwater flows (Turner 1993; Wilcox, in litt. 1994). An unnamed stream that fed into Kenwood Marsh was susceptible to water diversions for agricultural purposes (e.g., irrigating vineyards) and had sometimes been diverted to the point that the streambed was a dry channel (Turner 1993). The source of water that feeds the marsh in Knights Valley, where the Kenwood Marsh checkerbloom is also recorded, remains unknown.

IV. DISTRIBUTION AND ABUNDANCE

A. RANGE AND DISTRIBUTION

The first collection of Kenwood Marsh checkerbloom was from Knights Valley and was described by William H. Brewer in 1861, and later named by Edward L. Greene (1897). The three populations of Kenwood Marsh checkerbloom are all at around 120 m (400 ft) in elevation, but the possible range of suitable elevations is unknown because the original extent of the species range is not known. Given that the populations occur on sandstone and alluvial deposits, Kenwood Marsh checkerbloom may be restricted to low elevation sites with a geologic history as ancient seabed.

The range of Kenwood Marsh checkerbloom is extremely small. The species is restricted to Sonoma County and is known from only two locations: Kenwood Marsh near Kenwood, CA, and Knights Valley near Kellogg, CA which is about 29 km (18 mi) northwest of Kenwood Marsh. Kenwood Marsh once covered a much larger area, but the growth of the town of Kenwood and the expansion of vineyards west of town drastically reduced the habitat for Kenwood Marsh checkerbloom over the past 70 or more years. The two small populations at Kenwood Marsh are on adjacent privately-owned parcels with different owners. The population at Knights Valley is less than 0.1 ha (0.25 acre) in area (USFWS 2009) and is also privately owned.

TABLE 2. Deerfield Ranch Winery subpopulations of Kenwood Marsh checkerbloom (*Sidalcea oregana* ssp. *valida*) (Symonds, pers. comm. 2020).

Subpopulation	Flowering plants in 2019	Light	Type	Notes
Road	16	Full sun	Natural	Unknown number of immature plants present.
Willow	0	Shaded	Natural	No longer supports Kenwood Marsh checkerbloom
#3	0	Shaded	Introduced	Mimics surrounding vegetation of “Willow” subpopulation.
#4	0	Full sun	Introduced	Mimics surrounding vegetation of “Road” subpopulation.

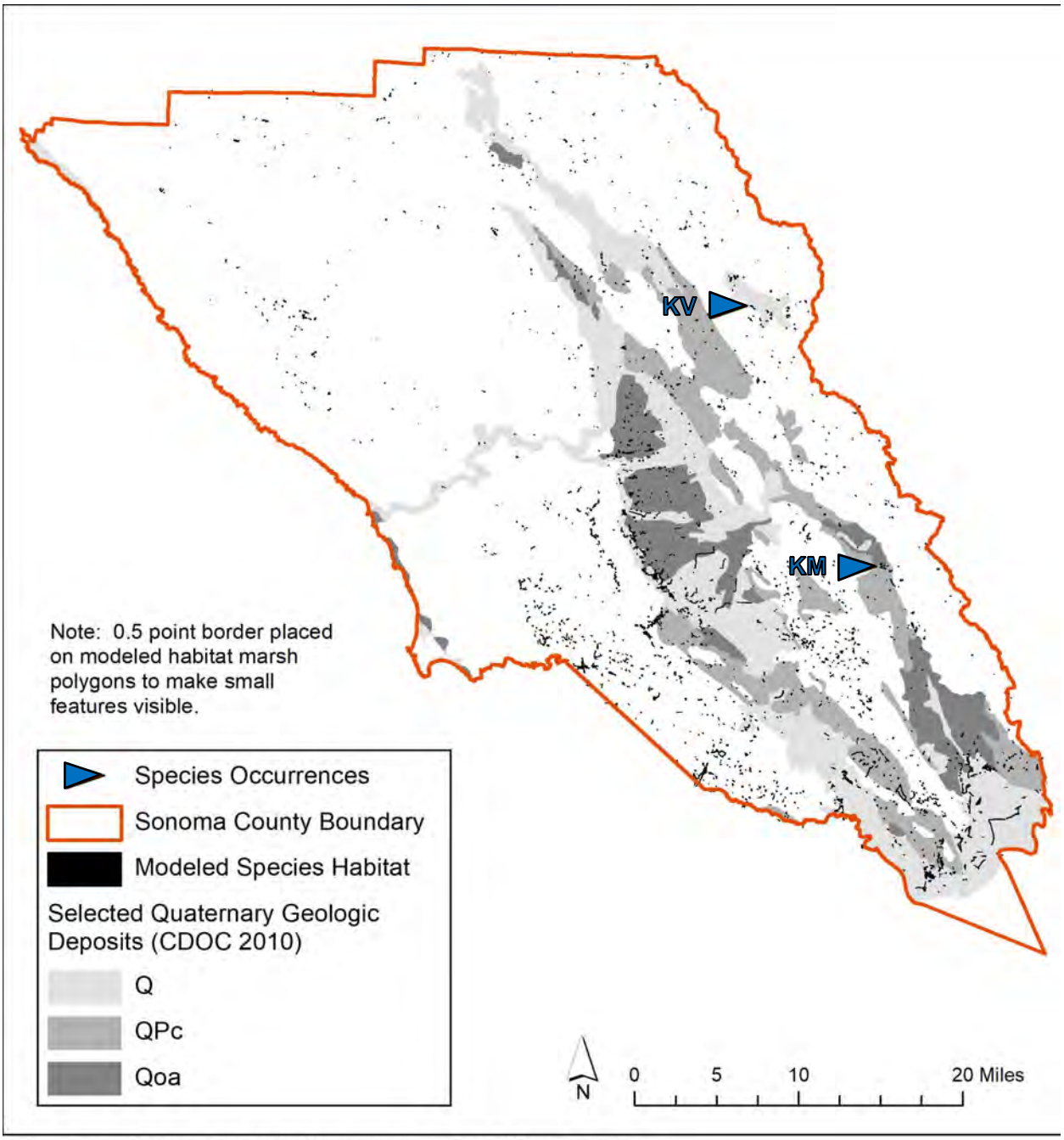

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FIGURE 2. **Modeled suitable habitat for Kenwood Marsh checkerbloom in Sonoma County**. Potential suitable habitat was modeled by CDFW based on the vegetation types and geologic substrates associated with Kenwood Marsh checkerbloom. Black represents portions of Western North American Freshwater Marsh Macrogroup vegetation that is within 30.5 m (100 ft) of adjacent California Annual and Perennial Grassland Macrogroup vegetation. A 0.5 point border was added to all patches to make small features visible. Shades of gray represent types of geologic deposits that are associated with the known sites (Appendix A). The overlap of these two layers, vegetation and geology, predict the areas that might best support Kenwood Marsh checkerbloom, or be suitable for reintroductions. Kenwood Marsh (KM) and Knights Valley (KV) are identified by blue arrows.

The distribution of Kenwood Marsh checkerbloom is documented within the California Natural Diversity Database (CNDDB). The CNDDB documents “elements,” which are plant or animal taxa, or natural communities that are of conservation concern within California. For plants, an “element occurrence” (EO) is a location record for a site which contains an individual, population, or “colony” of a special status element. Populations, individuals, or colonies that are located within 1/4 mile of each other generally constitute a single occurrence (Bittman 2001).

There are currently two occurrences of Kenwood Marsh checkerbloom that are documented in the CNDDB; however, one of these occurrences consists of two separately mapped parts. To make it easier to refer to the different occurrences and their parts in this species review, each occurrence or part of an occurrence has been named as a separate “population” in Table 1 and below. Kenwood Marsh is the element occurrence (EO 1) containing two populations and Knights Valley (EO 2) contains one population, for a total of three populations. The full known distribution of the species is displayed in Figure 3, and the three populations are described in more detail below.

- *Deerfield Ranch Winery* (extant) – this is the southernmost population on record and occurs in Kenwood Marsh on private property in the Kenwood U.S. Geological Survey 7.5-minute topographic quadrangle. There are herbarium collections dating back to 1927, presumably before much of Kenwood Marsh was developed for vineyards and housing. The last voucher specimen was collected in 1998. The population of Kenwood Marsh checkerbloom at this site is fenced and actively managed. In 2009, there were four subpopulations at this site (Table 2). Two of these subpopulations were natural; one was near the road in a clearing (“Road”, Fig. 4) and the other was about 50-80 m (165-265 ft) to the north among small willows (“Willow”). Two additional subpopulations were created in April 2009, one in the willows (“#3”) and one in open sun (“#4”), mimicking the two natural subpopulations (Symonds, pers. comm. 2019). The #4 subpopulation did not last more than a year, and by 2019, the other reintroduced subpopulation, #3, no longer supported any plants. As early as 2015, the natural patch in the willows appeared to be extirpated, so by 2019, the Road subpopulation was all that remained at Deerfield Ranch Winery.

- *Kenwood Marsh-West* (presumed extant) – this site is located about 400 m (0.25 mi) north-northwest of Deerfield Ranch Winery, and also in the Kenwood U.S. Geological Survey 7.5-minute topographic quadrangle. It is on private property and has not been monitored in over 15 years; its current status is unknown, but until the site can be surveyed, it is presumed to be extant.

- *Knights Valley* (presumed extant) – this is the northernmost population on record and occurs northwest of Calistoga, CA on private property in an area known as Knights Valley. The population is mapped within the Mount St. Helena U.S. Geological Survey 7.5-minute topographic quadrangle. There are herbarium collections dating back to 1890, with additional collections in 1979, 1984, and most recently, in 1998. This site was last surveyed in 2001.

Based on satellite images, the wetlands where the three populations are known have not been developed or converted, but without updated plant or hydrological surveys of the areas, it is not possible to determine if changes in hydrology or other threats have led to a change in the plant community, and to the extirpation of Kenwood Marsh checkerbloom in two of the three populations.

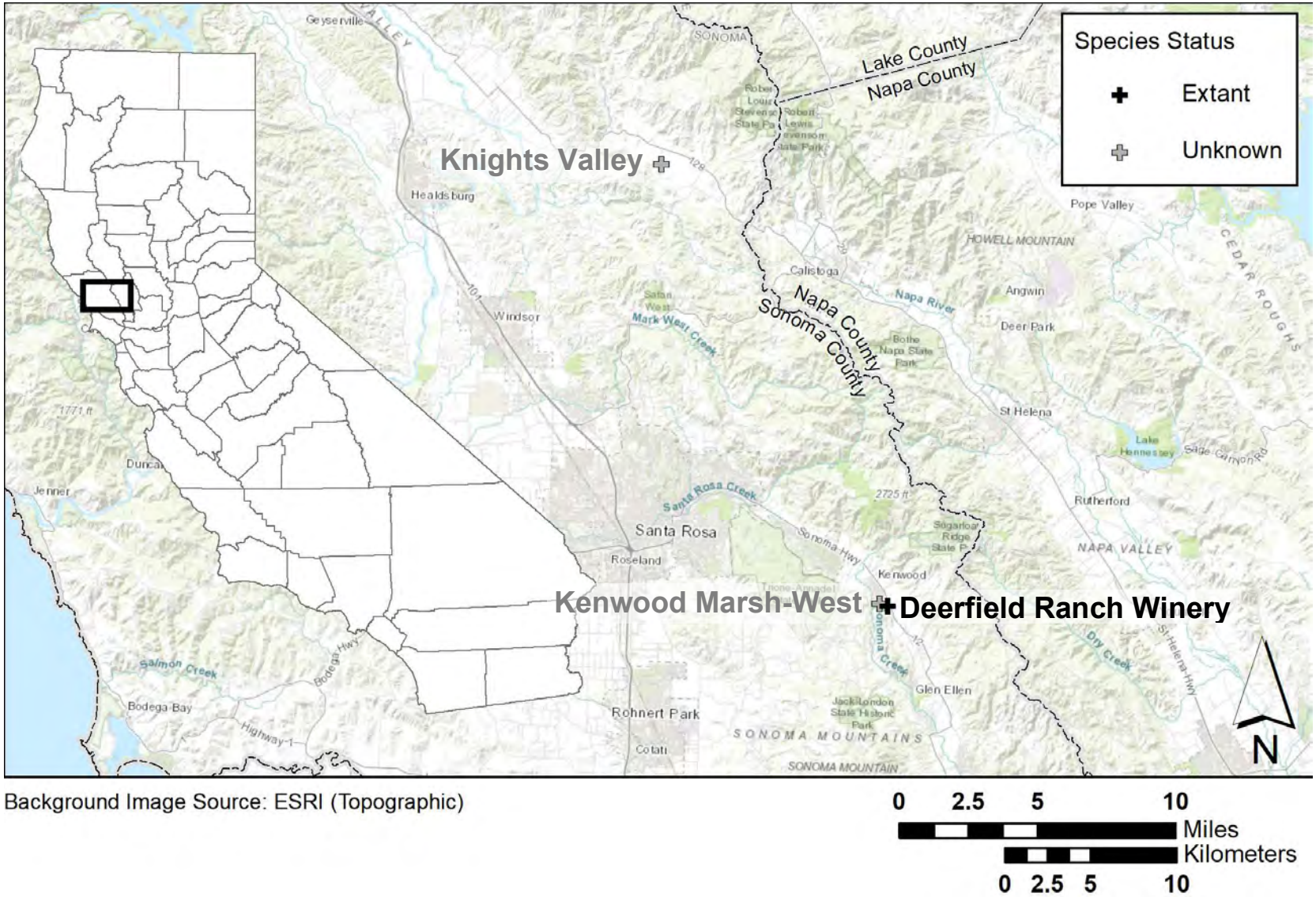

FIGURE 3. **Distribution and range map of Kenwood Marsh checkerbloom.** The only confirmed extant population is shown in black and populations of unknown status (presumed extant) are shown in gray.

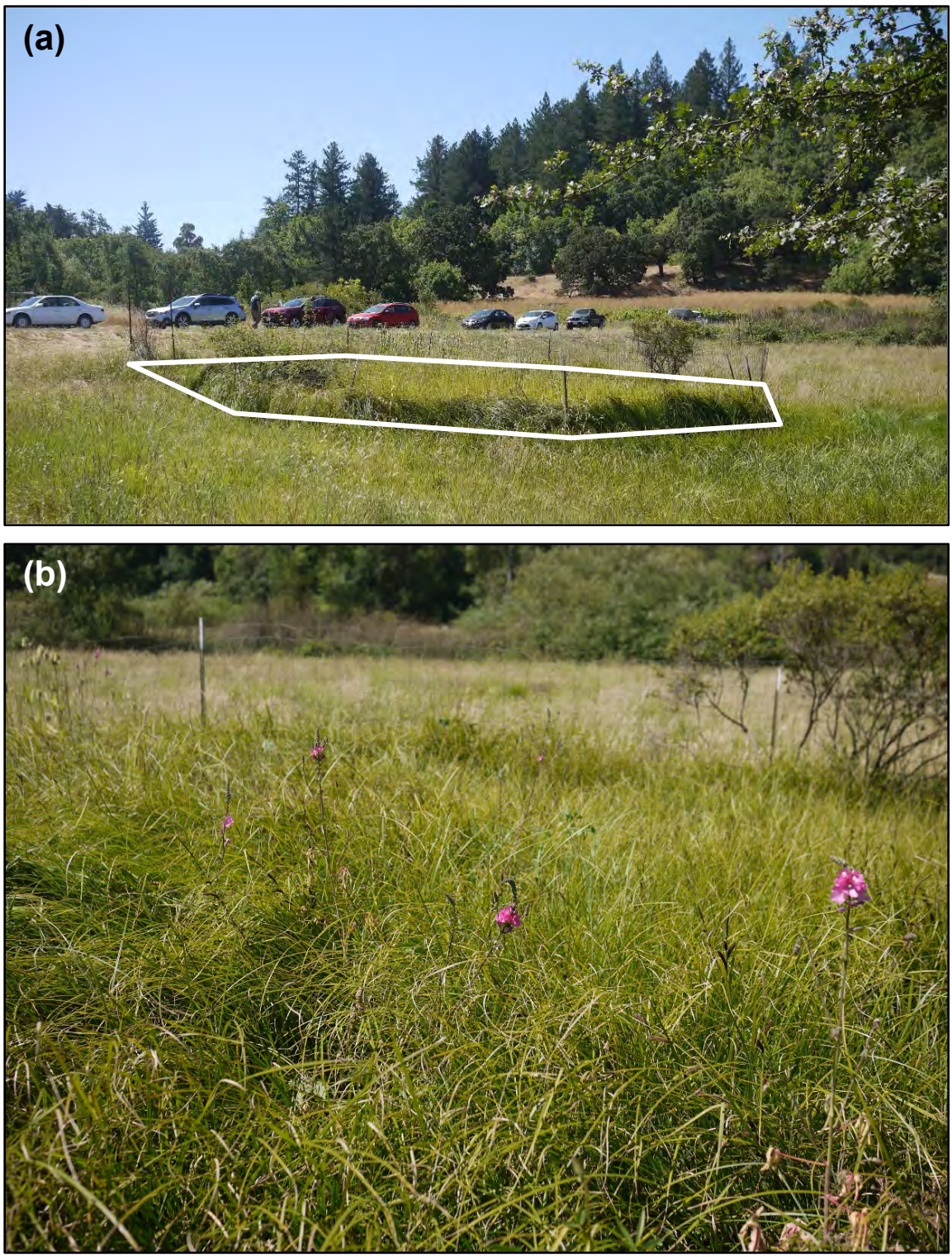

FIGURE 4. Photos of the Road subpopulation at Deerfield Ranch Winery showing (a) the fenced enclosure protecting the only known extant patch, and (b) a closer view into the enclosure showing Kenwood Marsh checkerbloom in bloom surrounded by sedges (*Carex* spp.)**.** Photos by R. La Rosa.

B. POPULATION TREND AND ABUNDANCE

The periodic monitoring of Kenwood Marsh checkerbloom at Deerfield Ranch Winery and Knights Valley since 1981 shows fluctuating populations, but the way in which population sizes were estimated sometimes differed between years (Appendix C). Because Kenwood Marsh checkerbloom is a long-lived perennial with a large root stock, it can produce many stems each year, which each have branching inflorescences, so flower number per stem can vary greatly. Kenwood Marsh checkerbloom often grows among thick vegetation, making it difficult to determine which stems are growing from a common root base to identify individual plants. Plant surveyors have also been hesitant to get too close to plants for fear of trampling young plants (Symonds, pers. comm. 2019). Consequently, plant censusing across years has not been consistent and has sometimes estimated population size using different "currencies," such as number of genetic individuals, stem number, or number of blooming branch tips. This makes it difficult to compare population estimates across years to identify population trends. In the most recent survey of the single extant subpopulation in 2019, there were 16 flowering individuals, which was fewer than in previous years (Symonds, pers. comm. 2020). Deerfield Ranch Winery is the only site that has been monitored in any of the past 18 years; there is no information on population trends or abundance for the other two populations. Because the condition of the other two populations is unknown, they are presumed extant, but that is unconfirmed.

There is no genetic information from this species to give any indication of its genetic variability and its ability to adapt to changing environmental conditions. It is also unknown how much gene flow occurred between the two populations in Kenwood Marsh (Deerfield Ranch Winery and Kenwood Marsh-West), and whether or not they are one interbreeding population.

V. THREATS AND SURVIVAL FACTORS

A. FACTORS AFFECTING ABILITY TO SURVIVE AND REPRODUCE

At the time of listing in 1982, the threat to Kenwood Marsh checkerbloom was identified as modification and/or destruction of habitat (i.e., conversion of land to vineyards and urbanization). After its listing, the Department identified additional threats to the species in the first five-year species review (CDFG 1987), including cattle grazing and trampling, and competition. For this review in 2020, the Department has identified additional threats, including: human-related activities (e.g., climate change, mowing, and wildfire), predation (i.e., herbivory), competition from invasive species, and random events that pose a threat to species with small populations. Explanations of how these factors threaten Kenwood Marsh checkerbloom's survival are described below.

- *Present or threatened modification or destruction of its habitat* – Conversion of land to agriculture (i.e., viticulture) (CDFG 1981) was an immediate threat to Kenwood Marsh checkerbloom when it was listed in 1982. The area that supported habitat for Kenwood Marsh checkerbloom became increasingly fragmented as it was quickly being converted into vineyards. This conversion of land continues to threaten the survival of Kenwood Marsh checkerbloom, both directly and indirectly. At least two populations are now landlocked and surrounded by vineyards or reservoirs. Lack of adequate habitat adjacent to the current populations diminishes the chances of Kenwood Marsh checkerbloom expanding beyond its current restricted habitat.

In October 2019, the Kincade Fire burned 77,758 acres of Sonoma County, including the entire marsh in Knights Valley where Kenwood Marsh checkerbloom was most recently documented in 2001. It is not known how dry the marsh was leading up to the fire, the intensity of the fire (i.e., how hot it burned), or if Kenwood Marsh checkerbloom root stock or seeds were harmed. It is not known if Kenwood Marsh checkerbloom might benefit from periodic burns to also remove competing vegetation or buildup of dead plant material.

- *Herbivory* – Herbivores can pose a threat to Kenwood Marsh checkerbloom. The most likely herbivores were identified as: deer (*Odocoileus* sp.), slugs (several genera in the Phylum *Mollusca*), snails (*Helix aspersa*), spittle bugs (Family *Cercopidae*), and small rodents such as California voles (*Microtus californica*) (USFWS 2009; Symonds, pers. comm. 2019). These herbivores become a particular threat if a population is fenced, and the vegetation within the exclosure is not properly managed. Dense, overgrown vegetation has the potential to further attract the herbivores listed above.

- *Human-related activities* – In 1987, threats to the hydrology of the regions around the three Kenwood Marsh checkerbloom populations was identified in the Department's five-year species review (CDFG 1987). Because Kenwood Marsh checkerbloom is reliant on fresh water, the modification of regional hydrology through water diversion and wells can have devastating effects on populations. A private reservoir was built adjacent to the Knights Valley population sometime between 1993 and 2004, based on aerial photographs (UCSB 2019). The long-term effects of this reservoir on the adjacent marsh is not known, but it may be diverting water from the marsh.

  The landowner of Deerfield Ranch Winery fenced the Kenwood Marsh checkerbloom population around 2000 to protect it from the threat of mowing or other accidental destruction. There is no longer cattle grazing at Deerfield Ranch Winery (USFWS 2009), but it is unknown if there is currently grazing, or future plans to graze Knights Valley or Kenwood Marsh-West.

  Kenwood Marsh checkerbloom is susceptible to environmental changes associated with climate change (e.g., changes in temperature ranges and increased drought). The Climate Change Vulnerability Index (CCVI) quantifies the vulnerability of a species under current climate change models, using information on the needs of a species, its range, life history, and ecology (NatureServe 2016). Kenwood Marsh checkerbloom is rated as "Extremely Vulnerable" (CDFW 2019), meaning its "abundance and/or range are extremely likely to substantially decrease or disappear by 2050" (NatureServe 2016). The factors that greatly increase the vulnerability of Kenwood Marsh checkerbloom are: natural and anthropomorphic barriers (e.g., hills, dry upland habitat, and vineyards) that restrict the species' ability to shift its range in response to climate change; low dispersal, which limits the distance the species can move per generation; and a narrow physiological hydrological niche, because the species is restricted to wetlands and highly sensitive to drought (CDFW 2019). Other factors that increase its vulnerability are: low historical mean temperature variation (i.e., annual temperature range) of 9.4°C (49°F), which suggests Kenwood Marsh checkerbloom may not be well adapted to changes in climate; an historical hydrological niche, of very little variation in rainfall across the range (mean = 94 cm (37 in), st. dev. = 6.7 cm (2.6 in)); competition from other plant species; and reliance on pollinators for sexual reproduction.

- *Other natural occurrences* – With such small population sizes, confined to very small areas, Kenwood Marsh checkerbloom is highly vulnerable to random events. In 2012 rodents were likely responsible for the destruction of many reproductive stalks, reducing the population's ability to produce seed. Documented random events that have or may have negatively affected the natural population include rodent outbreaks, extended periods of inundation, and wildfire. Small populations are also susceptible to inbreeding depression, which results in low genetic variation and the potential inability to adapt to environmental changes (Ellstrand and Elam 1993). The ability to adapt is crucial in the face of climate change.

- *Competition* – Kenwood Marsh checkerbloom competes with dense surrounding vegetation for resources such as sunlight, soil moisture, and soil nutrients. Depending on the site, Kenwood Marsh checkerbloom competes with invasive species like velvetgrass (*Holcus lanatus*), Himalayan blackberry (*Rubus armeniacus*), and pennyroyal (*Mentha pulegium*). Kenwood Marsh also supports dense patches of sedges (*Carex* spp.) and common tule (*Schoenoplectus acutus* var. *occidentalis*), which were listed as a threat to the species in 1987.

B. Degree and Immediacy of Threats

Threats faced by Kenwood Marsh checkerbloom have increased since this species was placed on the list of endangered species in 1982. This species remains in extreme danger of extinction. Without continued protection of the natural populations, and management through recovery projects, Kenwood Marsh checkerbloom could become extinct at any time. Competition from dense surrounding vegetation, changes in hydrology from viticulture and climate change, loss of genetic diversity due to population reductions, and random events are likely the greatest threats to Kenwood Marsh checkerbloom. Timing and outcome of some of these types of threats are, by nature, unpredictable and require diligent monitoring and management actions to reduce the risk of extinction.

VI. MANAGEMENT AND RECOVERY

A. Impact of Existing Management Efforts

Management efforts have been undertaken only at Deerfield Ranch Winery. This management consisted of fencing subpopulations, collecting and storing seeds for long-term conservation, reducing dead plant material, and reintroducing cultivated plants to create new subpopulations. Funding to continue these activities has not been secured, and any management efforts are being conducted on a voluntary basis.

Current and past management efforts are described in more detail below.

i. Erecting Fence Exclosures

In 2000, the private landowner at Deerfield Ranch Winery fenced the two small subpopulations of Kenwood Marsh checkerbloom that were growing on the property (USFWS 2009). Fenced exclosures protect the species from human activities (e.g., mowing) and from grazing by large wildlife and livestock; however, fencing subpopulations also requires continued management to prevent a buildup of thatch and overgrown vegetation (see *ii.* below).

ii. REMOVAL OF THATCH

After the Road subpopulation at Deerfield Ranch Winery was fenced, thatch buildup became an issue because plant material could not be removed by other means (e.g., grazing or mowing). It built up over time, making it difficult for seedlings to become established. Current management is provided by the landowner and a team of volunteers, which visit the population annually to carefully remove dead plant material from around the Kenwood Marsh checkerbloom individuals. The thick layer of thatch is removed completely from the fenced exclosure. Anecdotally, removing thatch increases the number of seedlings (Symonds, pers. comm. 2020), benefitting the subpopulation. The subpopulation is too small to have control plots where thatch is left intact for an experimental comparison. The thatch removal occurs in the spring when plants are beginning to (re)sprout.

iii. CONSERVATION SEED STORAGE

In 2001, 2007, 2008, 2009 and 2018, about five percent or less of total seeds were collected by the Department, USFWS, or K. Symonds (CESA permit 2081(a)-09-04-RP) for the preservation of Kenwood Marsh checkerbloom (USFWS 2009; RSABG 2019; Symonds, pers. comm. 2019). Seeds were collected from Deerfield Ranch Winery and Knights Valley in 2001 and from only Deerfield Ranch Winery in subsequent years. The seeds are stored at Rancho Santa Ana Botanic Garden (RSABG) and the University of California Botanical Garden (UCBG) for long-term conservation. Some seeds from the 2007 collection were used for reintroduction efforts (see *iv* below) and were germinated by UCBG for reintroduction activities (USFWS 2009; Symonds, pers. comm. 2019). Seeds may also be stored by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS), but the NRCS could not confirmation this.

iv. REINTRODUCTION OF PLANTS AT KENWOOD MARSH (2004-PRESENT)

Beginning in 2004, efforts to protect the population of Kenwood Marsh checkerbloom growing in Kenwood Marsh were undertaken through a collaboration between the private landowner, the USFWS, NRCS, and the Department. A Wildlife Extension Agreement between the landowner and USFWS was signed in 2007 with a cost-sharing agreement and conservation plan in place. As part of the agreement, a permanent conservation easement was recorded in April 2007. Prior to this agreement, the landowner had fenced the two subpopulations that occurred on the property.

Two reintroduced subpopulations were outplanted through a Wildlife Extension Agreement. A grant from the Partnership Program in 2007 allowed for plants to be grown at UCBG and outplanted into two new sites at Deerfield Ranch Winery in April 2009 with permission from the private landowner. The two natural sites differed in soil moisture, associated plants, and light levels (USFWS, in litt. 2008a); the two new small outplanting sites were chosen to mimic one of each of the natural sites (Table 2). The new subpopulations were fenced, and 13 mature individuals were planted into the wetter, shaded, #3 site, and nine were planted into the drier, full sun, #4 site.

These sites were monitored for ten years. The drier, full sun subpopulation (#4) failed to establish after just one year, likely due to the very wet winter in 2009-2010 (Symonds, pers. comm. 2020). The wetter, low light subpopulation (#3) had very large plants with large leaves for many years, but declined to zero by 2019. Symonds (pers. comm. 2020) hypothesized this was because the surrounding willows grew much larger and the site became too shady to support the subpopulation. In 2019, only the Road subpopulation supported Kenwood Marsh checkerbloom. The Wildlife Extension Agreement expired in

2017, but the landowner has continued conservation efforts on the property with help from local volunteers and non-profit organizations.

B. Recommendations for Management Activities and Other Recommendations for Recovery of the Species

The Department's recommendations for management and recovery of Kenwood Marsh checkerbloom begin with the continued preservation of the current natural populations through monitoring activities and promotion of recruitment of plants into the population. Recovery of Kenwood Marsh checkerbloom is dependent on reintroductions into the historical range of the species to boost the number of individuals and occurrences. Recommendations include:

- Continue outreach efforts to the private landowners in the historical range of Kenwood Marsh checkerbloom for permission to survey the remaining populations and to discuss employing tools such as Safe Harbor Agreements (Fish and G. Code § 2089.2 et seq.) to incentivize recovery and conservation of the species.
- Coordinate with other resource agencies and organizations to establish a formal recovery team to support the recovery efforts that began with a 10-year Wildlife Extension Agreement through the USFWS in 2007 (USFWS 2009). The USFWS is in the process of developing a recovery plan for the species (Bainbridge, pers. comm. 2019b).
- Continue collecting seeds following protocols that consider genetic diversity and rarity (e.g., RSABG 2009) and place them in long-term conservation storage at Department-approved facilities.
- Conduct research into developing habitat management techniques that improve the longevity and reproductive success of existing mature plants, and provide habitat for the successful establishment of seedlings.
- Conduct a genetic analysis of the natural population in Kenwood Marsh, and others if possible, to quantify current genetic diversity, providing the most scientifically-grounded information for making decisions about management actions. It is critical to preserve genetic diversity of the species to increase its chances of adapting to environmental changes (i.e., climate change). Care should be taken when collecting tissue for such genetic studies, seeking techniques that minimize impacts to the natural population. Additionally, understanding the genetics of the cultivated stock will facilitate recovery efforts to promote genetic diversity in any new introduced populations.
- Consider expanding the natural population by planting seedlings that have been cultivated from wild-collected seeds. However, all proposals should strongly weigh the risk of unintended introductions of pathogens or other factors that may negatively affect the current highly vulnerable population.
- Promote educational outreach to the communities in the range of Kenwood Marsh checkerbloom to promote botanical surveys. Model habitat criteria to identify possible suitable habitat in the vicinity of Kenwood Marsh and Knights Valley, then survey to locate new occurrences that may have gone undetected. Additionally, post-fire surveys of areas that were previously surveyed will be important to understand the effects of wildfire on Kenwood Marsh checkerbloom.

VII. RECOMMENDATION TO THE COMMISSION

Pursuant to Fish and Game Code, section 2077, the Department has prepared this Five-Year Species Review based upon the best scientific information available to the Department to determine if conditions that led to the original listing are still present. Based on this Five-Year Species Review, the Department submits the following recommendation to the Commission:

In completing this Five-Year Species Review for Kenwood Marsh checkerbloom, the Department finds there is sufficient scientific information to indicate that the conditions that led to the listing of Kenwood Marsh checkerbloom as endangered are still present, and recommends no change to the status of Kenwood Marsh checkerbloom on the list of endangered species at this time.

VIII. Sources

A. LITERATURE CITED

ANDREASEN, K, B. G. BALDWIN. 2003. Reexamination of relationships, habital evolution, and phylogeography of checker mallows (*Sidalcea*; Malvaceae) based on molecular phylogenetic data. American Journal of Botany 90: 436-444.

ASHMAN, T-L., M. STANTON. 1991. Seasonal variation in pollination dynamics of sexually dimorphic *Sidalcea oregana* ssp. *spicata* (Malvaceae). Ecology 72: 993-1003.

BITTMAN, R. 2001. The California Natural Diversity Database: A natural heritage program for rare species and vegetation. Fremontia 29: 3-4.

CDOC (CALIFORNIA DEPARTMENT OF CONSERVATION). 2010. California Geologic Survey: Geological map of California. http://maps.conservation.ca.gov/cgs/gmc/ [Accessed: 13 December 2019].

CDFG (CALIFORNIA DEPARTMENT OF FISH AND GAME. 1981. Proposed list of endangered or rare plants. Delivered to the Fish and Game Commission on August 4, 1981. Decision on November 4, 1981. The Resources Agency, Sacramento, CA.

CDFG (CALIFORNIA DEPARTMENT OF FISH AND GAME. 1987. A recommendation to the California Fish and Game Commission: five year review of Kenwood Marsh checkerbloom (*Sidalcea oregana* ssp. *valida*). The Resources Agency, Sacramento, CA.

CDFW (CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE). 2019. Climate change vulnerability assessment for Kenwood Marsh checkerbloom (*Sidalcea oregana* ssp. *valida*) using the NatureServe Climate Change Vulnerability Index. Release 3.02.

CNDDB (CALIFORNIA NATURAL DIVERSITY DATABASE). 2019. Rarefind 5 [Internet]. California Department of Fish and Wildlife. [Accessed: 5 July 2019].

CNPS (CALIFORNIA NATIVE PLANT SOCIETY). 2019a. A Manual of California Vegetation, Online Edition. California Native Plant Society, Sacramento, CA. http://www.cnps.org/cnps/vegetation/ [Accessed: 29 October 2019].

CNPS (CALIFORNIA NATIVE PLANT SOCIETY). 2019b. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). Rare Plant Program. http://www.rareplants.cnps.org [Accessed: 3 December 2019].

ELLSTRAND N. C. AND D. R. ELAM. 1993. Population genetic consequences of small population size: implications for plant conservation. Annual Review of Ecology and Systematics 24: 217-242.

ESRI. 2019. Terrain: Slope in Degrees [GIS layer]. https://elevation.arcgis.com/arcgis/rest/services/WorldElevation/Terrain/ImageServer.

FGDC (FEDERAL GEOGRAPHIC DATA COMMITTEE). 2008. National vegetation classification standard, version 2. FGDC-STD-005-2008. Vegetation Subcommittee, FGDC Secretariat, U.S. Geological Survey, Reston, VA.

GREENE, E. L. 1897. Pittonia. A Series of Botanical Papers. Washington, D. C. April-July, 1897. New or Noteworthy Species—XVIII. Payot, Upham & Co., San Francisco, California.

GUGGOLZ, B. AND J. GUGGOLZ. 1986. California Native Species Field Survey Forms for *Sidalcea oregana* ssp. *valida*. Managed by the California Natural Diversity Database.

HILL, S. R. 2012. Malvaceae Mallow Family, in The Jepson Manual: Vascular Plants of California, 2nd edition. University of California Press. Berkeley, California. p. 894.

NATURESERVE. 2016. Climate Change Vulnerability Index. Release 3.02. Available online at http://www.natureserve.org/conservation-tools/climate-change-vulnerability-index. [Accessed: 16 December 2019].

MUNZ, P. A., D. D. KECK. 1959. A California Flora. University of California Press. Berkeley, California.

PRISM CLIMATE GROUP. 2004. Oregon State University. http://prism.oregonstate.edu. [Accessed: 7 November 2019].

RSABG (RANCHO SANTA ANA BOTANIC GARDEN). 2009. Seed collection guidelines for California native plant species. [Retrieved on 19 February 2020 from https://www.rsabg.org/conservation/seed-conservation].

RSABG (RANCHO SANTA ANA BOTANIC GARDEN). 2019. Online Seed List Jan 2019. [Retrieved on 4 November 2019 from https://www.rsabg.org/conservation/seed-conservation].

SCAPOSD (SONOMA COUNTY AGRICULTURAL PRESERVATION & OPEN SPACE DISTRICT). 2017. Vegetation - Sonoma County [ds2691]. Biogeographic Information and Observation System (BIOS). California Department of Fish and Wildlife. [Retrieved: 4 November 2019 from http://bios.dfg.ca.gov].

SOIL SURVEY STAFF. 2001. Official Soil Series Descriptions (Los Robles Series). Natural Resources Conservation Service, United States Department of Agriculture. Available at https://soilseries.sc.egov.usda.gov/OSD_Docs/L/LOS_ROBLES.html. [Accessed: 7 November 2019].

SOIL SURVEY STAFF. 2003. Official Soil Series Descriptions (Huichica Series). Natural Resources Conservation Service, United States Department of Agriculture. Available at https://soilseries.sc.egov.usda.gov/OSD_Docs/H/HUICHICA.html. [Accessed: 7 November 2019].

SOIL SURVEY STAFF. 2019. Web Soil Survey. Natural Resources Conservation Service, U. S. Department of Agriculture. http://websoilsurvey.nrcs.usda.gov [Accessed: 29 October 2019].

TURNER, J. L. 1993. "Kenwood Winegrowers Permit 20359 (Application 29292), Effects of Water Diversion from unnamed stream on the endangered plant Kenwood Marsh checkerbloom (Sidalcea oregana ssp. valida), Sonoma County" [Memorandum]. 24 February 1993. Environmental Services Division, California Department of Fish and Game.

UCSB (UNIVERSITY OF CALIFORNIA SANTA BARBARA). 2019. Special Research Collections, Aerial Photographs. https://www.library.ucsb.edu/src/airphotos. [Accessed: 22 January 2020].

USFWS (U. S. FISH AND WILDLIFE SERVICE). 2007. Notes by K. Symonds on Kenwood Marsh 16 May 2007 field visit on. Written 13 August 2007.

USFWS (U. S. FISH AND WILDLIFE SERVICE). 2009. 5-Year Review: *Sidalcea oregana* ssp. *valida* (Kenwood Marsh checkermallow). 15 pp. https://ecos.fws.gov/docs/five_year_review/doc2603.pdf

USFWS (U. S. FISH AND WILDLIFE SERVICE). 2012. Report by K. Symonds on Kenwood Marsh checkerbloom 20 July 2012 count.

USFWS (U. S. FISH AND WILDLIFE SERVICE). 2013. Report by K. Symonds on Kenwood Marsh checkerbloom 23 July 2013 count. 2 pp.

USFWS (U. S. FISH AND WILDLIFE SERVICE). 2019. 5-Year Review, Kenwood Marsh checker-mallow (*Sidalcea oregana* ssp. *valida*). 7 pp. https://ecos.fws.gov/docs/five_year_review/doc6007.pdf

B. IN LITTERIS

CDFG (CALIFORNIA DEPARTMENT OF FISH AND GAME). 1999. Email exchanges between D. Hickson, A. Howald, and R. Bittman during 1-19 September 1999. Subjects: Kenwood Marsh checkerbloom and Sidalcea oregana valida.

COOLEY, G. 2001. Letter to Seed Program Manager at Rancho Santa Ana Botanic Garden accompanying two seed collections. Subject: Conservation seed collection of *Sidalcea oregana* ssp. *valida*. Includes population estimates for Deerfield Ranch Winery and Knights Valley. Sent on 18 September 2001.

USFWS (U. S. FISH AND WILDLIFE SERVICE). 2008a. Email from K. Symonds to E. Warne. Subject: Kenwood Marsh Partners project description. Sent on 10 June 2008.

USFWS (U. S. FISH AND WILDLIFE SERVICE). 2008b. Notes by E. Warne from a telephone conversation to K. Symonds. Subject: Kenwood Marsh checkerbloom counts from Deerfield Ranch Winery. 29 December 2008.

USFWS (U. S. FISH AND WILDLIFE SERVICE). 2008c. Notes by E. Warne from a telephone conversation from E. Parsons. Subject: Kenwood Marsh checkerbloom counts. 30 December 2008.

WILCOX, N. 1994. Letter to D. Steeck, California Department of Fish and Game, and accompanying chemical analyses of wells within Kenwood Marsh.

C. PERSONAL COMMUNICATION

BAINBRIDGE, E. 2019a. E-mail message to R. La Rosa regarding the USFWS 5-year review. [20 February 2019].

BAINBRIDGE, E. 2019b. E-mail message to R. La Rosa regarding USFWS Recovery Plan for Kenwood Marsh checkermallow. [16 July 2019].

PARSONS, E. 2019. Discussion with R. La Rosa regarding a potted specimen of Kenwood Marsh checkerbloom. [13 July 2019].

SYMONDS, K. 2019. Conversation with R. La Rosa during a site visit to Kenwood Marsh. [13 July 2019].

SYMONDS, K. 2020. Conversation with R. La Rosa regarding reintroductions at Kenwood Marsh. [22 January 2020].

IX. LIST OF FIGURES

Figure 1. Photos of Kenwood Marsh checkerbloom (a) vegetative plant and (b) flowers. 4

Figure 2. Modeled suitable habitat for Kenwood Marsh checkerbloom in Sonoma County. 8

Figure 3. Distribution and range map of Kenwood Marsh checkerbloom. 10

Figure 4. Photos of the Road subpopulation at Deerfield Ranch Winery. 11

X. LIST OF TABLES

Table 1. Populations of Kenwood Marsh checkerbloom (*Sidalcea oregana* ssp. *valida*).....5

Table 2. Deerfield Ranch Winery subpopulations. 7

XI. LIST OF APPENDICES

Appendix A. Quaternary geologic deposits associated with Kenwood Marsh checkerbloom occurrences. 21

Appendix B. Soil composition of naturally occurring Kenwood Marsh checkerbloom sites. 21

Appendix C. Population and subpopulation census of Kenwood Marsh checkerbloom. 22

APPENDIX A. Quaternary geologic deposits associated with Kenwood Marsh checkerbloom occurrences. Sites include Deerfield Ranch Winery (DRW), Kenwood Marsh-West (KMW) and Knights Valley (KV). Descriptions are taken from the California Geological Survey (CDOC 2010).

Geological Series	Population	Description
QPc	DRW, KMW	Pleistocene and/or Pliocene sandstone, shale, and gravels deposits; mostly loosely consolidated
Qoa	KMW	Older alluvium, lake, playa, and terrace deposits
Q	KV	Alluvium, lake, playa, and terrace deposits; unconsolidated and semi-consolidated

APPENDIX B. Soil composition of naturally occurring Kenwood Marsh checkerbloom sites. Sites include Deerfield Ranch Winery (DRW), Kenwood Marsh-West (KMW), and Knights Valley (KV). The soils series share a similar profile: fine-loamy texture, mixed topsoil, and superactive cation activity (Soil Survey Staff 2001, 2003, 2019).

Soil Series	Site	Texture	Topsoil	Cation activity	Soil group
Huichica	DRW, KMW	fine-loamy	mixed	superactive	thermic Abruptic Haplic Durixeralfs
Los Robles	KV	fine-loamy	mixed	superactive	thermic Typic Haploxerepts

APPENDIX C. Population and subpopulation census of Kenwood Marsh checkerbloom. Survey method likely differed between years, so counts may represent individuals, flowering stalks, or flower clusters. Populations include Deerfield Ranch Winery (DRW), Kenwood Marsh-West (KMW), and Knights Valley (KV). *flowering stalks only; ** reproductive individuals only.

Population	DRW	DRW	DRW	DRW	DRW	KMW	KV	Collector	Source
Subpop.	Road	Willow	#3	#4					Table 2
EO	1	1	1	1	1	1	2		CNDDB 2019
1979							<100	Unknown	USFWS 2009
1981							500	Unknown	CDFG 1981
1986					85		38	B & J Guggolz	CNDDB 2019
1987					136			B & J Guggolz	CNDDB 2019
1988					150	400		E. Parsons	USFWS, in litt. 2008c
1989					100	125		E. Parsons	USFWS, in litt. 2008c
1990					200	150		E. Parsons	USFWS, in litt. 2008c
1991					92	80		E. Parsons	USFWS, in litt. 2008c
1993							70	B & J Guggolz	CNDDB 2019
1993					600	500		N. Wilcox	USFWS, in litt. 2008c
1998					40+		47	B & J Guggolz	CNDDB 2019
2001					232*		25	G. Cooley	Cooley, in litt. 2001
2007					33			K. Symonds	USFWS 2019
2008	11	13			24			K. Symonds	USFWS, in litt. 2008b
2009			13**	9**				K. Symonds	Symonds, pers. comm. 2019
2010	126*		13**	0				K. Symonds	USFWS 2019
2012	42*	20*	39*	0	103*			K. Symonds	USFWS 2012
2013	162*	9*	14*	0	185*			K. Symonds	USFWS 2013
2016	256*							K. Symonds	Symonds, pers. comm. 2020
2019	16**	0	0	0	16**			K. Symonds	Symonds, pers. comm. 2019

PETITION TO LIST
THE QUINO CHECKERSPOT BUTTERFLY (*Euphydryas editha quino*)
AS ENDANGERED UNDER
THE CALIFORNIA ENDANGERED SPECIES ACT

Photo credit: Robert A. Hamilton, Hamilton Biological

CENTER FOR BIOLOGICAL DIVERSITY
And
ENDANGERED HABITATS LEAGUE

June 29, 2020

FGC – 670.1 (3/94)

NOTICE OF PETITION TO THE STATE OF CALIFORNIA
FISH AND GAME COMISSION

For action pursuant to Section 670.1, Title 14, California Code of Regulations (CCR) and sections 2072 and 2073 of the Fish and Game Code relating to listing and delisting endangered and threatened species of plants and animals.

I. SPECIES BEING PETITIONED
Common name: Quino checkerspot butterfly
Scientific name: (*Euphydryas editha quino*)

II. **RECOMMENDED ACTION:** List as endangered

The Center for Biological Diversity and Endangered Habitats League submit this petition to list the Quino checkerspot butterfly as endangered throughout its range in California pursuant to the California Endangered Species Act (California Fish and Game Code §§ 2050 *et seq*.). This petition demonstrates that the Quino checkerspot butterfly clearly warrants listing based on the factors specified in the statute.

III. AUTHOR OF PETITION
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I hereby certify that, to the best of my knowledge, all statements made in this petition are true and complete.

Signature: Tara Cornelisse Date: June 29, 2020

The **Center *for* Biological Diversity** is a national, nonprofit conservation organization with more than 1.6 million members and online activists dedicated to the protection of endangered species and wild places.

The **Endangered Habitats League** is a Southern California nonprofit regional conservation organization dedicated to ecosystem protection and sustainable land use.

Table of Contents

Executive Summary 1
Introduction 2
Natural History 3
Taxonomy 3
Description 3
Habitat and Host Plants 4
Life Cycle and Behavior 6
Larval Diapause 7
Adult Dispersal 7
Metapopulation Dynamics 8
Population Trend, Distribution, and Abundance 9
Historic Population Trend, Distribution, and Abundance 11
Current Population Trend, Distribution, and Abundance 13
Riverside County 16
San Diego County 18
Factors Affecting the Ability of the Species to Survive and Reproduce 18
The Present or Threatened Destruction, Modification, or Curtailment of its Habitat or Range 18
Development 18
Habitat Fragmentation 27
Invasive Species 30
Cannabis cultivation 32
Livestock Grazing 32
Recreation 32
Overutilization for Commercial, Recreational, Scientific, or Educational Purposes 34
Other Natural or Manmade Factors Affecting its Continued Existence 35
Climate Change 35
Disease or Predation 37
The Inadequacy of Existing Regulatory Mechanisms and Impact of Existing Management Efforts 37
Federal Regulations 38

Endangered Species Act of 1973, as amended 38
National Environmental Policy Act 40
National Forest Management Act 40
Federal Land Policy and Management Act 41
National Wildlife Refuge System Improvement Act of 1997 41
Sikes Act 41
The Lacey Act 42
Pesticide regulations 42
State Regulations 42
California Environmental Quality Act 42
Natural Community Conservation Program 43
Local Regulations 43
Western Riverside County MSHCP 43
San Diego County MSCP 45
Other HCPs 46
Captive Breeding and Reintroduction Project 47
Degree and Immediacy of Threats 47
Suggestions for Future Management and Recovery Actions 48
Conclusion 49
References 50

Executive Summary

The Center for Biological Diversity and Endangered Habitats League submit this petition to list the Quino checkerspot butterfly (*Euphydryas editha quino* Behr) as endangered throughout its range in California pursuant to the California Endangered Species Act (CESA, California Fish and Game Code §§ 2050 et seq.). As outlined in this petition, without the protection of the CESA, the Quino checkerspot butterfly is highly likely to become further imperiled and go extinct in the very near future. The Quino checkerspot butterfly was once a common butterfly throughout Southern California but has lost over 75% of its habitat, largely due to sprawl development. The Quino checkerspot butterfly is now only known in 62 potential sites in Southern San Diego and South-western Riverside Counties; of those 62, the butterfly has been observed in only 33 sites (53.2%) in the last 10 years and all are threatened by climate change, habitat destruction, degradation, and fragmentation, invasive plants, drought, and/or fire.

The Quino checkerspot butterfly exhibits of boom and bust metapopulation dynamics with an extended larval diapause that has allowed it to adapt and survive the variable precipitation of southern California. These natural history characteristics make protection of core sites and connectivity between sites especially imperative for the butterfly's conservation and recovery to avoid incremental extirpation and eventual extinction. However, despite being federally protected as endangered under the Endangered Species Act (ESA), the Quino checkerspot butterfly's few remaining core populations are imminently threatened by large-scale sprawl development as well as habitat fragmentation, climate change, nitrogen pollution, invasive species, and also the construction of a border wall between the United States and Mexico in its little remaining critical habitat.

The United States Fish and Wildlife Service (FWS) designated 171,605 acres of critical habitat for the Quino checkerspot butterfly in 2002 but despite further declines and loss of habitat, the FWS reduced the designated critical habitat by 63.8% to 62,125 acres in nine disparate units, a decision that was based largely on economic reasons. Since its federal ESA listing in 1997, the Quino checkerspot butterfly has been included as a covered species in regional habitat conservation plans that have nevertheless resulted in loss of core habitat areas absent substantial or effective protections. Currently there are at least six major development projects in the Quino checkerspot butterfly's few remaining Core populations that are slated to begin imminently or within the next few years. By first decreasing the butterfly's designated critical habitat and then allowing large scale development projects within its few remaining strongholds without requiring adequate protection of the Quino checkerspot butterfly metapopulation dynamics and mitigation of core habitat loss, the FWS has failed to protect the Quino checkerspot butterfly, making it in dire need of increased protections in California as endangered under the CESA.

Introduction

Southern California is a global biodiversity hotspot, made up of extremely diverse habitats and home to over 700 endemic species, many of them rare and threatened (Myers et al. 2000; Chen et al. 2010 p. 165). Over the last several decades, human population growth and substantial land use and land cover change have led to severe habitat destruction and fragmentation as well as biodiversity loss in the region (Vandergast et al. 2008; Chen et al. 2010; Riordan & Rundel 2013; Phillips 2019). The Quino checkerspot butterfly (*Euphydryas editha quino* Behr) (referred throughout this petition as "Quino" or "QCB") was once widespread from coastal Los Angeles and Orange Counties, west to Riverside and southwestern San Bernardino Counties, and south to San Diego County and may well have been the most abundant butterfly in southern California.

The Quino checkerspot butterfly exists as a network of metapopulations with the survival of each population dependent on both the local habitat resources as well as the movement of individuals between patches (Hanski & Gyllenberg 1993; Hellmann et al. 2004). Historically, during years with optimal resource conditions, the Quino checkerspot butterfly had population booms in which there were many thousands of adults (Murphy & White 1984). Rampant development has reduced Quino's habitat by more than 75%, including more than 90% of its coastal distribution (USFWS 1997, 2003 p. 13) and the Quino is now extinct in Los Angeles, Orange, and San Bernardino Counties (Mattoni et al. 1997). Unfortunately, the destruction and fragmentation of core habitat is occurring again in the Quino's few remaining metapopulations in pockets of southwest Riverside and San Diego Counties.

Riverside and San Diego Counties are two of the fastest growing areas of the United States. In the last 10 years, Riverside County's population grew 12.8% and San Diego County's 7.8% compared to 6.1% in all of California (US Census Bureau 2020). In addition, there have been recent calls to increase housing construction to further stimulate the economy and reduce housing scarcity (Ober 2019). In this petition we outline six planned and/or occurring development projects in core Quino habitat, and those are just the currently known projects. Climate change, nitrogen deposition and invasive species are challenging the Quino's survival, but the butterfly will have no chance to naturally adapt if its habitat is destroyed and fragmented due to border wall construction and development.

In concurrence with site-specific management, region-wide management is needed to increase overall connectivity to reduce the negative effects of habitat fragmentation. For metapopulation survival, resilience, and recovery, the Quino needs protection in occupied and unoccupied habitat from sprawl development, degradation, and additional fragmentation across its range. These protections have not occurred while the Quino has been federally protected, and, as such, the butterfly must be protected by the state of California.

Natural History

Taxonomy

The Quino checkerspot butterfly (*Euphydryas editha quino*) was first described by Hans Herman Behr in 1863 and then subsequently named and classified by J. Emmel (USFWS 1997 p. 2314). The Quino is a member of the family Nymphalidae, the subfamily Nymphalinae, and tribe Melitaeinae and recognized as a valid subspecies (Integrated Taxonomic Information System 2020a). The Quino is one of 26 subspecies of Edith's checkerspot butterfly (*Euphydryas editha*) (Integrated Taxonomic Information System 2020b).

Description

Quino checkerspot butterflies have a 1.5 inch (4 cm) wingspan and checkered wings alternating in red, black, and cream colors on top and red and cream on the underside, the adult butterfly's abdomen has a dorsal red strip (USFWS 2003 p. 6) (Figure 1). Larvae of the Quino checkerspot hatch with a yellow coloration but after the first molt are gray with black markings, and after the second molt take on a characteristic dark-black coloration with eight to nine orange tubercles (Figure 1); pupae are mottled black on a gray background (USFWS 2003 p. 6). Adult Quino checkerspot butterflies are larger than the parapatric subspecies *E. editha agustina,* and compared to the nominotypical *E. editha*, Quino has increased orange/red scaling and larger cream-colored spots (Mattoni et al. 1997 p. 100).

Figure 1. Adult Quino checkerspot butterfly (top), photo credit: Robert A. Hamilton, Hamilton Biological. Mature Quino checkerspot butterfly larva (bottom), photo credit: G.R. Ballmer.

Habitat and Host Plants

The Quino checkerspot is found in grasslands, open chaparral, and coastal shrublands with sparse vegetation surrounded by bare patches up to 5,000 feet in elevation (Figure 2) (Mattoni et al. 1997 p. 112; USFWS 1997, 2003). Habitat is best defined by presence of larval host plants, nectar resources, microtopography, cryptobiotic crust, and presence of episodic disturbances (Mattoni et al. 1997 p. 112). The FWS (USFWS 2002 p. 18362) defined primary constituent elements of Quino habitat as: (1) Grassland and open-canopy woody plant communities, such as coastal sage scrub, open red shank chaparral, and open juniper woodland, with host plants or nectar plants; (2) Undeveloped areas containing grassland or open-canopy woody plant communities, within and between habitat patches, utilized for Quino checkerspot butterfly mating, basking, and movement; or (3) Prominent topographic features, such as hills and/or ridges, with an open woody or herbaceous canopy at the top determined relative to other local topographic features. For nectar, Quino adults prefer flowers with landing platforms and short corollas less than 0.43 inches (USFWS 2009b p. 10). Specifically, adult Quino have been documented to visit species in the following genera: *Cryptantha, Eriodictyon, Gilia, Lasthenia, Lomatium, Muilla,* and *Plagiobothrys* (Preston et al. 2012 p. 281).

The primary host plants that have been documented for the Quino checkerspot butterfly include dwarf plantain (*Plantago erecta*), woolly plantain (*Plantago patagonica*), Coulter's snapdragon (*Antirrhinum coulterianum*) (USFWS 2009b p. 9; Preston et al. 2012 p. 281), and possibly Nuttall's snapdragon (*Antirrhinum nuttallianum*) (Pratt 2020b). Quino also use Chinese houses (*Collinsia concolor*) as host plants at higher elevations where the plant is small (Pratt email 3.25.20) (Pratt & Pierce 2010; Parmesan et al. 2015 p. 9). Quino may also use owl's clover (*Castilleja exserta*) and stiff branch bird's beak (*Cordylandthus rigidus*) as secondary host plants if the primary host plants are not available or senesce before larval maturity (USFWS 2009b p. 9). Quino appear to utilize different host plants in different proportions depending on

microhabitat and annual climate conditions (Pratt 2020b). The persistence and availability of Quino host plants depend on microclimate factors. Years with little rainfall can cause host plants to senesce or be completely consumed before seed set with regeneration relying on seed bank germination in subsequent wetter years (Murphy & White 1984 p. 352). Host plant presence and suitability also vary annually with respect to soil type, slope aspect, vegetation cover, and sun exposure; host plants growing on a warmer southern facing slope will likely grow and mature earlier in the season than those growing on a cooler northern facing slope or those growing in shade (Osborne & Ballmer 2019 p. 1).

The Quino and its hosts plants have also been associated with cryptobiotic crust, or crusts on the soil formed by blue-green algae, lichens, mosses, fungi, and bacteria that hold in moisture, improve the availability of minerals to plants, limit invasive plants, and reduce soil erosion in arid environments (Mattoni et al. 1997 p. 112). Because cryptobiotic crusts are darker than the surrounding earth, they are warmer and serve as locations for thermoregulation for the Quino larvae and adults (Mattoni et al. 1997 p. 113).

Figure 2. Quino habitat showing undisturbed coastal sage scrub with native wildflowers, bare ground, and cryptobiotic crust. Photo credit: Robert A. Hamilton, Hamilton Biological.

To complete development into the pupal stage before host plants dry up, post-diapause larvae seek microclimates with low shade, bare ground, low grass and shrub cover, and presence of *P. erecta* (Osborne & Redak 2000 p. 112). Larvae diapause in soil, leaf litter, under rocks, and potentially in native bunch grasses or shrub covered areas (Osborne & Redak 2000 p. 113) and

subsequently pupate in the leaf litter or within native vegetation such as California Buckwheat (Pratt & Emmel 2010). As such, as a larva—the stage in which it spends the majority its life—the Quino requires heterogeneous habitat consisting of sunny southern facing slopes with shaded areas as well as both open areas with food plants and nearby areas with larger vegetation.

Quino metapopulations are found in a dynamic mosaic of fire climax communities in which host plants are initially dominant following a periodic wildfire but over time replaced by perennial shrubs until the next fire (Osborne & Ballmer 2019 p. 5). Thus, "fire plays an important role in determining the temporal-spatial distribution of reproductive resources for the Quino. This year's patch of 'dense chaparral' could, following wildfire, become the next season's field of wildflowers and Quino host plants" (Osborne & Ballmer 2019 p. 5). Permeable (e.g. not developed or not fragmented by a highway or high wall) dispersal habitat is also important for Quino adults to fly between habitat patches in search of mating partners and isolated larval hosts (Osborne & Ballmer 2019 pp. 4–6).

Life Cycle and Behavior

The Quino checkerspot butterfly exists in four main life stages: the highly active winged adult butterflies and the less conspicuous eggs, larvae, and pupae. The larval stage is divided into five to seven instars (growth stages) and there is typically one generation of adults per year. Adult emergence from pupae is staggered, resulting in a four to six week flight period beginning between late February and early May, depending on weather conditions, with each adult butterfly living up to two weeks (USFWS 2002 p. 18356). Although little is known regarding the relative length of time each life stage takes for Quino checkerspot butterflies, research into the conspecific bay checkerspot butterfly (*Euphydryas editha bayensis*) reveals that the butterflies spend approximately less than 5% of their lives as adults, about 80% as a caterpillar, 5% as a pupa, and 5% in the egg stage (White 1986).

Quino are univoltine (Mattoni et al. 1997 p. 106). Females lay egg masses with a minimum of 39 eggs per mass and up to 120-180 eggs, laying a total lifetime range of 400-800 eggs; the number of egg masses laid are dependent on the amount of nectar fed upon by the female (Mattoni et al. 1997 p. 106). Larvae that hatch from eggs undergo two or three molts and enter an obligate diapause as either third or fourth instar larvae, likely molting to the fourth instar when sufficient food is present. Larvae that survive come out of diapause after the winter rains the following year to consume any germinated host plants and undergo up to seven total instars before pupating under plants or rocks (Mattoni et al. 1997 p. 106). Adult butterflies eclose after approximately 10 days of pupation.

Once the butterfly emerges from the chrysalis, adult females actively mate and lay eggs as well as seek nectar plants for feeding. Mating behavior is important in the Quino's population dynamics; if populations are abundant, males actively fly to search for females that wait on the ground or on low lying host plants, whereas in areas with more sparse resources, males perch on and defend high points, a behavior known as "hill topping", and females move to find mates (Mattoni et al. 1997 pp. 109–110). After mating, males insert a mating plug to prevent females from copulating further to ensure paternity (Mattoni et al. 1997 p. 106).

Larval Diapause

The Quino checkerspot butterfly has evolved to survive in the hot dry summers of the Mediterranean climate of southern California by entering larval diapause. Quino host plants dry up before larvae can complete development; larvae that survive the late spring senescence of host plants enter an obligatory diapause for the summer and fall. During the first two instars, pre-diapause larvae cannot move more than a few centimeters and are usually restricted to the primary host plant species (USFWS 2002 p. 18356). Pre-diapause larvae are the most vulnerable Quino life stage due to their dependence on late season host plants that quickly dry up and senesce prior to winter rains (Mattoni et al. 1997 p. 107). During years with low host plant density, larvae will pupate when they are small, resulting in smaller females that lay fewer eggs (Murphy & White 1984 p. 353). Further, mortality can be high for diapausing larvae, especially if not well fed prior to diapause (Mattoni et al. 1997 p. 107).

Larvae have been found in diapause in or near the base of native shrubs (USFWS 2009b p. 12) but can also do so in cracks in the soil, under logs or rocks, in leaf litter or under bark, making them difficult to locate during surveys (USFWS 2009b; Preston et al. 2012). Larvae come out of diapause in response to winter rains, and thus host plant germination, and can re-enter diapause if there is not enough food to reach pupation, sometimes repeating this cycle for multiple years especially during drought conditions (Mattoni et al. 1997 p. 107; USFWS 2009b; Pratt & Emmel 2010; Preston et al. 2012). Even under apparently ideal developmental conditions of temperature, moisture, and host plant quality, a large percentage of larvae, after breaking diapause and a brief period of activity, may re-enter diapause for another year or more (Pratt & Emmel 2010). Thus, a large portion of a Quino population is likely to remain as larvae, undetected by surveyors following standard USFWS protocol for surveying adult Quino (Osborne & Ballmer 2019 p. 2). The ability of Quino to "hedge its bets" by keeping a reservoir of larvae allows it to survive extended drought and other adverse environmental conditions when larval hosts are scarce or unavailable (Osborne & Ballmer 2019 p. 2).

Adult Dispersal

Quino adult dispersal behavior varies between very little movement to high vagility, depending on available host and nectar resources and population size. The prior year's rainfall impacts the density of post-diapause larvae which in turn impacts current availability of host plants, while a current year's rainfall impacts availability of host and nectar plants and thus adult vagility (Murphy & White 1984 fig. 1). Adults exhibit greater dispersal behavior during warm and dry years when host plants senesce earlier and thus become unsuitable for oviposition (Murphy & White 1984 p. 350; Osborne & Ballmer 2019 p. 1). High vagility can also occur during wet years due to high adult abundances, competition for oviposition sites, and host plant consumption by post-diapause larvae (Murphy & White 1984 p. 351). For example, during a boom year, gravid females were found several kilometers from population centers in unsuitable habitat (Murphy & White 1984 p. 351). Within a habitat patch, adult Quino have been found to move up to 200 meters (656 feet) between host plants and nectar sources and they generally

avoid flying over objects taller than seven to eight feet (USFWS 2009b p. 10; Greenwald et al. 2017 p. 16; Peters et al. 2018 p. 741).

Metapopulation Dynamics

As a subspecies, the Quino checkerspot butterfly exists as a network of metapopulations, specifically as core-satellite metapopulations that consists of an interdependent network of populations on patches of suitable habitat that are geographically separated from each other by unsuitable habitat (USFWS 2009b; Osborne & Ballmer 2019). Quino populations are maintained through metapopulation dynamics of colonization and extirpation between habitat patches with the survival of each subpopulation dependent on both the local habitat resources as well as the movement of individuals between patches (Hanski & Gyllenberg 1993; USFWS 2002 p. 18357).

A core, or source, patch population is one in which the number of births exceeds the number of deaths, resulting in a net emigration of individuals to satellite patches and thus are centers of high population abundance, due to geographic size, quality of resources, connectivity to other patches, and high reproductive output (Howe et al. 1991; Hanski & Gyllenberg 1993). Core patches serve as a source of Quino individuals that repopulate other patches with suitable habitat (Murphy and White 1984; Mattoni et al. 1995). According to the final rule designating critical habitat for the Quino (USFWS 2009a p. 28778), a core population is a habitat patch where at least two of the following criteria apply: (1) 50 or more adults are reported during a single survey at least once; (2) immature life history stages are recorded; or (3) the geographic area within the occurrence complex (i.e. metapopulation) is greater than 1,290 acres (522 ha, or the size of the smallest core occurrence complex where reproduction has been documented and records indicate long-term resilience).

During years with little rainfall and host plant availability, Quino will not occupy smaller, more isolated habitats known as "satellite" patches and local extirpation will occur as a natural metapopulation process (Murphy & White 1984 p. 353). Quino populations in the larger, more connected habitats will survive in those dry years and become the sources of individuals who can recolonize the satellite patches during wet years, allowing Quino to persist in a region (Murphy & White 1984 p. 353). Thus, single patches of suitable habitat cannot be viewed in isolation and functional connectivity between patches is key for Quino persistence across a region. As recognized by the FWS: "Maintenance of landscape connectivity (habitat patches linked by intervening dispersal areas) is essential in order to maintain metapopulation resilience. Land use changes that limit dispersal between habitat patches and isolate local populations by compromising landscape connectivity can be just as detrimental to metapopulation survival as those that destroy or reduce the size of habitat patches" (USFWS 2002 p. 18357).

The loss of occupied or unoccupied satellite patches via habitat destruction and/or connectivity leads to individuals effectively being restricted to only core habitat with the inability to maintain high abundances over time and space. However, the loss of a core patch is especially devastating to Quino persistence and survival; entire Quino metapopulations in Los Angeles, Orange, and San Bernardino counties were lost due to core patch habitat destruction (Mattoni et al. 1995; Harrison 1989; Harrison et al. 1988; Hanski et al. 1996). Thus, the loss of

any Quino core or source populations due to habitat destruction or degradation creates a "ripple effect of irreversible long-term extinctions" (Murphy & White 1984 p. 353).

Population Trend, Distribution, and Abundance

Due to the ephemeral nature of Quino checkerspot butterfly populations, it is not always accurate to consider occupied population sites as permanently occupied (USFWS 2009b pp. 5–6). Any snapshot of abundance is not a useful metric for Quino population occurrence, as the species can experience an order of magnitude change in abundance every 5-20 years, depending on rainfall and temperatures (USFWS 2009b p. 7; Preston et al. 2012; Strahm 2018 p. 1). Instead, FWS defines Quino occupancy by "occurrence complexes" using population-scale occupancy, or "areas used by adults during the persistence time of a population (years to decades)" (USFWS 2003 p. 24, 2009b pp. 5–6). Occurrences within approximately 1.2 miles (2 kilometers) of each other are considered to be part of the same occurrence complex, as they are proximal enough that the observed butterflies are likely to have come from the same population (USFWS 2003 p. 35, 2009b p. 5). Thus, multi-year studies are required to determine Quino population distributions (USFWS 2009a p. 28777). However, 'boom' years with high population numbers appear to now occur less frequently and be of lesser magnitude than in the past (Strahm 2018 p. 1). There are clear regions of occupancy that have been lost for many years that are considered extirpated while there are regions that continue to be occupied variably over the years and some regions that have 'new' populations either recently found or colonized. See the map below for all historic and current Quino occurrences recorded by the FWS and the California Natural Diversity Database (Figure 3).

'Core' occurrence complexes are also delineated by FWS and determined based on geographic size, reported abundance, documented reproduction, and repeated observations and are areas that contain habitat that can support local source populations for the metapopulation (Murphy & White 1984 p. 353; Mattoni et al. 1997 p. 111; USFWS 2003 pp. 25–26). In the final revised critical habitat rule (USFWS 2009a p. 28776) FWS defines a Core occurrence complex as an area where at least two of the following criteria apply: (1) 50 or more adults have been observed during a single survey; (2) immature life stages have been recorded; and (3) the geographic area within the occurrence complex (i.e., within 0.6 mile (1 kilometer) of subspecies occurrences) is greater than 1,290 acres (522 hectares). FWS also described 'habitat-based population distributions' for Core occurrence complexes as any contiguous habitat within an occurrence complex and within an additional 0.6 mile (1 kilometer) of an occurrence complex (USFWS 2009a p. 28776). Thus, occurrence complexes are areas of Quino metapopulations.

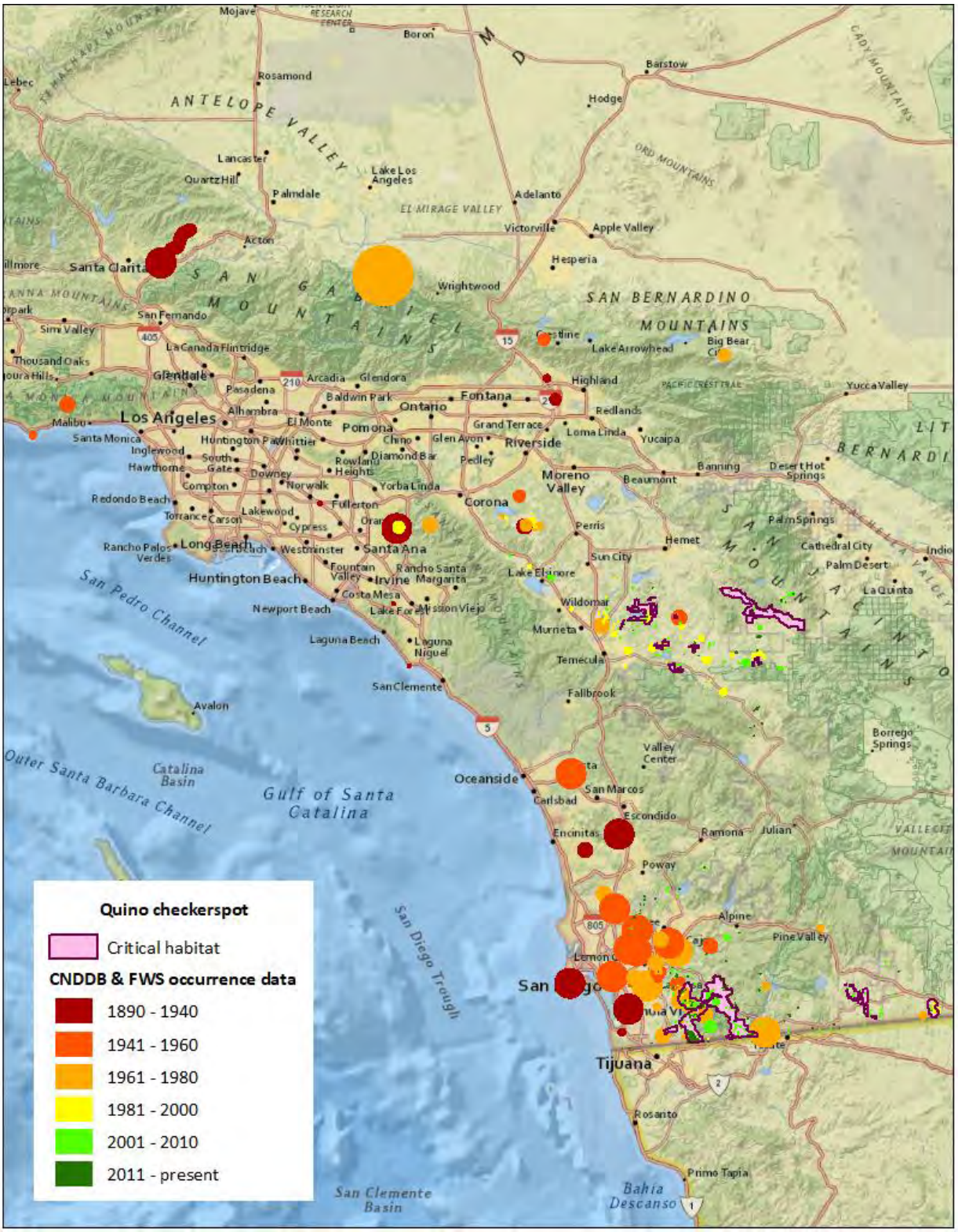

Figure 3. Historic and current occurrences of the Quino checkerspot butterfly from 1890 to present with current critical habitat. Data obtained from FWS and the California Natural Diversity Database (CNDDB). Map by Kara Clauser.

Historic Population Trend, Distribution, and Abundance

Prior to 1990, the Quino checkerspot was found in an estimated 40 sites in Los Angeles, San Bernardino, Riverside, Orange, and San Diego Counties in California and in northern Baja California, Mexico (Figures 4 and 5) (Mattoni et al. 1997 pp. 100, 104). Documented specimen localities and maps of vegetation communities indicated that the Quino checkerspot may have had a continuous distribution across southern California from Point Dume to Ensenada and inland up to 60 miles (Mattoni et al. 1997 pp. 104–105). In the 1950s, collectors described the butterfly as occurring on every coastal bluff, inland mesa top, and lower-mountain slopes in San Diego County and coastal northern Baja California (Murphy and White 1984). Large populations also were observed during this period in San Diego, Riverside, and Orange counties; in spring of 1977, hundreds to thousands of adults were observed in southern San Diego County at four population centers: Lower Otay, Upper Otay, Brown Field on Otay Mesa, and La Pressa Rodriquez near Tijuana (Murphy & White 1984 p. 351).

By the 1980s, more than 75% of its historical range and at least 95% of its coastal bluff and mesa habitat had been destroyed by urban development, agriculture, grazing, and non-native, invasive species (Mattoni et al. 1997 p. 105). The 1988 federal petition to list the Quino as endangered suggested it was extinct. Yet it was not until 1997 that the U.S. Fish and Wildlife Service (FWS, USFWS, Service) protected it under the Endangered Species Act, and it was that same year that the agency's scientists succeeded in locating an extant population.

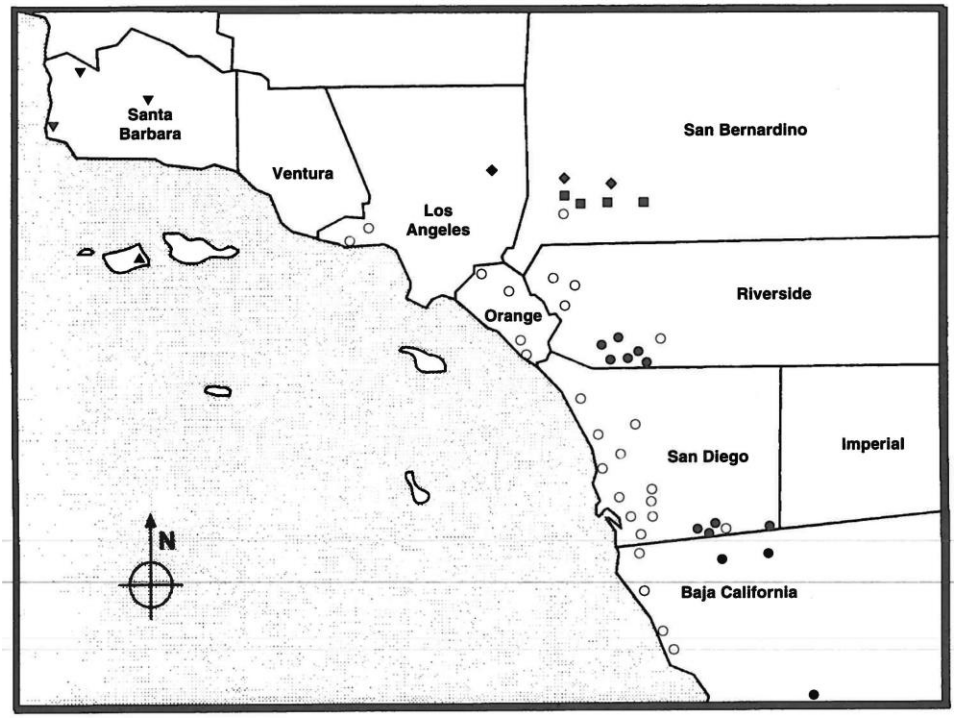

Fig. 1. Historic and current distribution of Quino checkerspot butterfly in southern California and Baja California, showing distribution of nearby subspecies of *Euphydryas editha*. Legend: ○ *quino* pre-1990, ● *quino* post-1990, ▲ *insularis*, ■ *augustina*, ◆ new subspecies, ▼ *editha*.

Figure 4. From Mattoni et al. (1997 pg. 100) see figure for legend.

Table 1. Localities for *Euphydryas editha quino* and most recent date of collection or observation. A list of museum specimens is available from the authors upon request.

Mexico			
Estrado de Baja California		Spring Valley	1969
N of Ensenada	1935	SE of El Cajon	1970
Las Animas Canon	1935	Proctor Valley	1971
Mosquito Springs	1936	Otay Lake	1973
Rodriguez Dam, Tijuana	1977	Mt. Palomar	1975
S of Salsipuedes	1979	San Diego	1976
N of Sordo Mudo	1979	Chula Vista	1978
Table Mt. (near Rosarita Beach)	1979	Little Cedar Canyon	1979
Turn off to Ojos Negros	1981	Mesa E of Otay Reservoir	1979
Valle de La Trinidad, Aquaito Spring	1994	Otay Mesa	1980
N of El Testerazo	1996	Dictionary Hill	1981
S of El Condor	1996	Brown Field	1997
California		Otay Mt., ridge S of O'Neal Canyon	1997
San Diego County		South Otay Mt., Marron Valley	1997
San Francisquita Pass	1914	Jacumba	1997
Warner's Dam	1916	North slopes of Tecate Peak	1997
South San Diego	1917	**Riverside County**	
Santa Fe Ranch	1930	Sage	1951
Lake Hodges	1932	Lake Elsinore	1983
Rancho Santa Fe	1933	Gavilan Hills	1985
Alta Vista	1934	Murrieta Hot Springs	1997
Adobe Falls, San Diego	1948	Aguanga	1997
Division Street, San Diego	1948	Oak Mountain	1997
Vista	1951	Temecula	1997
Dehesa	1957	Lake Skinner	1997
San Miguel Mt.	1957	**Orange County**	
El Cajon	1958	Hills E of Orange Co. (Irvine) Park	1917
La Presa, San Diego	1958	Anaheim	1930
Miramar	1960	Laguna Lakes	1931
Mission Gorge	1960	Hills N of Orange Co. (Irvine) Park	1934
Tecate Mt.	1961	Dana Point	1936
Fletcher Hills near El Cajon	1963	Irvine Park	1937
Sweetwater Dam/Reservoir	1969	Hidden Ranch	1967
Encanto	1969	**Los Angeles County**	
Kearney Mesa	1969	Tapia Camp, Santa Monica Mts.	1947
Paradise Mesa, National City	1969	Pt. Dume	1954

Figure 5. Historic Quino sites known before 1997 from Mattoni et al. (1997 pg. 104) shows the Quino historic range extent.

By 1997 the number of Quino populations decreased by 67.5% and it was extirpated from Los Angeles, Orange, and San Bernardino Counties (Mattoni et al. 1997 p. 100; USFWS 1997). Since listing in 1997, the Quino checkerspot had been found in up to 15 sites within six core occurrence complexes in Riverside County and San Diego County (USFWS 1997, 2003, 2009b p. 6). In Riverside County, the Tule Peak complex contained the highest density and produced more emigrants than any other area; in San Diego County, the core Otay occurrence complex (consisting of Otay Valley, West Otay Mountain, Otay Lakes, Proctor Valley, Dulzura, and Honey Springs occurrence complexes) was recognized as "an area of key landscape connectivity for all subpopulations in southwest San Diego County" (USFWS 2009b p. 7). Marron Valley, West Otay Valley, Jamul Butte, and Rancho San Diego/Jamul are also a part of the Otay habitat-based population distribution (USFWS 2009b p. 7). Four of six new occurrence complexes (South San Vicente, Sycamore Canyon, Fanita Ranch, and North East Miramar) are part of the

San Vicente core habitat-based population distribution in Central San Diego County (USFWS 2009b p. 7). In addition, a new occurrence complex east of Campo was included as part of the Jacumba occurrence complex in south-central San Diego County (USFWS 2009b p. 7).

Critical habitat was designated for the Quino in 2002 with 97,030 acres (39,260 ha) in Riverside County and 74,575 acres (30,180 ha) in San Diego County (USFWS 2002 p. 18363). The critical habitat units were configured "to provide room for metapopulation dynamics, which is essential for the conservation of the species, including dispersal corridors" (USFWS 2002 p. 18361). According to the FWS, there were 147,359 acres (59,634 hectares) of mapped occurrence complexes extant at the time of listing or documented post-listing with approximately 42% on public lands or privately-owned preserves, 19% on privately owned lands likely to be conserved under a Habitat Conservation Plan (HCP), 24% on private and tribal lands where the likelihood of habitat loss was variable, and 15% destroyed by development or land use changes (USFWS 2009b p. 14). As a result of a lawsuit and resulting settlement brought forth by the Homebuilders Association of Northern California and others, the FWS reduced the designated critical habitat by 63.8% to 62,125 acres in nine disparate units based on economic, national security, and "other relevant impacts" (Figure 6 and Table 1)(USFWS 2009a p. 28781).

Current Population Trend, Distribution, and Abundance

By 2012, Quino were clustered in the foothills of southwestern Riverside County and southern San Diego County (Preston et al. 2012 p. 284). A table of 'current' sites and their status, date last observed, location in Recovery Units, and current threats can be found in the 2019 Draft Recovery Plan Amendment (USFWS 2019). Quino population collapses have largely mirrored urbanization and extreme drought, both of which have only grown as threats in California as described in this petition. Loss of single, large or core population creates "a ripple effect of irreversible long-term extinctions,"; this well-accepted hypothesis—first put forth by Murphy and White (1984 p. 355) and which has continued to be relied upon in the Quino's listing (1984 p. 355; USFWS 2009b pp. 8–9)— is one that holds even more relevance for Quino's existence today, given increasingly high levels of development and more severe climate change projections. Today, there are few large, stable populations that can act as sources to surrounding non-core habitat patches, and dispersal between patches is further inhibited by the highly fragmented landscape in southern California (Strahm 2018 p. 1). The study by Preston et al. (2012) provides strong and region-wide evidentiary support for the ongoing operation of this process of development-triggered metapopulation collapse and extinction. Significant development within a one km radius was a strong predictor of whether a population remained extant or went extinct (Preston et al. 2012 fig. 3, p. 287).

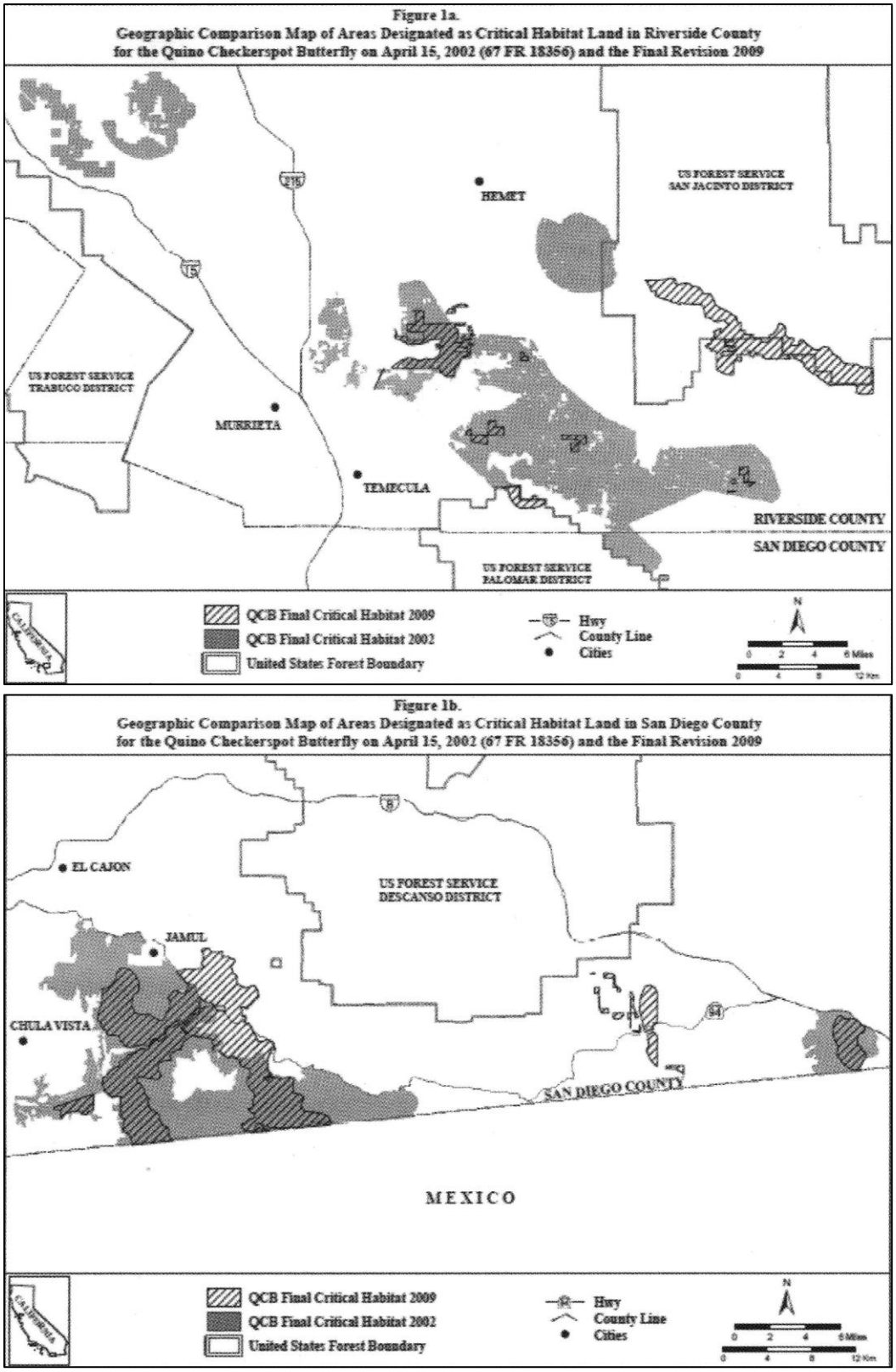

Figure 6. Reductions in designated critical habitat in Riverside County (top) and San Diego County (bottom) from 2002 to 2009 (USFWS 2009a).

Table 1. Changes between the April 15, 2002, Quino critical habitat designation and the revised final designation. Acreage values are approximate. From USFWS (2009a pp. 28801–28802).

Critical Habitat Unit in this Final Rule	**County**	**Recovery Plan occurrence complexes [1] (place names)**	**2002 Designation of Critical Habitat and ac (ha) [2]**	**2009 Final Revised Critical Habitat Designation and ac (ha)**
1. Warm Springs	Riverside	Warm Springs Creek and Warm Springs Creek North	Majority designated in Unit 2; 0 (0)	Entire unit excluded
2. Skinner/ Johnson	Riverside	(Lake) Skinner/ Johnson (Ranch)	Partially designated in Unit 2; 4,705 (1,904)	Partially designated in Unit 2; 5,443 (2,203), partially excluded, 6,560 (2,655)
3. Sage	Riverside	(Community of) Sage and San Ignacio (Ridge)	Majority designated in Unit 2; 123 (50)	Partially designated in Unit 3; 123 ac (50 ha), partially excluded, 2,569 ac (1,040 ha)
4. Wilson Valley		Wilson Valley	Designated in Unit 2; 463 (187)	Partially designated in Unit 4; 463 (187), partially excluded, 4,350 (1,760 ha)
5. Vail Lake/Oak Mountain	Riverside	Vail Lake, Pauba Valley, and (Communities of) Butterfield/Radec	Majority designated in Unit 2; 819 (332)	Partially designated in Unit 5; 1,788 (724), partially excluded, 6,398 (2,589)
6. Tule Peak	Riverside	Tule Peak (Road), Southwest Cahuilla (Reservation), and Silverado (Ranch)	Majority designated in Unit 2; 15 (6)	Partially designated in Unit 6; 326 (132), partially excluded, 6,106 (2,471)
7. Bautista	Riverside	Bautista Road, Pine Meadow, Lookout Mountain, and 3Horse Creek	Not essential	Partially designated in Unit 7; 13,880 (5,617), partially excluded, 79 (32)
8. Otay	San Diego	Otay Valley, West Otay Mountain, Otay Lakes/ Rancho Jamul, Proctor Valley, Marron Valley, (Community of) Dulzura, and Honey Springs	Majority designated in Unit 3; 25,325 (10,249)	Partially designated in Unit 8; 34,941 (14,140), partially excluded, 1,782 (721)
9. La Posta/Campo	San Diego	[3](Communities of) La Posta/Campo	Not essential	Partially designated in Unit 9; 2,647 (1,071), partially excluded, 5,740 (2,323)
10. Jacumba	San Diego	Jacumba	Designated as part of Unit 4; 2,514 (1,017)	Designated as Unit 10; 2,514 (1,017)
[4]Brown Canyon Subunit	Riverside	Brown Canyon	Designated subunit of Unit 2; 0 (0)	Determined not to be essential
[5]Lake Matthews	Riverside	Harford Springs (Park), [6]Lake Matthews Population Site	Unit 1; 0(0)	Determined not to be essential
[7]Otay	San Diego	(National Wildlife Refuge) NWR Rancho Jamul, NWR Los Montanas, Hid-den Valley, (Community of) Jamul, West Otay Mesa, Barret Junction, (City of) Tecate (border area)	Designated in Unit 3; 0 (0)	Determined not to be essential
Totals			33,964 (13,745)	62,125 (25,141) designated 36,270 (14,678) excluded

1 All occurrence complexes in proposed revisions to critical habitat are now part of a core occurrence complex, except Pine Meadow, Lookout Mountain, and Horse Creek. The geographic analysis of occurrence complexes in this table is based on habitat-based population distributions described in this final revised critical habitat rule. 2 Area designated in this rule that was also included in 2002 designated critical habitat units (67 FR 18356). 3 New occurrence complexes described in the 2008 proposed revised designation (73 FR 3328) that were not described in the Recovery Plan. 4 The Brown Canyon subunit in the 2002 final designation was not included in proposed revisions to critical habitat. 5 The Lake Matthews Unit in the 2002 final designation was not included in proposed revisions to critical habitat. 6 A "historically occupied population site" described in the Recovery Plan (not an occurrence complex). 7 The Otay Unit was Unit 3 in the 2002 final critical habitat rule (67 FR 18356). This row describes Recovery Plan occurrence complexes not included in Unit 8 of the proposed revisions to critical habitat.

Riverside County

Coinciding with droughts that began in 2012, the Quino checkerspot has been declining and is now extirpated from both the northwest Riverside core complex and one of the two core complexes in southwest Riverside (USFWS 2019). Specifically, Quino are extirpated from Northwest Riverside from the Lake Mathews, Canyon Lake, and Harford Springs (a Core area) areas as well as Pauba Valley in South Riverside and from Warm Springs Creek Core area (USFWS 2019 p. 5). In 2018, 54 total adult Quino were found in only four of the Core Areas (Silverado/Tule Peak, Oak Mountain, Johnson Ranch/Lake Skinner, and Sage) and one of the non-core satellite areas (Cactus Valley) (Figure 7) (Biological Monitoring Program 2019 pp. 7–9). While there were four adult Quino observed at the Sage Core Area in 2018, Quino were present in only half of the past 11 years in very low abundances; the site is isolated and shrinking in size every year due to invasive grasses; thus, without management, the Quino may be soon extirpated from this area (Biological Monitoring Program 2019 p. 12). Habitat quality at Johnson Ranch/Lake Skinner has also been decreasing over the past decade despite its adjacency to the Multi-Species Reserve sentinel site (Biological Monitoring Program 2019 p. 12). Silverado/Tule Peak and Oak Mountain are the remaining Quino Core Areas, yet Oak Mountain continues to be developed and impacted by off-road vehicles (Biological Monitoring Program 2019 p. 15).

According to the 2019 Recovery Plan Amendment, Quino is extant in 11 sites within Riverside County and in 17 sites at the border between Riverside and San Diego Counties; Quino have been observed in only 12 out of those 28 sites (42.9%) in the last 10 years and all are threatened by a combination of the following: climate change, habitat destruction, degradation, and fragmentation, invasive plants, drought, and fire (USFWS 2019 pp. 5–11).

Riverside County is home to the majority of critical habitat units that were eliminated or reduced in 2009 with the revised critical habitat rules (Figure 6 and Table 1) (USFWS 2009a). The Warm Springs unit (Unit 1, 2,684 acres) was entirely excluded, 6,560 acres of Skinner/Johnson (Unit 2), 2,569 acres of Sage (Unit 3), 4,350 acres of Wilson Valley (Unit 4), 6,398 acres of the Vail Lake/Oak Mountain (Unit 5), and 4,903 acres of Tule Peak (Unit 6) were excluded from protection as critical habitat because the area is "owned by or are under the jurisdiction of the permittees of the Western Riverside County MSHCP" (USFWS 2009a p. 28809). Major losses occurred in Northwest Riverside Subsequent to the removal of critical habitat designation; according to the FWS Recovery Plan Amendment (USFWS 2019 p. 3):

> The former Northwest Riverside subsequently hit an extirpation threshold, where resilience was irretrievably lost and all occurrence complexes within the unit were extirpated (including the Harford Springs Core Occurrence Complex). The entire Northwest Riverside Recovery Unit is now believed to be unoccupied, and not likely to be recolonized without assistance. Furthermore, one of the two core occurrence complexes in the Southwest Riverside Recovery Unit (Warm Springs Creek) may be extirpated. These two recovery units are not only highly affected by climate change and drought, but habitat loss has been concentrated in these areas. In western Riverside County approximately a dozen populations are believed to have been permanently extirpated by habitat loss, isolation, or both since recovery plan publication.

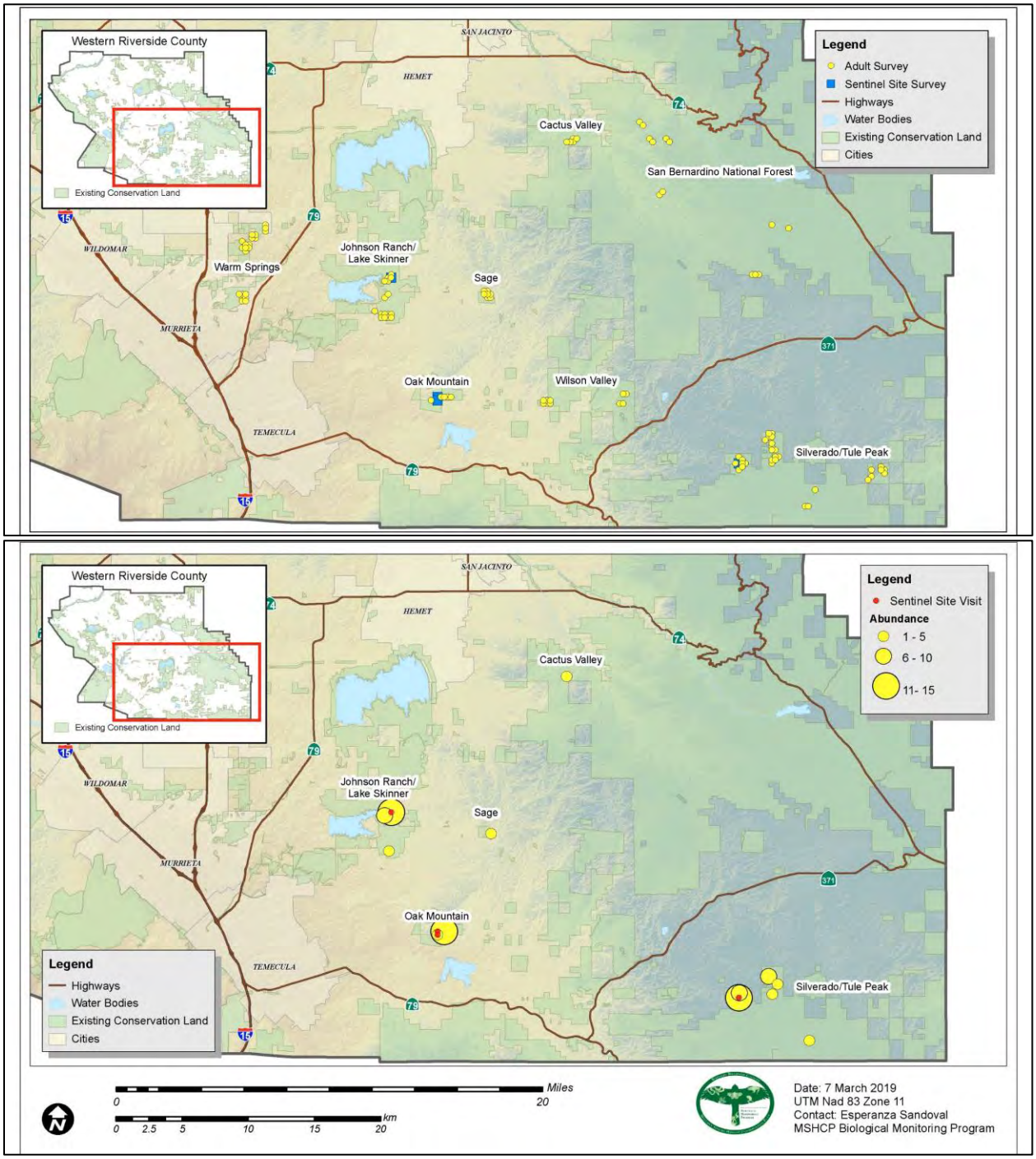

Figure 7. Survey locations in Riverside County (top) and subsequent documented presence and abundance of Quino in survey locations (bottom) in Riverside County in 2018. Maps from Biological Monitoring Program (2019). Noteworthy is the absence of occurrences at Warm Springs Creek, now considered an extinct population.

San Diego County

In San Diego County, Quino was considered extirpated from the following sites in 2012: Lake Hodges, Mira Mesa, Rancho Santa Fe, La Presa, Sweetwater Reservoir, and Dictionary Hill (Preston et al. 2012 p. Appendix). Quino has subsequently been documented at Dictionary Hill in 2017 (USFWS 2019 p. 9). According to the 2019 Recovery Plan Amendment, Quino is extant in 34 sites in San Diego County, including six Core Areas; of those 34 sites, Quino have only been observed in 21 sites (61.8%) in the last 10 years (USFWS 2019 pp. 8–11). Of the potential 34 extant sites in San Diego County, the FWS deems that all are still threatened by all or some combination of the following: climate change effects, habitat destruction, degradation, isolation, and fragmentation, nonnative plant invasion, drought, and fire (USFWS 2019 pp. 8–11).

The Quino checkerspot is generally known to occur at Otay Mesa, Otay Lake, Otay Mountain, Marron Valley, Jamul, Alpine, San Vicente Reservoir, and Jacumba (San Diego County Water Authority & RECON Environmental, Inc. 2010 p. B-172) with the following areas considered Core complexes: Miramar (seen in 2018, Central Marine Corps Air Station, outside any Recovery Unit), Otay (seen in 2018, SW San Diego and partially outside of any Recovery Unit), W Barrett Lake (seen in 2017, outside of any Recovery Unit), Marron Valley (seen in 2018, SW San Diego and partially outside of any Recovery Unit), Campo (seen in 2010, Campo Tribal Reservation, SE San Diego and partially outside of any Recovery Unit), and Jacumba (seen in 2011, SE San Diego) (USFWS 2019 pp. 8–11). Thus, only four of the six Core Areas were known occupied in the last nine years.

Some of the 2002 designated critical habitat units in San Diego County were eliminated or reduced in 2009 (Figure 6 and Table 1) (USFWS 2009a). From the Otay unit (Unit 8) 1,673 acres were excluded due to their coverage by the Chula Vista Subarea Plan and 109 acres of Air Force land; also excluded were 1,282 acres from La Posta-Campo (Unit 9) and 2,572 acres of Navy-owned or controlled land associated with the La Posta Facility "based on our [FWS] determination that the benefits of exclusion outweigh the benefits of inclusion, and that exclusion of this area will not result in extinction of the subspecies" (USFWS 2009a p. 28810).

Factors Affecting the Ability of the Species to Survive and Reproduce

The Quino checkerspot butterfly is threatened by sprawl development, habitat fragmentation, the U.S. southern border wall, *Cannabis* cultivation, grazing, recreation, pollution, invasive species, and climate change, including increased drought and fire frequency, as well as the inadequacy of existing regulatory mechanisms (USFWS 2009b, 2019).

The Present or Threatened Destruction, Modification, or Curtailment of its Habitat or Range

Development

Human population growth and increased development in Quino habitat has been and continues to be a major contributor to Quino extirpation and extinction risk since 1998 (Preston

et al. 2012 pp. 284–287). Development that does not take into account the life history, metapopulation dynamics, and connectivity needs of Quino checkerspot butterflies has led to the loss of vital Quino populations as well as habitat loss, degradation, and fragmentation throughout Riverside and San Diego Counties, two of the fastest growing areas of the United States. In the last 10 years, Riverside County's population grew 12.8% and San Diego County's population grew 7.8% compared to 6.1% in all of California (US Census Bureau 2020). Riverside and San Diego Counties are among the top 10 most populated counties in the United States, and Riverside County had the tenth and fifth highest county-level population growth from 2010-2018 and 2017-2018, respectively (US Census Bureau 2019). Further, there are recent calls to increase housing construction to stimulate the economy and reduce housing scarcity (Ober 2019).

Quino metapopulations which formerly occurred in Los Angeles, Orange, and western Riverside counties were extirpated as urbanization spread (Osborne & Ballmer 2019 p. 2). As described above, the ability of extended larval diapause together with the capacity of adults to colonize new or recolonize habitat patches has allowed for the Quino to adapt and survive the variable precipitation of southern California. Unfortunately, the metapopulation structure of Quino has proven much more vulnerable to the incompatible effects of historical and current urban land uses, and studies have shown that their populations can experience incremental extirpation or 'death by a thousand cuts' (Whitehead et al. 2017; Osborne & Ballmer 2019 pp. 2–3). The impacts of poorly-planned development on and adjacent to Quino population sites are greatly compounded by their domino effects on Quino metapopulation structure and reproductive resources and thus cannot be viewed as "land-proportional" impacts (Osborne & Ballmer 2019 p. 2). As stated by Quino experts: "whether, and at exactly what point, the loss of habitat surpasses an extinction threshold for the metapopulation remains unknown but has been surpassed time and time again both before and after the federal listing of Quino as endangered" (Osborne & Ballmer 2019 p. 2). Absent proactive land protection, ongoing development will inexorably impact remaining Quino populations.

Riverside County

The Quino is a covered species in the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) and is conserved on a *habitat* basis through Cell Criteria, which call for incorporation into 'the Preserve' of various percentages of cells (each cell is 160 acres) or groups of cells, in order to assemble a series of core areas and linkages (Dudek & Associates, Inc. 2003a pp. 3–121). Yet, the Western Riverside Regional Conservation Authority (RCA), which administers the MSHCP, is not currently acquiring private land within Criteria Cells for purposes of Quino conservation (land it did acquire in 2008 in Warm Springs Creek has been unoccupied during the last 11 years of surveys). Set-asides of large blocks of habitat through the land use process is not feasible due to already parceled conditions and due to the large-lot residential zoning present in most Quino habitat (County of Riverside 2015 figs. 3, Table 1, pp. 10, 19). Even if the RCA obtains small and scattered set asides from single family home construction or large lot subdivision, these are small scale and create a fragmented landscape rather than a functioning reserve system that support viable Quino metapopulations.

According to the RCA, occupied sites in the Wilson Valley Core Area—an area with typical rural residential zoning—are no longer highly suitable for the Quino and now support only small numbers (Biological Monitoring Program 2019 p. 14). While the Oak Mountain Core Area is one of the best remaining areas for Quino occupancy, with the remaining open land recognized as "very crucial to Quino persistence," it "continues to be developed," putting this prime location at risk (Biological Monitoring Program 2019 p. 15).

Western Riverside County and Murrieta Hills

Historic Riverside County western populations in the French Valley area, Warm Springs, Temecula, and Murrieta, are either extirpated or in decline. In 2018, 54 total adult Quino were found in only four of the Core Areas, none of which were within the French Valley (Biological Monitoring Program 2019 pp. 7–9) and Quino are considered extirpated from the Warm Springs Creek Core (USFWS 2019 p. 5). Edge effects from surrounding and intermixed development and pervasive non-native grasses that destroy the intact soil conditions needed by Quino larvae also likely make impossible any future Quino reintroduction (see discussion below on restoration feasibility in San Diego). Many highways cross core and satellite habitats in Riverside County and can lead to heavy Quino mortality (Dudek & Associates, Inc. 2003b pp. 1–26). Despite the conjecture that large wildlife overpasses could effectively permit Quino dispersal across busy roads (Dudek & Associates, Inc. 2003b pp. 1–26), the "Quino bridge" constructed over Clinton Keith Road at the behest of FWS is considered by Quino experts to be biologically completely inefficacious (Osborne 2020b).

On February 25, 2020, the U.S. Army Corps of Engineers posted notice of an application for a permit for the Murrieta Hills Development Project (U.S. Army Corps of Engineers 2020). The proposed project would construct 557 single-family residential units, 193 multi-family units and 18 acres of general commercial space within an approximately 973.7-acre area within the southern portion of Menifee Valley in unincorporated Riverside County, California (U.S. Army Corps of Engineers 2020 p. 7). The project site is currently undeveloped (U.S. Army Corps of Engineers 2020). The Corps' notice further indicates that the Quino is present in or around the proposed development, stating: "In total, the proposed project would remove approximately 277.21 acres of potential habitat for Quino checkerspot butterfly consisting of chaparral, coastal sage scrub, Riversidean sage scrub, non-native grassland, coast live oak woodland, and disturbed land cover types" (U.S. Army Corps of Engineers 2020 p. 5). The City of Murrieta issued a Draft Environmental Impact Report (DEIR) for the project on May 8, 2020. The DEIR acknowledges that Quino are "known to occur in [the Project] area" and that the property proposed for development contains Quino host plants and nectar sources (City of Murrieta et al. 2020 p. 4.3-27). Further, the Corps determined that the project "may affect, likely to adversely affect" the Quino and plans to initiate formal consultation with FWS "through a streamlined" process, requesting take authorization under the MSHCP be extended to this project and to the Corps (U.S. Army Corps of Engineers 2020 pp. 6–7). Thus, even if deemed compatible with the

MSHCP Criteria Cell standards, the Murrieta Hills development project may further jeopardize Quino in Riverside County through the effects of incremental habitat loss and fragmentation.

San Diego County

The Quino checkerspot butterfly is experiencing many cumulative and compounding threats from ongoing and imminent development in San Diego County that put it at risk of extinction in its last few Core populations areas. The mitigation thus far obtained by FWS for the destruction of Quino core habitat is insufficient to protect the butterfly from extinction. Importantly, the Quino checkerspot butterfly is not a covered species in the San Diego Multiple Species Conservation Program (MSCP), adopted in 1996 that covers some of Quino's current range. As a result, even in jurisdictions subject to an adopted MSCP NCCP/HCP Subarea Plan (County of San Diego) or which are preparing a subarea plan under the program (e.g. Santee), project impacts to Quino are being addressed through piecemeal, project-by-project permitting under Section 7 or Section 10 of the federal ESA.

Otay Village 14

On June 26, 2019, the County of San Diego approved the Otay Village 14 and Planning Areas 16 & 19 Project ("Village 14") (San Diego County 2020a p. 14; County of San Diego 2020d p. 2). The project site encompasses approximately 1,369 acres in Proctor Valley in unincorporated San Diego County in the Jamul/Dulzura Subregional Plan area (County of San Diego 2019 p. S.0-3). The Project is a planned community consisting of 1,119 single-family residential units, commercial uses, and a "Village Core" connected through a system of new roadways (County of San Diego 2019 p. S.0-2). The Final EIR for the project states that the project would result in the disturbance of 793.7 acres of Quino checkerspot butterfly "potential habitat," (County of San Diego 2018 p. 2.4-81) including at least 488.4 acres of federally designated critical habitat (Dudek & Associates, Inc. 2020a p. 29). Numerous Quino individuals at numerous locations in the immediate vicinity of the project were observed and recorded in 2017, 2018, and 2019, despite the fact that no protocol surveys were conducted in those years (Dudek & Associates, Inc. 2020a p. B-1, B-2).

On June 3, 2020, the County approved a revised "amended" project (County of San Diego 2020d) along with an associated amendment to the MSCP that "covers" the Quino under the MSCP for the amended Village 14 project only. The revised project reflects the exchange of 219 acres of State Ecological Reserve lands in central Proctor Valley that were purchased in 1993 by the Wildlife Conservation Board for "permanent protection" for private lands owned by GDCI Proctor Valley, LP (GDCI) in northern Proctor Valley. The proposed exchange of lands would shift development into the central portion of Proctor Valley from northern Proctor Valley, providing a more financially lucrative development footprint sought by GDCI, with 147, or 13%, more units. The Wildlife Conservation Board will consider the exchange in August of 2020.

The County has acknowledged that the revised project enacting the land exchange would result in a net loss of federally designated critical habitat for Quino compared to the approved project (County of San Diego 2020a p. 11). Indeed, the entirety of Central Proctor Valley where

Ecological Reserve Lands would be converted to development is designated Critical Habitat for the Quino, while northern Proctor Valley (where other lands would be conserved) contains almost no Critical Habitat (Dudek & Associates, Inc. 2020b fig. 2.4-20).

According to Quino biologists, central Proctor Valley is an integral part of the Otay metapopulation and key for connectivity between Otay Mountain and San Miguel Mountain (Osborne & Ballmer 2018). The development area is of critical importance to the continued regional persistence of the butterfly because the land in central Proctor Valley is generally intact, with native understory, bare ground, and cryptobiotic soil crusts important to the Quino (Osborne & Ballmer 2018). In contrast, the northern exchange lands are dominated by thick grasslands (see maps and photos, Hamilton 2020). The exchange lands are not expected to support a significant Quino population according to the California Department of Fish and Wildlife (CDFW) (CDFW 2019); as one indication of the difference in habitat quality, there were 44 observations of Quino in 2017, 2018, and 2019 on CDFW lands alone in Central Proctor Valley yet during the same time period, only six Quino were recorded in northern Proctor Valley (Hamilton & Stallcup 2020).

In sum, the results of the land exchange would be the destruction of hundreds of acres of known, occupied Quino habitat in central Proctor Valley and preservation of other habitat of marginal value to the Quino in northern Proctor Valley. The County did not prepare a subsequent or supplemental environmental impact report under the California Environmental Quality Act (CEQA) for the revised project. Although the the Land Conversion Evaluation (LCE) (CDFW 2019) identifies the need to restore GDCI exchange lands to a state comparable to the existing "highly intact" condition of the CDFW preserve lands, it never acknowledges that large-scale restoration of grassy and weedy areas to a "highly intact" (Quino-quality) condition is likely impossible, making the project's proposed mitigation inadequate. As stated in the letter dated May 25th, 2020, prepared by Quino experts Greg Ballmer and Ken Osborne (Ballmer & Osborne 2020a p. 5):

> The soil conditions that have precluded exotic weed invasion and that promote springtime longevity of *Plantago* require special compositions and decades or centuries of non-disturbance. In our experience, they cannot be recreated simply by weeding efforts. The proposed weeding of disturbed areas in the Village 14 "Quino Checkerspot Butterfly Conservation Strategy" is woefully inadequate to mitigate for lost Quino-quality *Plantago erecta* habitat that uniquely developed over ecological time.

Indeed, based on a review of all available monitoring reports of enhancement/restoration projects to date, no evidence exists that restoration efforts on such disturbed lands will be effective in sustaining Quino occupancy (AECOM 2010, 2013, 2015, 2016, 2017; Osborne 2013, 2014, 2015, 2016, 2017; Caltrans 2018; RECON Environmental, Inc. 2018, 2019; San Diego Habitat Conservancy 2019; HELIX Environmental Planning, Inc. 2019). These efforts involve weeding, host plant seeding, and a case of larvae reintroduction (which is not proposed here). The reports document no sustained increase of carrying capacity beyond baseline levels or the

establishment of self-sustaining Quino populations where none existed before. The proposed management measures therefore have no track record of efficacy. Even if the restoration were to overcome the soil condition obstacles described above, it would fail as mitigation because 1. its scale of several acres is a "drop in the bucket" compared to the impact of close to 200 acres, and 2. it would not recreate the range of microenvironments lost in the broad impact area, the diversity of which is essential for a viable metapopulation. There is no possibility of the exchange not resulting in a major net loss of occupied Quino habitat.

In conclusion, the Village 14 project in any of its iterations, including the land exchange, poses an imminent threat to the Otay population though loss of prime habitat in a location valuable for regional connectivity and the pernicious effects of development and fragmentation upon previously viable populations. In developing the mitigation plan for Quino that unsoundly relies on restoration, the applicant coordinated primarily with FWS rather than CDFW, reflecting CDFW's lack of regulatory authority (USFWS et al. 2020; Howard 2020).

Otay Village 13

A major development known as Otay Village 13 is planned to obliterate a large portion of the most reliable and productive Quino population known in San Diego. In March 2020, the County of San Diego published a Final EIR for the Otay Ranch Resort Village - Village 13 Project (San Diego County 2020b; County of San Diego 2020b). The proposed Project site consists of approximately 1,869 acres located on Otay Lakes Road in southwestern San Diego County, east of Chula Vista (County of San Diego 2020b p. S-1). The project is a portion of Otay Ranch, which like Village 14 is also covered by the 1993 Program EIR that requires avoidance of occupied Quino habitat. Village 13 proposes development of 1,881 single-family dwelling units, a mixed-use area with 57 multi-family residences and up to 20,000 square feet of neighborhood commercial uses, and a 17.4-acre resort hotel that would consist of up to 200 guest rooms and up to 20,000 square feet of ancillary commercial/office uses, including meeting rooms, a conference center, offices, shops, and restaurants.

The Village 13 Final EIR for the project discloses that 145 individual Quino checkerspot butterflies were recorded in surveys conducted in the past five years on the project site, and many of the sighting locations were within the development footprint of the project (County of San Diego 2020c p. 2.3-19). The project site would affect over 573 acres of federally designated critical habitat within Unit 8 (County of San Diego 2020c p. 2.3-20). The focus on mere numbers of host plants and adults in the Final EIR completely ignores the effect of the development on the site's current known function as a dependable source population. The loss of Core habitat from the project (even after proposed mitigation) will have a significant and potentially catastrophic effect on the long-term viability of the affected Unit 8 metapopulation.

By reducing the size of a large area of designated Quino critical core habitat, Village 13 will prevent Quino larvae from finding enough food to survive pre- and post-diapause and from successfully moving about the landscape to required areas of microhabitat for pupation, resulting in significant negative impact to butterfly's survival in the region. Quino larvae require

heterogeneous habitat of sunny southern facing slopes with shaded areas and both open areas with food plants and nearby areas with larger vegetation (Osborne & Redak 2000; Pratt & Emmel 2010). For a large Quino population to persist on a given site for many years and achieve population occupancy, the butterfly needs an expansive, connected heterogeneous area of habitat (Osborne & Redak 2000). Should it be allowed to proceed, Village 13 would break up the existing continuous expanse of habitat, reducing if not dooming the resiliency of this metapopulation. Also, Village 13 is located directly adjacent to Otay Lakes; proximity to moisture-laden waterbodies has been recognized as important to population resilience, yet such unique habitat is exactly what would be lost at Village13. (USFWS 2019 p. 4).

The Final EIR's proposal to mitigate the loss of an occupied core Quino checkerspot butterfly habitat at a 2:1 ratio largely on-site will not reduce the impacts from this project to less than significant (County of San Diego 2020c p. 2.3-20). The remaining on-site habitat will be seriously degraded as a result of edge effects, invasive species, fragmentation, and human disturbance. Given the well documented effects of nearby incremental development on Quino populations (Preston et al. 2012) there is no reason to believe that the undeveloped habitat will ensure that the affected metapopulation will be able to survive in the long term and continue to function as a source for temporarily depopulated locations. The Village 13 site has proven resilient during prolonged drought, with positive surveys when nearby locations were negative, and all proposed alternatives, including the their favored 'Alternative H' plan, are no substitute for protection of this unique source population and the diverse microclimes that confer resiliency. According to Greg Ballmer and Ken Osborne (2020b):

> The project's vast development footprint would remove 692 acres of Quino habitat, *all* of which is Critical Habitat for the species as determined by the US Fish and Wildlife Service. …Alternative H will eliminate substantial site diversity – in slope, aspect, soil, vegetation, etc. – and, contrary to unsupported claims in the FEIR, will have *devastating* effects on a known and reliable Quino source population.
>
> According to the FEIR, the development footprint of Alternative H directly displaces about 40% of reported QCB larval host plant sites within the overall project site. The documents point out that some of the densest occurrences of QCB larval host plants would be conserved within proposed open space… In contrast to the EIR's assumptions, it is precisely dispersed (*not* densely concentrated) larval resources in a diversity of microclimate settings that support the resilience of QCB populations through climate fluctuations and other stochastic events.
>
> All QCB resources within the proposed Alternative H development footprint would be eliminated. Additionally, based on the 1 km rule (Preston, et al 2012), essentially all observed QCB adult and larval host plant sites within the proposed preserved open space, and extending into adjacent lands managed by other entities, would be at risk of extirpation. Insofar as the QCB population within the Project site and adjacent properties is integral to the

larger Proctor Valley QCB metapopulation complex, Alternative H constitutes an existential threat to the Proctor Valley QCB metapopulation complex…

As mitigation for Alternative H, the County proposes to set aside occupied Quino habitat on-site in proximity to the development area and to undertake a very limited program of host plant restoration/enhancement in currently weedy patches in the conservation area. The proposed measures would fail to mitigate for the project's impacts to the Quino for two reasons. **First, the proposed mitigation would *not* compensate for the diverse microenvironmental range lost in the broad area impacted by the project, the diversity of which is essential for a viable metapopulation. At best it would produce marginally more host plants in the exact same fewer microenvironmental locations that already exist within the proposed covered space, and therefore perpetrate a great loss of the original diversity of microenvironments…**

The second reason for failure of the mitigation plan is that the restoration/enhancement *itself* has a low likelihood of efficacy, and indeed, no evidentiary support in providing actual benefit to the Quino. Even if successful, rehabilitating a *very small* amount of degraded QCB habitat on site cannot mitigate for the loss of *many times* that amount of mature, diverse, occupied habitat within the project impact area

Otay Quarry

This mining project located on Otay Mountain in southern San Diego County is pursuing consistency with the San Diego County MSCP Subarea Plan and an HCP permit from USFWS (HELIX Environmental Planning, Inc. 2020a). Based on the protocol for identifying occupied Quino habitat in the 2009 draft Quino Amendment to the MSCP, 410.7 of the 414.4 acres of the site and off-site parcel are considered occupied, respectively, and implementation of the proposed project would impact 104.9 acres of occupied Quino habitat with a loss of 97.8 acres of Critical Habitat (HELIX Environmental Planning, Inc. 2020b p. 4.3-9,10).

Otay Mesa Project Southwest Village Specific Plan

On February 26, 2020, the City of San Diego issued a Notice of Preparation of an EIR for the Otay Mesa Southwest Village Specific Plan project (The City of San Diego 2020). The project site is 490 acres, located approximately seven miles west of the coast and 0.5 miles north of the Mexican border (The City of San Diego 2020). The proposed project would allow up to 5,130 attached and detached residences, and new "village" anchored by up to 175,000 square feet of commercial and retail uses in a mixed-use Village Core (The City of San Diego 2020). Although the EIR has not yet been prepared and surveys, if conducted, have not been made public, CDFW submitted comments on the project noting that Quino is among the special-status species for which the project could have significant impacts (Mayer 2020 p. 2).

Fanita Ranch

The City of Santee issued a Notice of Preparation of a Draft Revised Environmental Impact Report for the Fanita Ranch project in 2018, and a draft EIR was circulated in May 2020. The proposed project is the latest iteration of development proposed for the approximately 2,635-acre Fanita Ranch site located on the northern edge of Santee. This version of the project would consist of up to 3,008 residential units (City of Santee 2018 p. 2). The Fanita Ranch site is considered a key component of Quino conservation and recovery due to the presence of 1,700 acres of suitable Quino habitat, including host plants, and its spatial relationship to other populations; the project currently under review would impact about 580 acres of potential Quino habitat and fragment the remainder (Technology Associates International Corporation 2006 pp. 4-57-4–59; Harris & Associates & City of Santee 2020 p. 4.3-63). Commenting on a version of the project substantially similar to that described in the Notice of Preparation, FWS and CDFW (Goebel & Sevrens 2016 p. 15) observed that

> The proposed Fanita Ranch footprint would directly and indirectly impact most of the remaining habitat for Quino (mapped by host plant occurrences) within the project site, including fragmenting what would be the largest remaining habitat patch within the project site. The largest area of extant mapped Quino habitat onsite would, following project implementation, be located between two closely adjacent development polygons; these proposed adjacent development areas would include a community farm and orchard as well as urban development, and two surrounding paved access roads.

Quino surveys were conducted on the Fanita Ranch site in 2004, 2005, and 2016, and an individual Quino was observed on the site in 2005. Although Quino were not detected on the site in 2016, FWS and CDFW consider that drought conditions over the past several years "have created unfavorable conditions for Quino and negatively affected Quino populations in San Diego County," and "expect that Quino are in low numbers on site or the site is currently temporarily unoccupied" (Goebel & Sevrens 2016 p. 15).

FWS and CDFW further observed (Goebel & Sevrens 2016 pp. 15–16) that Fanita Ranch is within the possible future Central San Diego County recovery unit described in the Quino Recovery Plan:

> The unit location described includes Fanita Ranch, and this general area is expected to be the only suitable location in the coastal metapopulation's distribution available and expected to support the species. Loss of the Quino habitat, per the current proposal on the Fanita Ranch site, may preclude recovery of the species. Moreover, based on the current declining status of the species, Quino habitat on Fanita Ranch should be conserved to provide for the Quino metapopulation in the area. As noted above, Quino requires conservation of temporarily unoccupied patches of habitat essential to maintain population resilience (Service 2009). The edge effects and habitat fragmentation that would likely result from the proposed

development would eliminate or considerably reduce the long-term viability of the Quino in the project area and limit the species ability to expand or re-populate the area locally.

FWS and CDFW concluded that "the Fanita Ranch proposed project would not fully minimize and mitigate its impacts on Quino, would result in a net loss of Quino habitat function, and would have a high potential to preclude recovery of the species" (Goebel & Sevrens 2016 p. 16).

Habitat Fragmentation

Quino metapopulations require connectivity between its subpopulations for survival and are vulnerable to the permanent loss of any subpopulation that reduces stepping stone connectivity or dispersal patterns (Mattoni et al. 1997 p. 114). Historically, isolation of Quino populations has been associated with extinction, as 92% of extant populations had another population within five km compared to just 8% of extinct sites (Preston et al. 2012 p. 284). The only appropriate protective approach for the Quino is to maintain large continuous parcels of land that contain all Quino metapopulations (Mattoni et al. 1997 p. 115). Unfortunately, even as it is federally protected as endangered with designated critical habitat, the Quino has and continues to lose large swaths of its core habitat areas, due to actions like those described above, reducing essential connectivity.

For a large Quino checkerspot butterfly population to persist on a given site for many years and achieve population occupancy, the butterfly needs an expansive, connected heterogeneous area of habitat (Osborne & Redak 2000). Turning a large area of designated critical core habitat for the Quino checkerspot butterfly into fragmented areas of smaller disturbed areas, such as proposed in the Otay Village 13 and 14 projects, will prevent Quino larvae from finding enough food to survive pre- and post-diapause and from successfully moving about the landscape to required areas of microhabitat for pupation, resulting in a significant negative impact to the butterfly's survival in the region. Should all of the currently proposed (and permitted) development projects be allowed to proceed, they would break up the continuous expanse of habitat, cumulatively causing Quino extinction (Whitehead et al. 2017).

Specifically, once the butterfly emerges from the chrysalis, adult females must mate and lay eggs as well as seek nectar plants for feeding. Habitat fragmentation from the many current and imminent development projects outlined above would result in less contiguous habitat, causing separation of larval host plants from potential nectar sources, reducing the resources available to adult butterflies. This translates to female adult butterflies unable to obtain enough nearby nectar resources between bouts of egg laying, reducing energy levels and fecundity, thus significantly harming the butterfly by reducing reproductive output (Mattoni et al. 1997 p. 106).

While the reproductive success of dispersing Quino adults depends on them finding suitable scattered resources, they can be inhibited from doing so by effective barriers such as high walls (probably in excess of ten feet high), extensive patches of housing and development, and large highways (Osborne & Ballmer 2019 p. 6). Adult Quino dispersing into inappropriate habitat (such as built environments) are lost to the metapopulation. Thus, placement of extensive areas of development within Quino metapopulations, as is outlined above, create barriers to

dispersal and remove Quino adults from the functional population. While Quino corridors have been discussed and attempted, experts believe that (Osborne & Ballmer 2019 p. 6):

> Setting aside dispersal corridors (through a built environment) is a problematic attempt to maintain connectivity within the larger metapopulation and assumes the unlikely ability of dispersing Quino to recognize and remain within such corridors without wandering into the "dead zone" of adjacent urban landscapes. For designated dispersal "corridors" to be effective, they must be buffered sufficiently from bordering urban landscapes. While the effective dimensions of such corridors have not been experimentally determined, a minimum width is likely to be at least as great as that for an edge effect buffer (i.e. 0.6-mile buffer from each edge).

The Quino is also negatively impacted by the synergistic threats of habitat fragmentation, invasive species, and climate change (USFWS 2009b). Habitat patches with large edge-to-area ratios also experience higher rates of invasive plants due to ground disturbance and edge effects (USFWS 2009b p. 15). Butterflies are unable to recolonize fragmented habitat patches once isolated from the metapopulation (Preston et al. 2012); thus, without interbreeding between patches, the butterfly will have limited behavioral and genetic adaptive capacity and be further compromised in the area. Further, all recent science on Quino conclude that maintaining connectivity among habitat and to higher elevation habitat is necessary for Quino's adaptation and survival in the face of climate change (USFWS 2019 p. 3). As such, maintenance of functional connectivity between contiguous core habitat and suitable habitat patches is a necessary conservation action to minimize the loss of the butterfly in the face of increasing human population growth and development and the changing climate.

Loss of Genetic Diversity

The lack of connectivity between populations results in lower gene flow between metapopulations and ultimately inbreeding depression (the increased incidence of mating among relatives leading to an increase in homozygosity of deleterious alleles), lower effective population size, loss of genetic diversity, and subsequent extinction (Nieminen et al. 2001 p. 237; Miller et al. 2014). Inbreeding depression occurs in small populations with no gene flow and is a major threat to population viability (Nieminen et al. 2001 pp. 240–243). While Quino's current genetic diversity has not been compared to historic levels, due to the extreme reduction in population abundances and connectivity, it is likely that genetic diversity of current wild populations is low relative to historical levels (Miller et al. 2014 p. 86). Inbreeding depression was found to increase the extirpation probability of a related, similar butterfly species, the Glanville fritillary, which is also found in isolated metapopulations (Nieminen et al. 2001 pp. 242–243). Continued habitat fragmentation and population isolation could lead to poor genetic health, reduced fitness (e.g. genetic disorders, susceptibility to disease), and reduced resilience to stochastic events (e.g. flooding, wildfire) and climate change.

Border Wall

On Jan. 25, 2017, Donald Trump issued an executive order calling for construction of a wall along the entirety of the nearly 2,000-mile border between the United States and Mexico. Since January 2017, 139 miles of new primary and secondary border wall system has been constructed along the U.S. southern border in addition to the already nearly 700 miles of barriers (U.S. Customs and Border Protection 2020a p. 1). In 2017, approximately 40 miles of new border wall system was built in San Diego and El Centro Sectors of California; construction of 12 more miles of new wall in San Diego began in 2019 and more are planned for 2020 (U.S. Customs and Border Protection 2020a pp. 1–2). The Department of Homeland Security describes the new wall system as follows: "The projects also include the installation of a linear ground detection system, road construction or refurbishment, and the installation of lighting, which will be supported by grid power and include embedded cameras. The design of the new bollard steel fencing includes 30-foot steel bollards that are approximately 6" x 6" in diameter" (U.S. Customs and Border Protection 2020b p. 1).

The wall itself creates an impassable barrier to wildlife; it results in thousands of acres of direct habitat destruction, impacts thousands more through indirect disturbance from roads, lights, noise, serves as a barrier to movement of plants and animals, and causes soil erosion, altered fire regimes and hydrological processes (Peters et al. 2018 p. 740). Impacts of existing border construction on wildlife or the environment as a whole have not been catalogued in large part because Congress, under the Real ID Act in 2005, has vested the Homeland Security secretary with the power to waive otherwise applicable laws, including the ESA and NEPA (Peters et al. 2018 p. 740).

Of the Quino's 62,174.2 acres of critical habitat, 40,133.5 acres, or 64.6%, lay within 50 miles of the border (Greenwald et al. 2017 pp. 11, 16). Quino critical habitat has already been hit hard by wall construction, with border wall prototypes having been built within Quino critical habitat (Hamblin 2018). Now more damage is occurring as a double-layer border wall is being built across the western edge of the Otay mountains within Quino critical habitat, resulting in habitat disturbance and cleared land to add the secondary barrier and patrol roads (U.S. Customs and Border Protection 2018 p. 3).

A map created by the Center for Biological Diversity (Figure 8), shows designated critical habitat for the Quino to the east of the existing border wall prototype site and where the Customs and Border Patrol (CBP) is constructing 14 miles of wall and associate infrastructure (U.S. Customs and Border Protection 2018). CBP's 2018 Biological Survey of this area notes that "the Quino checkerspot butterfly has a moderate to high potential to occur within the Project Area" and that "there is suitable habitat for the Quino checkerspot butterfly within the Project Area" (U.S. Customs and Border Protection 2018 pp. 25, C–4).

The proposed 30-foot high "secondary wall" will further interfere with migrations and flight patterns of the Quino checkerspot butterfly, which generally avoids flying over objects taller than seven to eight feet (USFWS 2009b; Greenwald et al. 2017 p. 16; Peters et al. 2018 p. 741). Even though there are gaps between bollards in a bollard-style wall, the proposed wall,

especially when considered cumulatively with the impacts of the existing 18-foot high "primary wall" and other infrastructure in the area, is likely to interfere with flight patterns and increase genetic isolation between the small U.S. population of butterflies and the larger population in Mexico (Stallcup 2004 p. 2). With the immense amount of ground disturbance, border wall construction also harms native vegetation and spread invasive species, threatening the host plants the butterfly needs to reproduce. Because the butterfly has declined so drastically, the size and connectivity of all surviving populations are critically important to avoid inbreeding depression and to contribute to adaptive resilience in the face of climate change.

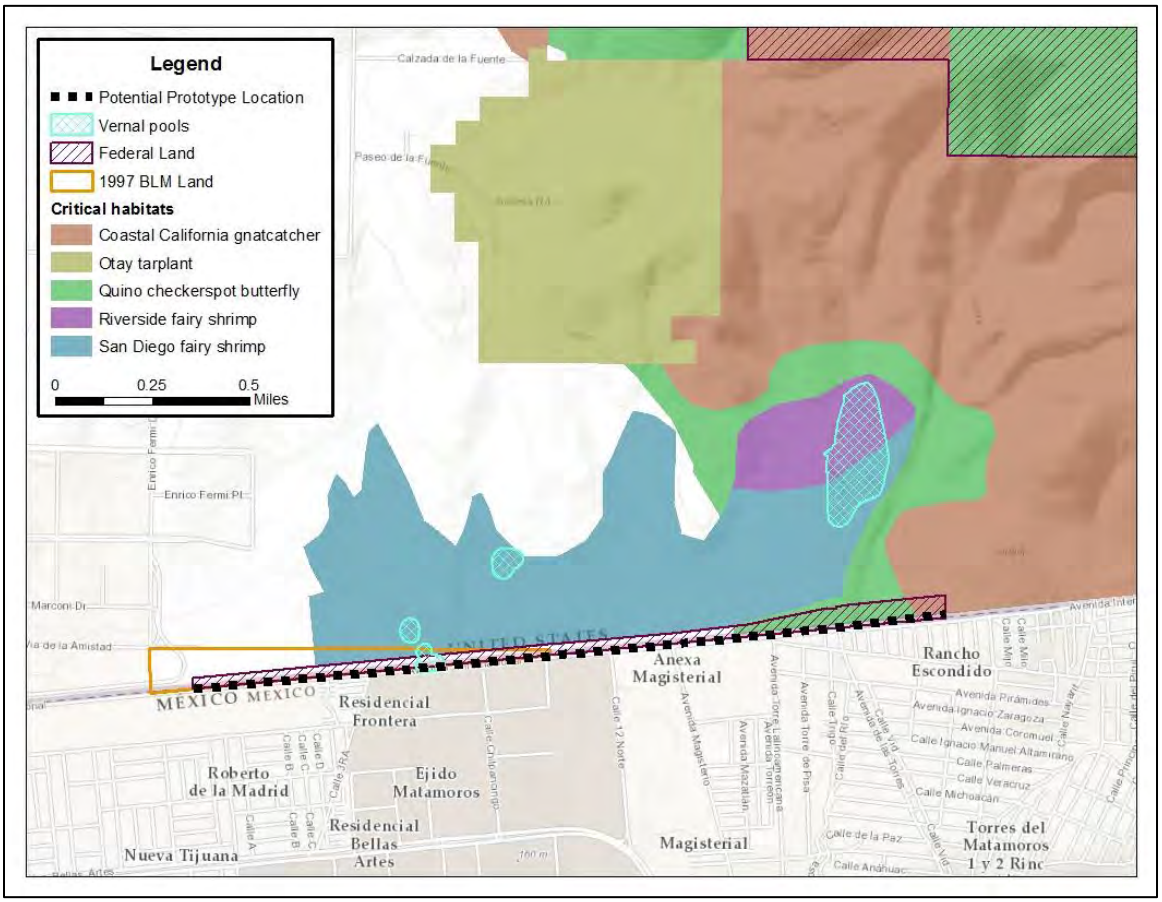

Figure 8. Critical habitat map at proposed wall construction in San Diego County, Quino shown in green. Map by Kara Clauser.

Invasive Species

According to the USFWS, the "Conversion from native vegetation to nonnative annual grassland is the greatest threat to conserved habitat and a high magnitude threat to all habitat that is not managed" (USFWS 2009b p. 15). Invasive plants outcompete and thus reduce the abundance of Quino host and nectar plants (USFWS 2003 pp. 57–58). Invasive plants also reduce the suitability of Quino host plants, as females are less likely to deposit eggs on host plants that are shaded by other plants (USFWS 2003 pp. 57–58, 2009b p. 15). Unfortunately, nearly all of the Quino's former range has been converted into a landscape dominated by human

habitation or non-native plant species (Biological Monitoring Program 2019 p. 2). At the time of the FWS's Quino five year review, "no plans or actions to control nonnative plant species are currently in place" in places where the threat of grazing has been reduced (USFWS 2009b p. 16).

The majority of the invasive plants threatening the Quino were introduced as forage for livestock, particularly Mediterranean grasses and forbs, that rapidly outcompeted and replaced most native grassland vegetation; thus, Quino host plants have been and continue to be severely reduced in population size and extent (Seabloom et al. 2003 pp. 575–576; Biological Monitoring Program 2019 p. 2). Nonnative annual grasses such as red brome (*Bromus rubens*), rigput brome (*B. diandrus*), and slender wild oat (*Avena barbata*) have spread from coastal to inland habitats, contributing to the rapid loss of Quino habitat and its decline (Preston et al. 2012 p. 288). According to Ballmer and Osborne (2020a p. 2), "Generally, all of the significant, lowland *Plantago erecta*-associated Quino populations occur on soil conditions that both support the butterfly hostplant ***and exclude competitive exotic annual plants.***"

Nitrogen Deposition

Soils in urbanized regions are being fertilized by excess nitrogen generated by human activities, an intensifying threat as more roads are constructed with increased urbanization, such as is planned in the Southern California Association of Government's long-range Regional Transportation Plan (USFWS 2003 p. 65; Weiss & Longcore 2020 p. 1). Specifically, nitrogen pollution from urban traffic produces nitrogen oxides and ammonia that increases soil fertility and in turn stimulate growth and dominance of nutrient-limited nonnative, invasive grasses, exacerbating their competitive advantage and the displacement of Quino host plants, like *P. erecta* (Padgett et al. 1999 p. 769; Weiss 1999; Fenn et al. 2010; Weiss & Longcore 2020). The continued urban sprawl being proposed and permitted currently in Quino's core and critical habitat areas will add to the nitrogen pollution and invasive species dominance.

Quino occurs in the fastest growing and spreading counties where even 20 years ago, soils in the most polluted regions near Riverside, California had more than four times the typical concentration of extractable nitrogen than found in unpolluted soils (Padgett et al. 1999; USFWS 2009b p. 15). Still today southern California has some of the highest nitrogen deposition in the United States, can exceed 25 kg-N ha^{-1} $year^{-1}$, and local hotspots can exceed 50 kg-N ha^{-1} $year^{-1}$ (pre-industrial background is estimated at < 1 kg-N ha^{-1} $year^{-1}$) (Weiss & Longcore 2020 pp. 2–3). Nonnative grass invasion is facilitated at 6 kg N ha^{-1} y^{-1} and 7.8–10 kg N ha^{-1} y^{-1} of deposition in native grasslands and coastal sage scrub, respectively; further, elevated nitrogen can spread and be deposited at least 1,500 feet from the roadway (Weiss 1999; Fenn et al. 2010; Weiss & Longcore 2020 pp. 2–5). In addition to the regional plume of nitrogen pollution, the long-range Regional Transportation Plan includes the widening of highway 79 within 1.5 miles Quino's critical habitat at Skinner Reservoir and the widening of I-15 adjacent to the Northwest Riverside recovery unit (Weiss & Longcore 2020 p. 6). Thus, nitrogen deposition is a major threat to the Quino and poses to become a larger threat due to sprawl development planned throughout its range.

Cannabis cultivation

New and existing agricultural operations are largely exempt, and thus require no mitigation, under the Western Riverside MSHCP (Dudek & Associates, Inc. 2003a pp. 6–56). Since the MSHCP adoption in 2003, smaller and more scattered operations have emerged as the agricultural economy has adapted to changing markets. A potential increasing threat to Quino and its habitat is cultivation of marijuana via direct effects of habitat destruction, introduction of pesticides and chemical fertilizers, and illegal and legal water extraction that exacerbates drought (Bauer et al. 2015; Carah et al. 2015). As Quino expert Gordon Pratt notes regarding the Anza population in Riverside, County (Pratt 2020a):

> The Anza populations are still here, although they have suffered drastically from a variety of things. One of the major problems is caused by local marijuana growing. Pesticides, herbicides, fertilizers, etc. put into the habitat where Quino occur have taken their toll upon local populations. Converting land use for marijuana growing on even Federal lands set aside in part for Quino such as with the Beauty Mountain Wilderness seems to have caused drastic reductions in populations. Less than 10 years back I could walk local drainages and literally see hundreds of Quino, now I can walk the same drainages and consider myself lucky to see one Quino.

Livestock Grazing

While light conservation-based grazing may maintain early successional habitat needed by the Quino, heavy grazing reduces the cover of Quino host plants in favor of invasive species, such as *Erodium botrys*, as *P. erecta* has been found to be more common in areas inaccessible to cattle (Mattoni et al. 1997 p. 113). As noted by a Quino expert, "even though grazing temporarily removes the annual crop of exotic weeds, it also disturbs the soil surface thus promoting the continued dominance of the same weeds. The promotion of grazing for Quino conservation overlooks this critical flaw- the unavoidable maintenance of soil surface disturbance as part of an unending feedback cycle" (Osborne 2020a). Grazing can directly trample and kill diapausing larvae and pupae, alter microclimates, and reduce the richness and abundance of host and nectar plants (USFWS 2003 pp. 59–60; Preston et al. 2012 pp. 285–288). Of critical importance due to Quino's extended diapause phase, soil surface stability is decreased and soil compaction increased by grazing (Kimoto et al. 2012 p. 7). Further, grazing disturbs and eliminates the important cryptogamic crusts that maintain soil stability and hold in essential moisture and nutrients (Mattoni et al. 1997 p. 112).

Recreation

Recreational activities such as biking, off road vehicle (ORV) use, and equestrian activities, are expected to increase with sprawl development projects outlined above and will be detrimental to Quino when adults and larvae are active, as larvae frequently bask in open areas and on bare ground, such as ORV tracks (Osborne & Ballmer 2019 p. 5). Frequent ORV use increases erosion and fire frequency, and creates trails that are conduits of nonnative plant

invasion (USFWS 2003 p. 59) but compaction and damage of arid soil can occur with as few as 1-10 passes by an ORV, leading to water runoff and alteration of the soil biotic community (Lei 2009 p. 159). Loss of cryptogamic crusts due to ORVs also reduces water retention, nutrient retention, and seedling germination (The Nature Conservancy 2007 pp. 52 and 58). ORV tracks, even single passes, can also facilitate the spread of invasive plants by creating areas that trap and shelter seeds (Brooks 2009 pp. 112–113). Large increases in nonnative plant biomass and species richness has been found within ORV tracks and areas with increased ORV track density, respectively (Brooks 2009 p. 116). ORVs also expel significant amounts of fine and coarse dust particles (Goossens & Buck 2009 pp. 118, 134) that can cause insect mortality by increased desiccation due to cuticle abrasion and excessive salivary grooming, respiratory stress by blocking spiracles, and disruption of digestion if ingested (Edwards & Schwartz 1981 p. 715).

The FWS has recognized that "recreational disturbance is frequently observed in monitored, occupied habitat where larvae are observed on host plants" (USFWS 2009b pp. 14–15). While Quino requires some disturbance to maintain its host plants, ORV trails can become ecological traps as habitat for Quino females to lay eggs on host plants adjacent to the trail and for post-diapause larvae to bask in the sun (Schlaepfer et al. 2002; Ballmer 2020). Specifically, ORVs push *P. erecta* host plant seeds 1-2 inches into the soil along trails, resulting in plants that grow larger than other *Plantago* spp. since the seeds remain moister for longer into the season; these large host plants attract Quino females since they prefer to lay their eggs upon large plants on open soil and larvae subsequently build communal shelters along the roads, attracted to the sun exposure (Pratt 2020c). Thus, the ORV trails become preferred habitat for Quino eggs, larvae, and adults that are then crushed when ORVs come back over the trails, an effect witnessed on Bureau of Land Management (BLM) properties in Wilson Valley, Riverside County in the late 1990s (Pratt 2020c). Thus, temporally and/or spatially extensive ORV use can be and has been extremely detrimental to Quino populations, aiding in the extirpation of at least two sites (Ballmer 2020).

Quino experts have witnessed numerous dead, squashed Quino larvae on an informal ORV trail shortly before, in subsequent seasons, the Harford Springs, Riverside County Quino colony had declined or disappeared (Ballmer 2020). That colony was well known for many years by lepidopterists prior to its extirpation, which occurred during a period of conversion of surrounding open space to semi-urban development (large lot homes of five or more acres) whose owners partook their equestrians and ORV recreational activities in the remaining open space surrounding the county park (Ballmer 2020). The Riverside County Oak Mountain/Vail Lake Quino Core site (the most significant remaining *P. erecta* associated Quino colony remaining in the county) is a patchwork of private and BLM lands with informal ORV trails throughout and has been regularly degraded by ORV activity (Figure 9), despite BLM signage prohibiting this use (Ballmer 2020; Osborne 2020a).

Figure 9. Off road vehicle tracks at Riverside County Oak Mountain/Vail Lake core site (Photo by Greg Ballmer).

Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

Overutilization pushes imperiled species towards extinction, especially in conjunction with other threats. At the time of federal listing, over-collection was considered a potential threat to Quino because of specimen value to collectors (USFWS 1997). Thus, the Quino is likely still imperiled by insect collectors who highly prize specimens of this subspecies due to its rarity and notoriety (C.D. Nagano pers. comm.). Like many other rare and imperiled butterflies, there are national and international markets for protected and petitioned species. For example, populations of the endangered Mitchell's satyr butterfly were visited on an almost daily basis by collectors who captured every specimen they could find and after a few seasons, they vanished (Gochfeld & Burger 1997). The collector who discovered the endangered Saint Francis satyr butterfly would not disclose its location and told others the animal was extinct to increase its commercial value (C.D. Nagano pers. comm.). Two collectors who later plead guilty to violating the Endangered Species Act had large numbers of nearly all the listed butterflies in the United States, including the Quino (US Attorney's Office 1993). There are now numerous dealers on the internet who sell a wide diversity of common, rare, imperiled, and protected butterflies on their own websites, eBay, and Facebook for up to thousands of dollars depending on the species and the quality of the specimen. Thus, commercial transactions have become easier and are often carried out with no public scrutiny via direct email between dealers and known customers.

Although there are no studies of the impact of the removal of individuals on natural populations of the Quino, studies of other imperiled and endangered nymphalid butterflies (Gall 1984a, 1984b; Hellmann et al. 2004), and a Lycaenid butterfly (Duffey 1968) indicate that it is highly likely that the Quino would be adversely affected if collected during low periods in their metapopulation cycle when colonies are small and isolated from each other. As has been observed by FWS law enforcement personnel, collectors are known to take large numbers of specimens of rare butterflies in anticipation of rising value when the species is at low populations or if they become extinct (C.D. Nagano pers. comm.). An added threat to the Quino is when collectors trample, compact, and destroy eggs, larvae, pupae and the sensitive cryptogrammic soils that are a key element of the early stage habitat. Concern about this impact caused the FWS to require permits for biologists surveying for the subspecies (C.D. Nagano, pers. comm.). The listing of the Quino as endangered by the State of California would give added critical protection from collectors.

Other Natural or Manmade Factors Affecting its Continued Existence

Climate Change

Human activities have increased global average temperatures 0.8-1.2°C above pre-industrial levels with a trend of about 0.2°C per decade due to past and current emissions (Intergovernmental Panel on Climate Change 2018 p. 4). At current emissions rates, global temperatures will increase by 1.5°C between 2030-2052, resulting in increased incidence of severe weather events (Intergovernmental Panel on Climate Change 2018 p. 4,8). At a warming of 1.5°C, temperature and precipitation extremes will be exacerbated (Intergovernmental Panel on Climate Change 2018 pp. 8–9). The Quino's range in southern California has been and will continue to experience more precipitation extremes between heavy rainfall and extreme drought as well as increased annual mean temperatures and warmer nights (Parmesan et al. 2015 pp. 14–15). Quino population extinction is associated with a higher proportion of extreme rainfall events during 10-20 year periods and remaining Quino populations are found in areas with less precipitation extremes and lower temperatures (Preston et al. 2012 pp. 284–288).

Extended drought has been more common in Southern California since 2012 and has resulted in lower adult numbers across the Quino's range compared to years past (USFWS 2019 p. 3). Further, the remaining largest and most resilient Quino populations are associated with water bodies, particularly large and long-established reservoirs such as Lake Skinner, Vail Lake, and Lower Otay Lake, most likely due to the available moisture during times of drought (USFWS 2019 p. 4). Due to the reduction of cooler, high humidity coastal habitat due to development, it is essential that metapopulations near water bodies are conserved as they will likely contribute to the Quino's resilience to climate change (USFWS 2019 p. 4).

While other members of the Edith's checkerspot species have been documented to shift their ranges to higher latitudes and altitudes in response to regional warming, the Quino lives at the southernmost range limit of the group, making it particularly vulnerable to climate warming (Parmesan et al. 2015 p. 3). The Quino is currently extirpated from its historical northern range

limit but is precluded from re-colonizing the area without assisted migration due to urban development (Parmesan et al. 2015 pp. 3, 16). Range projections using climate models show zero overlaps between current and future range due to climate change (Parmesan et al. 2015 p. 15); however, Quino populations discovered since 2010 have been found at higher elevations and outside of the designated critical habitat areas, thus the Quino needs protection in these new habitats to allow for adaption and survival in the face of climate change (Parmesan et al. 2015 p. 14). Key to Quino survival in the face of climate change is connectivity between currently occupied sites and those at higher elevations (Parmesan et al. 2015 p. 17).

Increased fire frequency

Climate change is likely responsible for the increased fire frequency in southern California due to drying fuels, a trend that is likely to continue with further warming and declines in precipitation (Williams et al. 2019). Further, sprawl developments, like those planned in Quino habitat, lead to more frequent wildfires caused by human ignitions like power lines, arson, improperly disposed cigarette butts, debris burning, fireworks, campfires, or sparks from cars or equipment (Keeley et al. 1999; Keeley & Fotheringham 2003; Syphard et al. 2007, 2012, 2019; Bistinas et al. 2013; Balch et al. 2017; Keeley & Syphard 2018; Radeloff et al. 2018). The Quino's habitat of chaparral and sage scrub is adapted to large fires being infrequent (every 30 to 150 years) and if these regimes are disrupted, the habitat becomes degraded (Keeley 2005, 2006). When fires occur too frequently, native shrublands are replaced by non-native grasses and forbs that burn more frequently and more easily, ultimately eliminating native habitats and biodiversity while increasing fire threat over time (Keeley 2005, 2006; Syphard et al. 2009; Safford & Van de Water 2014). Thus, as climate change worsens and development is permitted, the resulting increased fire frequency will be detrimental to the Quino and its habitat.

Phenological mismatch

The life cycle of Quino is closely tied to the phenology of its host plants; pre- and post-diapause larval development and adult oviposition must precede host plant senescence (Osborne & Redak 2000 p. 114). Host plant senescence is determined by solar insolation and total precipitation as well as timing of winter and spring rains which are expected to be more extreme (Osborne & Redak 2000 p. 114; Parmesan et al. 2015 pp. 14–15). Quino larvae break diapause synchronously with germination of their annual hosts in response to precipitation in winter; rainfall which occurs during other seasons is of little or no benefit to diapause larvae (Osborne & Ballmer 2019 p. 3). If host plants senesce before the larvae feed and develop enough to enter diapause, many could starve and suffer high levels of mortality and loss of populations, which has been shown in other subspecies of the Edith's checkerspot butterfly group (Parmesan et al. 2015 pp. 2–3). Increased temperatures also cause accelerated host plant senescence at a rate faster than the impact to larval development, causing further phenological mismatch, starvation, and extinction of populations (Parmesan et al. 2015 pp. 14–15).

Disease or Predation

Disease and predation were unknown threats at the time of the FWS's last five year review of Quino (USFWS 2009b p. 16) and it is still unknown if disease or predation are significant sources of threat to the survival and recovery of the Quino checkerspot butterfly.

The Inadequacy of Existing Regulatory Mechanisms and Impact of Existing Management Efforts

The existing regulatory mechanisms are inadequate for preventing the Quino checkerspot butterfly from extinction. Specifically, as described below, the USFWS has not adequately protected the Quino through the implemented habitat conservation plans, critical habitat designation, nor the recovery plan. Due to imminent development projects, the Quino is even more threatened with extinction than at the time of listing.

The same threats impacting Quino at listing, when the 2003 recovery plan was published, and when the 2009 five year review was published were still significantly negatively impacting the Quino (USFWS 2009b p. 13) and continue to do so today despite formal federal protection and in fact, as discussed below, are in many cases worse than before. Those threats include "loss and fragmentation of habitat and landscape connectivity, invasion by nonnative plants, off-road vehicle activity, enhanced soil nitrogen, and increased atmospheric carbon dioxide concentration" (USFWS 2003a, pp. 56-60). The 2009 FWS five year review discussed the worsening of climate change as a threat but down played the threat of urbanization and development due to the "current economic conditions" present at the time (USFWS 2009b p. 13); however, those temporary economic conditions have changed and brought on more development throughout Riverside and San Diego County, as discussed in this petition.

At the time of the original designation of critical habitat for the Quino in 2002, the FWS recognized that the Quino requires multiple occupied and unoccupied areas as well as connectivity for conservation and recovery (USFWS 2002 p. 18362):

> Areas supporting core populations (large occurrence complexes) of the Quino checkerspot butterfly, or that have the potential to support core populations (*i.e.,* areas currently containing or supporting primary constituent elements), are essential to the long term conservation of the species because they represent the foundation for continued persistence of the species. Furthermore, some habitat areas that would not be considered essential if they were geographically isolated are, in fact, essential when situated in locations where they facilitate continued landscape connectivity among surrounding local populations or otherwise play a significant role in maintaining metapopulation viability (*e.g.,* by providing sources of immigrants to recolonize adjacent habitat patches following periodic extirpation events). Populations on the periphery of the species' range, or in atypical environments, are important for maintaining the genetic diversity of the species and could be essential to evolutionary adaptation to rapidly changing climatic and environmental conditions.

The FWS has discussed the many uncertainties underlying the conservation of the Quino checkerspot butterfly but understood that "We do not yet know how much local Quino abundance, distribution, and habitat availability can be reduced without critically compromising population resiliency… losses of crucial areas within habitat patches might not be apparent until consecutive years of severe drought or high rainfall, but then have an impact disproportional to the size of the area lost" (USFWS 2009b pp. 13–14). Despite acknowledged uncertainties and need for widespread habitat conservation, FWS has permitted continued development and habitat destruction/modification even in its few remaining Core habitats.

Federal Regulations

Endangered Species Act of 1973, as amended

The federal ESA is the primary protection for the Quino through sections 7, 9, and 10. The FWS analyzes the potential effects of federal projects under section 7(a)(2) which requires federal agencies to consult with the FWS prior to authorizing, funding, or carrying out activities that may affect listed species. The FWS then determines if the action will jeopardize a species; a jeopardy determination is made for an action that is reasonably expected, directly or indirectly, to appreciably reduce the likelihood of both the survival and recovery of a listed species in the wild by reducing its reproduction, numbers, or distribution; a non-jeopardy opinion may include reasonable and prudent measures that minimize the amount or extent of incidental take of listed species associated with a federal action (50 CFR 402.02). The FWS must also determine whether the action will result in the destruction or adverse modification of designated critical habitat.

Section 9 prohibits the taking of any federally listed endangered or threatened species. Section 3(18) defines "take" to mean "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." The ESA provides for civil and criminal penalties for the unlawful taking of listed species. Incidental take refers to taking of listed species that results from, but is not the purpose of, carrying out an otherwise lawful activity by a federal agency or applicant (50 CFR 402.02). For non-federal projects, the FWS may issue incidental take permits pursuant to section 10(a)(1)(B) of the ESA that are supposed to provide protection for the Quino through the approval of HCPs that "detail measures to minimize and mitigate the potential impacts of projects to the maximum extent practicable" (USFWS 2009b pp. 19–20). As described below, several HCPs that cover the Quino have been approved and, unfortunately, do not provide adequate protection for the butterfly.

Critical habitat was designated for the Quino by the FWS in 2002 but the area was subsequently reduced in 2009 as a result of a lawsuit and resulting settlement brought forth by the Homebuilders Association of Northern California and others (USFWS 2009a p. 28781). After originally designating 171,605 acres of critical habitat in four units for the Quino in 2002, the FWS reduced the designated critical habitat by 63.8% to 62,125 acres in nine disparate units based on economic, national security, and "other relevant impacts" (Figure 6 and Table 1) (USFWS 2009a pp. 28798–28799). Specifically residential development and tribal activities worth up to $50.4 million that would have occurred in the now excluded critical habitat,

impacting as many as 14 developers (USFWS 2009a p. 28813). The FWS also cited their "belief" that designation of critical habitat provides a "disincentive" to entities developing or contemplating developing HCPs because "one of the incentives for undertaking conservation is greater ease of permitting where listed species are affected" (USFWS 2009a p. 28815). This belief does not take away from the fact that the Quino lost over 100,000 acres of federally protected habitat and is still threatened by development in these formally protected areas, despite the Quino's inclusion in some HCPs. In originally designating critical habitat, the FWS took into account core habitat and connectivity requirements for population viability and recovery, yet subsequently has dissected and reduced critical habitat, perpetuating the biggest threat of "death by a thousand cuts," that can lead to extinction (Whitehead et al. 2017).

When discussing the elimination of critical habitat protection on tribal land, the FWS states "we believe that fish, wildlife, and other natural resources on tribal lands are better managed under tribal authorities, policies, and programs than through Federal regulation wherever possible and practicable" (USFWS 2009a p. 28816). The FWS also continually states their strained relationship with tribes as a reason not to include their lands in critical habitat designations (USFWS 2009a pp. 28816–28821). The FWS states that the benefits of eliminating critical habitat on the Air Force land outweigh the benefits of including these lands in the name of national security (USFWS 2009a pp. 28823–28824). While these statements may be accurate, they are not a regulatory mechanism and so do not assure protection of the Quino on these lands. In addition to the loss of critical habitat, in 2009 FWS stated (USFWS 2009a p. 28):

> Although some management is occurring at a few conserved sites scattered throughout the subspecies range, no occurrence complex/population is currently being managed. Most sites are not currently managed for Quino conservation and a comprehensive assessment of the success of management practices has not been conducted…. No formal monitoring has been initiated as described, although the Service continues to qualitatively track the persistence and abundance of Quino in some occurrence complexes.

Recovery efforts for the Quino have included some habitat protection, population monitoring, and completion of a genetic study (USFWS 2009b) as well as captive breeding and reintroduction with limited initial success (Strahm 2018). The original 2003 Quino Recovery Plan predicted a drought-induced crash, which has occurred since 2012 reducing adult numbers throughout Quino's range (USFWS 2003 p. 31, 2019 p. 3). The 2003 Recovery Plan criteria included protecting all remaining habitat, but as detailed above in the "Current population" section, Quino has been lost from all occurrences in northwest Riverside, from one of the two core occurrence complexes in the Southwest Riverside Recovery Unit, and a dozen populations in western Riverside County since Recovery Plan publication (USFWS 2019 p. 3).

The 2019 Quino Recovery Plan amendment concluded correctly that Quino likely "will need assistance to reestablish or maintain population resilience across its post-listing range to achieve recovery" and that "core occurrence complexes within the species' current range must be protected, as they represent resilient populations or metapopulations that are most likely to

rebound from low population numbers after drought, fire, or other stochastic events" (USFWS 2019 pp. 3, 18–19). Recovery Plan criteria include protection of 40 non-core and 15 core complexes in perpetuity, especially establishing resilient populations for metapopulation health, including the crucial for survival Skinner/Johnson, Oak Mountain, and Otay core occurrence complexes (USFWS 2019 p. 17). Unfortunately, despite this realization by FWS, they continue to do the opposite by permitting development projects that destroy Quino core populations in the only areas the butterfly remains, and in the case of Otay Village 14, trading the loss of high quality occupied habitat for unproven and likely to fail restoration attempts.

Further, section 7 consultation is supposed to result in the adoption of reasonable and prudent alternatives that avoid jeopardizing the species or destroying or adversely modifying its critical habitat, but consultation on actions that may affect Quino, typically on Clean Water Act section 404 permits, has primarily been a vehicle for authorizing the incidental take of Quino without effective measures to address habitat loss and fragmentation. Even under an HCP, the minimize and mitigate process may well produce deficient and non-compensatory mitigation. For example, determinations of how much land can be set aside on-site, the viability of alternative project designs, or how much mitigation can occur offsite are routinely based upon the applicants' own determinations of what is financially feasible for them. Self-serving applicant determinations become the basis for determining what is "practicable." The USFWS has no development economists on staff and does not retain outside consultants for the purpose of making its own determinations.

National Environmental Policy Act

The National Environmental Policy Act ("NEPA") requires the preparation of an environmental impact statement with public review and input (42 U.S.C. § 4231 et seq). NEPA requires Federal agencies to consider the effects of their actions on the environment through the utilization of environmental assessments and environmental impact statements. These reports must disclose any adverse impacts to the environment including impacts to sensitive and federally listed threatened and endangered species. However, courts have interpreted the law to only require agencies to disclose the impacts of their actions to the public, but not to prohibit agencies from choosing alternatives that will negatively affect individuals or populations of the Quino. As the U.S. Supreme Court held in *Robertson v. Methow Valley Citizens Council* (1989):

> [I]t would not have violated NEPA if the Forest Service, after complying with the Act's procedural requisites, had decided that the benefits to be derived from downhill skiing at Sandy Butte justified the issuance of a special use permit, notwithstanding the loss of 15 percent, 50 percent, or even 100 percent of the mule deer herd. Other statutes may impose substantive environmental obligations on federal agencies, but NEPA merely prohibits uninformed—rather than unwise—agency action.

National Forest Management Act

Congress enacted the National Forest Management Act of 1976 ("NFMA") to reform

Forest Service management of national forest system lands (16 U.S.C. § 1600 et seq). The NFMA requires that the Forest Service implement a Land and Resource Management Plan ("LRMP") for each national forest. The LRMP must include land allocations, desired conditions, objectives, and standards and guidelines with which site-specific projects must comply. In addition, among NFMA's substantive requirements is the duty to provide for the diversity of plant and animal communities (16 U.S.C. § 1604(g)(3)(B)).

The NFMA regulations require species viability, but do not prohibit the Forest Service from carrying out actions that harm species or their habitat, stating only that "Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area" (36 C.F.R. § 219.19). This regulation is inadequate for the conservation of Quino because it does not require the responsible agency to support the persistence of all species, including invertebrates. Quino critical habitat is designated in the USFS San Jacinto (San Bernardino National Forest) and Palomar Districts (Cleveland National Forest) in Riverside County (USFWS 2009a p. 28800).

Federal Land Policy and Management Act

The Federal Land Policy and Management Act (FLPMA) regulates the management of public lands administered by the BLM; specifically the "management, protection, development, and enhancement of public lands" with the intention to "…preserve and protect certain public lands in their natural condition; that will provide food and habitat for fish and wildlife…" (43 U.S.C. § 102). This Act could protect the Quino on any remaining BLM lands, but thus far has failed to protect the Quino from ORV activity in BLM properties in Wilson Valley and Oak Mountain/Vail Lake Quino Core sites in Riverside County as described above.

National Wildlife Refuge System Improvement Act of 1997

This act establishes the protection of biodiversity as the primary purpose of the National Wildlife Refuge system. Quino habitat within the Otay core complex in southern San Diego County has been conserved within the National Wildlife Refuge System (USFWS 2009a p. 19). This is an important designation but insufficient itself to ensure Quino survival and recovery.

Sikes Act

The Sikes Act (16 U.S.C. 670) Improvement Act of 1997 requires Department of Defense installations to prepare Integrated Natural Resource Management Plans (INRMPs) that provide for the conservation and rehabilitation of natural resources on military lands consistent with military uses. The Navy updated its Naval Base Coronado INRMP at the La Posta Facility to incorporate all conservation measures included in the current Quino Habitat Enhancement Plan and address expansion plans for the La Posta Facility (USFWS 2009a p. 18). However, INRMPs are not regulatory mechanisms because their implementation is subject to funding availability and thus insufficient to ensure Quino survival and recovery.

The Lacey Act

The Lacey Act (P.L. 97-79), as amended in 16 U.S.C. 3371, makes unlawful the import, export, or transport of any wild animals whether alive or dead taken in violation of any United States or Indian tribal law, treaty, or regulation, as well as the trade of any of these items acquired through violations of foreign law. The Lacey Act further makes unlawful the selling, receiving, acquisition or purchasing of any wild animal, alive or dead. The designation of "wild animal" includes parts, products, eggs, or offspring. This Act could protect Quino from trade or sale if enforced to do so; however, the Lacey Act cannot protect loss of Quino habitat.

Pesticide regulations

The U.S. Environmental Protection Agency (EPA) licenses the sale and use of the herbicides and insecticides under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA, 7 U.S.C. § 136 et seq). FIFRA directs EPA to register a pesticide only upon determining that "when used in accordance with widespread and commonly recognized practice it will not generally cause unreasonable adverse effects on the environment" (7 U.S.C § 136a(c)(5)(D)). The EPA evaluates the risk of pesticides to insects by using honey bees as a surrogate for all terrestrial insects. Butterfly physiology, behavior, and life cycle characteristics differ from honey bees in ways that are not considered when tests are applied only to honey bees (Hoang et al. 2011 pp. 997–998). For example, butterfly adults have greater surface area, including their wings, than honey bees and all stages of the butterfly life cycle are exposed to pesticides on plants, making them more likely to be exposed corporally during pesticide spray or from drift (Hoang et al. 2011; Bargar 2012). Thus, the EPA does not adequately regulate pesticides for risk to butterflies.

State Regulations

California Environmental Quality Act

The environmental review process under the CEQA (California Public Resources Code §§ 21000-21177) requires state agencies, local governments and special districts to evaluate and disclose impacts from "projects" in the state. CEQA declares that it is the policy of the state to prevent "the elimination of fish or wildlife species due to man's activities, ensure that fish and wildlife populations do not drop below self-perpetuating levels, and preserve for future generations representations of all plant and animal communities" (California Public Resources Code, section 21001(c)). The CEQA process is triggered when discretionary activities of state or local agencies may have a significant effect on the environment and requires full disclosure of the potential environmental impacts of proposed projects. The operative document for major projects is usually the Environmental Impact Report (EIR).

Under CEQA, Species of Special Concern must be considered during the environmental review process, with an analysis of the project impacts on the species, only if they meet the criteria of sensitivity under Section 15380 of the CEQA Guidelines. For federally listed species like the Quino checkerspot butterfly, an EIR typically indicates that the species is covered by an

HCP or that the impacts will be addressed through section 7 consultation, thus not providing adequate protection to the Quino per se.

Besides ensuring environmental protection through procedural and informational means, CEQA also has substantive mandates for environmental protection. The most important of these is the provision requiring public agencies to deny approval of a project with significant adverse effects when feasible alternatives or feasible mitigation measures can substantially lessen such effects. In practice, however, if significant impacts remain after all mitigation measures and alternatives deemed feasible by a lead agency have been adopted, a lead agency is allowed under CEQA to approve a project despite environmental impacts if it finds that social or economic factors outweigh the environmental costs. It is important to note that CEQA is not, nor was it ever intended to be, a habitat protection mechanism.

The CDFW and FWS often provide comments on draft EIRs and often, these comments are simply dismissed or responded to in immaterial ways. For example, the CDFW commented extensively on the severe deficiencies of the environmental reviews for Otay Village 14, taking issue with claims of non-occupancy and recommended additional mitigation (CDFW 2018) but no substantive changes were made in response, and deference was given to future permitting under the federal ESA.

Natural Community Conservation Program

The Natural Community Conservation Program (NCCP) is a cooperative effort supported by the CDFW and FWS to protect regional habitats and species under the Natural Community Conservation Planning Act (CDFG 2002; CDFW 2020). The program helps identify and provide for area-wide protection of plants, animals, and their habitats while allowing compatible and appropriate economic activity (CDFG 2002 sec. 2801). Many Natural Community Conservation Plans are developed in conjunction with HCPs prepared pursuant to the Federal Endangered Species Act. All HCPs outlined below are also part of a NCCP (CDFG 2019).

Local Regulations

Western Riverside County MSHCP

The Western Riverside County MSHCP encompasses 1.26 million acres including all unincorporated Riverside County land west of the crest of the San Jacinto Mountains to the Orange County line and the cities of Temecula, Murrieta, Lake Elsinore, Canyon Lake, Norco, Corona, Riverside, Moreno Valley, Banning, Beaumont, Calimesa, Perris, Hemet, and San Jacinto (Dudek & Associates, Inc. 2003a pp. 1–1). The MSHCP authorizes take of 146 listed and unlisted imperiled plant and wildlife species identified within the Plan Area to "provide the infrastructure necessary for economic development and a high quality of life in the County" (Dudek & Associates, Inc. 2003a pp. 1-1,4,17). The FWS issued an incidental take permit (USFWS 2004, TE-088609-0) under section 10(a)(1)(B) of the Act to 22 permittees under the MSHCP for a period of 75 years (USFWS 2009a p. 21). The Quino is a covered species.

Originally, there were 22 Quino occurrence complexes within the MSHCP Plan Area and seven core population areas; the MSHCP covers 109,161 acres of potential habitat but contains 'Conservation Areas' of 67,493 acres (27,314 hectares) of Quino habitat meant to support the seven core areas (Dudek & Associates, Inc. 2003b p. I–18, 19; USFWS 2009b p. 21). As such, the MSHCP allows for incidental take in 41,668 acres of potential habitat within Quino Core Areas, 32% of which are areas with high certainty of occupancy (Dudek & Associates, Inc. 2003b p. I–27, 28, 38). Under the MSHCP, if permitted entities alter public or quasi-public land so that it no longer contributes to the conservation strategy of the MSHCP, they must do a 1:1 mitigation on biological equivalent or superior acreage based on Quino's defined primary constituent elements; FWS views this is protective of critical habitat and its role in Quino recovery (USFWS 2011 p. 14).

In 2019, 15 years after the issuance of the take permit, the MSHCP reserve creation is ongoing and expected to take over 20 years to complete (Biological Monitoring Program 2019 p. iii). Current monitoring done to meet the MSHCP Quino-specific Conservation Objective 4 focus on six of the Core Areas identified in the Conservation Object 1: Warm Springs Creek, Johnson Ranch/Lake Skinner, Oak Mountain, Wilson Valley, Sage, and Silverado/Tule Peak as well as two non-core satellite areas, southwest San Bernardino National Forest and Cactus Valley; the Quino is not surveyed for at the Lake Mathews/Estelle Mountain/Harford Springs Core Area because it was extirpated from that area (Biological Monitoring Program 2019 p. 1).

In 2018, only 54 total adult Quino were found in only four of the Core Areas (Silverado/Tule Peak, Oak Mountain, Johnson Ranch/Lake Skinner, and Sage) and one of the non-core satellite areas (Cactus Valley) (Biological Monitoring Program 2019 pp. 7–9). Quino have not been seen at Warm Springs Creek Core Area since at least 2008 and only one individual adult has been seen at the Wilson Valley Core Area in the last seven survey years (Biological Monitoring Program 2019 p. 12). While there were four adult Quino observed at the Sage Core Area, the population sizes have been small and present only 50% of the past 11 years, the site is isolated and being encroached upon by invasive grasses, shrinking in size every year; thus without management, the Quino may be extirpated from this area (Biological Monitoring Program 2019 p. 12). Despite being the most productive site and being adjacent to the Multi-Species Reserve sentinel site, habitat quality at Johnson Ranch/Lake Skinner has been decreasing over the past decade (Biological Monitoring Program 2019 p. 12). Silverado/Tule Peak and Oak Mountain are the two best remaining Core Areas for Quino occupancy yet continue to be developed (Biological Monitoring Program 2019 p. 15).

Thus, there are several fundamental problems with how the MSHCP is functioning for the Quino:

- Populations in several Core Areas in the more western plan area intended to protect Quino may well be extinct, with little to no realistic chance of restoration, due to both biological barriers and financial limitations.
- Because the MSHCP is also a plan for the permitting of development (both urban and rural) and a major assembly mechanism is set asides through the land use process,

increased fragmentation of Core Areas is inevitable. At the time of MSCHP adoption in 2003, the effects of fragmentation on Quino populations were not as well recognized. Rural residential zoning covers virtually all private land in the more eastern Core Areas. The phenomenon of large lot development under existing zoning is poorly controllable, as single-family homes on thousands of legal lots can be built "by right" and any land preserved through rural subdivision process will be small and fragmented.

- Assembly of all Core Areas is delayed due to a structural shortfall in land acquisition funds and due to limited state and federal grants. Delay makes it more likely that sprawl development and large lot residential subdivision will intervene. The resulting incremental loss of Quino habitat and the introduction of fragmentation will destabilize viable metapopulations and increase risk of their eventual loss.
- Unpermitted recreational uses continue to degrade habitat on public lands intended to contribute to MSHCP conservation goals.

Unless these current trends change – and there is no evidence to that effect – it is increasingly unlikely that the MSHCP will be successful in conserving the Quino.

San Diego County MSCP

The San Diego County Multiple Species Conservation Plan (MSCP) is made up of the City of San Diego, portions of the unincorporated County, and 10 additional city jurisdictions, and was developed to provide for incidental take of several federally listed species in southwest San Diego County (San Diego County 2020c p. 2). The MSCP established and provided for management of 171,920 acres of preserve lands with the Multiple Habitat Preserve Area (MHPA) and Pre-Approved Mitigation Areas (PAMA), or areas where the purchase of land is approved for mitigation of lost habitat elsewhere; subarea plans were approved, including the South County Plan in 1997 (San Diego County 2020c p. 2).

Despite having one of its few major core occurrences, Otay Unit, in South County, the Quino is not a covered species under the County of San Diego (South County) subarea Plan "because not enough was known about local Quino populations at the time of plan adoption" (San Diego County 2020c p. 2). However, since 1997, more locations of Quino populations and habitat have been identified and development pressure in the South County Subarea have added to the need for what is known as the "Quino Addition" in order to provide regional conservation strategies for the butterfly (San Diego County 2020c p. 2). While the Quino Addition has been discussed and planned for since at least 2003 (San Diego County 2003), the Quino checkerspot butterfly has not yet been added to the County of San Diego Subarea MSCP as a covered species (San Diego County 2020c). The proposed Village 14-specific amendment to add the Quino is not really a means of extending the MSCP's conservation measures to the Quino so much as a means of allowing take of the Quino associated with the approved Village 14 project.

The Quino is a covered species under the City of Chula Vista Subarea Plan, a plan that requires monitoring and adaptive management of Quino habitats in a conservation easement called the 'Preserve' (City of Chula Vista 2003 pp. 4–41, 5–1; USFWS 2009a pp. 20–21). The original conservation and recovery measures put forth in the Chula Vista Subarea Plan to

"provide for the long-term conservation and recovery of the species in its jurisdiction" were the following actions: 1. Preserve the area within the final critical habitat designation for the Quino; 2. Maintain connectivity along key habitat linkages within the City's boundaries; 3. Manage the Preserve for the benefit of the Quino (along with other Covered Species); 4. Restore/enhance Quino habitat; and 5. Minimize project impacts to Quino which, taken together, they claim "provides an extraordinary net biological benefit to the species when weighed against anticipated impacts" (City of Chula Vista 2003 pp. 4–41, 4–42). The subarea plan protects and manages 2,806 acres of potential Quino habitat as part of the Preserve that extends onto lands owned by Otay Ranch, Rolling Hills Ranch, and Bella Lago (City of Chula Vista 2003 pp. 4–46, 4–47). However, the designation of the Preserve does not prohibit planned and future infrastructure projects from impacting the Quino. Rather, it declares that impacts will be avoided "to the extent practicable as determined by the City" (City of Chula Vista 2003 pp. 4–58). No development projects outside the Preserve are subject to avoidance requirements (City of Chula Vista 2003 pp. 4–59), despite being within potential Quino metapopulations and areas of important connectivity. Further, the plan states that "none of the eight locations are considered critical populations, thus, no critical populations of the [Quino] will be impacted by the Take Authorization" (City of Chula Vista 2003 pp. 4–60). These statements show a lack of recognition of the need for various types of open, non-development habitat quality and sites throughout the Quino's range to maintain metapopulation dynamics. Both FWS and CDFW signed off on this approach, noting deference to FWS on Quino matters.

Other HCPs

The Quino is a covered species under the San Diego County Water Authority HCP permit (San Diego County Water Authority & RECON Environmental, Inc. 2010 pp. 6–6). Within the probable impact zone (PIZ), there are 997 acres of Quino's revised designated critical habitat and seven of the 18 occurrences in San Diego in the San Miguel Habitat Management Area; in addition, there are 23,499 acres or 37.8% of the total 62,125 acres of Quino's designated critical habitat within the covered area (San Diego County Water Authority & RECON Environmental, Inc. 2010 p. B-29, B-173). Covered activities allow for loss of Quino habitat and indirect effects, like an increase in invasive species, that, if not temporary, are required to be mitigated in a 2:1 ratio (San Diego County Water Authority & RECON Environmental, Inc. 2010 p. B-175, 176). The HCP includes a 'Preserve Area' that may be used as mitigation for impacts to Quino that is 127 acres of suitable habitat and 649 acres of available habitat (San Diego County Water Authority & RECON Environmental, Inc. 2010 p. B-174). The FWS believes that the agreement provides for the "conservation of the species and their habitats within the Covered Lands to the extent such species and habitat may be affected by the Covered Activities" and agrees to a "No Surprises" rule in which no measures shall be required of the Water Authority in a future ESA section 7 consultation evaluating the impacts of a Covered Activity on the designated Critical Habitat of a Covered Species unless required by law (San Diego County Water Authority & RECON Environmental, Inc. 2010 p. Agreement, 31).

The Quino checkerspot butterfly is also a covered species under a low-effect HCP held by the San Diego Gas and Electric Company (SDG&E) for anticipated take of 33 acres of Quino habitat as a result of ongoing operations and maintenance activities and construction of new facilities in San Diego, Riverside, and Orange Counties in California (Ebbin Moser & Skaggs LLP 2007 p. i). Unavoidable impacts to occupied habitat are mitigated in a 2:1 ratio and to suitable habitat in a 1:1 ratio by one or more of the following ways: payment into a Quino habitat fund managed by the San Diego Foundation, enhancement of a portion of the existing SDG&E mitigation parcel which could support Quino habitat, purchase credits from an established Quino bank should one be approved by the Service at a future date, or create a new mitigation bank (Ebbin Moser & Skaggs LLP 2007 pp. 13–15). Due to surveys and mitigation of activities in Quino habitat only occurring in "mapped areas", activities completed by SDG&E outside of but adjacent to Quino habitat known at the time of the HCP are not subject to mitigation (Busby 2014 pp. 3–5). Thus, this HCP allows for non-mitigated activities within potentially important Quino habitat due to the dynamic nature of suitable habitat and Quino metapopulations.

Captive Breeding and Reintroduction Project

A team of FWS, scientists, managers, and the San Diego Zoo are conducting a captive rearing and reintroduction project to augment the Quino population at the San Diego National Wildlife Refuge which is part of the Otay metapopulation (Strahm 2018 p. 1). Around 10 gravid females were collected from Tule Peak Road near Anza in southern Riverside County in 2016 and from McMillian Parcel in Otay in San Diego in both 2017 and 2018 (Strahm 2018 pp. 9–10). Eggs from collected females were reared and diapause larvae reintroduced to San Diego County on San Miguel Mountain in Jamul, CA and to the south near the Brown Field Municipal Airport in 2017 and 2018 (Strahm 2018 pp. 3–5). The 2017 and 2018 release years were boom and bust years, respectively, but reintroduced larvae emerged as adults in the initial and possibly in the second year (Strahm 2018 p. 32). Captive breeding and reintroduction are experimental techniques and should not be considered mitigation for loss of known occupied habitat.

Degree and Immediacy of Threats

Despite being protected as endangered by the federal ESA for 23 years, the Quino checkerspot butterfly is at greater risk of extinction today due to continued habitat loss, habitat fragmentation, climate change, invasive species, and lack of enforced protections. Tellingly, the major FWS recovery objectives for the Quino have not changed but only multiplied in the 16 years from 2003 to 2019 (USFWS 2003 pp. 92–95, 2019 pp. 17–19). Besides the lack of knowledge on Quino's natural history and progress on captive rearing and release, threats to the butterfly have only been exacerbated and recovery objectives have not been met. Specifically, occurrence complexes, critical habitat, and habitat connectivity have not been permanently protected or adequately managed, restored, or enhanced to maintain resilient populations; resilience as defined by the drop and subsequent increase in population of equal or greater magnitude has not occurred and the Quino has been extirpated where the FWS required

additional populations (e.g. Lake Matthews and Northwest Riverside Recovery Unit) (USFWS 2003 pp. 92–95). The Quino checkerspot butterfly has been eliminated from over half of its historical range in Southern California, and Quino have only been observed in ~53% of identified extant sites in Riverside (12/28) and San Diego (21/34) Counties since 2010 (USFWS 2019). Continued land-use planning that allows for development within core critical habitat and the lack of adequate management continues to push this butterfly to the brink of extinction.

The 2019 amendment to the Recovery Plan includes criteria that address key Quino threats from nonnative plants, enhanced nitrogen deposition effects, increasing atmospheric carbon dioxide effects, from off-road vehicle activity and grazing, and the risk of permanent population extirpation due to wildfire and climate change (USFWS 2019 p. 18). These threats have been impacting the butterfly since federal listing and are included in the original Recovery Plan (USFWS 2003 pp. 178–179) and the butterfly will have no chance to persist if its habitat is destroyed and fragmented through continued development with little regard of its metapopulation and connectivity needs, including preservation of unoccupied patches. Currently there are at least six major development projects in the Quino's few remaining Core population areas that are slated to begin imminently or within the next few years, as outlined above. By first decreasing the Quino's designated critical habitat and then allowing large scale development projects and the construction of the border wall within its few remaining strongholds, FWS has failed to protect the Quino checkerspot butterfly, making it in dire need of increased protections as endangered under the CESA. As described above, in projects that pose major threats to Quino core populations, like Otay Village 13 and 14, CDFW currently plays a minor role on Quino issues, deferring to the FWS as the only regulatory authority regarding the butterfly. Without state protections, California could lose Quino checkerspot butterflies permanently.

Suggestions for Future Management and Recovery Actions

Management actions in California can address threats to the Quino checkerspot butterfly including but not limited to habitat loss, reduced connectivity, nitrogen deposition, increased wildfire frequency, invasive species, off-road vehicles, poorly managed grazing, and climate change. All these threats can and should be addressed at the State level. Listing under the CESA will fundamentally change how much conservation occurs in the future and how likely it will be that the Quino will survive. Unlike the provisions of federal law described above, which have afforded the Quino little or even no mitigation and conservation benefit, a permit for take of a listed species under CESA requires a *specific standard* for mitigation: "measures to minimize and *fully mitigate* the impacts" (emphasis added). If the Quino is to survive and recover from its current severe depletion and other challenges, fully compensatory mitigation is a bare minimum necessity. The federal standards and practices have failed and there is no indication that they will be applied to reverse the Quino's decline. Recommendations for the management and recovery of the Quino include, at a minimum:

- CDFW should protect the Quino checkerspot butterfly as endangered under the CESA and prepare a recovery plan pursuant to Cal. Fish & Game Code § 2079.1, including management efforts aimed at reducing habitat loss and degradation.
- Acquire and protect areas with suitable habitat that promote connectivity within and between metapopulation complexes. In particular, permanent protection for core occurrence complexes with known populations of Quino and its host plants is desperately needed, as those areas support the requisite clay soil with cryptobiotic crust that supports the host plant growth form and seasonality required by the Quino (Osborne 2019). Source populations that are resilient to events such as drought are top priority.
- Protect habitat and connectivity at extirpated Quino occurrence complexes, including the northwest Riverside Recovery Unit and the Warm Springs Creek Core complex (southwest Riverside) for possible though as yet experimental Quino reintroduction.
- Continue currently experimental efforts to restore/enhance degraded habitat, including remediation of elevated artificially elevated soil nitrogen. Continue experimental Quino reintroduction efforts. Such efforts should *not* be considered as a substitute or mitigation measure for protection of high-quality existing habitat.
- Ensure Quino habitat is buffered from nitrogen pollution and that off-road vehicle rules are enforced, especially in and around the Oak Mountain core population.
- Protect habitat with any or all known and potential host plants listed in this petition, not just *P. erecta,* but also lesser known potential hosts such as *Antirrhinum nuttallianum*. Care should be taken to use the annual variety adapted to clay lenses and not the short-lived perennial adapted to granitic soils (Pratt 2020a).
- For climate change adaptation, acquire and protect higher elevation habitats such as near Tule Peak and Bautista Road and their connections to other habitat areas. Prioritize the conservation of known Quino populations near water bodies. The remaining largest and most resilient Quino populations are associated with water bodies, particularly large and long-established reservoirs such as Lake Skinner, Vail Lake, and Lower Otay Lake, most likely due to the available moisture during times of drought (USFWS 2019 p. 4). Due to the reduction of cooler, high humidity coastal habitat due to development, it is essential that metapopulations near water bodies are conserved as they will likely contribute to Quino's resilience to climate change (USFWS 2019 p. 4).

Conclusion

In this petition, we have carefully assessed the best scientific and commercial information available regarding the Quino checkerspot butterfly. We have reviewed the best scientific and commercial information available regarding the historic, present, and future threats faced by the Quino and have determined that the butterfly is in imminent danger of extinction throughout its range, largely due to sprawl development projects in its few remaining Core population areas. The protection afforded to the Quino under the federal ESA has not proven to be effective at

reducing its risk of extinction, which has only exacerbated over recent years. In the United States, the Quino checkerspot butterfly is endemic to California and despite its suffering under threats unique to California's economic growth and development, it does not currently receive California-specific protection. As such, we urge the California Fish and Game Commission to protect the Quino checkerspot butterfly as endangered under the California Endangered Species Act.

Please contact me at 503-283-5474 and/or tcornelisse@biologicaldiversity.org if you have any questions or need any clarification on the above information.

Sincerely,

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References

AECOM. 2010. Year 5 Monitoring Report for the State Route 125 South Vernal Pool and Quino Checkerspot Butterfly Habitat Restoration Site (November 2009-October 2010).

AECOM. 2013. Final Sunrise Powerlink Restoration Year 1 Maintenance and Monitoring Report.

AECOM. 2015. Sunrise Powerlink Restoration Year 2 Maintenance and Monitoring Report (2013/2014).

AECOM. 2016. Sunrise Powerlink Restoration Year 3 Maintenance and Monitoring Report (October 2014 through September 2015).

AECOM. 2017. Sunrise Powerlink Restoration Year 5 Maintenance and Monitoring Report (October 2016 through September 2017).

Balch JK, Bradley BA, Abatzoglou JT, Nagy RC, Fusco EJ, Mahood AL. 2017. Human-started wildfires expand the fire niche across the United States. Proceedings of the National Academy of Sciences **114**:2946–2951.

Ballmer GR. 2020, April 16. Re: Impacts to quino from recreation/OHVs and grazing.

Ballmer GR, Osborne KH. 2020a, May 25. RE: Comments on the Otay Ranch Village 14 and Planning Areas 16/19 Proposed Project Amendment in regard to the Quino Checkerspot Butterfly (Quino).

Ballmer GR, Osborne KH. 2020b, June 29. RE: Response to Final Environmental Impact Report (FEIR), Otay Ranch Village 13 "Response to Comments" in regard to the Quino Checkerspot Butterfly (Quino).

Bargar TA. 2012. Risk assessment for adult butterflies exposed to the mosquito control pesticide naled. Environmental Toxicology and Chemistry **31**:885–891. Wiley Online Library.

Bauer S, Olson J, Cockrill A, Van Hattem M, Miller L, Tauzer M, Leppig G. 2015. Impacts of surface water diversions for marijuana cultivation on aquatic habitat in four northwestern California watersheds. PloS one **10**. Public Library of Science.

Biological Monitoring Program. 2019. Western Riverside County MSHCP Biological Monitoring Program 2018 Quino Checkerspot Butterfly (Euphydryas editha quino) Survey Report. Prepared for the Western Riverside County Multiple Species Habitat Conservation Plan. Riverside, CA. Available from http://wrc-rca.org/about-rca/monitoring/monitoringsurveys/.

Bistinas I, Oom D, Sá ACL, Harrison SP, Prentice IC, Pereira JMC. 2013. Relationships between human population density and burned area at continental and global scales. PLoS ONE **8**:1–12.

Brooks ML. 2009. Spatial and temporal distribution of nonnative plants in upland areas of the Mojave Desert. Pages 101–124 The Mojave Desert: ecosystem processes and sustainability. University of Nevada Press, Reno, Nevada.

Busby M. 2014, December 3. Response to Data Request #3, Issue 27: Provide GIS data for Quino checkerspot butterfly (QCB, Euphydryas editha quino) localities and Mapped Areas, and provide a project-specific habitat assessment.

Caltrans. 2018. Year 5 Monitoring Report for the Lonestar Ridge West Restoration Site November 2016-October 2017.

Carah JK, Howard JK, Thompson SE, Short Gianotti AG, Bauer SD, Carlson SM, Dralle DN, Gabriel MW, Hulette LL, Johnson BJ. 2015. High time for conservation: adding the environment to the debate on marijuana liberalization. BioScience **65**:822–829. Oxford University Press.

CDFG. 2002. Natural Community Conservation Planning Act. Page FGC. Available from http://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=FGC&division=3.&title=&part=&chapter=10.&article=.

CDFG. 2019, December. Summary of Natural Community Conservation Plans (NCCPs). Available from https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=15329&inline.

CDFW. 2018, April 16. Comments on the Draft Environmental Impact Report for the Otay Ranch Village 14 and Planning Areas 16/19 Project (SCH# 2016121042).

CDFW. 2019. Land Conversion Evaluation. Page 25. California Department of Fish and Wildlife.

CDFW. 2020. Natural Community Conservation Planning (NCCP). Available from https://wildlife.ca.gov/Conservation/Planning/NCCP.

Chen X, Li B-L, Allen MF. 2010. Characterizing urbanization, and agricultural and conservation land-use change in Riverside County, California, USA. Annals of the New York Academy of Sciences **1195**:E164–E176. Blackwell Publishing Inc Malden, USA.

City of Chula Vista. 2003. City of Chula Vista MSCP Subarea Plan. Page 245.

City of Murrieta, Goldman R, Atkins J, Kimley-Horn and Associates, Inc. 2020. Draft Environmental Impact Report Murrieta Hills Specific Plan Amendment. Page 776. No. EA-2017-1396. The City of Murrieta.

City of Santee. 2018. Notice of Preparation (NOP) of a Draft Revised Environmental Impact Report for the Fanita Ranch Project (SCH #2005061118). Page 13.

Collins NM, Morris MG. 1985. Threatened swallowtail butterflies of the world: the IUCN Red Data Book. Iucn.

County of Riverside. 2015. Riverside Extended Mountain Area Plan. Page 62. General Plan.

County of San Diego. 2018. Otay Ranch Village 14 and Planning Areas 16/19 FEIR Biological Resources. Page 2.4-232.

County of San Diego. 2019. Otay Ranch Village 14 and Planning Areas 16/19 Summary. Page S.0-96.

County of San Diego. 2020a. Proposed Project Amendment (spa-19-001) Otay Ranch Village 14 and Planning Areas 16/19. Page 64. Amendment to MSCP County Subarea Plan. Planning and Development Services.

County of San Diego. 2020b. Otay Ranch Resort Village Draft FEIR Summary. Page S-70.

County of San Diego. 2020c. Otay Ranch Resort Village Draft FEIR Biological Resources. Page 2.3-96.

County of San Diego. 2020d. Planning Commission Hearing Report: Otay Ranch Village 14 and Planning Areas 16 &19 –Project Amendment: PDS2019-SPA-19-001, PDS2019-STP-19-029, PDS2019-VTM-5616R, and PDS2019-ER-16-19-006A. Page 625.

Dudek & Associates, Inc. 2003a. Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP): Vol 1 The Plan. Page 1312. County of Riverside Transportation and Land Management Agency. Available from https://www.wrc-rca.org/document-library/.

Dudek & Associates, Inc. 2003b. Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP): Vol 2 Reference Document. Page 5978. County of Riverside Transportation and Land Management Agency. Available from https://www.wrc-rca.org/document-library/.

Dudek & Associates, Inc. 2020a. Biological Resources Technical Memorandum for the Proposed Project Amendment – Otay Ranch Village 14 and Planning Areas 16/19. Page 318.

Dudek & Associates, Inc. 2020b. 2.4 Biological Resources (9.25.18)_Part19– Otay Ranch Village 14 and Planning Areas 16/19. Page 12.

Duffey E. 1968. Ecological studies on the large copper butterfly Lycaena dispar HAW. batavus OBTH. at Woodwalton Fen National Nature Reserve, Huntingdonshire. Journal of Applied Ecology:69–96. JSTOR.

Ebbin Moser & Skaggs LLP. 2007. Low-Effect Habitat Conservation Plan for the Issuance of an Incidental Take Permit Under Section 10(a)(1)(B) of the Endangered Species Act for the Federally Endangered Quino Checkerspot Butterfly for the San Diego Gas and Electric Company. Page 162.

Edwards JS, Schwartz LM. 1981. Mount St. Helens ash: a natural insecticide. Canadian Journal of Zoology **59**:714–715.

Fenn ME, Allen EB, Weiss SB, Jovan S, Geiser LH, Tonnesen GS, Johnson RF, Rao LE, Gimeno BS, Yuan F. 2010. Nitrogen critical loads and management alternatives for N-impacted ecosystems in California. Journal of Environmental Management **91**:2404–2423. Elsevier.

Gall LF. 1984a. Population structure and recommendations for conservation of the narrowly endemic alpine butterfly, Boloria acrocnema (Lepidoptera: Nymphalidae). Biological conservation **28**:111–138. Elsevier.

Gall LF. 1984b. The effects of capturing and marking on subsequent activity in Boloria acrocnema (Lepidoptera: Nymphalidae), with a comparison of different numerical models that estimate population size. Biological Conservation **28**:139–154. Elsevier.

Gochfeld M, Burger J. 1997. Butterflies of New Jersey: A guide to their status, distribution, conservation, and appreciation. Rutgers University Press.

Goebel KA, Sevrens G. 2016, December 20. Proposed Fanita Ranch Project within the City of Santee Draft MSCP Subarea Plan, City of Santee, San Diego County, California.

Goossens D, Buck B. 2009. Dust emission by off-road driving: Experiments on 17 arid soil types, Nevada, USA. Geomorphology **107**:118–138.

Greenwald N, Segee B, Curry T, Bradley C. 2017. A Wall in the Wild. Center for Biological Diversity.

Hamblin A. 2018, March 12. Everything you need to know about Trump's border wall prototypes in San Diego. The San Diego Union-Tribune. Available from https://www.sandiegouniontribune.com/opinion/the-conversation/sd-trump-border-prototypes-san-diego-20180228-htmlstory.html.

Hamilton R, Stallcup JA. 2020. Review of Land Conversion Evaluation Otay Village Ranch 14 and Planning Areas 16/19, County of San Diego. Page 30. Hamilton Biological.

Hamilton RA. 2020. Documentation of poor quality Quino habitat (dense grassland) on northern Proctor Valley exchange lands, rather than coastal sage scrub as erroneously mapped.

Hanski I, Gyllenberg M. 1993. Two General Metapopulation Models and the Core-Satellite Species Hypothesis. The American Naturalist **142**:17–41.

Harris & Associates, City of Santee. 2020. Draft Revised Environmental Impact Report Fanita Ranch Project. Available from https://www.cityofsanteeca.gov/our-city/public-notice/draft-revised-environmental-impact-report.

HELIX Environmental Planning, Inc. 2019. Otay Crossings Commerce Park Mitigation Project Year 2 Monitoring Report.

HELIX Environmental Planning, Inc. 2020a, June. Draft Environmental Impact Report Otay Hills Construction Aggregate and Inert Debris Engineered Fill Operation Project. Available from https://www.sandiegocounty.gov/content/sdc/pds/ceqa/3300-04-004.html.

HELIX Environmental Planning, Inc. 2020b. Draft Environmental Impact Report Otay Hills Construction Aggregate and Inert Debris Engineered Fill Operation Project Chapter 4 Biological Resources. PDS2004-3300-04-004 (MUP); PDS2004-3310-04–001 (RP); PDS2010-3813-10–002 (SPA); PDS2018-BC-18–0017; Log No. 04-190–04. Available from https://www.sandiegocounty.gov/content/dam/sdc/pds/ceqa/OtayHills/Sect-4-3-Impacts-Bio.pdf.

Hellmann JJ, Weiss SB, McLaughlin JF, Ehrlich PR, Murphy DD, Launer AE. 2004. Structure and dynamics of Euphydryas editha populations. on the wings of checkerspots: a model system for population biology. oxford university press, new york, new york, usA:34–62.

Hoang TC, Pryor RL, Rand GM, Frakes RA. 2011. Use of butterflies as nontarget insect test species and the acute toxicity and hazard of mosquito control insecticides. Environmental Toxicology and Chemistry **30**:997–1005. Wiley Online Library.

Howard S. 2020, February 2. RE: [EXTERNAL] Village 14 Draft QCB Conservation Strategy and Framework Management Plan (email from HELIX Environmental Planning, Inc. to FWS).

Howe RW, Davis GJ, Mosca V. 1991. The demographic significance of 'sink'populations. Biological Conservation **57**:239–255.

Integrated Taxonomic Information System. 2020a. *Euphydryas editha quino*. Available from https://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=779299#null (accessed February 5, 2020).

Integrated Taxonomic Information System. 2020b. *Euphydryas editha*. Available from https://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=201290#null (accessed February 6, 2020).

Intergovernmental Panel on Climate Change. 2018. Global Warming of 1.5°C. Page 34. Summary for Policymakers, Special Report. Incheon, Republic of Korea. Available from http://www.ipcc.ch/report/sr15/.

Keeley JE. 2005. Fire as a threat to biodiversity in fire-type shrublands. Planning for biodiversity: bringing research and management together. USDA Forest Service General Technical Report PSW-GTR-195:97–106.

Keeley JE. 2006. Fire management impacts on invasive plants in the western United States. Conservation Biology **20**:375–384. Wiley Online Library.

Keeley JE, Fotheringham CJ. 2003. Impact of Past Present and Future Fire Regimes on North American Mediterranean Shrublands. Pages 218–262 Fire and climatic change in temperate ecosystems of the Western Americas.

Keeley JE, Fotheringham CJ, Morais M. 1999. Reexamining fire suppression impacts on brushland fire regimes. Science **284**:1829–1832.

Keeley JE, Syphard AD. 2018. Historical patterns of wildfire ignition sources in California ecosystems. International Journal of Wildland Fire **27**:781.

Kimoto C, DeBano SJ, Thorp RW, Taylor RV, Schmalz H, DelCurto T, Johnson T, Kennedy PL, Rao S. 2012. Short-term responses of native bees to livestock and implications for managing ecosystem services in grasslands. Ecosphere **3**:1–19.

Lei SA. 2009. Rates of soil compaction by multiple land use practices in Southern Nevada. Pages 159–167 The Mojave Desert: ecosystem processes and sustainability. University of Nevada Press, Reno, Nevada.

Mattoni R, Pratt GF, Longcore TR, Emmel JF, George JN. 1997. The endangered quino checkerspot butterfly, *Euphydryas editha quino* (Lepidoptera: Nymphalidae). Journal of Research on the Lepidoptera **34**:99–118.

Mayer D. 2020, March 26. Southwest Village Specific Plan (Project) Notice of Preparation (NOP) of a Supplemental Environmental Impact Report (SEIR) SCH# 2004051076. California Department of Fish and Wildlife.

Miller MP, Pratt GF, Mullins TD, Haig SM. 2014. Comparisons of Genetic Diversity in Captive Versus Wild Populations of the Federally Endangered Quino Checkerspot Butterfly (Euphydryas editha quino Behr; Lepidoptera: Nymphalidae). Proceedings of the Entomological Society of Washington **116**:80–90. BioOne.

Murphy DD, White RR. 1984. Rainfall resources, and dispersal in southern populations of Euphydryas editha (Lepidoptera: Nymphalidae).

Myers N, Mittermeier RA, Mittermeier CG, Da Fonseca GA, Kent J. 2000. Biodiversity hotspots for conservation priorities. Nature **403**:853. Nature Publishing Group.

Nieminen M, Singer MC, Fortelius W, Schöps K, Hanski I. 2001. Experimental confirmation that inbreeding depression increases extinction risk in butterfly populations. The American Naturalist **157**:237–244. The University of Chicago Press.

Ober H. 2019, November 6. Housing scarcity: the Inland Empire's natural barrier to economic growth UCR's Center for Economic Forecasting says the region's housing problem is a land use issue solvable at the local level. UC Riverside News:5. University of California Riverside.

Osborne KH. 2013. Year 2013 Quino Checkerspot Butterfly Monitoring for the SDG&E Sunrise Powerlink Habitat Restoration Project, San Diego County.

Osborne KH. 2014. Year 2014 Quino Checkerspot Butterfly Monitoring for the SDG&E Sunrise Powerlink Habitat Restoration Project, San Diego County.

Osborne KH. 2015. Year 2015 Quino Checkerspot Butterfly Monitoring for the SDG&E Sunrise Powerlink Habitat Restoration Project, San Diego County.

Osborne KH. 2016. Year 2016 Quino Checkerspot Butterfly Monitoring for the SDG&E Sunrise Powerlink Habitat Restoration Project, San Diego County.

Osborne KH. 2017. Year 2017 Quino Checkerspot Butterfly Monitoring for the SDG&E Sunrise Powerlink Habitat Restoration Project, San Diego County.

Osborne KH. 2019. An Additional Follow-up on Response to Final Environmental Impact Report, "Response to Comments", regarding occupation of proposed Land Exchange Project in Proctor Valley by the Quino Checkerspot Butterfly (QCB). Page 3.

Osborne KH. 2020a, April 17. Re: Impacts to quino from recreation/OHVs and grazing.

Osborne KH. 2020b, June 16. Quino Bridge.

Osborne KH, Ballmer GR. 2018, April 9. Draft Environmental Impact Report, General Plan Amendment, and Specific Plan Amendment for Otay Ranch Village 14 and Planning Areas 16/19 Impacts on the Federally Endangered Quino Checkerspot Butterfly.

Osborne KH, Ballmer GR. 2019. Response to Final Environmental Impact Report, "Response to Comments", regarding QCB occupation of project site (Otay Ranch Village 14 and Planning Areas 16/19). Page 12.

Osborne KH, Redak RA. 2000. Microhabitat conditions associated with the distribution of postdiapause larvae of Euphydryas editha quino (Lepidoptera: Nymphalidae). Annals of the Entomological Society of America **93**:110–114. Entomological Society of America.

Padgett PE, Allen EB, Bytnerowicz A, Minich RA. 1999. Changes in soil inorganic nitrogen as related to atmospheric nitrogenous pollutants in southern California. Atmospheric Environment **33**:769–781. Elsevier.

Parmesan C, Williams-Anderson A, Moskwik M, Mikheyev AS, Singer MC. 2015. Endangered Quino checkerspot butterfly and climate change: Short-term success but long-term vulnerability? Journal of Insect Conservation **19**:185–204. Springer.

Peters R, Ripple WJ, Wolf C, Moskwik M, Carreón-Arroyo G, Ceballos G, Córdova A, Dirzo R, Ehrlich PR, Flesch AD. 2018. Nature divided, scientists united: US–Mexico border wall threatens biodiversity and binational conservation. BioScience **68**:740–743.

Phillips A. 2019, May 7. As U.N. warns of widespread extinction, California is already losing species. Los Angeles Times. Available from https://www.latimes.com/politics/la-na-pol-california-united-nations-extinction-report-20190507-story.html (accessed May 3, 2020).

Pratt GF. 2020a, March 23. Re: Quino populations - With corrected AGAIN table - USE THIS ONE, THANK YOU.

Pratt GF. 2020b, March 25. Re: Quino populations - With corrected AGAIN table - USE THIS ONE, THANK YOU.
Pratt GF. 2020c, April 16. Re: Impacts to quino from recreation/OHVs and grazing.
Pratt GF, Emmel JF. 2010. Sites chosen by diapausing or quiescent stage quino checkerspot butterfly, Euphydryas editha quino,(Lepidoptera: Nymphalidae) larvae. Journal of Insect Conservation **14**:107–114. Springer.
Pratt GF, Pierce CL. 2010. A new larval food plant, Collinsia concolor, for the endangered quino checkerspot, Euphydryas editha quino. The Journal of the Lepidopterists' Society **64**:36–37. BioOne.
Preston KL, Redak RA, Allen MF, Rotenberry JT. 2012. Changing distribution patterns of an endangered butterfly: Linking local extinction patterns and variable habitat relationships. Biological Conservation **152**:280–290. Elsevier.
Radeloff VC et al. 2018. Rapid growth of the US wildland-urban interface raises wildfire risk. Proceedings of the National Academy of Sciences **115**:3314–3319.
RECON Environmental, Inc. 2018. Annual Report for the Otay Ranch Preserve January 1–December 31, 2017.
RECON Environmental, Inc. 2019. Annual Report for the Otay Ranch Preserve January 1–December 31, 2018.
Riordan EC, Rundel PW. 2013. The future of California sage scrub in an era of increasing urbanization and global climate change. Fremontia **41**:2–7. Citeseer.
Safford HD, Van de Water KM. 2014. Using fire return interval departure (FRID) analysis to map spatial and temporal changes in fire frequency on national forest lands in California. Res. Pap. PSW-RP-266. Albany, CA: US Department of Agriculture, Forest Service, Pacific Southwest Research Station. 59 p **266**.
San Diego County. 2003. Draft: Quino Checkerspot Butterfly Amendment to the Multiple Species Conservation Program County of San Diego Subarea Plan. Page 92.
San Diego County. 2020a. Otay Ranch Village 14 and Planning Areas 16/19- Proposed Project Amendment. Available from https://www.sandiegocounty.gov/pds/ceqa/OtayRanchVillage14.html (accessed April 24, 2020).
San Diego County. 2020b. Otay Ranch Resort Village- Village 13. Available from https://www.sandiegocounty.gov/content/sdc/pds/ceqa/OtayRanchVillage13.html (accessed April 24, 2020).
San Diego County. 2020c. Quino Addition: Plan Overview. Available from https://www.sandiegocounty.gov/content/sdc/pds/mscp/quino/overview.html#planoverview (accessed March 3, 2020).
San Diego County Water Authority, RECON Environmental, Inc. 2010. San Diego County Water Authority Subregional Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP). Page 1180. Available from https://www.sdcwa.org/sites/default/files/files/NCCP-HCP-merged.pdf.
San Diego Habitat Conservancy. 2019. Otay Crossings Commerce Park On-site Biological Open Space Annual Report. PDS2016-RMP-16–004.
Schlaepfer MA, Runge MC, Sherman PW. 2002. Ecological and evolutionary traps. Trends in ecology & evolution **17**:474–480. Elsevier.
Seabloom EW, Borer ET, Boucher VL, Burton RS, Cottingham KL, Goldwasser L, Gram WK, Kendall BE, Micheli F. 2003. Competition, seed limitation, disturbance, and

reestablishment of California native annual forbs. Ecological applications **13**:575–592. Wiley Online Library.
Stallcup JA. 2004. Regional Conservation Significance of Jesus Maria Mesa. Conservation Biology Institute. Available from https://d2k78bk4kdhbpr.cloudfront.net/media/content/files/Jesus_Maria_web.pdf.
Strahm S. 2018. San Diego National Wildlife Refuge Quino Checkerspot Butterfly (Euphydryas editha quino) Augmentation Project. Conservation Biology Institute.
Syphard AD et al. 2007. Human influence on California fire regimes. Ecological Society of America **17**:1388–1402.
Syphard AD, Keeley JE, Massada ABar, Brennan TJ, Radeloff VC. 2012. Housing arrangement and location determine the likelihood of housing loss due to wildfire. PLoS ONE **7**:e33954.
Syphard AD, Radeloff VC, Hawbaker TJ, Stewart SI. 2009. Conservation threats due to human-caused increases in fire frequency in Mediterranean-climate ecosystems. Conservation Biology **23**:758–769. Wiley Online Library.
Syphard AD, Rustigian-romsos H, Mann M, Conlisk E, Moritz MA, Ackerly D. 2019. The relative influence of climate and housing development on current and projected future fire patterns and structure loss across three California landscapes. Global Environmental Change **56**:41–55. Elsevier Ltd.
Technology Associates International Corporation. 2006. Public Review Draft Santee MSCP Subarea Plan Conservation Analysis.
The City of San Diego. 2020, February 26. Public Notice for Preparation of a Subsequent Environmental Impact Report and Scoping Meeting. Development Services Department.
The Nature Conservancy. 2007. A conservation management strategy for nine low elevation rare plants in Clark County, Nevada. Page 401. Nevada Field Office, Reno, Nevada.
U.S. Army Corps of Engineers. 2020, February 25. Public Notice: Application for Permit Murrieta Hills Development Project. U.S. Army Corps of Engineers Los Angeles District.
US Attorney's Office. 1993. United States v. Richard J. Skalski, Thomas W. Kral, and Marc L. Grinnell.
US Census Bureau. 2019, April 18. New Census Bureau Estimates Show Counties in South and West Lead Nation in Population Growth. Available from https://www.census.gov/newsroom/press-releases/2019/estimates-county-metro.html (accessed April 7, 2020).
US Census Bureau. 2020. QuickFacts Riverside County, California; San Diego County, California; California. Available from https://www.census.gov/quickfacts/fact/table/riversidecountycalifornia,sandiegocountycalifornia,CA/PST045218 (accessed April 7, 2020).
U.S. Customs and Border Protection. 2018, February. Biological Survey Report – 14 Mile Fence Replacement. Appendix C to CBP Sand Diego Sector Fence Replacement Environmental Stewardship Plan. San Diego Sector.
U.S. Customs and Border Protection. 2020a, March 13. Border Wall Status- March 13, 2020.
U.S. Customs and Border Protection. 2020b, April 1. RE: Comment Period Extended for San Diego County Border Barrier Projects.

USFWS. 1997, January 16. Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the Laguna Mountains Skipper and Quino Checkerspot Butterfly Final Rule. Federal Register.

USFWS. 2002. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Quino Checkerspot butterfly (Euphydryas editha quino). Federal Register. Available from https://www.federalregister.gov/documents/2002/04/15/02-8525/endangered-and-threatened-wildlife-and-plants-designation-of-critical-habitat-for-the-quino.

USFWS. 2003. Recovery Plan for the Quino Checkerspot Butterfly (Euphydryas editha quino). U.S. Fish and Wildlife Service, Portland, Oregon.

USFWS. 2009a, June 17. Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the Quino Checkerspot butterfly (Euphydryas editha quino); Final Rule. Federal Register.

USFWS. 2009b. Quino Checkerspot Butterfly (Euphydryas editha quino) 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service, Carlsbad, California.

USFWS. 2011. Reinitiation of Consultation and Amendment to the Biological Opinion Regarding Inssuance of an Endangered Species Act Section 10(a)(1)(B) Permit (TE088609-1) for the Western Riverside County Multiple Species Conservation Plan, Riverside County, California. Page 28. Biological Opinion Amendment.

USFWS. 2019. Draft Amendment: Recovery Plan for Quino Checkerspot Butterfly (Euphydryas editha quino). U.S. Fish and Wildlife Service, Carlsbad, California.

USFWS, HELIX Environmental Planning, Inc., Dudek & Associates, Inc. 2020, January 17. See FWS edits to: Draft quino checkerspot butterfly conservation strategy for otay ranch village 14 and planning areas 16/19.

Vandergast AG, Bohonak AJ, Hathaway SA, Boys J, Fisher RN. 2008. Are hotspots of evolutionary potential adequately protected in southern California? Biological conservation **141**:1648–1664. Elsevier.

Weiss SB. 1999. Cars, cows, and checkerspot butterflies: nitrogen deposition and management of nutrient-poor grasslands for a threatened species. Conservation Biology **13**:1476–1486. Wiley Online Library.

Weiss SB, Longcore T. 2020. Effects of Nitrogen Deposition on Sensitive Species and Habitats Resulting from the Southern California Association of Governments Regional Transportation Plan. Page 11.

Whitehead AL, Kujala H, Wintle BA. 2017. Dealing with cumulative biodiversity impacts in strategic environmental assessment: A new frontier for conservation planning. Conservation letters **10**:195–204. Wiley Online Library.

Williams AP, Abatzoglou JT, Gershunov A, Guzman-Morales J, Bishop DA, Balch JK, Lettenmaier DP. 2019. Observed impacts of anthropogenic climate change on wildfire in California. Earth's Future **7**:892–910. Wiley Online Library.

State of California
Department of Fish and Wildlife

Memorandum

Original on file,
received July 23, 2020

Date: July 16, 2020

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

From: Charlton H. Bonham
Director

Subject: **Request for 30-day Extension, Quino Checkerspot Butterfly Petition**

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 the Quino checkerspot butterfly (*Euphydryas editha quino*) under the California Endangered Species Act and to complete the evaluation report. This extension would change the due date of the Department's evaluation report from 90 days, due October 6, 2020, to 120 days, due on November 2, 2020.

If you have any questions or need additional information, please contact Scott Gardner, Wildlife Branch Chief, at (916) 801-6257.

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State of California
Department of Fish and Wildlife

Memo randum

Original on file,
received July 23, 2020

Date: July 23, 2020

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

From: Charlton H. Bonham
Director

Subject: **Evaluation of a Petition to Change the Status of Mohave Desert Tortoise from Threatened to Endangered under the California Endangered Species Act**

The California Department of Fish and Wildlife (Department) has completed its evaluation of a Petition to change the status of Mohave desert tortoise from threatened to endangered under the California Endangered Species Act, Fish and Game Code section 2050 et seq. The California Fish and Game Commission (Commission) received the Petition from Defenders of Wildlife, The Desert Tortoise Council, and The Desert Tortoise Preserve Committee on March 23, 2020. Pursuant to Fish and Game Code section 2073, the Commission referred the Petition to the Department on April 13, 2020.

The Department completed the attached Petition Evaluation report pursuant to Fish and Game Code section 2073.5. (See also Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1).). The Department's evaluation report delineates the categories of information required in a petition, evaluates the sufficiency of the available scientific information regarding each of the Petition components, and incorporates additional relevant information the Department possessed or received during the review period.

Based upon information contained in the petition and other relevant information in the Department's possession, the Department has determined there is sufficient scientific information available at this time to indicate the petitioned action may be warranted. The Department recommends the Petition be accepted and considered.

If you have any questions or need additional information, please contact Scott Gardner, Wildlife Branch Chief, at Scott.Gardner@wildlife.ca.gov.

Attachment

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State of California
Natural Resources Agency
Department of Fish and Wildlife

REPORT TO THE FISH AND GAME COMMISSION

EVALUATION OF A PETITION FROM THE DESERT TORTOISE COUNCIL, THE DESERT TORTOISE PRESERVE COMMITTEE, AND DEFENDERS OF WILDLIFE TO CHANGE THE STATUS OF MOHAVE DESERT TORTOISE (*GOPHERUS AGASSIZII*) FROM THREATENED TO ENDANGERED UNDER THE CALIFORNIA ENDANGERED SPECIES ACT

Mohave Desert Tortoise (*Gopherus agassizii*) (Photo by BLM)

Prepared by
California Department of Fish and Wildlife

August 2020

TABLE OF CONTENTS

EXECUTIVE SUMMARY **1**

INTRODUCTION **3**
Candidacy Evaluation 3
Desert Tortoise Taxonomy 5
Petition History 6
Overview of Mohave Desert Tortoise Ecology 7

SUFFICIENCY OF SCIENTIFIC INFORMATION TO INDICATE THE PETITIONED ACTION FOR MOHAVE DESERT TORTOISE MAY BE WARRANTED **10**
Population Trend 11
Geographic Range and Distribution 14
Abundance 16
Life History 17
Kind of Habitat Necessary for Survival 17
Factors Affecting the Ability to Survive and Reproduce 19
Degree and Immediacy of Threat 19
Impact of Existing Management Efforts 20
Suggestions for Future Management 21
Detailed Distribution Map 22
Sources and Availability of Information 22

RECOMMENDATION TO THE COMMISSION **22**

LITERATURE CITED **23**

LIST OF FIGURES

Figure 1. Distribution of Agassiz's or Mohave desert tortoise and Morafka's or Sonoran desert tortoise
Figure 2. Range and distribution of Mohave desert tortoise
Figure 3. Mohave desert tortoise Recovery Units and Critical Habitat Units
Figure 4. Distribution of desert tortoise records from Grinnell and Camp (1917)
Figure 5. Distribution of desert tortoises from Patterson (1981)

EXECUTIVE SUMMARY

Defenders of Wildlife, the Desert Tortoise Council, and the Desert Tortoise Preserve Committee (Petitioners) submitted a petition (Petition) to the Fish and Game Commission (Commission) to change the status of Mohave desert tortoise (*Gopherus agassizii*) from threatened to endangered under the California Endangered Species Act (CESA).

The Commission referred the Petition to the Department of Fish and Wildlife (Department) in accordance with Fish and Game Code Section 2073 (Cal. Reg. Notice Register 2020, No. 18-Z, p. 693). Pursuant to Fish and Game Code section 2073.5 and California Code of Regulations, title 14, section 670.1, the Department prepared this evaluation report (Petition Evaluation) of the Petition. The purpose of the Petition Evaluation is to assess the scientific information discussed and cited in the Petition in relation to other relevant and available scientific information possessed or received by the Department during the evaluation period and to recommend to the Commission whether the scientific information in the Petition is sufficient under the criteria prescribed by CESA to accept and consider the Petition to list Mohave desert tortoise as endangered.

After reviewing the Petition and other relevant information, the Department determined the Petition meets the requirement in Fish and Game Code section 2072.3 that it include sufficient scientific information to indicate the petitioned action may be warranted. Specifically, the Department determined:

- *Population Trend*. The information in the Petition is sufficient to indicate the Mohave desert tortoise population in California has declined substantially from historical levels and has continued to trend downward since the species was listed as a threatened species by the Commission in 1989.

- *Range and Distribution*. Information in the Petition and otherwise available to the Department indicates the geographic range of the Mohave desert tortoise in California has not substantially changed since the early 1900s; however, some changes in its distribution within the range have occurred in recent years.

- *Abundance*. The Petition provides sufficient information to indicate substantial reductions in Mohave desert tortoise abundance have occurred in large areas of their range, and that the abundance has continued to decline since the species was listed as threatened in California in 1989.

- *Life History*. The Petition provides sufficient information on the life history of the Mohave desert tortoise.

- *Kind of Habitat Necessary for Survival*. The Petition presents sufficient information on Mohave desert tortoise habitat requirements.

- *Factors Affecting the Ability to Survive and Reproduce*. The Petition presents a list of the factors that affect the survival and reproduction of the Mohave desert tortoise, including land uses (ranching, mining, agriculture, urbanization, military operations, transportation networks, recreation, and utility corridors), weather impacts (storms, drought, availability of natural water), predation from artificially high predator populations, and factors associated with climate change.

- *Degree and Immediacy of Threat*. The Petition describes the degree and immediacy of threats to the continued existence of Mohave desert tortoise in California.

- *Impact of Existing Management Efforts*. The Petition describes land ownership and includes a cursory discussion of land management practices by ownership within designated Mohave desert tortoise Critical Habitat Units. However, it does not provide similar information for the species' entire range in California which encompasses an area far greater than the Critical Habitat Units. Nonetheless, the Petition provided sufficient information on the general patterns of land ownership and land management practices in the species' range.

- *Suggestions for Future Management*. The Petition includes potential monitoring suggestions, management actions, and additional protective measures that would benefit Mohave desert populations.

- *A Detailed Distribution Map*. The Petition provides internet links to three distribution maps for Mohave desert tortoise in California.

- *Availability and Sources of Information*. Numerous scientific references were cited in the Petition and listed in Petition Attachment 4 – Literature Cited.

In completing its Petition Evaluation, the Department has determined the Petition provides sufficient scientific information to indicate that the petitioned action to change the status of the Mohave Desert Tortoise from threatened to endangered may be warranted. Therefore, the Department recommends the Commission accept the Petition for further consideration under CESA.

INTRODUCTION

Candidacy Evaluation

The Commission has the authority to list certain “species” or “subspecies” as threatened or endangered under CESA. (Fish & G. Code, §§ 2062, 2067, and 2070.) The listing process is the same for species and subspecies. (Fish & G. Code, §§ 2070-2079.1.)

CESA sets forth a two-step process for listing a species as threatened or endangered. First, the Commission determines whether to designate a species as a candidate for listing by evaluating whether the petition provides “sufficient information to indicate that the petitioned action may be warranted.” (Fish & G. Code, § 2074.2, subd. (e)(2).) If the petition is accepted for consideration, the second step requires the Department to produce, within 12 months of the Commission’s acceptance of the petition, a peer reviewed report based upon the best scientific information available that indicates whether the petitioned action is warranted. (Fish & G. Code, § 2074.6.) Finally, the Commission, based on that report and other information in the administrative record, determines whether the petitioned action to list the species as threatened or endangered is warranted. (Fish & G. Code, § 2075.5.)

A petition to list a species under CESA must include “information regarding the population trend, range, distribution, abundance, and life history of a species, the factors affecting the ability of the population to survive and reproduce, the degree and immediacy of the threat, the impact of existing management efforts, suggestions for future management, and the availability and sources of information. The petition shall also include information regarding the kind of habitat necessary for species survival, a detailed distribution map, and any other factors that the petitioner deems relevant.” (Fish & G. Code, § 2072.3; see also Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1).) The range of a species for the Department’s petition evaluation and recommendation is the species’ California range. (*Cal. Forestry Assn. v. Cal. Fish and Game Com.* (2007) 156 Cal.App.4th 1535, 1551.)

Within 10 days of receipt of a petition, the Commission must refer the petition to the Department for evaluation. (Fish & G. Code, § 2073.) The Commission must also publish notice of receipt of the petition in the California Regulatory Notice Register. (Fish & G. Code, § 2073.3.) Within 90 days of receipt of the petition (or 120 days if the Commission grants an extension), the Department must evaluate the petition on its face and in relation to other relevant information and submit to the Commission a written evaluation report with one of the following recommendations:

- Based upon the information contained in the petition, there is not sufficient information to indicate that the petitioned action may be warranted, and the petition should be rejected; or
- Based upon the information contained in the petition, there is sufficient information to indicate that the petitioned action may be warranted, and the petition should be accepted and considered.

(Fish & G. Code, § 2073.5, subds. (a)-(b).) The Department's candidacy recommendation to the Commission is based on an evaluation of whether the petition provides sufficient scientific information relevant to the petition components set forth in Fish and Game Code Section 2072.3 and the California Code of Regulations, Title 14, Section 670.1, subdivision (d)(1).

In *Center for Biological Diversity v. California Fish and Game Commission* (2008) 166 Cal.App.4th 597, the California Court of Appeals addressed the parameters of the Commission's determination of whether a petitioned action should be accepted for consideration pursuant to Fish and Game Code Section 2074.2, subdivision (e), resulting in the species being listed as a candidate species. The court began its discussion by describing the standard for accepting a petition for consideration previously set forth in *Natural Resources Defense Council v. California Fish and Game Commission* (1994) 28 Cal.App.4th 1104:

> As we explained in *Natural Resources Defense Council*, "the term 'sufficient information' in section 2074.2 means that amount of information, when considered with the Department's written report and the comments received, that would lead a reasonable person to conclude the petitioned action may be warranted." The phrase "may be warranted" "is appropriately characterized as a 'substantial possibility that listing could occur.'" "Substantial possibility," in turn, means something more than the one-sided "reasonable possibility" test for an environmental impact report but does not require that listing be more likely than not.

(*Center for Biological Diversity*, *supra*, 166 Cal.App.4th at pp. 609-10 [internal citations omitted].) The court acknowledged that "the Commission is the finder of fact in the first instance in evaluating the information in the record." (*Id.* at p. 611.) However, the court clarified:

> [T]he standard, at this threshold in the listing process, requires only that a substantial possibility of listing could be found by an objective, reasonable person. The Commission is not free to choose between conflicting inferences on subordinate issues and thereafter rely upon those choices in assessing how a reasonable person would view the listing decision. Its decision turns not on rationally based doubt about listing, but on the absence of any substantial possibility that the species could be listed after the requisite review of the status of the species by the Department under [Fish and Game Code] section 2074.6. (*Ibid*.)

CESA defines the "species" eligible for listing to include "species or subspecies" (Fish and G. Code, §§ 2062, 2067, and 2068), and courts have held that the term "species or subspecies" includes "evolutionarily significant units." (*Central Coast Forest Assn. v. Fish & Game Com.* (2018) 18 Cal.App.5th 1191, 1236, *citing Cal. Forestry Assn.*, *supra*, 156 Cal.App.4th at pp. 1542 and 1549.)

Desert Tortoise Taxonomy

Desert tortoises are members of the order Testudines, family Testudinidae, genus *Gopherus*. When the Commission listed desert tortoise in 1989, *Gopherus agassizii* was understood to range from southeastern California, across southern Nevada, through western Arizona, and south into Sonora and Sinaloa, Mexico (Figure 1). Since that time, studies of tortoise genetics, morphometrics, and ecology have led experts to conclude that the complex formerly known as "desert tortoise" in fact consists of two separate species, Mohave desert tortoise and Sonoran desert tortoise (Murphy et al. 2011, Iverson et al. 2017). Mohave desert tortoise, also known as Agassiz's desert tortoise, retains the binomial *G. agassizii*, and ranges across the deserts of southeastern California, southern Nevada, and small areas of Arizona and Utah north of the Colorado River. Desert tortoises south of the Colorado River in Arizona and northern Mexico are now classified as Sonoran desert tortoise, also known as Morafka's desert tortoise, (*Gopherus morafkai*). Only the Mohave (Agassiz's) desert tortoise occurs in California. References to Agassiz's desert tortoise and Mohave desert tortoise in the Petition and this evaluation should be considered synonymous. This evaluation uses the common name Mohave desert tortoise when referring to *G. agassizii* as the species is currently understood.

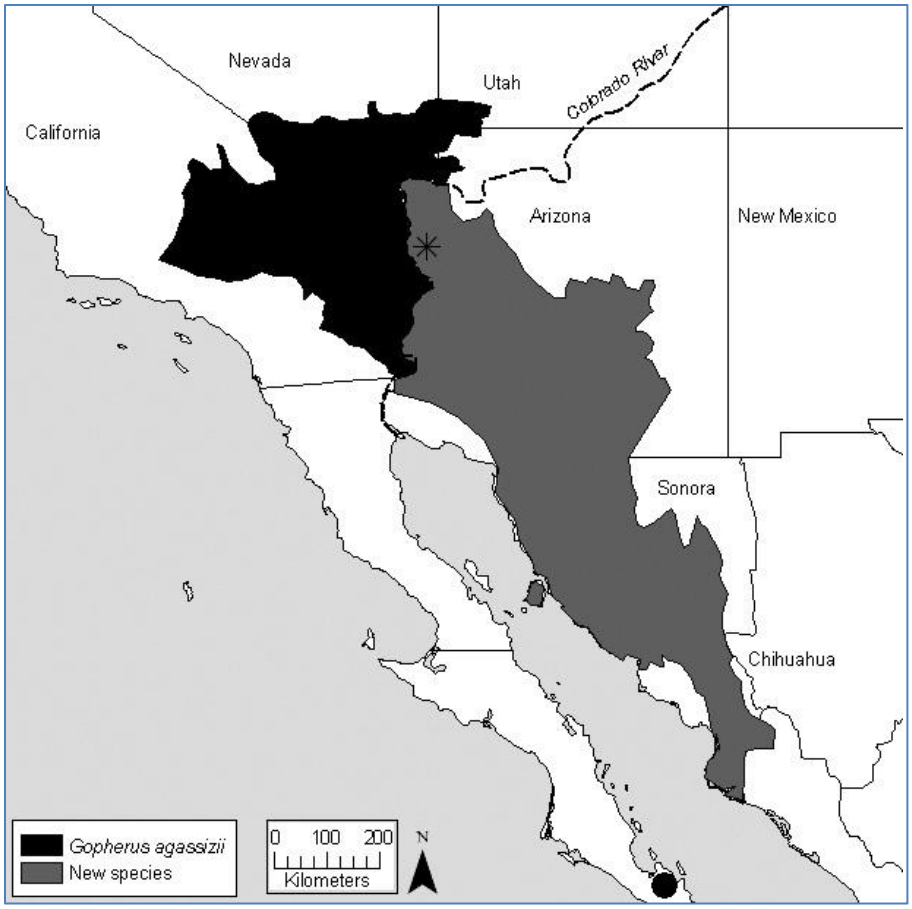

Figure 1. Distribution of Agassiz's or Mohave desert tortoise (*Gopherus agassizii,* black polygon) and Morafka's or Sonoran desert tortoise (*Gopherus morafkai,* gray polygon). Prior to taxonomic revision the two species collectively were considered "desert tortoise" (*G. agassizii*). Figure from Murphy et al. (2011).

Petition History

The desert tortoise was listed as a threatened species by the U.S. Fish and Wildlife Service (USFWS) in 1980 throughout its range which includes southeastern California. In 1989, the Commission listed desert tortoise as a threatened species under CESA. On March 23, 2020, the Commission received a Petition from The Desert Tortoise Council, The Desert Tortoise Preserve Committee, and Defenders of Wildlife to change the status of Mohave desert tortoise from threatened to endangered. On April 13, 2020, the Commission referred the Petition to the Department for evaluation. At its meeting on April 16, 2020, the Commission officially received the Petition.

The Department evaluated the scientific information presented in the Petition as well as other relevant information the Department possessed at the time of review. Pursuant to Fish and Game Code Section 2072.3 and Section 670.1, subdivision (d)(1), of Title 14 of the California Code of Regulations, the Department evaluated whether the Petition included sufficient scientific information regarding each of the following petition components to indicate that the petitioned action may be warranted:

- Population trend;
- Range;
- Distribution;
- Abundance;
- Life history;
- Kind of habitat necessary for survival;
- Factors affecting the ability to survive and reproduce;
- Degree and immediacy of threat;
- Impact of existing management efforts;
- Suggestions for future management;
- Availability and sources of information; and
- A detailed distribution map.

Overview of Mohave Desert Tortoise Ecology

Information in this section is summarized from Berry and Murphy's (2019) recent monograph on the species. The carapaces (shells) of hatchling Mohave desert tortoises average about 44 mm (1.7 in.) long while adult carapaces range in length from 178 to >370 mm (7.0 – 14.5 in.). Females are typically slightly smaller, averaging approximately 220 mm (8.7 in.), while males average about 243 mm (9.6 in.).

In California, the species occupies much of the Mojave Desert and portions of the Sonoran and Great Basin Deserts. It ranges from the southern end of the Owens Valley in the north to the Mexican border near the southeastern corner of the state, and from the Colorado River in the east to the lower slopes of the Sierra Nevada, Tehachapi, San Gabriel, San Bernardino, and Peninsular Mountains in the west (Figure 2).

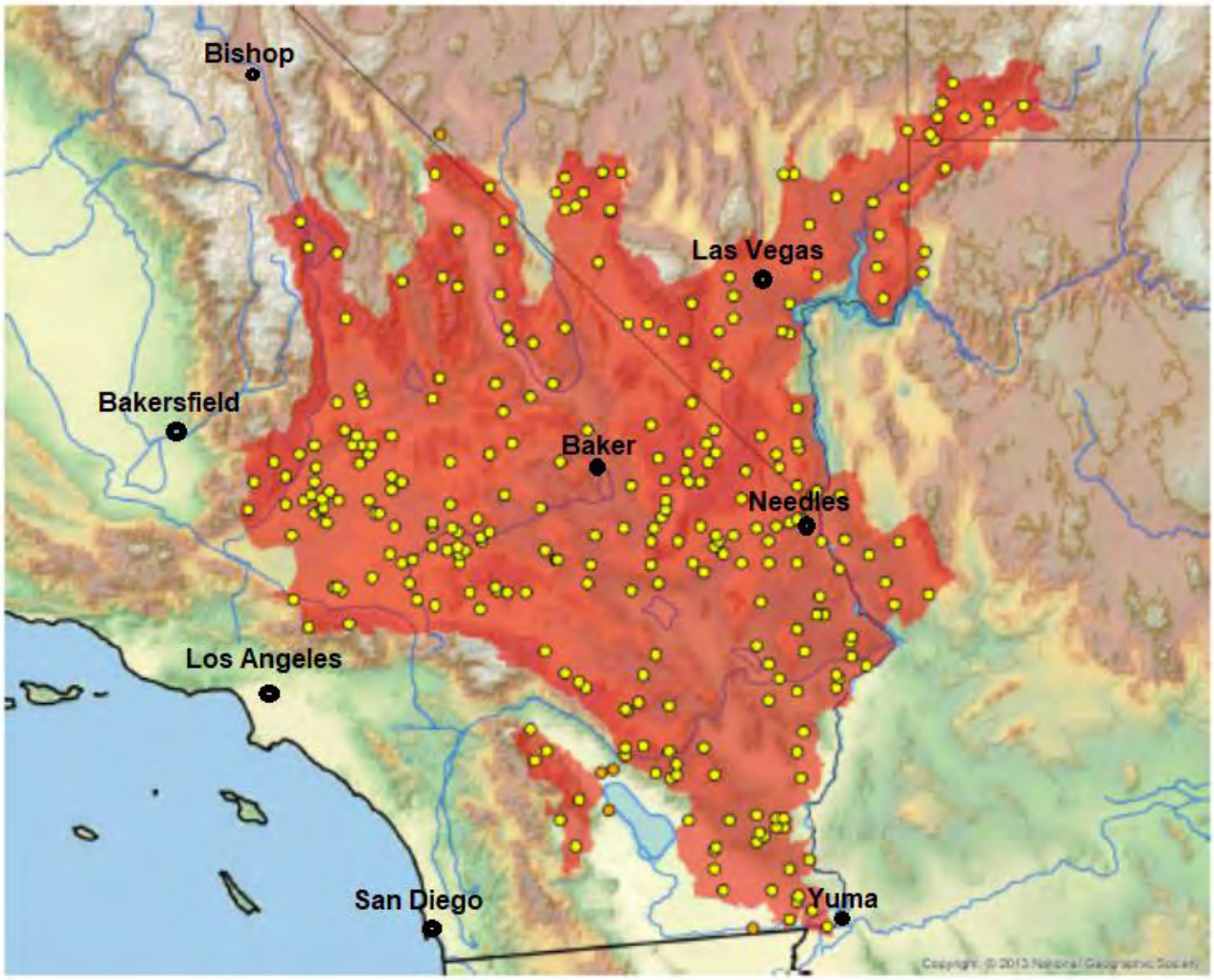

Figure 2. Range and distribution (yellow dots) of Mohave desert tortoise. Figure from Berry and Murphy (2019).

Mohave desert tortoises require topography, geologic features such as rock crevices and the banks of washes, and suitable soils for cover and the construction of burrows and dens. Shrub or tree cover is essential for protection from extreme temperature, precipitation, and predators. Over 70% of burrows occur beneath shrubs, with the larger shrubs or trees preferred. In the lowlands and dry lakebeds of the Mojave Desert ecosystem, tortoises are associated with several vegetation types in the Chenopodiaceae subfamily, including saltbush (*Atriplex* spp.). Most vegetation associations used by desert tortoise contain creosote bush (*Larrea tridentata*), often with white bur-sage (*Ambrosia dumosa*) or cheesebush (*A. salsola*) and several other species of shrubs, cacti, and perennial grasses. At higher elevations tree yuccas (Joshua tree, *Yucca brevifolia,* and Mojave yucca, *Y. schidigera*) and woody shrubs become more common, including blackbrush (*Coleogyne ramosissima*) associations at the highest elevations. The hotter western Sonoran Desert is characterized by creosote bushes, but also includes woodlands of blue palo verde (*Parkinsonia florida*), smoke tree (*Psorothamnus spinosus*), and ironwood (*Olneya tesota*) associated with dry stream channels interspersed with sparse ocotillo (*Fouqueria splendens*), creosote bush, and other shrubs, and cacti. Mohave desert tortoise densities are highest where diverse assemblages of grass, cacti, shrub, and tree cover occur, and low where shrub cover is sparse and precipitation is scarce and erratic. Densities also decline in areas modified by human activities.

Mohave desert tortoises eat annual plants, herbaceous perennials, succulents (cacti), and flowers and leaves of a few perennial shrubs.

Mohave desert tortoises spend >90% of their lives inactive and underground in burrows, pallets (shallow burrows which provide at least partial cover from the sun and predators), caves, or other cover which they can excavate themselves within a few days of hatching. While underground tortoises can reduce their metabolic rates to conserve water and energy. Burrows are often ≥ 3 m (9 ft.) long and ≥ 1 m (3 ft.) below the surface. Denning burrows, which may be used by multiple tortoises, are often found in washes, and may contain side rooms. Underground refuges provide shelter during periods of extreme heat and during droughts and food shortages. Mohave desert tortoise burrows and dens are important landscape features utilized by a wide range of invertebrates, reptiles, birds, and mammals (Henen et al.1998).

Activity patterns, both daily and seasonal, are strongly influenced by temperatures, the timing and amounts of precipitation, availability of free water to drink, and the availability of forage. Tortoises generally emerge from hibernation or brumation (a torpor like state of slowed metabolic activity) in late winter or early spring, followed by above-ground foraging and interactions with other tortoises. By late spring most individuals retreat to burrows, dens, pallets, and rock structures. Tortoises occasionally emerge from cover in early morning or late evening in June and July. From August through late October or early November above ground activity increases until temperatures fall, when individuals retreat underground to hibernate.

Courtship takes place in both the spring and fall, and polyandry (multiple males breeding with the same female) is not uncommon. Females first breed at 12 to 20 years of age and can store sperm and use it to fertilize eggs for several years after mating. Females lay up to three clutches of 1 to 10 eggs in nests within dens, burrows, pallets, and mounds as well as under shrubs. More eggs are laid when forage conditions are favorable. The sex of offspring is determined by the temperature eggs reach during incubation. Warmer conditions result in more females, and colder in more males. Consequently, local populations often have highly skewed sex ratios.

Home ranges of males are generally larger than females. In the central Mojave Desert, Harless et al. (2009) found males had home ranges of 43 to 49 ha (106 to 121 ac.), and females 16 to 17 ha (39.5 to 42 ac.) using minimum convex polygons. Home ranges of juveniles were smaller than those of adults.

Throughout their life stages, Mohave desert tortoises are subject to predation by a wide range of predators. Eggs are consumed by several vertebrate predators, such as Gila monsters (*Heloderma suspectum*), desert kit fox (*Vulpes macrotis*), coyote (*Canis latrans*), American badger (*Taxidea taxus*), and spotted skunks (*Spilogale gracilis*). Hatchlings can be killed by ants, including fire ants (*Solenopsis* spp.), common ravens (*Corvus corax*), bobcats (*Lynx rufus*), desert kit fox, rodents, and burrowing owls (*Athene cunicularia*). Adults are known to be preyed upon by common ravens, golden eagles (*Aquila chrysaetos*), coyotes, bobcats, mountain lions (*Puma concolor*), American badgers, and domestic dogs (*Canis lupus familiaris*).

SUFFICIENCY OF SCIENTIFIC INFORMATION TO INDICATE THE PETITIONED ACTION FOR MOHAVE DESERT TORTOISE MAY BE WARRANTED

The Petition components are evaluated below, pursuant to Fish and Game Code Section 2072.3 and Section 670.1, subdivision (d)(1), of Title 14 of the California Code of Regulations.

Population Trend

Scientific Information in the Petition

The Petition discusses population trends on pages 7to 21 under the heading "Population Trends".

The Petition relies upon analyses of long-term Mohave desert tortoise monitoring projects to characterize the population trend of the species. The Petition presents (see Petition Tables 1a. and 1b.) results from a long-term, fixed plot intensive search monitoring project conducted by the U.S. Bureau of Land Management (BLM) in the late 1970s and later surveyed by the U.S. Geologic Survey (Figure 3). These data illustrate a general pattern of decline in adult Mohave desert tortoise population density estimates in the Desert Tortoise Recovery Units (RUs), Critical Habitat Units (CHUs), Conservation Areas (CAs) and Wildlife Management Areas (WMAs) sampled 1977 to 2000; with a few exceptions such as the Joshua Tree Unit where populations appear to have increased or remained stable. Berry (2003) analyzed the results of these periodic intensive search surveys and found declines of 50% to 96% in adult tortoise densities between the late 1970s and early 2000s. In the Desert Tortoise Research Natural Area within the Western Mojave Recovery Unit, from 1982 to 1992 the overall Mohave desert tortoise population declined by 86%, with the adult population declining by about 94%, primarily due to Mycoplasmosis disease mortality (Brown et al. 1999).

Population estimates of permanent study plots in the Colorado Desert Recovery Unit at Chemehuevi Valley and Chuckwalla Bench showed population declines as high as 90% from the early 1990s to the 2000s (BLM and CDFG 2002). Surveys performed in 2000 showed all tortoise size classes in sampled eastern Mojave Desert Critical Habitat Units declined from previous tortoise population estimates, some by 76% to 80%. Larger tortoise size classes were estimated to have declined by as much as 90% from previous estimates (Berry 2000, BLM 2002).

Beginning in 2001, at the direction of the interagency Desert Tortoise Management Oversight Group, the long-term monitoring strategy was changed to line-distance sampling on randomly established plots to determine density estimates. Petition Table 3 presents the Mohave desert tortoise density estimates derived from annual line-distance sampling surveys by year from 2001 to 2019. Density estimates trend lower across all units except for the Ivanpah CHU, where the trend is less apparent. The USFWS (2015) analyzed density estimate data from 2004 to 2014 and found declines of 30 to 65% over the decade across the units except for the Joshua Tree sampling unit where the density estimate increased by 178%. Despite the dramatic increase in the Joshua Tree sampling unit, the overall density estimate for the larger Colorado Desert Recovery Unit, which contains Joshua Tree and five other sampling units, declined by more than 36% (USFWS 2015).

The 1994 Recovery Plan for the Mojave Population of the Desert Tortoise (USFWS 1994) determined that the minimum viable tortoise population density is 3.9 adults per square kilometer, or approximately 10 per square mile. The density estimates in nine of the 10 California Mohave desert tortoise sampling units were below the minimum viable density in 2014 (USFWS 2015).

Taken together, the two long-term monitoring projects indicate the Mohave desert tortoise population declined substantially in most sampling units from 1977 to 2000, and then substantially declined further from 2001 to 2014. The most recent estimates indicate the population densities in most sampling units are below the minimum density determined necessary to sustain populations.

Other Relevant Scientific Information

The USFWS Range-Wide Monitoring of the Mohave Desert Tortoise 2019 Annual Report (USFWS 2020) indicates that density estimates in eight of the nine reported sampling units remain below the minimum viable density of 3.9 adults per square kilometer.

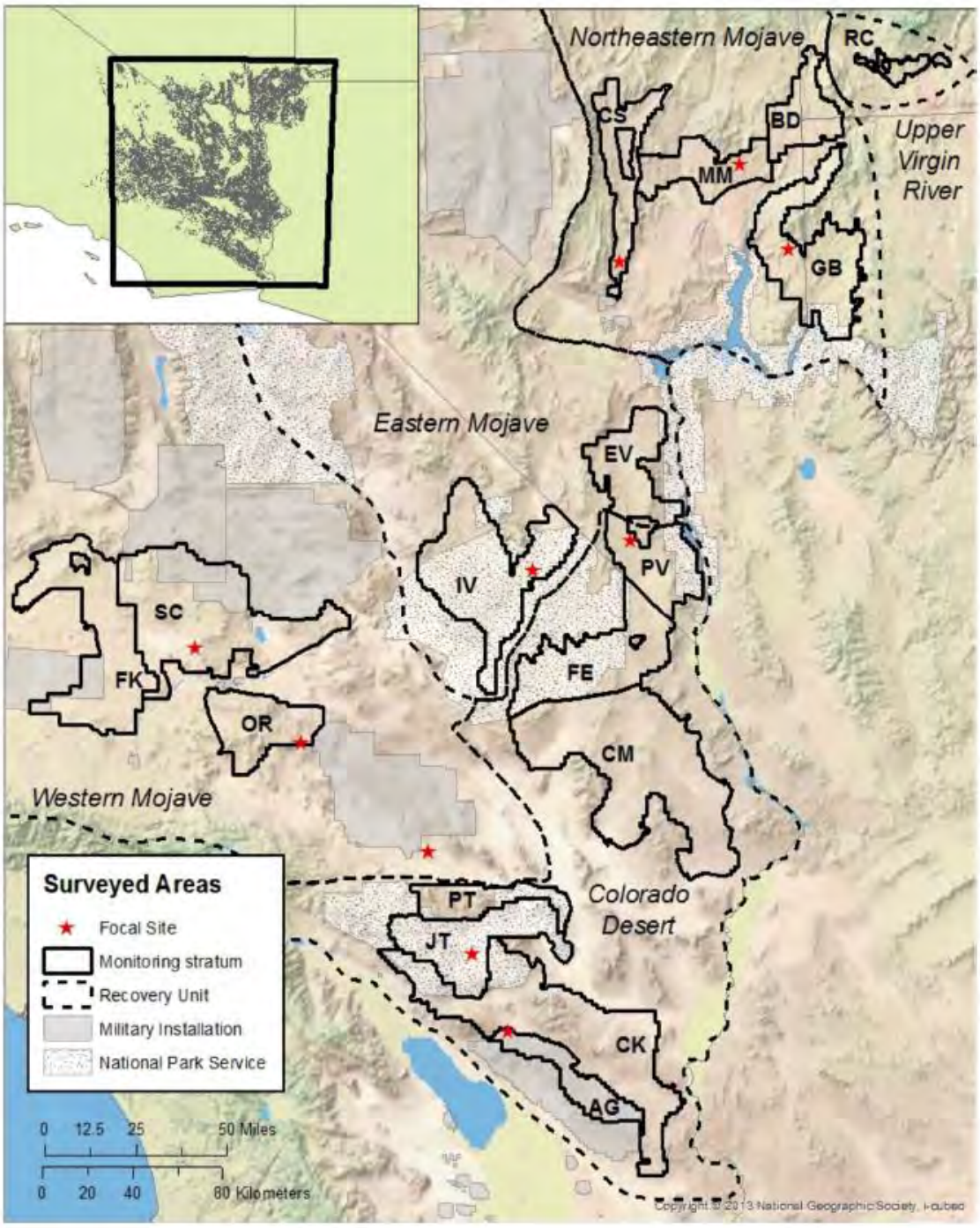

Figure 3. Mohave desert tortoise Recovery Units (dashed lines) and Critical Habitat Units (solid lines, shown as “Monitoring stratum” in legend). FK = Fremont-Kramer, SC = Superior-Cronese, OR = Ord-Rodman, PT = Pinto Mountains, JT = Joshua Tree, CK = Chuckwalla, AG = Chocolate Mtns, Aerial Gunnery Range, CM = Chemehuevi, FE = Fenner, IV = Ivanpah. This figure appears as Figure 1 in the Petition. Figure source is USFWS (2020).

Conclusion

While the Petition did not include a Mohave desert tortoise population estimate it presented observed population density data that indicate populations have dramatically declined over the last 40 years. Population census data is lacking for most wildlife species and the use of density estimates as a surrogate for tracking trends in population size is a commonly accepted practice (e.g. Anderson et al. 1979). The information in the Petition is sufficient to indicate the Mohave desert tortoise population in California has declined substantially from historical levels and has continued to trend downward since the species was listed as a threatened species by the Commission in 1989.

Geographic Range and Distribution

Scientific Information in the Petition

The Petition discusses geographic range and distribution on pages 21 to 25.

The Petition provided information on changes in Mohave desert tortoise distribution associated with the expansion of two military installations: Fort Irwin in 2002, and the U.S. Marine Corps Air Ground Combat Center in 2013. This information indicates changes in the distribution of Mohave desert tortoises may have occurred, but it does not inform trends in the historical or current geographic range.

Other Relevant Scientific Information

The Mohave desert tortoise is distributed through the Mojave Desert and portions of the Sonoran and Great Basin Deserts from the southern end of the Owens Valley in the north to the Mexican border near the southeastern corner of the state, and from the Colorado River in the east to the lower slopes of the Sierra Nevada, transverse, and Peninsular Mountains in the west (Berry and Murphy 2019). Grinnell and Camp (1917) produced an early desert tortoise distribution map based on museum records available at the time (Figure 4), and Patterson (1981), produced the first map of desert tortoise distribution derived from available literature and museum records as well as the observation of herpetologist (Figure 5). These early distribution maps show the same general pattern of distribution and range as contemporary maps such as Berry and Murphy (2019, see Figure 2). Accordingly, The USFWS (2019) concluded the species' distribution has not changed substantially in terms of the overall extent of its range, although desert tortoises have been removed from portions of their range for solar developments, military activities, and other development projects.

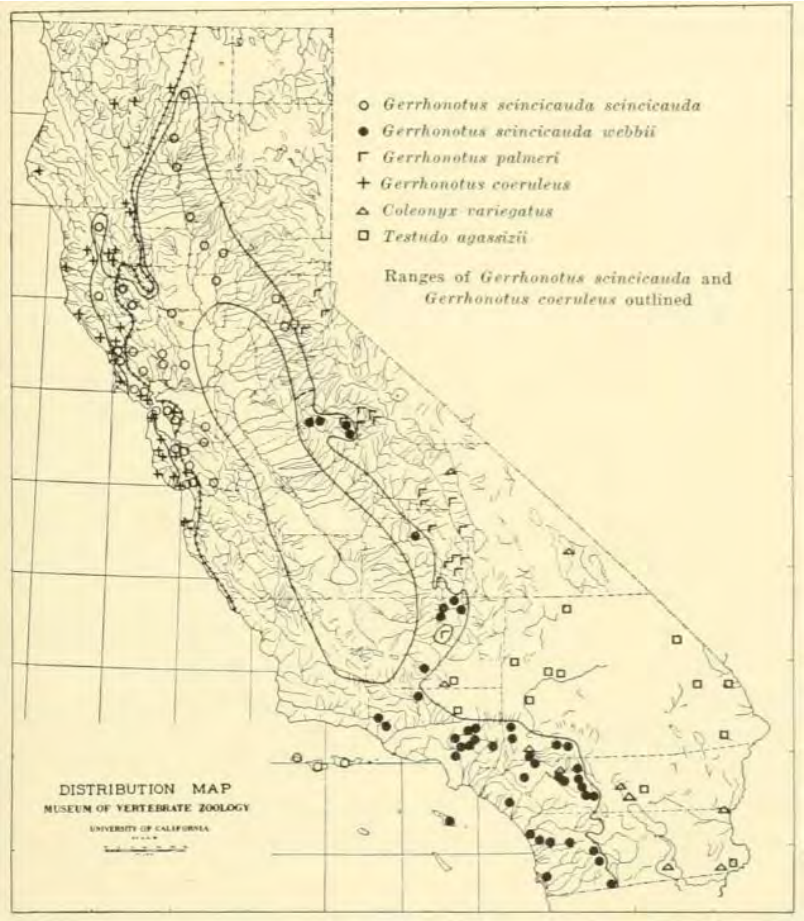

Figure 4. Distribution of desert tortoise records (open squares) from Grinnell and Camp (1917).

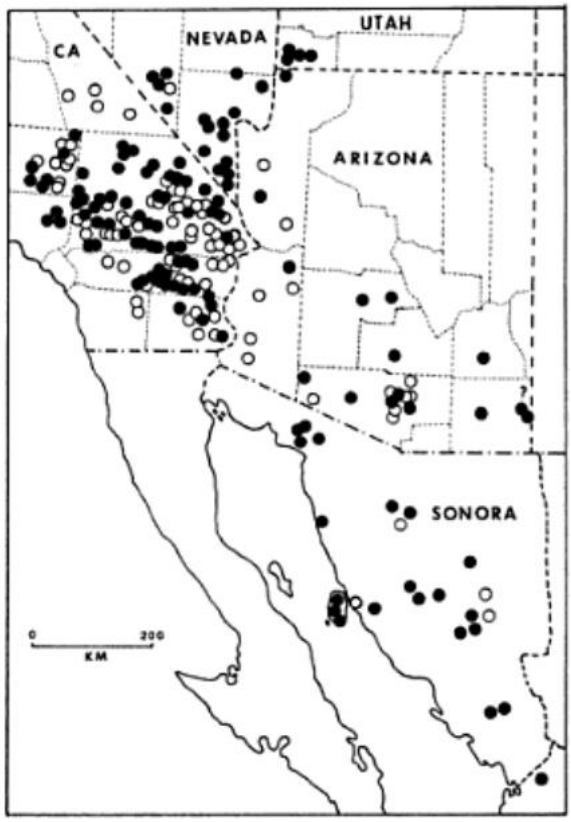

Figure 5. Distribution of desert tortoises from Patterson (1981). Black dots represent museum and literature records, open circles represent observations of professional and amateur herpetologists. Note that records outside of California include tortoises now ascribed to Morafka's desert tortoise and Goode's thornscrub tortoise (*Gopherus evgoodei*).

Conclusion

Information available to the Department indicates that the Mohave desert tortoise range has not changed substantially since it was first documented in the early 1900s. The Petition provides sufficient information to indicate changes in its distribution within the range have occurred in recent years.

Abundance

Scientific Information in the Petition

The Petition discusses the abundance of Mohave desert tortoises on pages 25 to 29.

The Petition restates information presented in the Population Trend section of the Petition, emphasizing that density estimates of adult Mohave desert tortoises in Critical Habitat Units declined by 51.3% from 2004 to 2014 (USFWS 2015); and that density estimates in the Western Mojave Recovery Unit appear to have declined by 85% to 95% since the earliest density information was collected in the late 1970s (USFWS 1994, 2015). The Petition restates that Mohave desert tortoise densities in eight of 10 sampling units are below the estimated minimum viable population density described in the Recovery Plan (USFWS 1994).

Conclusion

The Petition provides sufficient information to indicate substantial reductions in Mohave desert tortoise abundance have occurred in large areas of their range. Additionally, the Petition demonstrates that the abundance of Mohave desert tortoises has continued to decline since the species was listed as threatened in California in 1989.

Life History

Scientific Information in the Petition

The Petition discusses the life history of the Mohave desert tortoise on pages 29 to 31.

The Petition provides a brief overview of the species' physical description, behavior, adaptations to the desert environment, reproductive biology, home range, and genetic diversity within California.

Conclusion

The Petition provides sufficient information on the life history of the Mohave desert tortoise.

Kind of Habitat Necessary for Survival

Scientific Information in the Petition

The Petition discusses Mohave desert tortoise habitat requirements on pages 31 to 33.

The Petition states the required elements of Mohave desert tortoise habitat include sufficient suitable quantity and quality of plants for forage and cover, suitable substrates for burrow and nest sites, and low occurrence of predators. Most such habitat is found on flats and bajadas with soils ranging from sand to sandy gravel, and scattered shrubs with abundant inter-shrub space for growth of herbaceous plants; although tortoises are also found on rocky terrain and slopes in the Mojave region. Where Mohave desert tortoises occur in the Mojave Desert annual precipitation ranges from 10 to 21 cm (3.9 – 7.9 in.) (Germano et al. 1994). Other important requisites of Mohave desert tortoise habitat listed in the Petition include sufficient space for viable populations and protection from disturbance and human activity (USFWS 1994). The Petition describes the vegetation communities used by Mohave desert tortoises by Desert Tortoise Recovery Unit:

- Colorado Desert Recovery Unit
  - Succulent Scrub (*Fouquieria, Opuntia, Yucca*)
  - Blue Palo Verde-Smoke Tree Woodland
  - Creosote Bush Scrub
  - Blue Palo Verde-Ironwood-Smoke Tree Woodland
- Eastern Mojave Recovery Unit
  - Big Galleta-Scrub Steppe
  - Succulent Scrub (*Yucca, Opuntia* spp.)
  - Creosote Bush Scrub
  - Cheesebush Scrub
  - Indian Rice Grass (*Oryzopsis hymenoides*) Scrub-Steppe
- Western Mojave Recovery Unit
  - Saltbush-Allscale (*Atriplex polycarpa*) Scrub
  - Indian Rice Grass Scrub-Steppe
  - Hopsage (*Grayia spinosa*) Scrub
  - Big Galleta Scrub Steppe
  - Cheesebush Scrub
  - Desert Psammophytes
  - Blackbush (*Coleogyne ramosissima*) Scrub

Conclusion

The Petition presents sufficient information on the habitat requirements of the Mohave desert tortoise.

Factors Affecting the Ability to Survive and Reproduce

Scientific Information in the Petition

The Petition discusses factors affecting the ability of Mohave desert tortoise to survive and reproduce on pages 33 to 35. Other information related to threats is discussed in the Population Trend, Geographic Range, Abundance, and Kind of Habitat Necessary for Survival sections.

Petition Figure 2 graphically displays the relationships between the various factors that threaten the ability of Mohave desert tortoises to survive and reproduce. Threats listed include land uses (ranching, mining, agriculture, urbanization, military operations, transportation networks, recreation, and utility corridors), and weather impacts (storms, drought, availability of natural water). These factors work through various pathways to cause mortality, either directly or indirectly, through starvation, predation, habitat loss, dehydration, drowning, crushing, burial, disease, and other mechanisms.

The Petition also presents information on the threat of artificially high predation pressure from subsidized predators (predator populations maintained at artificially high levels due to obtaining some of their food resources for humans or land use changes associated with humans) such as ravens and coyotes, diseases, and effects associated with climate change. Identified climate change impacts included increasing summer high temperatures, more frequent and prolonged drought, decreasing annual precipitation and associated changes in vegetation communities, and decreased availability of nutritious forage plants and shrub cover.

Conclusion

The Petition provides sufficient information regarding the factors affecting the ability of Mohave desert tortoises to survive and reproduce.

Degree and Immediacy of Threat

Scientific Information in the Petition

The Petition generally discusses threats to Mohave desert tortoises on page 36. Additional information on threats affecting desert tortoises is included throughout the Petition, including information on: disease, drought, and predation impacts (p.15); urbanization (p. 22); off-highway vehicle impacts (OHVs, pp. 22, 26, 41); invasive species (p. 22); threats associated with military bases and military training (p. 22); renewable energy facilities (p. 24); roads (pp. 24, 32); human presence and subsidized predators (pp. 26, 27); impacts associated with climate change (pp. 27, 28, 34); grazing (p. 32); and translocations (p. 38).

Conclusion

The Petition provides sufficient information on the threats affecting the Mohave desert tortoise.

Impact of Existing Management Efforts

Scientific Information in the Petition

The Petition discusses the impact of existing management efforts on Mohave desert tortoise populations on pages 36 to 43.

The Petition describes the property ownership pattern of land designated Desert Tortoise Critical Habitat by the USFWS (1994). USFWS designed critical habitat covers 19,239 km2 (4,754,000 ac.) in California. The major landowners, in descending area of ownership, are BLM, private lands, U.S. National Park Service (NPS), U.S. Department of Defense (DOD), and the State of California.

Current land use on BLM lands in the Mohave desert tortoise range is governed by a series of Regional Plans. BLM lands are managed under a multiple use mandate which includes grazing, utility rights of way, off road vehicle recreation, wildlife habitat management, and wilderness and wild and scenic river areas. In recent years, BLM has received numerous applications for renewable energy development projects, totaling tens of thousands of acres. In response to these applications BLM–with support from USFWS, California Energy Commission, and the Department–enacted the Desert Renewable Energy Conservation Plan (DRECP) across 91,054 km^2 (approximately 22.5 million ac.) of southeastern California deserts, a landscape-scale plan for siting renewable energy facilities and preserving environmentally sensitive areas. The siting of these facilities could result in the removal or degradation of up to 4,569 ha (11,290 ac.) of Mohave desert tortoise habitat in the plan area, including 1,916 ha (4,734 ac.) of critical habitat (USFWS 2016). The BLM is currently considering amending the DRECP in response to Executive Order 13783 which directs federal agencies to review regulations that unnecessarily impede energy development (Fed. Reg. 83(23):4921-4922).

NPS lands in the Mohave desert tortoise range include the Mojave National Preserve and Joshua Tree National Park. NPS General Management Plans emphasize the protection of natural and cultural resources.

DOD lands in the Mohave desert tortoise range include China Lake Naval Air Weapons Station, Edwards Air Force Base, Fort Irwin (U.S. Army), Marine Corps Air Ground Combat Center, and the Chocolate Mountains Gunnery Range (U.S. Navy and U.S. Marine Corps). These lands are managed under Integrated Natural Resource Management Plans. Use of the lands includes weapons development, mechanized training, and weapons fire. These uses can result in the loss and fragmentation of habitat but use of the China Lake Naval Air Weapons Station and Edwards Air Force Base largely occurs in air space, with relatively little impact to Mohave desert tortoise habitat.

Private lands in the Mohave desert tortoise range are primarily used for residential and commercial development, agriculture, mining, and open space. Land use practices are governed by city and county general plans.

Conclusion

The Petition describes land ownership and includes a cursory discussion of land management practices by ownership within designated Mohave desert tortoise Critical Habitat Units. However, it does not provide similar information for the species' entire range in California which encompasses an area far greater than the Critical Habitat Units. Nonetheless, the Petition provided sufficient information on the general patterns of land ownership and land management practices in the species' range.

Suggestions for Future Management

Scientific Information in the Petition

The Petition provides suggestions for future management of Mohave desert tortoises on pages 43 to 47, which are summarized below.

- Increase protections for Mohave desert tortoise in BLM Areas of Critical Environmental Concern using the measures proven effective in Desert Tortoise Reserve Natural Areas.
- Implement science-based monitoring of the extent and impact of OHV and grazing uses of BLM lands.
- Amend the California Desert Conservation Plan (BLM 1980) to reduce OHV and grazing uses on BLM lands, and to enforce protective measures.
- State and Federal management agencies should be actively engaged in planning and implementing recovery actions.
- Control ravens in desert tortoise Recovery Units.
- Meet the recovery goals of the USFWS Recovery Plan (1994).

Conclusion

The Petition provides sufficient information regarding suggestions for future management of Mohave desert tortoise and its habitat.

Detailed Distribution Map

Scientific Information in the Petition

The Petition provides links to three websites containing Mohave desert tortoise distribution maps on page 48.

Conclusion

The range maps linked in the Petition are sufficient.

Sources and Availability of Information

Scientific Information in the Petition

The Petition cites an extensive list of sources in Appendix 4.

Other Relevant Scientific Information

The Department used additional sources of scientific information cited in this Petition Evaluation.

Conclusion

The Petition provides sufficient information on the sources and availability of information used in the Petition.

RECOMMENDATION TO THE COMMISSION

Pursuant to Section 2073.5 of the Fish and Game Code, the Department has evaluated the Petition on its face and in relation to other relevant information the Department possesses or received. In completing its Petition Evaluation, the Department has determined that the Petition and other relevant information indicates there is sufficient scientific information to indicate that the petitioned action to change the status of Mohave desert tortoise from threatened to endangered may be warranted. Therefore, the Department recommends the Commission accept the Petition for further consideration under CESA.

LITERATURE CITED

The sources provided below were used during preparation of this Petition Evaluation and/or cited in the Petition.

Anderson, D.R., J.L. Laake, B.R. Crain, and K.P. Burnham. 1979. Guidelines for line transect sampling of wildlife populations. Journal of Wildlife Management 43(1):70-78.

Berry, K.H. 2000. Preliminary Report on the Spring Survey of Desert Tortoises at the Goffs Permanent Study Plot and Special Project on Effects of Roads. United States Geological Survey, Western Ecological Research Center, 6221 Box Springs Blvd., Riverside, California.

Berry, K.H. 2003. Declining Trends in Desert Tortoise Populations at Long-term Study Plots in California between 1979 and 2002: Multiple Issues. 28th Annual Desert Tortoise Council Symposium, p. 75.

Berry, K.H., and R.W. Murphy. 2019. Gopherus agassizii (Cooper 1861) – Mojave Desert Tortoise, Agassiz's Desert Tortoise. *in* A.G.J. Rhodin, J.B. Iverson, P.P. van Dijk, C.B. Stanford, E.V. Goode, K.A. Buhlmann, P.C.H. Pritchard, and R.A. Mittermeier, (eds.). Conservation Biology of Freshwater Turtles and Tortoises: A Compilation Project of the IUCN/SSC Tortoise and Freshwater Turtle Specialist Group. Chelonian Research Monographs 5(13):109.1–45. doi:10.3854/crm.5.109.agassizii.v1.2019

Brown, M., K.H. Berry, M. Schumacher, K.A. Nagy, M.M. Christopher, P.A. Klein. 1999. Seroepidemiology of Upper Respiratory Tract Disease in the Desert Tortoise in the Western Mojave Desert of California. Journal of Wildlife Diseases 35(4):715-727.

Bureau of Land Management. 1980. California Desert Conservation Area Plan. Riverside District Office, Riverside, CA.

Bureau of Land Management. 2002. Proposed Northern and Eastern Mojave Desert Management Plan Amendment to the California Desert Conservation Area Plan and Final Environmental Impact Statement. California Desert District, Riverside, CA.

Bureau of Land Management and California Department of Fish and Game. 2002. Proposed Northern & Eastern Colorado Desert Coordinated Management Plan, an amendment to the California Desert Conservation Area Plan 1980 and Sikes Act Plan with the California Department of Fish and Game and Final Environmental Impact Statement. U.S. Department of Interior, Bureau of Land Management, California Desert District and California Department of Fish and Game, Inland, Deserts, and Eastern Sierra Region.

Germano, D.J., R.B. Bury, T.C. Esque, and T.H. Fritts. 1994. Range and habitat of the desert tortoise. Pages 57-72 *in* R.B. Bury and D.J. Germano (eds.), Biology of the North American Tortoises. National Biological Survey, Fish and Wildlife Research 13, Washington, D.C.

Grinnell, J., and C.L. Camp. 1917. A Distributional List of the Amphibians and Reptiles of California. University of California Publications in Zoology 17(10):127-208.

Harless, M.L., A.D. Walde, D.K. Delaney, L.L. Pater, and W.K. Hayes. 2009. Home range, spatial overlap, and burrow use of the Desert Tortoise in the west Mojave Desert. Copeia 2009:378–389.

Henen, B.T., C.C. Peterson, I.R. Wallis, I.R., K.H. Berry, and K.A. Nagy. 1998. Effects of climatic variation on field metabolism and water relations of Desert Tortoises. Oecologia 117:365–373.

Iverson, J.B., P.A. Meylan, and M.E. Seidel. 2017. Testudines – Turtles. *in* J.J. Moriarty (ed). Scientific and Standard English Names of Amphibians and Reptiles of North America North of Mexico, With Comments Regarding Confidence in Our Understanding. Society for the Study of Amphibians and Reptiles, Herpetological Circular number 43.

Murphy, R.W., K.H. Berry, T. Edwards, A.E. Leviton, A. Lathrop, and J.D. Riedle. 2011. The dazed and confused identity of Agassiz's land tortoise, *Gopherus agassizii* (Testudines, Testudinidae) with the description of a new species, and its consequences for conservation. ZooKeys 113: 39–71. doi:10.3897/zookeys.113.1353

Patterson, R. 1981. The distribution of the desert tortoise (*Gopherus agassizii*). in Bury, R. B., ed. 1981. North American tortoise conservation and ecology. Wildl. Res. Rep. 12. Washington, DC: U.S. Department of the Interior, Fish and Wildlife Service: 51-53.

U.S. Fish and Wildlife Service. 1994. Desert Tortoise (Mojave Population) Recovery Plan. U.S. Fish and Wildlife Service, Portland, OR.

U.S. Fish and Wildlife Service. 2015. Range-wide Monitoring of the Mojave Desert Tortoise (*Gopherus agassizii*): 2013 and 2014 Annual Reports. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada.

U.S. Fish and Wildlife Service. 2016. Biological Opinion on the Proposed Land Use Plan Amendment under the Desert Renewable Energy Plan [1340 (CA 930) P, 1150 (CA 930) P

U.S. Fish and Wildlife Service. 2019. Status of the Desert Tortoise March 2019. Recovery Office, Reno, Nevada.

U.S. Fish and Wildlife Service. 2020. Range-wide Monitoring of the Mojave Desert Tortoise (*Gopherus agassizii*): 2019 Annual Report. Report by the Desert Tortoise Recovery Office, U.S. Fish and Wildlife Service, Reno, Nevada.

Bacterial Outbreak Forces Euthanization of Fish at Three Southern California Hatcheries

July 20, 2020

Three California Department of Fish and Wildlife (CDFW) fish hatchery facilities in the eastern Sierra and Southern California have been battling a bacterial outbreak that has affected 3.2 million fish. This week, after consultation with fish pathology experts and exhausting all avenues of treatment, CDFW announced that the fish, which are all trout, at the affected facilities must be euthanized in order to stop the spread of the outbreak.

The affected facilities – Mojave River Hatchery, Black Rock Hatchery and Fish Springs Hatchery – usually provide fish for stocking waterways in CDFW's South Coast Region and Inland Deserts Region. The euthanization of all the fish at these facilities will have a profound effect on CDFW's ability to stock fish for anglers in those regions in the near future.

"Euthanizing our hatchery stocks was not a decision we came to lightly, but it had to be done," said Jay Rowan environmental program manager for CDFW hatcheries. "This bacterium is resistant to all the treatment options we have available for fish. The fish losses were getting worse despite our treatments. The best option we have available that will get us back to planting fish from these hatcheries in the shortest timeline is to clear the raceways, thoroughly disinfect the facilities, and start over."

CDFW has had the three facilities under quarantine for more than a month, while pathologists and hatchery staff treated the affected fish and researched potential options. The outbreak of Lactococcus garvieae, which is similar to streptococcus, has been reported in cattle and poultry farms as well as fresh and salt water fish and shellfish hatcheries around the world, but had never before been detected in fish in California. Research of treatment options employed at trout farms in Europe and other parts of the world show there is almost no chance for successfully eliminating the bacteria from a facility without depopulation and disinfection.

Fish that are infected with Lactococcus garvieae can show symptoms including bulging eyes, lethargic or erratic swimming and increased mortality, or be asymptomatic and show no signs of infection depending on a several factors including water temperature and stress. Fish-to-human transmission of this bacteria is rare and unlikely but there are several documented instances associated with immunocompromised people consuming infected raw fish and unpasteurized milk products.

Hot Creek Hatchery in the eastern Sierra has tested negative for the bacteria and is still planting eight waters in Inyo and Mono counties. CDFW is in the process of developing a

modified stocking plan to reallocate fish from central and northern California hatcheries to a small number of high angler use, easily accessible waters in geographically distinct parts of the eastern Sierra and Southern California.

For real-time updates, California anglers can refer to CDFW's Fish Planting Schedule. This schedule is updated directly by CDFW hatchery staff. Although it contains current information, all fish plants are subject to change depending on road, water, weather and operational conditions.

For additional information, please see CDFW's frequently asked questions about the L. garvieae outbreak. Also, members of the public can email questions to hatcherybacteriainfo@wildlife.ca.gov.

###

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Harry Morse, CDFW Communications, (208) 220-1169

Disease Outbreak Strikes California Deer Herds

August 3, 2020

The California Department of Fish and Wildlife (CDFW) has confirmed outbreaks of adenovirus hemorrhagic disease in deer in several northern California counties, and is asking California residents to help curb the spread by not feeding wild animals, and reporting potential cases to the department.

“Providing attractants for deer – food, salt licks or even water – is against the law for good reason,” said Dr. Brandon Munk, senior wildlife veterinarian with CDFW’s Wildlife Investigations Laboratory. “Because these artificial attractants can congregate animals and promote the spread of disease, it’s particularly imperative to leave wildlife alone during an outbreak. There is no cure or vaccine for this disease, so our best management strategies right now are to track it carefully, and to take preventative measures to limit the spread.”

Beginning in May, CDFW began receiving increased reports of mortality in deer, both free-ranging and at fawn rehabilitation facilities. With the assistance of wildlife rehabilitation facilities and the California Animal Health and Food Safety Laboratory, CDFW confirmed cervid adenovirus 1 (CdAdV-1) as the cause of hemorrhagic disease outbreaks in Napa, Santa Clara, Sonoma, Tehama and Yolo counties.

The disease is typically fatal to deer and can be spread by animals in close contact with each other. The virus is not known to affect people, pets or domestic livestock.

CdAdV-1 was the cause of a 1993-1994 outbreak of hemorrhagic disease in black tailed deer and mule deer that spanned at least 18 California counties. Since then, CdAdV-1 has been identified as the cause of sporadic, often widespread, outbreaks of hemorrhagic disease in California and other western states. Deer fawns are at greatest risk, with high rates of mortality following infection. Yearlings and adult deer are more resistant but mortalities in these age groups occur as well. Outbreaks can be widespread and have significant impact on affected deer populations.

Affected deer are often found dead without any obvious symptoms. They may be found near water. Sick animals may have excessive salivation (drooling or foaming at the mouth), diarrhea, regurgitation or seizures.

In addition to removing food and other attractants, Californians can help wildlife veterinarians track and study the disease by reporting sightings of sick or dead deer. Anyone who observes a deer exhibiting symptoms, or encountering a deer that has died from unknown causes, can submit the information to CDFW through the department’s online mortality reporting system.

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Wildlife Resources Committee (WRC) 2020-1 Work Plan
Scheduled Topics and Timeline for Items Referred to WRC by the California Fish and Game Commission

Updated August 11, 2020

		May 2020 Teleconference	Sep 2020 Sacramento	Jan 2021 TBD
Periodic Regulations				
Upland (Resident) Game Birds	Annual		X	X/R
Inland Sport Fishing	Annual		X	
Mammal Hunting	Annual	X	X/R	
Waterfowl	Annual	X	X/R	
Central Valley Salmon Sport Fishing	Annual	X	X/R	
Klamath River Basin Sport Fishing	Annual	X	X/R	
Regulations & Legislative Mandates				
Falconry	Referral for Review			
Special Projects				
American Bullfrog and Non-native Turtle Stakeholder Engagement Project	Referral for Review	X	X	X

KEY: X Discussion scheduled X/R Recommendation developed and moved to FGC

From: afa@mcn.org <afa@mcn.org>

Sent: Wednesday, August 5, 2020 5:22 PM

To: Office of the Secretary CNRA <secretary@resources.ca.gov>; FGC <FGC@fgc.ca.gov>; Wildlife DIRECTOR <DIRECTOR@wildlife.ca.gov>; Cornman, Ari@FGC <Ari.Cornman@FGC.ca.gov>

Subject: WESTERN POND TURTLES

Warning: This email originated from outside of CDFW and should be treated with extra caution.

https://gcc02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.hoodrivernews.com%2Fnews%2Fzoo-reared-western-pond-turtles-released-in-gorge%2Farticle_fdfc90f8-d686-11ea-b90b-8377bc2b0267.html&data=02%7C01%7CAri.Cornman%40FGC.ca.gov%7Cd45c7103137e4e72a26808d83b2ca2c5%7C4b633c25efbf40069f1507442ba7aa0b%7C0%7C0%7C637324410185213690&sdata=muRT3fRoLWxJ0hKJkoMNDa8YllzrHQkcPxMJzfdOLBc%3D&reserved=0

The non-native American bullfrogs are a major predator of baby western pond turtles. Yet another reason to prohibit the importation of the bullfrogs for human consumption. Many are released into local waters where they displace and prey upon native species, while spreading all sorts of diseases and parasites, including the chytrid fungus (Bd), believed to have caused the extinction of some 200 amphibian species worldwide in recent years.

The DFW has the authority to cease issuing the import permits for the non-native market frogs and turtles. Why they don't remains one of Life's Mysteries.

x

Eric Mills, coordinator

ACTION FOR ANIMALS

Oakland

State of California
Fish and Game Commission
Initial Statement of Reasons for Regulatory Action

Amend Sections 3.00, 4.00, 5.00, 5.41, 5.85, 7.00, 7.50, 8.10
Add Sections 5.84, 5.89, 7.40
Title 14, Code of Regulations
Re: Simplification of Statewide Inland Sport Fishing Regulations

I. Date of Initial Statement of Reasons: May 6, 2020

II. Dates and Locations of Scheduled Hearings

(a) Notice Hearing

Date: June 25, 2020 Location: Teleconference

(b) Discussion Hearing

Date: August 20, 2020 Location: Teleconference

(c) Adoption Hearing

Date: October 15, 2020 Location: Teleconference

III. Description of Regulatory Action

(a) Statement of Specific Purpose of Regulatory Change and Factual Basis for Determining that Regulation Change is Reasonably Necessary

Purpose

Regulations on the take of sport fish in California have been enacted since the late 1800s. Uncontrolled fishing can have a dramatic, negative impact on sport fishing resources. Considering the size, diversity, and conservation of California's inland (freshwater) fisheries and waters, in the past hundred years as the number of anglers in California increased, the number and complexity of fishing regulations likewise increased. For years, the Fish and Game Commission (Commission) and the California Department of Fish and Wildlife (Department) have heard concerns from anglers about the complexity of freshwater sport fishing regulations. Some anglers (or potential anglers) may be dissuaded from fishing due to actual or perceived difficulty in complying with the regulations. This regulatory package represents Phase I of the proposed process and focuses on simplifying and streamlining the sport fishing regulations for inland trout waters. The Department will prepare a separate regulatory package in the near future (i.e., Phase II) to address the complexity of the sport fishing regulations for those inland waters that are utilized by adult fish for migration and spawning after spending the majority of their lives in the ocean (i.e., anadromous waters) .

The purpose and necessity of the proposed regulation changes is to address anglers' concerns regarding the complexity of the inland sport fishing regulations by simplifying the various regulatory options, and to align the inland trout regulations with the Department's current fisheries management goals and objectives. Major proposed changes aim to:

- Separate regulations for inland trout (i.e., non-anadromous waters) from those for steelhead and salmon (i.e., anadromous waters), a process that facilitates the production of separate regulations booklets to help provide clarity to anglers;
- Replace the District Regulations (Section 7.00) with statewide regulations separated for trout; and
- Standardize and consolidate the Special Fishing Regulations (Section 7.50).

The proposed changes aim to increase regulatory consistency statewide, reduce complexity of the inland sport fishing regulations, and remove regulations that are no longer biologically justifiable.

A. Regulatory Elements

Regulations are important because they:

(1) Protect sport fish from overharvest, including species that are designated as threatened, endangered, or species of special concern;
(2) Enhance trophy or quality trout fishing as part of the Department's Wild Trout or Catch and Release Program; and
(3) Provide for equitable distribution of the catchable-sized trout that comprise the Department's put-and-take program.

Normally, no single element of a regulation controls a sport fishery. For example, most trout streams in California have both a closed season and bag limit. The type of gear, legal fishing hours, and use of bait are also part of the regulatory equation. Most often, combinations of elements of regulations apply to a given water. The following is a description of each element of regulation used to manage trout populations in California.

1) Seasons (Specified Opened or Closed Seasons)

The "general trout season" runs all year for lakes and reservoirs, and from the last Saturday in April through November 15 for most streams and rivers. Trout stream closures are normally applied to maintain an adequate breeding population. Streams are commonly closed during the trout reproductive seasons of either fall or spring to protect spawning fish, at a time when the population is especially vulnerable to harvest. However, there are exceptions based on the location of the water, species, and life history. The closure through the spring (in some waters, through the end of April, in other waters, through the end of May) tends to protect Rainbow, Golden and Cutthroat Trout, whereas the fall closures protect Kokanee Salmon, Brown, and Brook Trout. Since trout spawn over a period of several weeks which extends into the open season, the late spawning fish are generally not protected from the sport fishing closures. Spring spawning trout normally spawn from March through May, but some high elevation Golden Trout populations may spawn as late as July. Snow and ice cover protect many late spawning trout in high elevation streams. Fall-spawning trout may spawn from October through December. Thus, the stream trout seasons that start on the last Saturday in April through either October 31 or November 15 protect some, but not all spawners.

2) Bag and Possession Limits

The key purpose for restricting the number of trout an angler can take ("bag limit") and possess ("possession limit") is to prevent a given fish population from becoming overharvested. That is, the population is so reduced in density by fishing that remaining fish are too small to be desirable, or so few that fishing success declines to unacceptable levels. Bag limits are also deemed necessary to help spread the catch among anglers. This is the principal reason for the current five fish or less daily bag limit for most trout.

On a water with a 10 trout possession limit and five trout bag limit, an angler may take up to five trout on the first day of fishing, and five trout on the second day to comprise the 10 fish possession limit. Except for areas where a Brook Trout bonus bag limit is allowed, it is unlawful for an individual angler to take more than five trout on any single day or have more than 10 trout in possession on such a water. Thus, in this example, an angler with 10 fish in possession cannot fish on the third day unless one or more of the 10 fish have been consumed or given away.

3) Size Limits

Minimum size limits have been imposed on a growing number of trout lakes and streams in California. These are invariably combined with reduced bag limits and the requirement that only artificial lures and/or flies with barbless hooks may be used. In almost all instances, such waters are officially designated Wild Trout or catch and release waters. The basic purpose is to provide more trophy trout for the sport anglers.

4) Gear and Bait Restrictions

Gear and bait restrictions are applied to waters with listed or sensitive trout populations. Fish caught using bait have the highest rate of mortality. Bait-caught fish tend to be more deeply hooked, which makes release more difficult, and increases the risk of injury to vital organs. Therefore, bait is generally permitted for use only on waters with minimal restrictions on harvest. Waters with sensitive trout populations require conservative gear restrictions to reduce angling impacts. Reducing fish mortality requires the safe release of captured trout. Trout caught using artificial lures can be released with a greater chance of survival than fish caught on bait of some kind. Barbless hooks tend minimize potential injury to the fish and makes their release easier. Artificial lures or flies with barbless hooks are normally required in catch and release waters to reduce injuries to fish and make it easier to release fish. With rare exception, artificial lures or flies are required wherever size limits are in force.

B. Comprehensive Evaluation: Trout Menu

In 2013, the Department initiated a comprehensive evaluation of the inland sport fishing regulations to address concerns from anglers regarding years of complex regulations. For example, currently there are 212 inland special regulation waters in Section 7.50(b), including 88 different seasons, 13 different size restrictions, 10 different gear restrictions, and 6 different bag and possession limits, for both anadromous and non-anadromous waters. Furthermore, many waters have not been monitored for regulation effectiveness, and changes in hatchery stocking and angling practices warrant an updated evaluation of the sport fishing regulations.

The Department has been working to develop a framework to simplify sport fishing regulations guided by five goals, or tenets:

1. Maintain or increase angling opportunity;
2. Improve regulatory consistency across similar waters;
3. Align sport fishing regulations with the Department's current fisheries management goals and objectives;
4. Reduce complexity and confusion; and
5. Protect the fishery resources.

After significant review of Special Fishing Regulations in Title 14, subsection 7.50(b), it became apparent much of the complexity and associated public frustration stemmed from the diversity of different regulations established over decades that had limited alignment or consistency. The use of District Fishing Regulations in Title 14, Section 7.00 increases confusion and inconsistency by applying political boundaries in contrast to the watershed approach found within the Special Fishing Regulations. Although some of the regulations fit with apparent management objectives, others did not, or were no longer appropriate for current fisheries.

As part of this effort, the Department developed a suite of regulations, or "menu," comprised of angling seasons, bag and possession limits, size limits, and gear restrictions, to standardize the Special Fishing Regulations in Title 14, subsection 7.50(b) and uncouple the inland trout waters from the District General Regulations in Title 14, subsections 7.00(a)-(g) and from anadromous waters. This menu represents the foundation of this rulemaking. At its February 2019 meeting, the Commission endorsed the menu concept for simplifying and organizing the inland trout regulations and allowed the Department to select from a standardized suite of established management approaches. As the menu evolved between 2019 and 2020, Department state, regional and local staff have worked with stakeholders to assess and select the most appropriate regulations for inland trout waters statewide as outlined in the following pages.

The regulations menu described below is the result of a collaborative effort by partners and fisheries biologists throughout the state to standardize the Special Fishing Regulations based on fisheries management goals, which include maximizing fishing opportunity (most liberal) and protecting sensitive fishery populations (most conservative). The process for developing the menu started with identifying the statewide regulations for trout, evaluating the frequency of the most used special regulations, identifying which regulations continue to be biologically and locally relevant, and which are no longer relevant, and then consolidating the relevant regulations into the menu suite of biologically justifiable regulations that most effectively manage California's trout populations. To help achieve statewide consistency across inland trout waters within the Special Fishing Regulations, the District General Regulations in Title 14 Section 7.00 have been replaced by a Statewide Regulation for all inland trout waters under the proposed amended Section 5.85.

1) Trout Menu Coding

The trout menu primarily applies to amended sections 5.85, 7.00 and 7.50, and added Section 7.40. The menu described below is divided into three categories of a standardized suite of

management approaches reflected as regulatory elements for the 200+ special inland waters in California:

- An updated Statewide Regulation;
- Seasons; and
- Bag/ Possession Limits (plus gear restrictions and size limits).

Statewide Regulations

"SL" for Lakes and Reservoirs (proposed in amended subsection 5.85(a)(1)):

Open all year, five trout daily bag limit, 10 trout in possession.

- Slow-moving waters subject to this statewide regulation represent robust, self-sustaining, and stocked fisheries with a maximum sustainable harvest with emphasis on high natural yield and/or elevated stocking rates.

"SR" for Rivers and Streams (proposed in amended subsection 5.85(a)(2)):

From the last Saturday in April through November 15, five trout daily bag limit, 10 trout in possession; and, from November 16 through the Friday preceding the last Saturday in April, 0 trout bag limit, artificial lures with barbless hooks only and trout must be released unharmed and not removed from the water.

- Fast-moving waters subject to this statewide regulation align with the traditional trout season, previous district regulations, and Commission Policy[1], for both wild and stocked fisheries with a goal of sustainable harvest, while allowing catch and release during the fall and early spring in an effort to increase angling opportunities, while also reducing population level effects stemming from over-harvest and/or associated hooking mortality.

Seasons

Seasons are described as follows, and designated by capital letters A-J (under "Menu Option" column shown in the amended subsection 7.50(b) table):

A. <u>All year</u> = Most liberal and focused on maximizing angling opportunities.

B. <u>Last Saturday in April through November 15</u> = Spring and summer angling season for both stocked and wild trout. Alignment with traditional trout season and Commission Policy for trout opener. Limited protections for spring and fall spawning trout.

C. <u>November 16 through the Friday preceding the last Saturday in April</u> = For use in conjunction with a spring and summer angling season (**B**) to implement more restrictive bag limits and gear restrictions during spring and fall spawning.

D. <u>Last Saturday in April through July 31</u> = Alignment with a "traditional" trout opener (**A**) to support local communities for seasonal economic and fiscal needs (i.e., spring and summer tourism), and public safety concerns.

[1] Fish and Game Commission Policy, Amended January 4, 1994. Trout. Available from: https://fgc.ca.gov/About/Policies/Fisheries#Trout

E. August 1 through November 15 = Summer and fall angling season to allow for limited/selected harvest or closures to protect spawning runs, thermal refuges, or periods of elevated water temperatures.

F. Saturday preceding Memorial Day through September 30 = Summer angling season where both spring and fall spawning trout aggregations occur.

G. Saturday preceding Memorial Day through the last day in February = Spring fishing closure to protect spring spawning trout.

H. September 1 through November 30 = Fall angling season to either protect fall spawning trout aggregations or allow angling during the fall when summer temperatures make angling impacts more significant.

I. October 1 through the Friday preceding Memorial Day = For use in conjunction with a summer angling season (**F**) to implement more restrictive bag limits and gear restrictions during spring and fall spawning.

J. Closed to fishing all year = Most conservative and used to protect populations that are listed species under the state or federal Endangered Species Act or imperiled populations upon which angling could have a significant negative effect.

Bag and Possession Limits and Gear Restrictions

Bag and Possession Limits and Gear Restrictions are described as follows, and designated by numbers 1-7 (under “Menu Option” column shown in the amended subsection 7.50(b) table):

1. 5 trout, no gear restrictions = (most liberal) Robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries with maximum sustainable harvest.

2. 2 trout per day, 4 trout in possession, no gear restrictions = Limited daily harvest but with additional possession, set for limited effect to hatchery supplemented or productive self-sustaining fisheries to allow some harvest. Moderate concern regarding harvest with minimal threat to total population.

3. 2 trout, artificial lures = Limited daily harvest without additional possession, set for limited effect to less productive self-sustaining fisheries to allow some harvest. Moderate concern regarding harvest with minimal threat to total population.

4. 2 trout with 14” total length minimum, artificial lures = Limited selected harvest with protection for smaller age classes. Allows most individuals to spawn prior to entering the fishery.

5. 2 trout with 18” total length minimum, artificial lures = Limited selected harvest with protection for smaller age classes in high productivity systems that can produce large trout. Allows individuals to spawn prior to trophy sized harvest.

6. 0 trout, artificial lures with barbless hooks = Reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.

7. 0 trout, artificial flies with barbless hooks = (most conservative) Reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of

spawning trout, achieve fast action or trophy fisheries, and/or promote/retain unique angling experiences.

2) Trout Menu Codes Applied

For the proposed Section 7.50 regulatory language "Alphabetical List of Trout Waters with Special Fishing Regulations," in the table encompassing subsection 7.50(b), a right-hand column has been added called "Menu Option" to serve as an easy reference to the assigned management approach of each special regulation water. This column is only shown for the purpose of clarity for the ISOR to indicate any changes affecting a water. The options are either assignment to one of the two statewide regulations (SL, or SR), a combination from the trout menu of season, bag/possession and gear limitations for each state water, or coding showing the water has been moved to another section or deleted. The coding is also shown by special water in the Decision Matrix, Summary Table of Changes for the subsection 7.50(b) regulatory table (**Appendix A**).

Combined options for season (letter) and bag/possession limit and gear limitation (number) present as a capital letter-number code. For example, "B5" would signify a water with a season from the last Saturday in April through November 15, a bag/possession limit of 2 trout with 18" minimum size, and a gear restriction of artificial lures.

Two other codes in the right-hand column in the subsection 7.50(b) table inform anglers of how that particular water is considered, if it doesn't fall under one of the above codes.

"HSS" Refers to waters moved to the newly added Section 7.40 of Title 14 under the anadromous table for salmon and steelhead, proposed for naming as "Alphabetical List of Hatchery Steelhead and Salmon Waters with Special Fishing Regulations." Those waters with HSS coding are shown as strikeout in Section 7.50 because they are proposed for relocation to Section 7.40.

"Del##" Refers to a special water or regulation that is proposed for removal entirely from the Section 7.50(b) special regulations table, and justification for the removal is outlined by numerical increment below under the description for amendment of Section 7.50.

C. Presentation of The Proposed Regulations

The proposed regulatory revisions by section fall under three general categories, and are described in this ISOR in the following order:

1. Proposed for Amendment
    a. Sections 5.00, 5.41, 5.85, 7.00, 7.50 (with expanded discussion on application of the trout menu), and 8.10
2. Proposed for Addition
    a. Sections 5.84, 5.89, and 7.40
3. Proposed Changes Without Regulatory Effect (e.g., re-numbering, re-ordering, or relocating a regulatory provision)
    a. Sections 3.00 and 4.00

D. Proposed for Amendment

Amend subsection 5.00(b) Black Bass, Special Regulations

- Remove subsections (b)(3) Lassen County; (b)(4) Modoc County; (b)(7) Shasta County; (b)(9) Big Lake (Shasta County); (b)(13) Diamond Valley Lake; (b)(15) El Capitan Reservoir; (b)(22) Perris Lake; (b)(25) Silverwood Lake; (b)(26) Skinner Lake; and (b)(28) Trinity Lake.

  The Department is proposing to remove these subsections from the bass special regulations. Therefore, these waters will revert to the statewide standard under subsection 5.00(a) of open to fishing all year, with a 12-inch minimum size limit, and a five-fish daily bag limit. Specifically, two changes of non-regulatory effect include removal of (b)(15) El Capitan Reservoir, and (b)(22) Perris Lake as listed in the table, due to existing redundancy with the statewide standard because the season (all year), size (12-inch minimum), and bag limit already matches that of the statewide standard. It is necessary to remove the remaining subsections from the bass special regulations because there is no longer a biological reason to support a special regulation on these waters, so these waters will revert to the statewide standard under subsection 5.00(a) of open to fishing all year, with a 12-inch minimum size limit, and a five-fish daily bag limit. This will allow anglers to harvest bass of a size relatively safer to consume given the advisories for consumption set forth through the Office of Environmental Health Hazard Assessment (OEHHA) and Water Quality Control Boards due to bioaccumulation of mercury and other concerning substances. The predominant catch and release culture in the bass fishing community also makes increased protection afforded by reduced bag limits and increased size limits unnecessary and moot.

- Remove Subsection (b)(29) Trout Lake

  The Department is proposing to amend the exiting bass fishing season on Trout Lake to align with the proposed new trout fishing season under the Statewide Regulation “SL” as listed in subsection 7.50(b)(195.5) for Trout Lake. Under existing regulations, the fishing season for trout and bass is limited to Wednesdays and weekends from the last Saturday in April through September 30. This season is in place to restrict fishing in the Shasta Valley Wildlife Area during the waterfowl hunting season. There is no longer a biological reason for restricting the fishing season on this lake. In addition, the Department no longer manages Trout Lake as a trophy bass fishery, thus the current 22-inch minimum size limit and one fish bag limit is no longer necessary. Therefore, the Department is proposing to remove Trout Lake from the Special Black Bass fishing regulations. The Department’s Lands division would be responsible for restricting access to Trout Lake, and any special closures will be addressed in the Wildlife Area regulations. This change will align the fishing seasons for bass and trout on the lake and, thus, eliminate potential law enforcement issues. With the removal of Trout Lake from 5.00(b), the regulation for bass fishing on that lake will revert to the statewide standard under subsection 5.00(a) of open to fishing all year, with a 12-inch minimum size limit, and a five-fish daily bag limit.

- Amend subsections (b)(2) for waters in Inyo County, and (b)(5) and (b)(16) for waters in Mono County.

  The Department is amending subsections (b)(2) and (b)(5) for waters in Inyo County to include reference to Inyo County streams and rivers in the Special Fishing Regulations in subsection 7.50(b). Subsection (b)(2) and (b)(5) amendments also clarify the closure to black bass fishing from November 16 to the Friday preceding the last Saturday in April to ensure anglers understand the open season is late April through November 15. Subsection (b)(16) similarly includes reference to Mono County streams and rivers in the Special Fishing Regulations in subsection 7.50(b), while correcting a reference for Fish Slough to the boundaries from Owens Valley Native Fishes Sanctuaries to the BLM Spring. These changes are necessary to ensure anglers are clear on season dates, geographic boundaries, and other considerations for Inyo and Mono counties.

- Re-numbering of the waters in 5.00(b)

  The resulting proposed list of special black bass waters is re-numbered by paragraph for clarity and consistency.

Amend Section 5.41. Landlocked Salmon.

Subsection (e) is amended so that the same exceptions formerly referenced in subsection 7.50(b) are specifically listed within this subsection with a daily bag limit of ten salmon, and possession limit of twenty. It is necessary to make this change since the regulation of landlocked salmon is no longer indicated in subsection 7.50(b).

Amend Section 5.85. Trout.

The name of this section is changed to reflect that only trout (and not salmon) are covered under this general regulation. Additional introductory language is added to clarify how the bag and possession limits should be interpreted, for the total number of trout in combination.

- Under subsection (a)(1), the Department is proposing to remove all “non-special” trout fishing regulations for inland lakes and reservoirs from Section 7.00 District General Regulations and move them to Section 5.85, Trout. This addition of subsection (a)(1) to Section 5.85 provides the new proposed statewide regulation for slow-moving waters, or inland lakes, reservoirs, and ponds, as described in the trout menu and noted by the coding “SL.” These Statewide Regulation waters will be open to fishing year-round, with a five trout daily bag limit, a 10 trout possession limit, no size limit, and no gear restrictions. This Statewide Regulation is intended to be applied to those waters that have self-sustaining and/or stocked fisheries where the maximum catch can be harvested sustainably, based on high natural yield and/or elevated stocking rates. Therefore, the most liberal angling regulations can be applied to these waters.

- Under subsection (a)(2), the Department is proposing to remove all trout fishing regulations for inland rivers and streams from the Section 7.00 District General Regulations and move them to Section 5.85, Trout. This addition of subsection (a)(2) to Section 5.85 provides the new proposed statewide regulation for fast-moving waters, or rivers, streams, creeks, and

canals as described in the trout menu and noted by the coding “SR.” Under the new Statewide Regulation, these waters will be open to fishing from the last Saturday in April through November 15, with a five trout daily bag limit, and a 10 trout possession limit; and, from November 16 through the Friday preceding the last Saturday in April, with a zero trout bag limit, a gear restriction of artificial lures with barbless hooks only, and a requirement that trout must be released unharmed and should not be removed from the water. These waters have self-sustaining and/or stocked fisheries where the maximum catch can be harvested sustainably and, therefore, the most liberal angling regulations can be applied to these waters. The changes will increase fishing opportunities in areas where waters are closed to fishing in the winter and decrease fishing opportunities in areas where waters are currently open to fishing in the winter with allowable harvest. A detailed description of the effects is provided below.

- Subsection (a)(3) describes exceptions to the statewide regulations, and under paragraph (A) refers readers to Section 7.50, Alphabetical List of Waters with Special Fishing Regulations for individual trout waters with special regulations that would not fall under the statewide regulation. Paragraph (B) further clarifies that Brook Trout bag and possession limits may be in addition to the statewide trout bag and possession limits.

  This proposal will result in either no change to the current regulations or an added possession limit for waters moved to the statewide regulation. Below is a description of changes to the district waters, Section 7.00.

  Subsection (a) is necessary to inform anglers of the statewide standard season, bag, possession limit for lakes, reservoirs, and ponds, as well as streams, rivers, creeks, and canals that are not subject to a special regulation in subsection 7.50(b).

Amend Section 7.00. District General Regulations

To address anglers’ concerns regarding the complexity of the 7.00 District General Regulations, the Department is proposing to uncouple the state’s inland trout waters from the District General Regulations. Most trout waters currently under the District General Regulations will be moved to either the new subsection 5.85(a)(1), Statewide Regulation for lakes and reservoirs, or to subsection 5.85 (a)(2), Statewide Regulation for rivers, streams, and creeks. Some individual trout waters will require special restrictions and reduced bag limits and, therefore, will be moved to Section 7.50, Special Fishing Regulations. The amendments will result in little or no substantive change to the regulations for most waters currently under the District General Regulations. Clarifications are made to the opening paragraph prior to subsection 7.00(a) to ensure that hatchery trout and hatchery steelhead are covered under Section 7.00.

The Department proposes to remove or amend the following subsections:

- (a)(1) and (b)(3), delete these subsections: Waters under the North Coast District and Sierra District subsections are currently open to fishing all year, with a five-trout daily bag limit, a 10 trout possession limit, no size limit, and no gear restriction. For simplification purposes, regulations for these waters will move/ revert to subsection 5.85(a)(1), the new

Statewide Regulation for lakes and reservoirs. In effect, there will be no substantive change to the existing regulations for these waters.

- (a)(4), (b)(4), and (b)(7), delete these subsections: Waters under the North Coast District and Sierra District subsections are currently open to fishing from the last Saturday in April through November 15, with a five-trout daily bag limit, a 10 trout possession limit, and no gear restriction. For simplification purposes, regulations for these waters will move/ revert to subsection 5.85(a)(2), the new Statewide Regulation for rivers, and streams, which will extend the fishing season on these waters to year-round with catch and release fishing allowed from November 16 through the Friday preceding the last Saturday in April. This proposed change will increase fishing opportunities on these waters during the winter and early spring while protecting spawning wild trout.
- (a)(5) and (b)(9), delete these subsections: The current bonus bag limit for Brook Trout under the North Coast and Sierra District subsections will move/ revert to a new Section 5.84, Statewide Regulation for Brook Trout. The new Statewide Regulation for Brook Trout will apply to all inland trout waters not listed under the Special Fishing Regulations, with the exception of Red Lake in Alpine County which is managed for trophy-sized trout by stocking effort.
- (b)(5), delete this subsection: Waters under this subsection in Shasta County are currently open to fishing from the last Saturday in April through November 15, with a two-trout daily bag and possession limit, and no gear restriction. For simplification purposes, regulations for these waters will move/ revert to subsection 5.85(a)(2), the new Statewide Regulation for rivers and streams. This proposed change will increase the current daily bag limit to five trout and add a 10 trout possession limit. In addition, the fishing season will be extended to year-round, with catch and release fishing only allowed from November 16 through the Friday preceding the last Saturday in April. This proposed change will increase fishing opportunities on these waters in the winter and early spring while protecting wild trout populations.
- (b)(6), delete this subsection: Waters under this subsection in Lassen and Modoc counties are currently open to fishing from the Saturday preceding Memorial Day through November 15, with a five-trout daily bag limit, a 10 trout possession limit, and no gear restriction. For simplification purposes, regulations for these waters will move/ revert to subsection 5.85(a)(2), the new Statewide Regulation for rivers and streams. This will extend the fishing season to year-round, with catch and release fishing only allowed from November 16 through the Friday preceding the last Saturday in April. This proposed change will increase fishing opportunities on these waters in the winter and early spring while protecting wild trout populations.
- (c)(1), (d)(1), (e)(1), (f)(1), and (g)(2), delete these subsections: Waters under these subsections in the North Central District, Valley District, South Central District, Southern District, and Colorado River District are currently open to fishing all year, with a five-trout daily bag and possession limit, and no gear restriction. For simplification purposes, regulations for these waters will move/revert to subsection 5.85(a)(1), Statewide Regulation

for lakes and reservoirs. As a result, the possession limit on these waters will increase from five trout to 10 trout.

- (d)(3), (f)(3), (f)(5), and (g)(2), delete these subsections: Waters under these subsections in the Valley District, Southern District, and Colorado River District are currently open to fishing all year, with a five-trout daily bag and possession limit, and no gear restriction. For simplification purposes, regulations for these waters will move/ revert to subsection 5.85(a)(2), Statewide Regulation for rivers and streams. As a result, the possession limit will increase from five trout to 10 trout from the last Saturday in April through November 15. Catch and release fishing only will be allowed from November 16 through the Friday preceding the last Saturday in April. While this proposed change will remove the opportunity to harvest trout in the winter and early spring to protect spawning wild trout, moving these subsections to the Statewide Regulations fulfills the goals of simplification and management.

- (e)(3) amend this subsection: Waters under this subsection for Alameda, Contra Costa, and Santa Clara counties are currently open to fishing from the last Saturday in April through November 15, with a five-trout daily bag and possession limit, and no gear restriction. For simplification purposes, regulations for these waters will move/ revert to subsection 5.85(a)(2), the new Statewide Regulation for rivers and streams for trout. This will increase the possession limit to 10 trout and extend the fishing season to year-round, with catch and release fishing allowed from November 16 through the Friday preceding the last Saturday in April. This proposed change will increase fishing opportunities on these waters in the winter and early spring while protecting spawning wild trout. The amendment to this subsection also clarifies that waters under these three counties are closed to the take of salmon.

- (g)(1), delete this subsection: Waters under this subsection are currently open to fishing year-round, with a 10 trout daily bag and possession limit, and no gear restriction. For simplification purposes, regulations for these waters will move/ revert to subsection 5.85(a)(2), Statewide Regulation for rivers and streams. This will reduce the daily bag limit from 10 trout to five trout from the last Saturday in April through November 15 and restrict fishing to catch and release only from November 16 through the Friday preceding the last Saturday in April. While this proposed change will remove the opportunity to harvest trout in the winter and early spring to protect spawning wild trout, moving these subsections to the Statewide Regulations fulfills the goals of simplification and management.

- (b)(8), delete this subsection: This language is no longer needed under Section 7.00(b) as all Mono County waters under the District General Regulations will be subject to the new Statewide Regulations for trout (i.e., Section 5.85(a) or Section 5.85(b)), or to Section 7.50(b), Special Fishing Regulations. This language does not need to be moved to Section 5.85 or Section 7.50 as waters under the new Statewide Regulations will be open to fishing year-round and similar language already exists under subsection 7.50(a)(3) of the Special Fishing Regulations.

- (b)(2), amend this subsection: Anadromous waters under this subsection for Tehama and Shasta counties are currently open to fishing from the last Saturday in April through

November 15, with a two-trout or steelhead daily bag and possession limit, and artificial lures with barbless hooks restriction. This subsection is amended for section and paragraph numbers, and to clarify the artificial lures possess hooks that are barbless.

- Edits for clarity and consistency: These edits include re-numbering of paragraphs within District Regulations in subsections 7.00(b) through (g), adjusted capitalization of certain words throughout Section 7.00, and specification of the referenced Section number to clarify interpretation from the previous 7.50 to the newly added 7.40 section.

Amend Section 7.50. Alphabetical List of Trout Waters with Special Fishing Regulations

It is necessary to streamline the Special Regulations for trout waters by utilizing the trout menu described above to align the regulations with the Department's current fisheries management goals and objectives. The regulations proposed herein were tailored to each individual water, and include a variety of combinations of regulation elements, such as bag limits, gear restrictions, season restrictions, and size limits. Upon review of the extensive public input received during pre-notice outreach efforts (Appendix B), Department fisheries biologists and managers, often in consultation with fishing groups or individuals, assigned waters to the trout menu based on their expertise and knowledge of specific waters in their management area.

As a result of this streamlining process, the number of:

- Special fishing seasons for trout-only waters will be reduced from 30 to 10;
- Special size limits will be reduced from 8 to 2;
- Different gear restrictions will be reduced from 10 to 7;
- Different bag/ possession limits will be reduced from 6 to 4; and
- Fishing opportunities will be expanded on nearly 50 percent of the existing special regulation waters from a reduced season to year-round.

As noted in **Appendix A**, proposed amendments and additional comments and considerations are summarized for Section 7.50(b), Alphabetical List of Waters with Special Fishing Regulations. This table includes the biological and management rationale for proposed changes to each special water, as well as other considerations such as public input, socio-economic considerations, traditional values, access, public safety, etc.

For those special waters without a special assigned management approach from the menu listed in Appendix A, the proposed regulatory text outlining the "Menu Option" in the right-hand column indicates the assigned management approach of each water (assignment to Statewide lakes/reservoirs, or "SL", statewide rivers and streams, or "SR", etc.)

Truckee River Management Options, Section 7.50(b), Subsections (196)(B), (196)(C), and (196)(D)

At the Commission's April 15, 2020 meeting, George Osborn, representing Mr. Montna, requested that the Commission consider Mr. Montna's proposal as an alternative to the Department's proposed regulations for the Truckee River, subsections (196)(B), (C), and (D). The Commission directed the Department to add a regulatory option to allow further consideration of Mr. Montna's proposal.

Option 1 – Department Proposal

The Department is proposing to amend the current regulations on the Truckee River from Trout Creek downstream to the mouth of Prosser Creek (subsections 7.50(b)(196)(B) and (C) are combined and re-numbered subsection 7.50(b)(153)(B)), to open all year, zero trout daily bag limit, and artificial lures with barbless hooks. This will remove the current two-trout daily bag and possession limit from the last Saturday in April through November 15. It will also change the gear restriction from artificial flies to artificial lures between Glenshire Bridge and the mouth of Prosser Creek. The Department is also proposing to amend the current regulation from the mouth of Prosser Creek downstream to the Nevada State Line (Subsection 7.50(b)(196)(D) is re-numbered subsection 7.50(b)(153)(C)) to open all year, two trout daily bag and possession limit, and artificial lures. This will increase the daily bag limit from zero trout to two trout from November 16 through the Friday preceding the last Saturday in April. This will also change the gear restriction from artificial lures with barbless hooks to artificial lures, thus removing the requirement for barbless hooks.

Option 2 – Mr. Montna's Proposal

Mr. Montna supports the Department's proposed changes to the current regulations on the Truckee River from Trout Creek downstream to the mouth of Prosser Creek to open all year with a zero trout daily bag limit, but requests that the Department change the proposed gear restriction from artificial lures with barbless hooks to artificial barbless flies. Mr. Montna also requests that the regulations from the mouth of Prosser Creek downstream to the Nevada State Line be changed to open all year, zero trout daily bag limit, and artificial lures with barbless hooks. This will reduce the current daily bag limit from two to zero trout from the last Saturday in April through November 15 and keep the requirement for barbless hooks in place.

Summary of Changes to Special Waters (7.50 table)

SL: Moving to statewide lakes and reservoirs regulation (subsection 5.85(a)(1)): 16

SR: Moving to statewide rivers and streams regulation (subsection 5.85(a)(2)): 28

Waters being moved from 7.00, District General Regulations, to Section 7.50, Special Fishing Regulations, as a result of the goal to provide new opportunity and for the simplification project, summarized by the new trout menu coding (asterisks indicate waters new since Feb. 2020 Commission meeting):

1. NEW 7.50(b)(15) Boulder Creek (San Diego Co.) upstream of El Capitan Reservoir, and all of its tributaries – **A3**
2. NEW 7.50(b)(24) Caples Creek from the confluence with the Silver Fork American River upstream to Caples Lake Dam (El Dorado and Alpine cos.) – **A6**
3. NEW 7.50(b)(43) Dismal Creek (Modoc Co.). – **G6**
4. NEW 7.50(b)(52) Goose Lake and tributaries (Modoc Co.) excluding Pine Creek and Davis Creek. – **G6**
5. NEW 7.50(b)(54) Gull Lake (Mono Co.). – **B1**
6. NEW 7.50(b)(72) Kitchen Creek (San Diego Co.) upstream of Lake Morena, and all its tributaries. – **A3**

7. NEW 7.50(b)(81) Los Gatos Creek (Santa Clara Co.) upstream of Camden Avenue drop including Lexington Reservoir and all tributaries. – **A6**
8. NEW 7.50(b)(107) Pine Valley Creek (San Diego Co.) upstream of Barrett Lake, and all its tributaries. – **A3**
9. NEW 7.50(b)(109)(A) Pit River, South Fork (Modoc Co.) and tributaries upstream of the Highway 395 bridge in Likely – **G1**
10. NEW 7.50(b)(109)(B) – Pit River, North Fork (Modoc Co.) and tributaries from the confluence with the South Fork in Alturas upstream to (including) Franklin Creek – **G3**
11. NEW 7.50(b)(123) – Rush Creek (Mono Co.) between Silver Lake and Grant Lake – **F1**
12. NEW 7.50(b)(129) – San Luis Rey River West Fork (San Diego Co.) – **A3**
13. NEW 7.50(b)(147) – Stevens Creek and all tributaries upstream of Stevens Creek Reservoir (Santa Clara Co.). – **A6**
14. NEW 7.50(b)(X) – Twelvemile Creek (Modoc Co.) – **G6**
15. NEW 7.50(b)(156) Twin Lakes, Upper and Lower (Bridgeport, Mono Co). **– B1**
16. *NEW 7.50(b)(16) Bridgeport Reservoir and tributaries (Mono Co.) – **B1**
17. *NEW 7.50(b)(30) – Convict Lake (Mono County) – **B1**
18. *NEW 7.50(b)(50) – George Lake (Lake George, Mono Co.) – **B1**
19. *NEW 7.50(b)(53) – Grant Lake (Mono Co.) – **B1**
20. *NEW 7.50(b)(54) – Gull Lake (Mono Co.) – **B1**
21. *NEW 7.50(b)(60) – Horseshoe Lake (Mono Co.) – **B1**
22. *NEW 7.50(b)(65) – Isabella Lake (Lake Isabella, Kern Co.) – **A1**
23. *NEW 7.50(b)(67) – June Lake (Mono Co.) – **B1**
24. *NEW 7.50(b)(82)- Lundy Lake (Mono County)– **B1**
25. *NEW 7.50(b)(83) Lytle Creek and tributaries upstream of Interstate 15 bridge. (San Bernardino Co.) – **A1**
26. *NEW 7.50(b)(85)- Mamie Lake (Lake Mamie, Mono County) – **B1**
27. *NEW 7.50(b)(89) – Mary Lake (Lake Mary, Mono Co.) – **B1**
28. *NEW 7.50(b)(96) Miller Canyon from Silverwood Lake upstream (San Bernardino Co.) – **A1**
29. *NEW 7.50(b)(121) – Rock Creek Lake (Mono Co.) – **B1**
30. *NEW 7.50(b)(124) – Sabrina Lake (Lake Sabrina, Inyo Co.) – **B1**
31. *NEW 7.50(b)(127) Salmon Creek and tributaries above Highway 1 (Monterey Co.). – **F6**
32. *NEW 7.50(b)(157)- Twin Lakes (Mammoth, Mono Co.) – **B1**
33. *NEW 7.50(b)(137) – Silver Lake (Mono Co.) – **B1**
34. *NEW 7.50(b)(144) – South Lake (Mono Co.) – **B1**
35. *NEW 7.50(b)(161) – Virginia Lakes, Upper and Lower (Mono Co.) – **B1**

The last coding, “Del##” listed in the right-hand column in the subsection 7.50(b) table shows which waters or segments of waters are outright deleted. The “##” signifies numerically assigned waters that are listed in the table below, which also provides the justification for removal of these waters from the 7.50 table.

Table 2. List of special water removals and justification as noted under the “Menu Option” column shown in the amended subsection 7.50(b) table.

Deletion ##	**Necessity for removal in Section 7.50(b)**
Del01	(13) Balm of Gilead Creek is removed because it has its own standalone regulation under the newly added Eel River regulation above Lake Pillsbury
Del02	(26.5) Bridgeport Reservoir with the season of Saturday preceding Memorial Day through Sept.30 is removed because this same subparagraph was expanded for the tributaries and the proposed amended season of last Saturday in April through November 15.
Del03	(39.3) for Castle Creek regulation was consolidated into 7.50(b)(156.5) for the Sacramento River.
Del04	(43)(B) Convict Creek downstream of U.C. Study area season is removed because the former minimize trout size and split regulation of seasons is replaced with a simplified season of Saturday preceding Memorial Day through September 30.
Del05	(48)(A) through (B) Cottonwood Creek is removed because of simplification of this water through consolidation of this subparagraph with (A) into the previous paragraph.
Del06	(49.5) Cottonwood Creek and tributaries is removed because it is now covered under the “Goose Lake tributaries” special regulation.
Del07	(62.5) Edson Creek and all tributaries is removed because it is already covered under the McCloud River regulation (115)(C)
Del08	(77.3) Hilton Creek (A) downstream of Crowley Lake Drive is removed because the former minimize trout size and split regulation of seasons is replaced with a simplified season of Saturday preceding Memorial Day through September 30.
Del09	(86) Kern River, (C) the U.S. Forest Service trail is removed because of simplification of this water through consolidation of this subparagraph with (B). (C) is further replaced with a reach of Kern River downstream of Lake Isabella.
Del10	(90) Kirman (Carmen) Lake tributaries is removed because duplicative with (89) Kirman (Carmen) Lake.
Del11	(91) Klamath River, (B) Shovel Creek and tributaries above mouth of Panther Creek (C) Shovel Creek and tributaries up to and including Panther Creek are removed because of simplification of this water through consolidation of these subparagraph with (A) for all tributaries above Iron Gate Dam.
Del12	(98) Lassen Creek and tributaries is removed because it is now covered under the “Goose Lake tributaries” special regulation.
Del13	(103.5) Little Truckee River from Stampede Reservoir Dam downstream to Boca Reservoir for Nov. 15 through the Friday preceding the last Saturday in Apr. is removed because the previous paragraph changed this water to a year-round regulation.
Del14	(115) McCloud River and tributaries (B) McKay Creek and all tributaries including Sheepheaven Spring is removed because Sheepheaven Creek

	has been officially named by the USGS, and now has its own regulation under (115)(E) to provide the intended protection with a year-round closure.
Del15	(115) McCloud River and tributaries (G) McCloud River from the lower boundary of the U.S. Forest Service loop is consolidated into subsection (F) and is removed for consistency with lower McCloud regulations.
Del16	(115.3) McGee Creek (A) McGee Creek downstream from Highway 395 is removed because the former minimum trout size and split regulation of seasons is replaced with a simplified season of Saturday preceding Memorial Day through September 30.
Del17	(115.4) McKay Creek and all tributaries is removed because of the removal of (115)(B) for McKay Creek.
Del18	(125.5) Moosehead Creek and tributaries is removed because Moosehead Creek is already covered under (115)(A) for McCloud River tributaries.
Del19	(134) Owens River (C) Upper Owens River from fishing monument is removed because of simplification of this water through consolidation of this subparagraph with (B).
Del20	(138) Pillsbury Lake tributaries is removed because it is covered under Eel River regulations in subsection (63)(A)(3), which is moving to the 7.40 HSS table.
Del21	(139) Pine Creek and Pine Creek Slough is removed because it is covered under the (61)(C) Eagle Lake regulations.
Del22	(141) Pit River (D) From Pit No. 7 dam downstream to Shasta Lake is removed because of simplification of this water through consolidation of this subparagraph with (C).
Del23	(156) Sacramento River and tributaries above Keswick Dam, (D) Sacramento River and tributaries excluding Castle Creek is removed because of simplification of this water through consolidation of this subparagraph with (C).
Del24	(176.5) Sheepheaven Spring is removed because it has its own regulation under (115)(E) to provide the intended protection with a year-round closure.
Del25	(177) Shovel Creek and tributaries is removed because angler use in this water is minimal and restricted; further, this water is now covered under (91) Klamath River regulations.
Del26	(180.5) Soda Creek is removed because this water is now covered under (156)(B) Sacramento River.
Del27	(189) Stony Creek, and tributaries, (A) From the headwaters downstream to the diversion dam west of Stonyford, and (B) Stony Creek Middle Fork from Red Bridge upstream are removed because of simplification of this water through consolidation of this subparagraph with paragraph (A) into (189) for Stony Creek.
Del28	(189.8) Swamp Creek and all tributaries is removed because it is covered under (115)(D).
Del29	(191) Sworinger Lake tributaries is removed because it is essentially a duplicate of subsection 177.5.
Del30	(196) Truckee River (C) Truckee River from the Glenshire Bridge downstream to the mouth of Prosser Creek is removed because of simplification of this water through consolidation of this subparagraph with paragraph (C) into (B).

Del31	(198) Tuolumne River (A) From O'Shaughnessy Dam (Hetch Hetchy Reservoir) downstream to Early Intake Dam is removed because of simplification of this water through consolidation of subparagraph (A) through (C) into 198 (Tuolumne River).
Del32	(208) Willow Creek and tributaries is removed because it is now covered under the “Goose Lake tributaries” special regulation.

Amend Section 8.10, Youth Fishing Derby, Susan River (Lassen County)

The Youth Fishing Derby on the Susan River is held every year one week before the trout season opener, which currently is the Saturday preceding the last Saturday in April. The Department is proposing to move the season opener on Susan River from the last Saturday in April to the Saturday preceding Memorial Day. The Department will continue to hold the derby on the Saturday before the season opener and, therefore, it is necessary to change the youth fishing derby date from the Saturday preceding the last Saturday in April to the Saturday preceding the trout season opener in May. Added language refers to subsection 7.50(b)(149) for regulations on the Susan River. These clarifications are necessary to ensure anglers understand the date of the new season opener.

E. Proposed for Addition

Add Section 5.84. Brook Trout.

Currently under the North Coast and Sierra District General Regulations (subsections 7.00(a)(5) and (b)(9)) up to 10 Brook Trout less than 8 inches and 10 inches, respectively, may be harvested per day, in addition to the daily bag and possession limits for trout. This regulation will be removed from Section 7.00 under the current proposal to uncouple the trout regulations from the District General Regulations. In its place, the Department is proposing a new Statewide Regulation for Brook Trout in Section 5.84 which will allow the harvest of up to 10 Brook Trout less than 10 inches per day in all inland trout waters, year-round. Brook Trout are a cold-water species found in high elevation lakes and streams in remote wilderness areas. Many of these wilderness fisheries contain overpopulated, undersized fish and are not attractive or targeted fisheries for anglers due to the size and poor condition of the fish (skinny). The Department initiated the Brook Trout bonus bag and possession limit to both increase fishing opportunity and reduce the numbers of fish in overpopulated lakes in hopes of increasing condition (fatter, heavier, and bigger fish). Although most Brook Trout fisheries occur in the North Coast and Sierra districts, these wilderness fisheries also occur in other areas of the state, but are hard to access for most anglers. Because of the remoteness of these fisheries and for simplification purposes, the Department is proposing to expand the Brook Trout bonus bag and possession limit to inland trout waters statewide. Exceptions to this Brook Trout bonus bag limit include all waters listed in Section 7.50, Trout Waters with Special Fishing Regulations, and Red Lake in Alpine County, which is managed as a trophy Brook Trout fishery.

Add Section 5.89. Salmon

This Section will be added only to refer readers to the appropriate regulatory sections for salmon and steelhead, which are not the focus of this current rulemaking, but may be for a subsequent one (i.e., Phase II).

Add Section 7.40. Alphabetical List of Hatchery Trout, Hatchery Steelhead, and Salmon Waters with Special Fishing Regulations

For simplification purposes, the Department is proposing to separate the trout special fishing regulation waters (inland waters) from the salmon and steelhead special fishing regulation waters (anadromous waters). The special fishing regulations for trout will remain in Section 7.50. This requires a new regulatory section be created for the hatchery trout, hatchery steelhead and salmon special fishing regulation waters (abbreviated "HSS" per the coding outlined in the trout menu). The proposed new section is Section 7.40, "Alphabetical List of Hatchery Trout, Hatchery Steelhead, and Salmon Waters with Special Fishing Regulations." The existing language in subsections 7.50(a)(1)-(6) will be included in the new Section 7.40, but references to trout will be replaced with salmon and steelhead. All the special waters indicated by the coding "HSS" in the subsection 7.50(b) table are moved into the new 7.40 table, and aside from this move, are not proposed to be altered as part of this rulemaking. Approximately 185 individual waters, or reaches of waters, are proposed to be moved from subsection 7.50(b) to the new 7.40 table. Moving these special waters to a separate regulation section is necessary to fulfill the goals of separating and consolidating regulations for inland trout (i.e., non-anadromous waters) from steelhead and salmon (i.e., anadromous waters).

F. Proposed Changes Without Regulatory Effect

Below are minor changes to clarify and correct various sport fishing regulations in Title 14.

Amend Section 3.00. Fishing Hours.

The reference in subsection (a)(1)(B) Heenan Lake, (Alpine Co.) is changed to subsection 7.50(b)(56) because of renumbering in the section.

Amend Section 4.00. Bait - General.

The reference in subsection (d) Hat Creek is changed to subsection 7.50(b)(55) because of renumbering in the section.

Amend Section 5.00 Black Bass Special Regulations.

Remove the special closure language (b)(14), Eastman Lake. This language was removed from the sport fishing regulations in 2017.

Subsection (a) title, General Statewide Restrictions, is changed to read General Statewide Regulations to be more accurate and consistent with other statewide regulations sections in Title 14.

Subsection (a)(1) is being amended to specify that the black bass 12 inch minimum size limit is to be measured in total length. This requirement is already specified in subsection 5.00(b). It is being added to Section 5.00(a)(1) to provide additional clarity.

(b) Goals and Benefits of the Regulation

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. 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 trout seasons, size limits, and bag and possession limits provide for the maintenance of sufficient populations of trout to ensure their continued existence.

The benefits of the proposed regulations include up to date and streamlined trout fishing regulations that are consistent statewide, consistency with federal fishery management goals, sustainable management of California's trout fisheries, promotion of the general health and welfare of California residents, and promotion of businesses that rely on sport fishing throughout the state. The proposed changes will provide benefits by maximizing trout fishing opportunity, where possible, through the proposed extensions of fishing seasons and increases in bag and possession limits on both district and special regulations waters without adversely affecting native and non-native wild trout populations. The proposed regulatory changes may increase participation in sport fishing by new anglers, and increased retention of existing angler through simpler regulations facilitating ease of compliance and comprehension.

(c) Authority and Reference Sections from Fish and Game Code for Regulation

Authority: Section(s) 200, 205, 265, 270, 275, 315, 316.5, 399, and 2084, Fish and Game Code
Reference: Section(s) 200, 205, 265, 270, 316.5, 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

None.

(f) Public Discussions of Proposed Regulations Prior to Notice Publication

The Department held a series of public information meetings in 2018 and 2019 to inform stakeholders about the Project and solicit input and suggestions. In addition, the Department regularly provided Project updates at Commission subcommittee and full Commission meetings. See **Appendix B**, Public Outreach, for detailed information.

IV. Description of Reasonable Alternatives to Regulatory Action

(a) Alternatives to Regulation Change

The purpose for separating the inland trout waters in Title 14, Section 7.50(b), Special Fishing Regulations and anadromous waters into two tables is to make it easier for anglers to locate the body of water they intend to fish. An alternative to the proposed regulation changes is to not separate the inland trout water regulations from the anadromous (i.e., salmon and steelhead) regulations which are currently in the same table.

Alternatives on a per-water basis are outlined the Section 7.50(b) Special Fishing Regulations table in **Appendix A. Appendix A** shows the current open season and special regulations, bag and possession limit, the proposed regulations developed before the 2019 statewide public outreach meetings (i.e., "2019 Proposed Open Season or Daily Bag, Possession Limit, & Gear Restrictions"), and the final proposed regulations (i.e., 2020 "Proposed Regula Open Season or Daily Bag, Possession Limit, & Gear Restrictions"). Many alternatives to the 2019 proposed regulations, by special water, were considered based on public input and further evaluation of the regulations by regional Department staff biologists. As a result, some revisions to the "2019 Proposed Regulations" were made and are presented in the table under "2020 Proposed Regulations."

In view of information currently possessed, no reasonable alternative considered would be more effective in carrying out the purpose for which the regulation is proposed, would be as effective and less burdensome to affected private persons than the proposed regulation, or would be more cost effective to affected private persons and equally effective in implementing the statutory policy or other provision of law.

(b) No Change Alternative

The no change alternative would leave existing regulations in place. The current regulations for inland trout waters would remain under the District General Regulations and anglers' concerns regarding the complexity of the trout fishing regulations would not be addressed. Anglers would continue to be frustrated with the regulations to the point that some may choose to not go fishing as a result. In addition, outdated regulations in the Special Fishing Regulations would not be updated and, thus, would result in less efficient and effective regulations for California's trout fisheries.

V. Description of Reasonable Alternatives that Would Lessen Adverse Impact on Small Business

The proposed regulation will directly impact individual inland sport fisheries and only indirectly affect businesses, many of which are likely to be "small businesses" (per Government Code, Article 2, Section 11342.610). In response to public input and in accordance with Government Code Section 11346.2(b)(4)(B), several originally proposed changes were modified to lessen the potential for adverse impacts on small businesses that serve sportfishing activities, as noted in the right-hand column "Additional Comments and Considerations" in **Appendix A**. These alternatives were location-specific, such as for specific waters in the Sierra District, and elsewhere, to support local economic needs, public safety concerns, and local business operations.

VI. Mitigation Measures Required by Regulatory Action

The proposed regulatory changes may lead to potential localized impacts on the environment by opening some waters year-round, and modifying certain bag and possession limits, which could result in additional angler access to certain fishing areas, or increased take of trout, depending on the behavior of anglers in response to the regulations. While the proposed regulations would provide year-round openings for some waters, they are expected to result in no change or a small increase in angler days per year, which are anticipated to lead to less-than-significant impacts to the environment. The way the proposed regulations are structured ensure that the amount of take allowed will not exceed the sustainable yield level, and the populations will be maintained in equilibrium.

VII. 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 anticipates neutral to positive impacts on the creation of jobs, no elimination of jobs or existing businesses, and neutral to positive impacts on the creation of new businesses or the expansion of businesses in California. The proposed regulatory changes will result in increased fishing opportunities that along with easier to comprehend regulations should retain the current number of anglers and may encourage the recruitment of new sport fishing anglers to sustain or increase support for businesses related to sportfishing.

The Commission anticipates benefits to the health and welfare of California residents. Providing opportunities for inland sport fishing encourages outdoor activity and the consumption of a nutritious food. The Commission anticipates benefits to the environment by the sustainable management of California's inland sportfish resources. The Commission does not anticipate any benefits to worker safety.

(c) Cost Impacts on a Representative Private Person or Business

The Commission is not aware of any cost impacts that a representative private person or business would necessarily incur in reasonable compliance with the proposed action.

(d) Costs or Savings to State Agencies or Costs/Savings in Federal Funding to the State

None.

(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.

VIII. Economic Impact Assessment

(a) Effects of the Regulation on the Creation or Elimination of Jobs Within the State

The Commission anticipates neutral to positive impacts on the creation of jobs with no elimination of jobs.

(b) Effects of the Regulation on the Creation of New Businesses or the Elimination of Existing Businesses Within the State

The Commission anticipates neutral to positive impacts on the creation of new businesses with no adverse impacts to existing businesses within the State.

(c) Effects of the Regulation on the Expansion of Businesses Currently Doing Business Within the State

The Commission anticipates neutral to positive impacts on the expansion of businesses currently doing business within the State.

(d) Benefits of the Regulation to the Health and Welfare of California Residents

The Commission anticipates benefits to the health and welfare of California residents. Providing opportunities for inland sport fishing encourages a healthy outdoor activity and the consumption of a nutritious food.

(e) Benefits of the Regulation to Worker Safety

The Commission does not anticipate any benefits to worker safety because the proposed action does not affect working conditions.

(f) Benefits of the Regulation to the State's Environment

The Commission anticipates benefits to the environment by the sustainable management of California's inland fishery resources.

(g) Other Benefits of the Regulation

Other benefits of the proposed regulations are anticipated to be an increase in regulatory consistency statewide, a reduction in the complexity of the regulations, and a reduction in the number of Special Fishing Regulations by eliminating regulations that are no longer biologically justifiable.

Informative Digest/ Policy Statement Overview

For years, the Fish and Game Commission (Commission) and the California Department of Fish and Wildlife (Department) have heard concerns from anglers about the complexity of freshwater sport fishing regulations. Some anglers (or potential anglers) may be dissuaded from fishing due to actual or perceived difficulty in complying with the regulations. This regulatory package represents Phase I of the proposed process and focuses on simplifying and streamlining the sport fishing regulations for inland trout waters. The Department will prepare a separate regulatory package in the near future (i.e., Phase II) to address the complexity of the sport fishing regulations for those inland waters that are utilized by adult fish for migration and spawning after spending the majority of their lives in the ocean (i.e., anadromous waters) .

The purpose and necessity of the proposed regulation changes is to address anglers' concerns regarding the complexity of the inland sport fishing regulations by simplifying the various regulatory options, and to align the inland trout regulations with the Department's current fisheries management goals and objectives. Major proposed changes aim to:

- Separate regulations for inland trout (i.e., non-anadromous waters) from those for steelhead and salmon (i.e., anadromous waters), a process that facilitates the production of separate regulations booklets to help provide clarity to anglers;
- Replace the District Regulations (Section 7.00) with statewide regulations separated for trout; and
- Standardize and consolidate the Special Fishing Regulations (Section 7.50).

The proposed changes aim to increase regulatory consistency statewide, reduce complexity of the inland sport fishing regulations, and remove regulations that are no longer biologically justifiable.

Normally, no single element of a regulation controls a sport fishery (e.g., most trout streams in California have both a closed season and bag limit). The type of gear, legal fishing hours, and use of bait are also part of the regulatory equation. Most often, combinations of elements of regulations apply to a given water. The following are elements of regulations used to manage trout populations in California.

- Seasons (specified opened or closed seasons)
- Bag and possession limits
- Size limits; and
- Gear and bait restrictions.

Comprehensive Evaluation: Trout Menu

The Department evaluated above elements of the inland sport fishing regulations, specifically in the District Fishing Regulations in Title 14, Section 7.00, CCR and the Special Fishing Regulations in Title 14, Section 7.50, CCR. The District Fishing Regulations apply political boundaries in how the above regulatory elements are implemented by county line, in contrast to the watershed approach found within the Special Fishing Regulations, leading to complexity and associated public frustration stemmed from the diversity of different regulations established over decades, with limited alignment or consistency. The Department developed a suite of regulations, or "menu," comprised of angling

seasons, bag and possession limits, size limits, and gear restrictions, to standardize the Special Fishing Regulations in Title 14, subsection 7.50(b) and uncouple the inland trout waters from the District General Regulations in Title 14, subsections 7.00(a)-(g) and from anadromous waters. This menu described below represents the foundation of this rulemaking, and is the result of a collaborative effort by partners and fisheries biologists throughout the state to standardize the Special Fishing Regulations based on fisheries management goals, which include maximizing fishing opportunity (most liberal) and protecting sensitive fishery populations (most conservative).

Trout Menu Coding

The trout menu described below primarily applies to amended sections 5.85, 7.00 and 7.50, and added Section 7.40. It is divided into three categories of a standardized suite of management approaches reflected as regulatory elements for the 200+ special inland waters in California:

- An updated Statewide Regulation;
- Seasons; and
- Bag/Possession Limits (plus gear restrictions and size limits).

For the proposed Section 7.50 regulatory language "Alphabetical List of Trout Waters with Special Fishing Regulations," in the table encompassing subsection 7.50(b), a right-hand column has been added called "Menu Option" to serve as an easy reference to the assigned management approach of each special regulation water. This column is only shown for the purpose of clarity for the Initial Statement of Reasons (ISOR) to indicate any changes affecting a water. The options are either assignment to one of the two statewide regulations ("SL," or "SR," as noted below), a combination from the trout menu of season, bag/possession and gear limitations for each state water, or coding showing the water has been moved to another section or deleted. The coding is also shown by special water in the Decision Matrix, Summary Table of Changes for the subsection 7.50(b) regulatory table (**Appendix A** to the ISOR).

Statewide Regulations

"SL" for Lakes and Reservoirs (proposed in amended subsection 5.85(a)(1)):

Open all year, five trout daily bag limit, 10 trout in possession.

"SR" for Rivers and Streams (proposed in amended subsection 5.85(a)(2)):

From the last Saturday in April through November 15, five trout daily bag limit, 10 trout in possession; and, from November 16 through the Friday preceding the last Saturday in April, 0 trout bag limit, artificial lures with barbless hooks only and trout must be released unharmed and not removed from the water.

Seasons

Seasons are described as follows, and designated by capital letters A-J (under "Menu Option" column shown in the amended subsection 7.50(b) table):

A. <u>All year</u>

B. <u>Last Saturday in April through November 15</u>

C. <u>November 16 through the Friday preceding the last Saturday in April</u>

D. Last Saturday in April through July 31

E. August 1 through November 15

F. Saturday preceding Memorial Day through September 30

G. Saturday preceding Memorial Day through the last day in February

H. September 1 through November 30

I. October 1 through the Friday preceding Memorial Day

J. Closed to fishing all year

Bag and Possession Limits and Gear Restrictions

Bag and Possession Limits and Gear Restrictions are described as follows, and designated by numbers 1-7 (under "Menu Option" column shown in the amended subsection 7.50(b) table):

1. 5 trout, no gear restrictions

2. 2 trout per day, 4 trout in possession, no gear restrictions

3. 2 trout, artificial lures

4. 2 trout with 14" total length minimum, artificial lures

5. 2 trout with 18" total length minimum, artificial lures

6. 0 trout, artificial lures with barbless hooks

7. 0 trout, artificial flies with barbless hooks

Combined options for season (letter) and bag/possession limit and gear limitation (number) present as a capital letter-number code. For example, "B5" would signify a water with a season from the last Saturday in April through November 15, a bag/possession limit of 2 trout with 18" minimum size, and a gear restriction of artificial lures.

Two other codes in the right-hand column in the subsection 7.50(b) table inform anglers of how that particular water is considered, if it doesn't fall under one of the above codes.

"HSS" Refers to waters moved to the newly added Section 7.40 of Title 14 under the anadromous table for salmon and steelhead, proposed for naming as "Alphabetical List of Hatchery Steelhead and Salmon Waters with Special Fishing Regulations." Those waters with HSS coding are shown as strikeout in Section 7.50 because they are proposed for relocation to Section 7.40.

"Del##" Refers to a special water or regulation that is proposed for removal entirely from the Section 7.50(b) special regulations table, and justification for the removal is outlined by numerical increment below under the description for amendment of Section 7.50.

Proposed for Amendments

Amend subsection 5.00(b) Black Bass, Special Regulations

- Remove subsections (b)(3) Lassen County; (b)(4) Modoc County; (b)(7) Shasta County; (b)(9) Big Lake (Shasta County); (b)(13) Diamond Valley Lake; (b)(15) El Capitan Reservoir; (b)(22) Perris Lake; (b)(25) Silverwood Lake; (b)(26) Skinner Lake; and (b)(28) Trinity Lake.

- The Department is proposing to remove these subsections from the bass special regulations. Therefore, these waters will revert to the statewide standard under subsection 5.00(a) of open to fishing all year, with a 12-inch minimum size limit, and a five-fish daily bag limit. Specifically, two changes of non-regulatory effect include removal of (b)(15) El Capitan Reservoir, and (b)(22) Perris Lake as listed in the table, due to existing redundancy with the statewide standard because the season (all year), size (12-inch minimum), and bag limit already matches that of the statewide standard

  The Department is proposing to amend the existing bass fishing season on Trout Lake to align with the proposed new trout fishing season under the Statewide Regulation "SL" as listed in subsection 7.50(b)(195.5) for Trout Lake.

- Amend subsections (b)(2) for waters in Inyo County, and (b)(5) and (b)(16) for waters in Mono County.

  The Department is amending subsections (b)(2) and (b)(5) for waters in Inyo County to include reference to Inyo County streams and rivers in the Special Fishing Regulations in subsection 7.50(b). Subsection (b)(2) and (b)(5) amendments also clarify the closure to black bass fishing from November 16 to the Friday preceding the last Saturday in April to ensure anglers understand the open season is late April through November 15. Subsection (b)(16) similarly includes reference to Mono County streams and rivers in the Special Fishing Regulations in subsection 7.50(b), while correcting a reference for Fish Slough to the boundaries from Owens Valley Native Fishes Sanctuaries to the BLM Spring.

- Re-numbering of the waters in 5.00(b)

  The resulting proposed list of special black bass waters is re-numbered by paragraph for clarity and consistency.

Amend Section 5.41. Landlocked Salmon.

Subsection (e) is amended so that the same exceptions formerly referenced in subsection 7.50(b) are specifically listed within this subsection with a daily bag limit of ten salmon, and possession limit of twenty.

Amend Section 5.85. Trout.

The name of this section is changed to reflect that only trout (and not salmon) are covered under this general regulation. Additional introductory language is added to clarify how the bag and possession limits should be interpreted, for the total number of trout in combination.

- Under subsection (a)(1), the Department is proposing to remove all trout fishing regulations for inland lakes and reservoirs from Section 7.00 District General Regulations and move them to Section 5.85, Trout. This addition of subsection (a)(1) to Section 5.85 provides the new proposed statewide regulation for slow-moving waters, or inland lakes, reservoirs, and ponds, as described in the trout menu and noted by the coding "SL."

- Under subsection (a)(2), the Department is proposing to remove all trout fishing regulations for inland rivers and streams from the Section 7.00 District General

Regulations. This addition of subsection (a)(2) to Section 5.85 provides the new proposed statewide regulation for fast-moving waters, or streams, rivers, creeks, and canals, as described in the trout menu and noted by the coding "SR." Under the new Statewide Regulation, these waters will be open to fishing from the last Saturday in April through November 15, with a five trout daily bag limit, and a 10 trout possession limit; and, from November 16 through the Friday preceding the last Saturday in April, with a zero trout bag limit, and artificial lures with barbless hooks only gear restriction.

- Subsection (b) describes those exceptions to the statewide regulations, and refers readers to Section 7.50, Alphabetical List of Waters with Special Fishing Regulations for individual trout waters with special regulations that would not fall under the statewide regulation. Subsection (b) further clarifies that brook trout bag and possession limits may be in addition to the trout bag and possession limits.

This proposal will result in either no change to the current regulations or an added possession limit for waters moved to the statewide regulation. Below is a description of changes to the district waters, Section 7.00.

Subsections (a) and (b) are necessary to inform anglers of the statewide standard season, bag, possession limit for lakes, reservoirs, and ponds, as well as streams, river, creeks, and canals that don't otherwise have a special regulation in subsection 7.50(b).

Amend Section 7.00. District General Regulations

To address anglers' concerns regarding the complexity of the 7.00 District General Regulations, the Department is proposing to uncouple the state's inland trout waters from the District General Regulations. Most regulations for trout waters currently under the District General Regulations will be moved to either the new subsection 5.85(a)(1), Statewide Regulation for lakes and reservoirs, or to subsection 5.85 (a)(2), Statewide Regulation for rivers, streams, creeks, and canals. Some individual trout waters will require special restrictions and reduced bag limits and, therefore, these regulations will be moved to Section 7.50, Special Fishing Regulations. The amendments will result in little or no substantive change to the regulations for most waters currently under the District General Regulations. Clarifications are made to the opening paragraph prior to subsection 7.00(a) to ensure clarity that hatchery trout and hatchery steelhead are covered under Section 7.00.

The Department proposes to remove or amend the following subsections:

- (a)(1) and (b)(3), delete these subsections: Waters under the North Coast District and Sierra District subsections are currently open to fishing all year, with a five-trout daily bag limit, a 10 fish possession limit, no size limit, and no gear restriction. For simplification purposes, regulations for these waters will move/revert to subsection 5.85(a)(1), the new Statewide Regulation for lakes and reservoirs. In effect, there will be no substantive change to the existing regulations for these waters.

- (a)(4), (b)(4), and (b)(7) delete these subsections: Waters under the North Coast District and Sierra District subsections are currently open to fishing from the last Saturday in April through November 15, with a five-trout daily bag limit, a 10 trout possession limit, and no gear restriction. For simplification purposes, regulations for these waters will move/ revert to subsection 5.85(a)(2), the new Statewide Regulation for rivers and streams, which will extend the fishing season on these waters to year-round with catch

and release fishing allowed from November 16 through the Friday preceding the last Saturday in April.

- (a)(5) and (b)(9) delete these subsections: The current bonus bag limit for Brook Trout under the North Coast and Sierra District General Regulations will move/revert to a new Section 5.84, Statewide Regulation for Brook Trout. The new Statewide Regulation for Brook Trout will apply to all inland trout waters not listed under the Special Fishing Regulations, with the exception of Red Lake in Alpine County which is managed for trophy-sized trout by stocking effort.

- (b)(5) delete this subsection: Waters under this subsection in Shasta County are currently open to fishing from the last Saturday in April through November 15, with a two-trout daily bag and possession limit, and no gear restriction. For simplification purposes, regulations for these waters will move/revert to subsection 5.85(a)(2), the new Statewide Regulation for rivers and streams. This proposed change will increase the current daily bag limit to five trout and add a 10 trout possession limit. In addition, the fishing season will be extended to year-round, with catch and release fishing allowed from November 16 through the Friday preceding the last Saturday in April.

- (b)(6) delete this subsection.: Waters under this subsection in Lassen and Modoc counties are currently open to fishing from the Saturday preceding Memorial Day through November 15, with a five-trout daily bag limit, a 10 trout possession limit, and no gear restriction. For simplification purposes, regulations for these waters will move/revert to subsection 5.85(a)(2), the new Statewide Regulation for rivers and streams. This will extend the fishing season to year-round, with catch and release fishing allowed from November 16 through the Friday preceding the last Saturday in April.

- (c)(1), (d)(1), (e)(1), (f)(1), and (g)(2), delete these subsections: Waters under these subsections in the North Central District, Valley District, South Central District, Southern District, and Colorado River District are currently open to fishing all year, with a five-trout daily bag and possession limit, and no gear restriction. For simplification purposes, regulations for these waters will move/revert to subsection 5.85(a)(1), Statewide Regulation for lakes and reservoirs. As a result, the possession limit on these waters will increase from five trout to 10 trout.

- (d)(3), (f)(3), (f)(5), and (g)(2) delete these subsections: Waters under these subsections in the Valley District, Southern District, and Colorado River District are currently open to fishing all year, with a five-trout daily bag and possession limit, and no gear restriction. For simplification purposes, regulations for these waters will move/revert to subsection 5.85(a)(2), Statewide Regulation for rivers and streams. As a result, the possession limit will increase from five trout to 10 trout from the last Saturday in April through November 15. Catch and release fishing only will be allowed from November 16 through the Friday preceding the last Saturday in April.

- (e)(3) amend this subsection: Waters under this subsection for Alameda, Contra Costa, and Santa Clara counties are currently open to fishing from the last Saturday in April through November 15, with a five-trout daily bag and possession limit, and no gear restriction. For simplification purposes, regulations for these waters will move/revert to

subsection 5.85(a)(2), the new Statewide Regulation for rivers and streams. This will increase the possession limit to 10 trout and extend the fishing season to year-round, with catch and release fishing allowed from November 16 through the Friday preceding the last Saturday in April.

- (g)(1) delete this subsection: Waters under this subsection are currently open to fishing year-round, with a 10 trout daily bag and possession limit, and no gear restriction. For simplification purposes, regulations for these waters will move/revert to subsection 5.85(a)(2), Statewide Regulation for rivers and streams. This will reduce the daily bag limit from 10 trout to five trout from the last Saturday in April through November 15 and allow catch and release fishing only from November 16 through the Friday preceding the last Saturday in April.
- (b)(8) delete this subsection: This language is no longer needed under Section 7.00(b) as all Mono County waters under the District General Regulations will be subject to the two new Statewide Regulations for trout (i.e., Section 5.85(a) or Section 5.85(b)), or to Section 7.50(b), Special Fishing Regulations. This language does not need to move to Section 5.85 or Section 7.50 as waters under the new Statewide Regulations will be open to fishing year-round and similar language already exists under subsection 7.50(a)(3) of the Special Fishing Regulations.
- (b)(2), amend this subsection: Anadromous waters under this subsection for Tehama and Shasta counties are currently open to fishing from the last Saturday in April through November 15, with a two-trout or steelhead daily bag and possession limit, and artificial lures with barbless hooks restriction. This subsection is amended for section and paragraph numbers, and to clarify the artificial lures possess hooks that are barbless.
- Edits for clarity and consistency: These edits include re-numbering of paragraphs within District Regulations in subsections 7.00(b) through (g), adjusted capitalization of certain words throughout Section 7.00, and specification of the referenced Section number to clarify interpretation from the previous 7.50 to the newly added 7.40 section.

Amend Section 7.50. Alphabetical List of Trout Waters with Special Fishing Regulations.

It is necessary to streamline the Special Fishing Regulation trout waters by utilizing the trout menu described above to align the regulations with the Department's current fisheries management goals and objectives. The regulations proposed herein were tailored to each individual water, and include a variety of combinations of regulation elements, such as bag limits, gear restrictions, season restrictions, and size limits. Upon review of the extensive public input received during pre-notice outreach efforts (Appendix B), Department fisheries biologists and managers, often in consultation with fishing groups or individuals, assigned waters to the trout menu based on their expertise and knowledge of specific waters in their management area.

As a result of this streamlining process, the number of:

- Special fishing seasons for trout-only waters will be reduced from 30 to 10;
- Special size limits will be reduced from 8 to 2;
- Different gear restrictions will be reduced from 10 to 7;
- Different bag/ possession limits will be reduced from 6 to 4; and

- Fishing opportunities will be expanded on nearly 50 percent of the existing special regulation waters from a reduced season to year-round.

As noted in **Appendix A** to the ISOR, proposed amendments and additional comments and considerations are summarized for Section 7.50(b), Alphabetical List of Waters with Special Fishing Regulations. This table includes the biological and management rationale for proposed changes to each special water, as well as other considerations such as public input, socio-economic considerations, traditional values, access and public safety, etc.

For those special waters without a special assigned management approach from the menu listed in **Appendix A**, the proposed regulatory text outlining the "Menu Option" in the right-hand column indicates the assigned management approach of each water (assignment to Statewide lakes/ reservoirs, or "SL", statewide rivers and streams, or "SR", etc.)

Truckee River Management Options, Section 7.50(b), Subsections (196)(B), (196)(C), and (196)(D)

At the Commission's April 15, 2020 meeting, George Osborn, representing Mr. Montna, requested that the Commission consider Mr. Montna's proposal as an alternative to the Department's proposed regulations for the Truckee River subsections (196)(B), (C), and (D). The Commission directed the Department to add a regulatory option to allow further consideration of Mr. Montna's proposal.

Option 1 – Department Proposal

The Department is proposing to amend the current regulation on the Truckee River from Trout Creek downstream to the mouth of Prosser Creek (re-numbered subsection 7.50(b)(153)(B)), to open all year, zero trout daily bag, and artificial lures with barbless hooks. This will remove the current two-trout daily bag and possession limit from the last Saturday in April through November 15. It will also change the gear restriction from artificial flies to artificial lures between Glenshire Bridge and the mouth of Prosser Creek. The Department is also proposing to amend the current regulation from the mouth of Prosser Creek downstream to the Nevada State Line (re-numbered subsection 7.50(b)(153)(C)) to open all year, two-trout daily bag and possession limit, and artificial lures. This will increase the daily bag limit from zero trout to two trout from November 16 through the Friday preceding the last Saturday in April. This will also change the gear restriction from artificial lures with barbless hooks to artificial lures, thus removing the requirement for barbless hooks.

Option 2 – Mr. Montna's Proposal

Mr. Montna supports the Department's proposed changes to the current regulations on the Truckee River from Trout Creek downstream to the mouth of Prosser Creek to open all year with a zero trout daily bag limit, but requests that the Department change the proposed gear restriction from artificial lures with barbless hooks to artificial barbless flies. Mr. Montna also requests that the Department's proposed regulations from the mouth of Prosser Creek downstream to the Nevada State Line be changed to a zero trout daily bag limit, and artificial lures with barbless hooks. This will reduce the current daily bag limit from two to zero trout from the last Saturday in April through November 15 and keep the requirement for barbless hooks in place.

Amend Section 8.10, Youth Fishing Derby, Susan River (Lassen County)

The Youth Fishing Derby on the Susan River is held every year one week before the trout season opener, which currently is the Saturday preceding the last Saturday in April. The Department is proposing to move the season opener from the last Saturday in April to the Saturday preceding Memorial Day. The Department will continue to hold the derby on the Saturday before the season opener and, therefore, it is necessary to change the youth fishing derby date from the Saturday preceding the last Saturday in April to the Saturday preceding the trout season opener in May. Added language refers to subsection 7.50(b)(149) for regulations on the Susan River.

Proposed for Addition

Add Section 5.84. Brook Trout.

Currently under the North Coast and Sierra District General Regulations (subsections 7.00(a)(5) and (b)(9)) up to 10 Brook Trout less than 8 inches and 10 inches, respectively, may be harvested per day, in addition to the daily bag and possession limits for trout. This regulation will be removed from Section 7.00 under the current proposal to uncouple the trout regulations from the District General Regulations. In its place, the Department is proposing a new Statewide Regulation for Brook Trout in Section 5.84 which will allow the harvest of up to 10 Brook Trout less than 10 inches per day in all inland trout waters, year-round. Because of the remoteness of these fisheries and for simplification purposes, the Department is proposing to expand the Brook Trout bonus bag and possession limit to inland trout waters statewide. Exceptions to this Brook Trout bonus bag limit include all waters listed in Section 7.50, Trout Waters with Special Fishing Regulations, and Red Lake in Alpine County, which is managed as a trophy Brook Trout fishery.

Add Section 5.89. Salmon

This Section will be added only to refer readers to the appropriate regulatory sections for salmon and steelhead, which are not the focus of this current rulemaking, but may be for a subsequent one (i.e., Phase II).

Add Section 7.40. Alphabetical List of Hatchery Trout, Hatchery Steelhead, and Salmon Waters with Special Fishing Regulations

For simplification purposes, the Department is proposing to separate the trout special fishing regulation waters (inland waters) from the salmon and steelhead special fishing regulation waters (anadromous waters). The special fishing regulations for trout will remain in Section 7.50. This requires a new regulatory section be created for the hatchery trout, hatchery steelhead and salmon special fishing regulation waters (abbreviated “HSS” per the coding outlined in the trout menu). The proposed new section is Section 7.40, Alphabetical List of Hatchery Trout, Hatchery Steelhead, and Salmon Waters with Special Fishing Regulations. The existing language in subsections 7.50(a)(1)-(6) will be included in the new Section 7.40, but references to trout will be replaced with salmon and steelhead. All the special waters indicated by the coding “HSS” in the subsection 7.50(b) table are moved into the new 7.40 table, and aside from this move, are not proposed to be altered as part of this rulemaking. Approximately 185 individual waters, or reaches of waters, are proposed to be moved from subsection 7.50(b) to the new 7.40 table.

Proposed Changes Without Regulatory Effect

Amend Section 3.00. Fishing Hours.

The reference in subsection (a)(1)(B) Heenan Lake, (Alpine Co.) is changed to subsection 7.50(b)(56) because of renumbering in the section.

Amend Section 4.00. Bait - General.

The reference in subsection (d) Hat Creek is changed to subsection 7.50(b)(55) because of renumbering in the section.

Amend Section 5.00 Black Bass Special Regulations.

Remove the special closure language (b)(14), Eastman Lake. This language was removed from the sport fishing regulations in 2017.

Subsection (a) title, General Statewide Restrictions, is changed to read General Statewide Regulations to be more accurate and consistent with other statewide regulations sections in Title 14.

Subsection (a)(1) is being amended to specify that the Black Bass 12 inch minimum size limit is to be measured in total length. This requirement is already specified in subsection 5.00(b). It is being added to Section 5.00(a)(1) to provide additional clarity.

Benefits of the Proposed Regulations

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. 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 trout seasons, size limits, and bag and possession limits provides for the maintenance of sufficient populations of trout to ensure their continued existence.

The benefits of the proposed regulations include up to date and streamlined trout fishing regulations that are consistent statewide, consistency with federal fishery management goals, sustainable management of California's trout fisheries, promotion of the general health and welfare of California residents, and promotion of businesses that rely on sport fishing throughout the state. The proposed changes will provide benefits by maximizing trout fishing opportunity, where possible, through the proposed extensions of fishing seasons and increases in bag and possession limits on both district and special regulations waters without adversely affecting native and non-native wild trout populations. The proposed regulatory changes may increase participation in sport fishing by new anglers, and increased retention of existing angler through simpler regulations facilitating ease of compliance and comprehension.

Consistency and Compatibility with Existing Regulations

Article IV, Section 20 of the State Constitution specifies that the Legislature may delegate to the Fish and Game 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

recreational fishing in waters of the state (Fish and Game Code sections 200, 205, 315 and 316.5). 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 California Code of Regulations and finds no other state agency regulations pertaining to trout sport fishing seasons, bag, and possession limits.

Proposed Regulatory Language

Section 3.00, Title 14, CCR, is amended to read:

§ 3.00. Fishing Hours.

(a) Day Defined: One hour before sunrise to one hour after sunset. Remaining hours are night.
(b) All fish may be taken day or night, except as follows:
(1) WATERS WITH RESTRICTED FISHING HOURS FOR ALL SPECIES:
(A) American River between Business 80 and Nimbus Dam (Sacramento Co.): Night fishing prohibited.
(B) Heenan Lake, (Alpine Co.): See section 7.50(b)~~(76)(A)~~(56).
(C) Mono County: Night fishing is prohibited in all Mono County waters except Topaz Lake, where fishing is prohibited from two hours after sunset to one hour before sunrise.
(D) Tahoe Lake (Placer and El Dorado ~~Cos~~cos.): Fishing is prohibited from two hours after sunset to one hour before sunrise.
(2) WATERS WHERE NIGHT AND DAY FISHING IS ALLOWED, BUT NO TROUT OR SALMON MAY BE TAKEN AT NIGHT:
(A) North Coast District
(B) North Central District, all waters except no fishing hour restrictions at Berryessa Lake (Napa Co.) and Mendocino Lake (Mendocino Co.)
(C) South Central District, all waters except no fishing hour restrictions at Coyote Lake (Santa Clara Co.)
(D) Valley District, north of Interstate 80, all waters except no fishing hour restrictions at Camp Far West Lake (Nevada, Placer, and Yuba cos.), Collins Lake (Yuba Co.), Oroville Lake (Butte Co.) and Wildwood Lake (Nevada Co.)
(E) Shasta, Siskiyou, Lassen, and Tehama counties.
Also, see Section 27.56.
Note: Authority cited: Sections 200, 205, 265, 270 and 275, Fish and Game Code. Reference: Sections 110, 200 and 205, Fish and Game Code.

Proposed Regulatory Language

Section 4.00, Title 14, CCR, is amended to read:

§ 4.00. Bait - General.
Legally acquired and possessed invertebrates, mollusks, crustaceans, amphibians (except salamanders), fish eggs and treated and processed foods may be used for bait, except:
(a) No species specified as endangered, threatened, candidate, fully-protected, or otherwise protected under state and federal law may be used as bait.
(b) No salamander may be used as bait. See section 5.05 for other amphibians that may be used as bait.
(c) See Section 5.35 for restrictions on crayfish;
(d) See Section 7.50(b)(~~74~~55) for restriction on bait collecting on Hat Creek;
(e) No trout may be maintained or possessed in a live condition in any container on or attached to any boat;
(f) Except for restrictions listed under special regulations, dead ocean fish may be used as bait statewide. This section supersedes the provisions of sections 4.10, 4.15, 4.20, 4.25 and 4.30.
Note: Authority cited: Sections 200, 205 and 265, Fish and Game Code. Reference: Sections 200, 201, 205, 265 and 5505, Fish and Game Code.

Proposed Regulatory Language

Section 5.00, Title 14, CCR, is amended to read:

§ 5.00. Black Bass.
It is unlawful to take or possess black bass except as provided below:
(Note: Some waters are closed to all fishing under sections 7.40 and 7.50.)
(a) General Statewide sRegulations:
(1) Lakes/Reservoirs and the Sacramento-San Joaquin Delta: The following waters, except for those listed in subsection (b) Special Regulations (below), are open to fishing all year, with a 12-inch total length minimum size limit and a five-fish daily bag limit: All lakes and reservoirs in the State, and the Sacramento-San Joaquin River Delta, (see Section 1.71 for definition of the Delta).
(2) Rivers/Streams and Private Ponds: Rivers, streams, canals, and lakes or ponds entirely on private lands, which are not listed in subsection (b) Special Regulations (below), are open all year with no size limit and a five-fish daily bag limit.
(b) Special Regulations: Counties and individual waters listed below are those having regulations different from the General Statewide Restrictions in subsection (a).
DISTRICTS AND COUNTIES WITH SPECIAL REGULATIONS

Area or Body of Water	Open Season	Size (total length)	Bag Limit
~~DISTRICTS AND COUNTIES WITH SPECIAL REGULATIONS~~			
(1) Colorado River District: All waters (Bag and size limits conform with Arizona regulations.).	All year.	13-inch minimum.	6
(2) Inyo County: all streams east of Highway 395 from the southern Inyo County line north to the junction of Highway 6 and east of Highway 6 to the Mono County line~~.~~, except those streams listed by name in Section 7.50(b), Special Fishing Regulations.	All year.	12-inch minimum.	5
The remaining streams of Inyo County, except those waters listed in ~~sections~~Section 7.50(b)~~(82) and 7.50(b)(134)~~, Special Fishing Regulations.	Last Saturday in April through ~~Nov.~~November 15. Closed to bass fishing from November 16 through the Friday preceding the last Saturday in April.	12-inch minimum.	5
All Lakes, Big Pine Canal, Fish Spring Canal, and Millpond in Inyo County.	All year.	12-inch minimum.	5
~~(3) Lassen County: all waters.~~	~~All year.~~	~~No size limit.~~	~~5~~
~~(4) Modoc County: all waters except Dorris and Big Sage Reservoirs (see subsection (a)(1)).~~	~~All year.~~	~~No size limit.~~	~~10~~

(~~5~~3) Mono County: all ~~waters~~streams except for Fish Slough (see subsection (b)(~~16~~10)) and those waters listed ~~as closed to all fishing in Section 7.50.~~by name in Section 7.50(b), Special Fishing Regulations.	Last Saturday in April through ~~Nov.~~November 15. Closed to bass fishing from November 16 through the Friday preceding the last Saturday in April.	No size limit.	5
(~~6~~4) Plumas County: all waters.	All year.	No size limit.	5
~~(7) Shasta County: all lakes except Britton, Shasta and Whiskeytown lakes (see subsection (a)(1) and Big Lake (see subsection (b)(9)).~~	~~All year.~~	~~No size limit.~~	~~5~~

INDIVIDUAL BODIES OF WATER WITH SEPCIAL REGULATIONS

~~INDIVIDUAL BODIES OF WATER WITH~~	
~~SPECIAL REGULATIONS~~	

Area or Body of Water	**Open Season**	**Size (total length)**	**Bag Limit**
(~~8~~5) Barrett Lake (San Diego County). (Also see Section 2.08)	All year.	No black bass shall be possessed.	0
~~(9) Big Lake (Shasta County) (Also see Section 7.00(b)(4))~~	~~Last Saturday in Apr through Nov. 15.~~	~~12-inch minimum~~	~~5~~
	~~Nov. 16 through last Friday in April.~~	~~No black bass shall be possessed.~~	~~0~~
(~~10~~6) Casitas Lake (Ventura County).	All year.	12-inch minimum. No more than one over 22 inches.	5
(~~11~~7) Castaic Lake (Los Angeles County).	All year.	15-inch minimum.	5
(~~12~~8) Cuyamaca Lake (San Diego County).	All year.	No size limit. No smallmouth bass shall be possessed.	5
~~(13) Diamond Valley Lake, (Riverside County)~~	~~All year.~~	~~Largemouth bass 15-inch minimum. No smallmouth bass shall be possessed.~~	~~5~~

Area or Body of Water	Open Season	Size (total length)	Bag Limit
(~~14~~9) Eastman Lake (Madera and Mariposa ~~Cos.~~cos.) ~~(Note: See Section 7.50(b)(62) for special area closures).~~	All year.	22-inch minimum.	1
~~(15) El Capitan Reservoir (San Diego County).~~	~~All year.~~	~~12-inch minimum.~~	~~5~~
(~~16~~10) Fish Slough (Mono County), except the fenced portions of Fish Slough within ~~Owens Valley Native Fishes Sanctuaries and~~ the BLM Spring, which are closed to all fishing all year. See Section 7.50(b)(49), Special Fishing Regulations.	All year.	No size limit.	5
(~~17~~11) Hensley Lake (Madera County).	All year.	15-inch minimum.	2
(~~18~~12) Hodges Lake (San Diego County).	All year.	15-inch minimum.	5
(~~19~~13) Isabella Lake (Kern County).	All year.	15-inch minimum.	2
(~~20~~14) Kaweah Reservoir (Tulare County).	All year.	15-inch minimum.	2
(~~21~~15) Lett's Lake (Colusa County).	All year.	No size limit.	5
~~(22) Perris Lake (Riverside County).~~	~~All year.~~	~~12-inch minimum.~~	~~5~~
(~~23~~16) Plaskett Meadows lakes, upper and lower (Glenn County).	All year.	No size limit.	5
(~~24~~17) Shaver Lake (Fresno County).	All year.	No size limit.	5
~~(25) Silverwood Lake (San Bernardino County).~~	~~All year.~~	~~15-inch minimum.~~	~~2~~
~~(26) Skinner Lake (Riverside County).~~	~~All year.~~	~~15-inch minimum.~~	~~2~~
(~~27~~18) Success Reservoir (Tulare County).	All year.	15-inch minimum.	2
~~(28) Trinity Lake (Trinity County).~~	~~March 1 through May 31~~	~~12-inch minimum.~~	~~2~~
	~~June 1 through last day in Feb.~~	~~12-inch minimum.~~	~~5~~

Area or Body of Water	Open Season	Size (total length)	Bag Limit
~~(29) Trout Lake (Siskiyou (County).~~	~~Only weekends and Wednesdays from the last Saturday in April through Sept. 30.~~.	~~22-inch minimum. Only artificial lures may be used.~~	~~1~~
(~~30~~19) Upper Otay Lake (San Diego County). (Also see Section 2.08).	All year.	No black bass shall be possessed.	0

Note: Authority cited: Sections 200, 205, 265, 270 and 275, Fish and Game Code. Reference: Sections 200 and 205, Fish and Game Code.

Proposed Regulatory Language

Section 5.41, Title 14, CCR, is amended to read:

§ 5.41. Landlocked Salmon.

(a) Open season: All year.
(b) Daily bag limit: Five.
(c) Possession limit: Ten.
(d) Size limit: None.
(e) ~~See exceptions in Section 7.50(b) for Bucks Lake, Lake Pardee, New Bullards Bar Reservoir, upper Scotts Flat Reservoir, and Trinity Reservoir~~Exceptions:
(1) Bucks Lake (Plumas Co.), New Bullards Bar Reservoir (Yuba Co.), Pardee Lake (Amador Co.), Upper Scotts Flat Reservoir (Nevada Co.), and Trinity Lake (Trinity Co.), which shall be subject to the following limits:
(A) Daily bag limit: Ten
(B) Possession limit: Twenty
Note: Authority cited: Sections 200, 205, 219 and 265, Fish and Game Code. Reference: Sections 200, 205 and 265, Fish and Game Code.

Proposed Regulatory Language

Section 5.84, Title 14, CCR, is added to read:

§ 5.84. Brook Trout.
(a) Open season: All year.
(b) Limit: Ten.
(c) Size limit: Less than 10 inches total length.
(d) Brook Trout bag limits may be taken in addition to the statewide trout daily bag and possession limits specified in Section 5.85.
(1) Exceptions:
(A) Red Lake in Alpine County.
(B) All waters in Section 7.50(b), Alphabetical List of Trout Waters with Special Fishing Regulations.
Note: Authority cited: Sections 200, 205, 219, 265 and 275, Fish and Game Code. Reference: Sections 200, 205, 255, 265, 270 and 275, Fish and Game Code.

Proposed Regulatory Language

Section 5.85, Title 14, CCR, is amended to read:

§ 5.85. Trout ~~and Salmon~~.

~~See Chapter 3, District Trout, Salmon and Special Regulations.~~

As used in this section, daily bag and possession limits, unless otherwise noted, mean the total number of trout in combination, including but not limited to rainbow, golden, brown, and cutthroat.

(a) General Statewide Regulations:

(1) All inland lakes, reservoirs, and ponds entirely on private lands, except those listed in Section 7.50(b), are open to fishing all year with a five-trout daily bag limit, and 10 trout possession limit.

(2) All inland streams, rivers, and canals, except those listed in Section 7.50(b), are open to fishing from the last Saturday in April through November 15, with a five-trout daily bag limit, and 10 trout possession limit, with no gear restrictions. From November 16 through the Friday preceding the last Saturday in April, a 0 (zero) trout bag limit applies, and only artificial lures with barbless hooks may be used. In waters where the bag limit for trout is 0 (zero), trout must be released unharmed, and should not be removed from the water.

(3) Exceptions:

(A) All waters in Section 7.50(b), Alphabetical List of Trout Waters with Special Fishing Regulations, are those having regulations different from the General Statewide Regulations for trout.

(B) Brook Trout bag and possession limits may be taken in addition to the statewide trout daily bag and possession limits. See Section 5.84.

Note: Authority cited: Sections 200, 205, 219, 265 and 275, Fish and Game Code. Reference: Sections 200, 205, 255, 265, 270 and 275, Fish and Game Code.

Proposed Regulatory Language

Section 5.89, Title 14, CCR, is added to read:

§ 5.89. Salmon
See Chapter 3, Trout, Salmon and Special Regulations
Note Authority cited: Sections 200, 205, 219, 265 and 275, Fish and Game Code. Reference: Sections 200, 205, 255, 265, 270 and 275, Fish and Game Code.

Proposed Regulatory Language

Section 7.00, Title 14, CCR, is amended to read:

§ 7.00. District General Regulations

Unless otherwise provided, waters shown as open to hatchery trout-and hatchery steelhead fishing in subsections (a) through (g) below, are open to fishing for other species. Gear restrictions listed in this section apply to the take of all species of fish unless otherwise noted. Every body of water listed in subsections (a) through (g) of Section 7.00 (below) is closed to all fishing, except during the open season as shown. Unless otherwise provided, waters closed to hatchery trout-and hatchery steelhead fishing are closed to fishing for all other species, except that these closures do not apply to fishing for amphibians (see Section 5.05), freshwater clams (see Section 5.20), crayfish (see Section 5.35), and lamprey (see Section 5.40), using legal fishing methods other than hook-and-line fishing, and saltwater clams, crabs, ghost shrimp, and blue mud shrimp (see Ocean Regulations Booklet ~~Sections~~sections 29.20 to 29.87). Crabs may only be taken using hoop nets or by hand, and Dungeness crab may only be taken within the North Coast District and Sonoma and Mendocino counties.

Daily bag and possession limits, unless otherwise provided, mean the total number of hatchery trout and hatchery steelhead. Unless otherwise provided, no more than one daily bag limit may be possessed. Coho (silver) Salmon may not be taken in any of the waters of the State. Incidentally hooked Coho (silver) Salmon must be immediately released unharmed to the waters where they are hooked. In waters where the bag limit for hatchery trout and hatchery steelhead is zero, fish for which the bag limit is zero must be released unharmed, and should not be removed from the water.

These waters may also be subject to restrictions on fishing methods and gear (sections 2.00 through 2.45), fishing hours (~~section~~Section 3.00), and the use of bait (sections 4.00 through 4.30).

(a) North Coast District

District/Water	*Open Season and Special Restrictions*	*Daily Bag and Possession Limit*
~~(a) North Coast District~~		
~~(1) All lakes and reservoirs except those listed by name in the Special Regulations.~~	~~All year.~~	~~5 trout per day. 10 trout in possession.~~
(~~2~~1) Anadromous waters of the Klamath and Trinity River ~~S~~systems, and those entering the ocean south of Humboldt Bay, which are not listed in the Special Regulations.	Closed to all fishing all year.	
(~~3~~2) All anadromous waters tributary to Humboldt Bay, and north of Humboldt Bay, except those of the Klamath and Trinity river systems and those listed by name in the Special Regulations.	Fourth Saturday in May through Oct. 31. Only artificial lures with barbless hooks may be used.	2 hatchery trout or hatchery steelhead*. 4 hatchery trout or hatchery steelhead* in possession. Closed to the take of salmon.
~~(4) All streams except anadromous waters and those listed by name in the Special Regulations.~~	~~Last Saturday in Apr. through Nov. 15.~~	~~5 trout per day. 10 trout in possession.~~

~~(NOTE: A list of the non-anadromous waters opened to trout fishing (STREAMS AND PORTIONS OF STREAMS NOT LISTED IN THE SPECIAL REGULATIONS THAT ARE OPEN TO TROUT FISHING FROM THE LAST SATURDAY IN APRIL THROUGH NOVEMBER 15 (New 6-12-98), which is incorporated by reference herein) is available from the Department's Region 1 Office, 601 Locust Street, Redding, CA 96001 (Telephone: (530) 225-2300).~~
~~(5) SPECIAL BROOK TROUT BONUS BAG AND POSSESSION LIMIT: UP TO 10 BROOK TROUT PER DAY LESS THAN 8 INCHES TOTAL LENGTH MAY BE TAKEN AND POSSESED IN ADDITION TO THE OTHER DAILY BAG AND POSSESSION LIMITS SPECIFIED FOR THE NORTH COAST DISTRICT~~

(b) Sierra District

~~(b) Sierra District~~*District/Water*	*Open Season and Special Restrictions*	*Daily Bag and Possession Limit*
(1) All rivers and associated tributaries above Lake Shasta.	Closed to the take of salmon.	
(2) Anadromous waters of Tehama and Shasta counties not listed in the Special Regulations. (Section ~~7.50~~7.40). (See subsection~~s~~ ~~(b)(156) and~~ (b)(~~156.5~~80) of Section ~~7.50~~7.40 regarding the Sacramento River.)	Last Saturday in Apr. through Nov. 15. Only artificial lures ~~and~~with barbless hooks may be used.	2 hatchery trout or hatchery steelhead*. 4 hatchery trout or hatchery steelhead* in possession. Closed to the take of salmon.
~~(3) All lakes and reservoirs except those in the Fall River Valley, those in Inyo and Mono counties and those listed by name in the Special Regulations.~~	~~All year.~~	~~5 trout per day. 10 trout in possession.~~
~~(4) All streams, lakes and reservoirs in Inyo and Mono counties, except those listed by name in the Special Regulations.~~	~~Last Saturday in Apr. through Nov. 15.~~	~~5 trout per day. 10 trout in possession.~~
~~(5) All streams, lakes and reservoirs in the Fall River Valley above the Pit No. 1 PG&E Diversion Dam on Fall Riverin Shasta County, except those listedby name in the Special Regulations.~~	~~Last Saturday in Apr. through Nov. 15.~~	~~2 trout~~
~~(6) All streams in Lassen and Modoc counties east of Highway 395 and north of Clarks Valley Road. Clarks Valley Road is defined as those portions of county routes 510, 512 and 506 running easterly from the town of Madeline to the Nevada border.~~	~~Saturday preceding Memorial Day through Nov. 15.~~	~~5 trout per day. 10 trout in possession.~~
~~(7) All other streams except those listed by name in the Special Regulations.~~	~~Last Saturday in Apr. through Nov. 15.~~	~~5 trout per day. 10 trout in possession.~~

~~(8) Mono County waters, when closed to trout fishing, are closed to all fishing, except for the unrestricted portions of Fish Slough which are open to fishing all year. Also, see Mono County waters listed in sections 5.00 and 7.50.~~		

~~(9) SPECIAL BROOK TROUT BONUS BAG AND POSSESSION LIMIT:~~
~~(A) IN SIERRA DISTRICT WATERS OF SISKIYOU, SHASTA AND TEHAMA COUNTIES, UP TO 10 BROOK TROUT PER DAY LESS THAN 8 INCHES TOTAL LENGTH MAY BE TAKEN AND POSSESSED IN ADDITION TO THE OTHER DAILY BAG AND POSSESSION LIMITS SPECIFIED FOR THE SIERRA DISTRICT.~~
~~(B) IN THE SIERRA DISTRICT SOUTH OF INTERSTATE 80, UP TO 10 BROOK TROUT PER DAY LESS THAN 10 INCHES TOTAL LENGTH MAY BE TAKEN AND POSSESSED IN ADDITION TO THE OTHER DAILY BAG AND POSSESSION LIMITS SPECIFIED FOR THE SIERRA DISTRICT. THIS ALLOWANCE DOES NOT INCLUDE RED LAKE IN ALPINE COUNTY OR KIRMAN, LANE OR ROOSEVELT LAKES IN MONO COUNTY.~~

(c) North Central District

~~(c) North Central District~~*District/Water*	*Open Season and Special Restrictions*	*Daily Bag and Possession Limit*
~~(1) All lakes and reservoirs except those listed by name in the Special Regulations.~~	~~All year.~~	~~5 trout~~
(~~2~~1) All streams except those listed by name in ~~the~~ Section 7.40, Special Regulations.	Closed to all fishing all year.	
(~~3~~2) The tidewaters of all streams except those listed by name in ~~the~~ Section 7.40, Special Regulations. Note: Some waters within this district are tide waters regulated by regulations for the ocean and San Francisco Bay District (see sections 1.53 and 27.00).	Closed to all fishing all year.	

(d) Valley District

~~(d) Valley District~~*District/Water*	*Open Season and Special Restrictions*	*Daily Bag and Possession Limit*
~~(1) All lakes and reservoirs except those listed by name in the Special Regulations.~~	~~All year.~~	~~5 trout~~
(~~2~~1) All anadromous waters except those listed by name in ~~the~~ Section 7.40, Special Regulations (See definition of anadromous waters, Section 1.04).	All year.	2 hatchery trout or hatchery steelhead*. 4 hatchery trout or hatchery steelhead* in possession. Closed to the take of salmon.
~~(3) All streams except anadromous waters and those listed by name in the Special Regulations.~~	~~All year~~	~~5 trout~~

(e) South Central District

~~(e) South Central~~*District/Water*	*Open Season and Special Restrictions*	*Daily Bag and Possession Limit*
~~(1) All lakes and reservoirs except those listed by name in the Special Regulations.~~	~~All year~~	~~5 trout~~
(~~2~~1) That portion of any stream west of any Highway 1 bridge except those listed by name in ~~the~~ Section 7.40, ~~special~~Special ~~regulations~~Regulations.	Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.	2 hatchery trout or hatchery steelhead*. 4 hatchery trout or hatchery steelhead* in possession. Closed to the take of salmon.
(~~3~~2) All streams in Alameda, Contra Costa, and Santa Clara ~~C~~counties except those listed by name in ~~the~~ Section 7.40, Special Regulations.	~~Last Saturday in Apr. through Nov. 15~~Closed to the take of salmon.	~~5 trout Closed to the take of salmon.~~
(4~~3~~) All other streams and portions of streams except those listed in subsection (e)(~~2~~1) above or by name in ~~the~~ Section 7.40, Special Regulations.	Closed to all fishing all year.	

(f) Southern District

~~(f) Southern~~*District/Water*	*Open Season and Special Restrictions*	*Daily Bag and Possession Limit*
~~(1) All lakes and reservoirs except those listed by name in the Special Regulations.~~	~~All year.~~	~~5 trout~~
~~(2) All streams except anadromous waters in San Diego County, and except those listed by name in the Special Regulations.~~	~~All year. Only artificial lures with barbless hooks may be used.~~	~~2 trout~~
~~(3) All streams except anadromous waters in Los Angeles, Ventura, Santa Barbara, Orange, San Bernardino and Riverside Counties, and except those listed by name in the Special Regulations.~~	~~All year.~~	~~5 trout~~
(4~~1~~) All anadromous waters except those listed by name in ~~the~~ Section 7.40, Special Regulations (See definition of anadromous waters, Section 1.04).	Closed to all fishing all year.	
~~(5) All streams and tributaries (except those listed by name in the Special Regulations) above Twitchell Dam on the Cuyama River, above Bradbury Dam and below Gibraltar Dam on the San Ynez River; above Matilja Dam on Matilija Creek and above Wheeler Gorge~~	~~All year~~	~~5 trout~~

~~Campground on NF Matilija Creek; and above Rindge Dam on Malibu Creek.~~		
~~(g) Colorado River District~~		
~~(1) The Colorado River and its back waters~~	~~All year~~	~~10 trout~~
~~(2) All other waters~~	~~All year~~	~~5 trout~~

*Hatchery trout or steelhead have a healed adipose fin clip (adipose fin is absent). Unless otherwise provided, all other trout and steelhead must be immediately released. Wild trout or steelhead are those not showing a healed adipose fin clip (adipose fin present).

Note: Authority cited: Sections 200, 205, 265 and 275, Fish and Game Code. Reference: Sections 110, 200, and 205, Fish and Game Code.

Proposed Regulatory Language

Section 7.40, Title 14, CCR, is added to read:

§ 7.40. Alphabetical List of Hatchery Trout, Hatchery Steelhead, and Salmon Waters with Special Fishing Regulations.

(a) General Provisions:

(1) Every body of water listed below is closed to the take of hatchery trout, hatchery steelhead, and salmon and to fishing for these species, unless otherwise noted.

(2) Unless otherwise provided, waters shown as open to hatchery trout, hatchery steelhead, and salmon fishing below, are open to fishing for other species. Every body of water listed below is closed to all fishing except during the open season as shown. Gear restrictions listed in this section apply to the take of all species of fish unless otherwise noted.

(3) Unless otherwise provided, waters closed to hatchery trout, hatchery steelhead, or salmon fishing are closed to fishing for all other species, except that these closures do not apply to fishing for amphibians (see Section 5.05), freshwater clams (see Section 5.20), crayfish (see Section 5.35), and lamprey (see Section 5.40), using legal fishing methods other than hook-and-line fishing, and saltwater clams, crabs, ghost shrimp, and blue mud shrimp (see Ocean Regulations Booklet Sections 29.20 to 29.87). Crabs may only be taken using hoop nets or by hand, and Dungeness crab may only be taken within the North Coast District and Sonoma and Mendocino counties.

(4) As used in this section, daily bag and possession limits, unless otherwise noted, mean the total number of trout in combination, including but not limited to rainbow, brown, golden, and cutthroat.

(5) Unless otherwise provided, it is unlawful to possess more than one daily bag limit.

(6) These waters may also be subject to restrictions on fishing methods and gear (sections 2.00 through 2.40), fishing hours (section 3.00), and the use of bait (sections 4.00 through 4.30).

(b)

Body of Water	***Open Season and Special Restrictions***	***Daily Bag and Possession Limit***
(1) Alameda Creek and tributaries (Alameda and Santa Clara cos.).		
(A) Alameda Creek and tributaries downstream of San Antonio, Calaveras, and Del Valle Reservoirs except for Arroyo Del Valle between Bernal Ave. and the Thiessen St. intersection with Vineyard Ave.	Closed to all fishing all year.	
1. Arroyo Del Valle between Bernal Ave. and the Thiessen St. intersection with Vineyard Ave.	All year. Only artificial lures with barbless hooks may be used.	0 trout
(2) Albion River (Mendocino Co.). Also see Section 8.00(b). Main stem below the confluence of South Fork Albion.	Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct 31. Only barbless	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.

Body of Water	***Open Season and Special Restrictions***	***Daily Bag and Possession Limit***
	hooks may be used from Nov. 1 through Mar. 31.	
(3) Alder Creek (Mendocino Co.). Also see Section 8.00(b). Main stem below Tramway Gulch.	Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(4) American River (Sacramento Co.).		
(A) From Nimbus Dam to the U.S. Geological Survey gauging station cable crossing about 300 yards downstream from the Nimbus Hatchery fish rack site.	Closed to all fishing all year.	
(B) From the U.S. Geological Survey gauging station cable crossing about 300 yards down-stream from the Nimbus Hatchery fish rack site to the SMUD power line crossing at the southwest boundary of Ancil Hoffman Park.	Jan. 1 through July 15. Only barbless hooks may be used.	2 hatchery trout or hatchery steelhead** 4 hatchery trout or. hatchery steelhead** in possession.
	July 16 through Oct. 31. Only barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession. 2 Chinook Salmon. 4 Chinook Salmon in possession.
(C) From the SMUD power line crossing at the southwest boundary of Ancil Hoffman Park down- stream to the Jibboom Street bridge.	Jan. 1 through July 15.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
	July 16 through Dec. 31.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession. 2 Chinook Salmon. 4 Chinook Salmon in possession.

Body of Water	***Open Season and Special Restrictions***	***Daily Bag and Possession Limit***
(D) From the Jibboom Street bridge to the mouth.	Jan. 1 through July 15.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
	July 16 through Dec. 16.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession. 2 Chinook Salmon. 4 Chinook Salmon in possession.
	Dec. 17 through Dec. 31.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(5) Antelope Creek (Tehama Co.).		
(A) From confluence with North Fork downstream to U.S. Geological Survey gauging station cable crossing at mouth of Antelope Creek Canyon.	Last Saturday in April through Nov. 15. Only artificial lures with barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(B) From U.S. Geological Survey gauging station cable crossing at mouth of Antelope Creek Canyon downstream to mouth of Antelope Creek.	June 16 through September 30.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(6) Aptos Creek (Santa Cruz Co.) from mouth to bridge on Aptos Creek Road. Also see Low-Flow Restrictions, Section 8.00(c)(4).	Dec. 1 through Mar. 7, but only on Sat., Sun. ,Wed., legal holidays and opening and closing days. Only barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(7) Arroyo Grande Creek (San Luis Obispo Co.). From mouth to Lopez Canyon Dam.	Closed to all fishing all year.	
(8) Arroyo Leon (San Mateo Co.).	Closed to all fishing all year.	
(9) Arroyo Seco River (Monterey Co.). Also see	Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal	2 hatchery trout or hatchery steelhead**.

Body of Water	***Open Season and Special Restrictions***	***Daily Bag and Possession Limit***
Section 8.00(c). The main stem Arroyo Seco and tributaries below the waterfall located approximately 3.5 miles upstream from the U.S. Forest Service Ranger Station.	holidays and opening and closing days. Only barbless hooks may be used.	4 hatchery trout or hatchery steelhead** in possession.
(10) Auburn Ravine Creek and tributaries (Placer Co.) east of Nelson Lane.	Fourth Saturday in May through Oct. 15.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(11) Battle Creek (Shasta and Tehama Cos.).		
(A) From mouth to Coleman Fish Hatchery weir.	Closed to all fishing all year.	
(B) From 250 feet upstream from the Coleman National Fish Hatchery upstream to Angel Falls (near Mineral) on the South Fork and to Ponderosa Way Bridge on the North Fork.	Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(12) Bear River (Humboldt Co.) downstream from County Road Bridge at Capetown, excluding tributaries.	Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(13) Bear River and tributaries (Placer Co.) From Highway 65 to the South Sutter Irrigation District Diversion Dam.	Fourth Saturday in May through Oct. 15.	2 hatchery trout or hatchery steelhead**, 4 hatchery trout or hatchery steelhead** in possession.
(14) Big Chico Creek (Butte Co.).		
(A) From mouth to Bear Hole, located approximately one mile downstream from the upper end of Bidwell Park.	June 16 through Feb. 15. Only artificial lures with barbless hooks may be used from Oct. 16 through Feb. 15.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(B) From Bear Hole to the upper boundary of the Big Chico Creek Ecological Reserve.	Nov. 1 through April 30. Only artificial lures with barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or

Body of Water	***Open Season and Special Restrictions***	***Daily Bag and Possession Limit***
		hatchery steelhead** in possession.
(C) From the upper boundary of the Big Chico Creek Ecological Reserve to Higgins Hole Falls, located about one-half mile upstream from Ponderosa Way.	Closed to all fishing all year.	
(15) Big Lagoon (Humboldt Co.). For purposes of this regulation, the boundary between Big Lagoon and Maple Creek is the first private road bridge, located approximately 1/2 mile southeast of the Highway 101 bridge crossing.	All year. Only barbless hooks may be used. Cutthroat trout minimum size limit: 10 inches.	2 cutthroat trout. 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(16) Big River (Mendocino Co.). Also see Section 8.00(b). Main stem below the confluence of Two Log Creek.	Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(17) Big Sur River (Monterey Co.). Big Sur river within Pfeiffer Big Sur State Park, east of the Highway 1 bridge, to its boundary within the Ventana Wilderness Area.	Closed to all fishing all year.	
(18) Black Butte River and tributaries (Glenn Co.) except Cold Creek.	Closed to all fishing all year.	
(19) Bodfish Creek and tributaries (Santa Clara Co.)	Closed to all fishing all year.	
(20) Bogus Creek (Siskiyou Co.).	See Klamath River 7.40(b)(50).	
(21) Brush Creek (Mendocino Co.). Main stem below the Lawson bridge. Also see Section 8.00(c).	Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.

Body of Water	***Open Season and Special Restrictions***	***Daily Bag and Possession Limit***
(22) Butano Creek (San Mateo Co.).		
From mouth to county bridge on Pescadero-Bean Hollow Road. Also see Low- Flow Restrictions, Section 8.00(c)(2).	Dec. 1 through Mar. 7, but only on Sat., Sun.,Wed.,legal holidays and opening and closing days. Only barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(23) Butte Creek (Butte and Sutter Cos.).		
(A) From the Oro-Chico Road bridge crossing south of Chico to the Centerville Head Dam, located 300 yards downstream from the DeSabla Powerhouse below DeSabla Reservoir.	November 15 through February 15. Only artificial lures with barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(B) From the Oro-Chico Road bridge crossing south of Chico to the point that Butte Creek enters the Sacramento River both via Butte Slough outfall gates at Moon's Bend and through Butte Slough, thence both the East and West Canals of the Sutter Bypass, thence Sacramento Slough.	All year.	Open to fishing for non-salmonids only. Closed to the take of trout, and steelhead.
(24) Calaveras River downstream from New Hogan Dam and the diverting canal (Mormon Slough) from Bellota Weir downstream to Interstate Highway 5 (Calaveras and San Joaquin cos.).	Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(25) Carmel River and tributaries above Los Padres Dam (Monterey Co.).	Last Saturday in Apr. through Nov. 15. No rainbow trout less than 10 inches or greater than 16 inches total length may be kept. Only artificial lures with barbless hooks may be used.	5 trout, no more than 2 of which may be rainbow trout.
(26) Carmel River below Los Padres Dam. (Monterey Co.)		
(A) Carmel River tributaries below Los Padres Dam and main stem from Los Padres	Closed to all fishing all year.	

Body of Water	***Open Season and Special Restrictions***	***Daily Bag and Possession Limit***
Dam to the bridge at Robles Del Rio/Esquiline roads (Rosie's Bridge).		
(B) Carmel River main stem below the bridge at Robles Del Rio/Esquiline roads (Rosie's Bridge). Also see Section 8.00(c).	Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., and opening and closing days. Only artificial lures with barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(27) Chorro Creek (San Luis Obispo Co.) from the point that Chorro Creek enters Midway Marina in Morro Bay upstream to the twin bridges on South Bay Boulevard.	Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(28) Codornices Creek (Alameda Co.).	Closed to all fishing all year.	
(29) Coon Creek and tributaries (Placer Co.) east of Highway 65.	Fourth Saturday in May through Oct. 15.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(30) Coon Creek (San Luis Obispo Co.)	Closed to all fishing all year.	
(31) Corralitos Creek (Santa Cruz Co.) from mouth to Browns Valley Road. Also see Low-Flow Restrictions, Section 8.00(c)(5).	Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(32) Cosumnes River (Sacramento Co.) from Highway 99 bridge upstream to the Latrobe vehicle bridge.	Jan. 1 through Oct. 15. Only barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(33) Cottoneva Creek (Mendocino Co.). Main stem below the confluence of South Fork Cottoneva Creek. Also see Section 8.00(b).	Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.

Body of Water	***Open Season and Special Restrictions***	***Daily Bag and Possession Limit***
(34) Coyote Creek (Santa Clara Co.) Also see Low-Flow Restrictions, Section 8.00(c)(1).	Last Saturday in April through November 15. Only artificial lures and barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(35) Deer Creek (Tehama Co.).		
(A) From 250 feet below Upper Deer Creek Falls and fishway (located 1.5 miles upstream from Potato Patch Campground) downstream 31 miles to U.S. Geological Survey gauging station cable crossing at mouth of Deer Creek Canyon (see Section 2.35 for closure at Upper Deer Creek Falls).	Last Saturday in April through Nov. 15. Only artificial lures with barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(B) From U.S. Geological Survey gauging station cable crossing at mouth of Deer Creek Canyon downstream to mouth of Deer Creek.	June 16 through Sept. 30.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(36) Deer Creek (Yuba and Nevada Cos.) from mouth to Smartville- Englebright Dam road crossing.	Fourth Saturday in May through Oct. 15. Only artificial lures with barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(37) Dry Creek and tributaries (Placer Co.) east of the Atkinson Street Bridge in Roseville.	Fourth Saturday in May through Oct. 15.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(38) Dry Creek (Yuba and Nevada Co.) from mouth to Sid Smith Dam about one mile above junction of Scott Forbes and Peoria roads.	Fourth Saturday in May through Oct. 15.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(39) Earl Lake/Talawa (Del Norte Co.).	All year. Only barbless hooks may be used. Cutthroat trout minimum size limit: 10 inches.	2 cutthroat trout. 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.

Body of Water	***Open Season and Special Restrictions***	***Daily Bag and Possession Limit***
(40) Eel River (Humboldt, Lake, Mendocino and Trinity cos.).	Low-Flow Restrictions, Section 8.00, also apply, see below for more detail.	
ALL WATERS OF THE EEL RIVER DRAINAGE EXCEPT THOSE LISTED BELOW ARE CLOSED TO ALL FISHING.		
(A) Main stem.		
1. From mouth to Fulmor Road, at its paved junction with the south bank of the Eel River.	All year. Only artificial lures with barbless hooks may be used from April 1 through the Friday preceding the fourth Saturday in May. Only barbless hooks may be used from fourth Saturday in May through Mar. 31.	Catch and Release of Chinook Salmon 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
2. From Fulmor Road, at its paved junction with the south bank of the Eel River, to South Fork Eel River. Also see Low-Flow Restrictions, Section 8.00(a)(1).	All year. Only artificial lures with barbless hooks may be used from Apr. 1 through Sept. 30. Only barbless hooks may be used from Oct. 1 through Mar. 31.	Catch and Release of Chinook Salmon 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
3. From South Fork Eel River to Cape Horn Dam.	Jan. 1 through Mar. 31 and Fourth Saturday in May through Sept. 30. Only artificial lures with barbless hooks may be used.	Catch and Release of Chinook Salmon 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
	Apr. 1 through the Fourth Friday in May and Oct. 1 through Dec. 31.	Closed to all fishing.
(B) Van Duzen River.		
1. Main stem from its junction with the Eel River to the end of Golden Gate Drive near Bridgeville (approximately 4,000 feet upstream from the Little Golden Gate Bridge). Also see Low-Flow Restrictions, Section 8.00(a)(3).	Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Sept. 30. Only barbless hooks may be used from Oct. 1 through Mar. 31.	Catch and Release of Chinook salmon 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.

Body of Water	***Open Season and Special Restrictions***	***Daily Bag and Possession Limit***
(C) South Fork Eel River from mouth to Rattlesnake Creek. Also see Low-Flow Restrictions, Section 8.00(a)(2).	Apr. 1 to Fourth Friday in May. Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Sept. 30. Only barbless hooks may be used from Oct. 1 through Mar. 31. Apr. 1 to Fourth Friday in May.	Closed to all fishing Catch and Release of Chinook salmon 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession. Closed to all fishing
(D) Middle Fork Eel River.		
1. Middle Fork main stem from mouth to Bar Creek. Also see Low-Flow Restrictions, Section 8.00(a)(2).	Jan. 1 through May 31 and July 16 through Sept. 30. At all times, only artificial lures with barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
	Jun. 1 through July 15 and Oct. through Dec. 31.	Closed to all fishing
(41) Elk Creek (Mendocino Co.). Also see Section 8.00(b). Main stem below the confluence of South Fork Elk Creek.	Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(42) Elk River (Humboldt Co.) downstream from Highway 101 bridge, excluding tributaries.	Nov. 1 through Mar. 31. Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Oct. 1 through Mar. 31.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or 4 hatchery steelhead** in possession.
(43) Feather River below Fish Barrier Dam (Butte, Sutter and Yuba cos.).		
(A) From Fish Barrier Dam to Table Mountain bicycle bridge in Oroville.	Closed to all fishing all year.	
(B) From Table Mountain bicycle bridge to Highway 70 bridge.	Jan. 1 through July 15. Only barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or

Body of Water	***Open Season and Special Restrictions***	***Daily Bag and Possession Limit***
		hatchery steelhead** in possession.
(C) From Highway 70 bridge to the unimproved boat ramp above the Thermalito Afterbay Outfall.	All year.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout orhatchery steelhead** in possession.
(D) From the unimproved boat ramp above the Thermalito Afterbay Outfall to 200 yards above the Live Oak boat ramp.	Jan. 1 through July 15.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
	July 16 through Oct. 31.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession. 3 Chinook Salmon. 6 Chinook Salmon in possession.
	Nov. 1 through Dec. 31.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(E) From 200 yards above Live Oak boat ramp to the mouth. For purposes of this regulation, the lower boundary is defined as a straight line drawn from the peninsula point on the west bank to the Verona Marine boat ramp.	Jan. 1 through July 15.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
	July 16 through Dec. 16.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession. 3 Chinook Salmon. 6 Chinook Salmon in possession.
	Dec. 17 to Dec. 31.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.

Body of Water	***Open Season and Special Restrictions***	***Daily Bag and Possession Limit***
(44) Freshwater Creek (Humboldt Co.) downstream from bridge at “3 Corners” on the Old Arcata Road, excluding tributaries.	Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.	2 hatchery trout hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(45) Garcia River (Mendocino Co.). Also see Section 8.00(b). Main stem below the Eureka Hill Road bridge.	Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(46) Greenwood Creek (Mendocino Co.). Also see Section 8.00(b).		
Main stem below the log bridge about 1 1/2 miles east of Highway 1.	Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(47) Guadalupe River below Guadalupe Reservoir (Santa Clara Co.) including Los Gatos Ck. Below Vasona Lake, and Alamitos Ck. and Arroyo Calero below Calero Reservoir.	Last Saturday in April through November 15. Only artificial lures and barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(48) Gualala River (Mendocino and Sonoma cos.). Also see Section 8.00(b). Main stem below the confluence of Wheatfield and South Forks.	Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31. Fishing from a flotation device is prohibited from Nov. 15 through Feb. 28 from the confluence of the North Fork to the Highway 1 bridge.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(49) Islay Creek (San Luis Obispo Co.).	Closed to all fishing all year.	

(50) Klamath River Regulations (See Section 1.74 for salmon punch card requirements). Anadromous Waters of the Klamath River Basin Downstream of Iron Gate and Lewiston dams. The regulations in this subsection apply only to waters of the Klamath River Basin which are accessible to anadromous salmonids. They do not apply to waters of the Klamath River Basin which are inaccessible to anadromous salmon and trout, portions of the Klamath River system upstream of Iron Gate Dam, portions of the Trinity River system upstream of Lewiston Dam, and the Shasta River and tributaries upstream of Dwinnel Dam. Fishing in these waters is governed by the General Regulations for non-anadromous waters of the North Coast District (see Section 7.00, subsection (a)(4)).

(A) Restrictions and Requirements.

1. Only barbless hooks may be used. (For definitions regarding legal hook types, hook gaps and rigging see Chapter 2, Article 1, Section 2.10.)
2. During closures to the take of adult salmon, it shall be unlawful to remove any adult Chinook Salmon from the water by any means.
3. See Section 1.74 for sport fish report card requirements.

(B) General Area Closures.

1. No fishing is allowed within 750 feet of any Department of Fish and Wildlife fish-counting weir.
2. No fishing is allowed from the Ishi Pishi Road bridge upstream to and including Ishi Pishi Falls from August 15 through December 31. EXCEPTION: members of the Karuk Indian Tribe listed on the current Karuk Tribal Roll may fish at Ishi Pishi Falls using hand-held dip nets.
3. No fishing is allowed from September 15 through December 31 in the Klamath River within 500 feet of the mouths of the Salmon, the Shasta and the Scott rivers and Blue Creek.
4. No fishing is allowed from June 15 through September 14 in the Klamath River from 500 feet above the mouth of Blue Creek to 500 feet downstream of the mouth of Blue Creek.

(C) Klamath River Basin Possession Limits.

1. Trout Possession Limits.
   a. The Brown Trout possession limit is 20.
   b. The hatchery trout or hatchery steelhead possession limits are as follows:
      (i) Klamath River - 4 hatchery trout or hatchery steelhead.
      (ii) Trinity River - 4 hatchery trout or hatchery steelhead.
2. Chinook Salmon Possession Limits.
   a. Klamath River downstream of the Highway 96 bridge at Weitchpec from January 1 to August 14 and the Trinity River downstream of the Old Lewiston Bridge to the confluence of the South Fork Trinity River from January 1 to August 31: 2 Chinook Salmon.
   b. Klamath River from August 15 to December 31 and Trinity River from September 1 to December 31: 6 Chinook Salmon. No more than 3 Chinook Salmon over 23 inches total length may be retained when the take of salmon over 23 inches total length is allowed.

(D) Klamath River Basin Chinook Salmon Quotas.

The Klamath River fall-run Chinook Salmon take is regulated using quotas. Accounting of the tribal and non-tribal harvest is closely monitored from August 15 through December 31 each year. These quota areas are noted in subsection (b)(91.1)(E) with “Fall Run Quota” in the *Open Season and Special Regulations* column.

1. Quota for Entire Basin.

The 2020 Klamath River Basin quota is 1,296 Klamath River fall-run Chinook Salmon over 23 inches total length. The department shall inform the Commission, and the public via the news media, prior to any implementation of restrictions triggered by the quotas. (NOTE: A department status report on progress toward the quotas for the various river sections is updated weekly, and available at 1-800-564-6479.)

2. Subquota Percentages.

a. The subquota for the Klamath River upstream of the Highway 96 bridge at Weitchpec and the Trinity River is 50% of the total Klamath River Basin quota.

(i) The subquota for the Klamath River from 3,500 feet downstream of the Iron Gate Dam to the Highway 96 bridge at Weitchpec is 17% of the total Klamath River Basin quota.

(ii) The subquota for the Trinity River main stem downstream of the Old Lewiston Bridge to the Highway 299 West bridge at Cedar Flat is 16.5% of the total Klamath River Basin quota.

(iii) The subquota for the Trinity River main stem downstream of the Denny Road bridge at Hawkins Bar to the confluence with the Klamath River is 16.5% of the total Klamath River Basin quota.

b. The subquota for the lower Klamath River downstream of the Highway 96 bridge at Weitchpec is 50% of the total Klamath River Basin quota.

(i) The Spit Area (within 100 yards of the channel through the sand spit formed at the Klamath River mouth) will close when 15% of the total Klamath River Basin quota is taken downstream of the Highway 101 bridge.

(E) Klamath River Basin Open Seasons and Bag Limits.

All anadromous waters of the Klamath River Basin are closed to all fishing for all year except those areas listed in the following table. Bag limits are for trout and Chinook Salmon in combination unless otherwise specified.

Body of Water	***Open Season and Special Restrictions***	***Daily Bag Limit***
1. Bogus Creek and tributaries.	Fourth Saturday in May through August 31. Only artificial lures with barbless hooks may be used.	2 hatchery trout or hatchery steelhead.**
2. Klamath River main stem from 3,500 feet downstream of Iron Gate Dam to the mouth.		
a. Klamath River from 3,500 feet downstream of the Iron Gate Dam to the Highway 96 bridge at Weitchpec.	January 1 to August 14.	0 Chinook Salmon 2 hatchery trout or hatchery steelhead**

Body of Water	***Open Season and Special Restrictions***	***Daily Bag Limit***
	Fall Run Quota 220 Chinook Salmon August 15 to December 31, 2020.	2 Chinook Salmon - no more than 1 fish over 23 inches total length until subquota is met, then 0 fish over 23 inches total length. 2 hatchery trout or hatchery steelhead**
	Fall Run Quota Exception: Chinook Salmon over 23 inches total length may be retained from 3,500 feet downstream of Iron Gate Dam to the Interstate 5 bridge when the department determines that the adult fall-run Chinook Salmon spawning escapement at Iron Gate Hatchery exceeds 8,000 fish. Daily bag and possession limits specified for fall-run Chinook Salmon apply during this exception.	
b. Klamath River downstream of the Highway 96 bridge at Weitchpec.	January 1 to August 14.	2 Chinook Salmon 2 hatchery trout or hatchery steelhead**
	Fall Run Quota 648 Chinook Salmon August 15 to December 31, 2020.	2 Chinook Salmon - no more than 1 fish over 23 inches total length until subquota is met, then 0 fish over 23 inches total length. 2 hatchery trout or hatchery steelhead**
	Fall Run Quota Exception: Spit Area (within 100 yards of the channel through the sand spit formed at the Klamath River mouth). This area will be closed to all fishing after 15% of the Total Klamath River Basin Quota has been taken. All legally caught Chinook Salmon must be retained. Once the adult (greater than 23 inches) component of	

Body of Water	***Open Season and Special Restrictions***	***Daily Bag Limit***
	the total daily bag limit has been retained anglers must cease fishing in the spit area.	
3. Salmon River main stem, main stem of North Fork downstream of Sawyer's Bar bridge, and main stem of South Fork downstream of the confluence of the East Fork of the South Fork.	November 1 through February 28.	2 hatchery trout or hatchery steelhead**
4. Scott River main stem downstream of the Fort Jones-Greenview bridge to the confluence with the Klamath River.	Fourth Saturday in May through February 28.	2 hatchery trout or hatchery steelhead**
5. Shasta River main stem downstream of the Interstate 5 bridge north of Yreka to the confluence with the Klamath River.	Fourth Saturday in May through August 31 and November 16 through February 28.	2 hatchery trout or hatchery steelhead**
6. Trinity River and tributaries.		
a. Trinity River main stem from 250 feet downstream of Lewiston Dam to the Old Lewiston Bridge.	April 1 through September 15. Only artificial flies with barbless hooks may be used.	2 hatchery trout or hatchery steelhead**
b. Trinity River main stem downstream of the Old Lewiston Bridge to the Highway 299 West bridge at Cedar Flat.	January 1 to August 31.	2 Chinook Salmon 10 Brown Trout 2 hatchery trout or hatchery steelhead**
	Fall Run Quota 214 Chinook Salmon September 1 to December 31, 2020.	2 Chinook Salmon - no more than 1 fish over 23 inches total length until subquota is met, then 0 fish over 23 inches total length. 10 Brown trout 2 hatchery trout or hatchery steelhead**

Body of Water	***Open Season and Special Restrictions***	***Daily Bag Limit***
	Fall Run Quota Exception: Chinook Salmon over 23 inches total length may be retained downstream of the Old Lewiston Bridge to the mouth of Indian Creek when the department determines that the adult fall-run Chinook Salmon spawning escapement at Trinity River Hatchery exceeds 4,800 fish. Daily bag and possession limits specified for fall-run Chinook Salmon apply during this exception.	
c. Trinity River main stem downstream of the Highway 299 West bridge at Cedar Flat to the Denny Road bridge at Hawkins Bar.	January 1 through August 31.	2 Chinook Salmon 10 Brown Trout 2 hatchery trout or hatchery steelhead**
	September 1 through December 31.	Closed to all fishing.
d. New River main stem downstream of the confluence of the East Fork to the confluence with the Trinity River.	September 15 through November 15. Only artificial lures with barbless hooks may be used.	2 hatchery trout or hatchery steelhead**
e. Trinity River main stem downstream of the Denny Road bridge at Hawkins Bar to the mouth of the South Fork Trinity River.	January 1 to August 31.	2 Chinook Salmon 10 Brown Trout 2 hatchery trout or hatchery steelhead**
	Fall Run Quota 214 Chinook Salmon September 1 through December 31, 2020. This is the cumulative quota for subsections 6.e. and 6.f. of this table.	2 Chinook Salmon - no more than 1 fish over 23 inches total length until subquota is met, then 0 fish over 23 inches total length. 10 Brown Trout 2 hatchery trout or hatchery steelhead**
f. Trinity River main stem downstream of the mouth of the South Fork Trinity River to the confluence with the Klamath River.	January 1 to August 31.	0 Chinook Salmon 10 Brown Trout 2 hatchery trout or hatchery steelhead**

Body of Water	***Open Season and Special Restrictions***	***Daily Bag Limit***
	Fall Run Quota 214 Chinook Salmon September 1 through December 31, 2020. This is the cumulative quota for subsections 6.e. and 6.f. of this table.	2 Chinook Salmon - no more than 1 fish over 23 inches total length until subquota is met, then 0 fish over 23 inches total length. 10 Brown Trout 2 hatchery trout or hatchery steelhead**
g. Hayfork Creek main stem downstream of the Highway 3 bridge in Hayfork to the confluence with the South Fork Trinity River.	November 1 through March 31. Only artificial lures with barbless hooks may be used.	2 hatchery trout or hatchery steelhead**
h. South Fork Trinity River downstream of the confluence with the East Fork of the South Fork Trinity River to the South Fork Trinity River bridge at Hyampom.	November 1 through March 31. Only artificial lures with barbless hooks may be used.	2 hatchery trout or hatchery steelhead**
i. South Fork Trinity River downstream of the South Fork Trinity River bridge at Hyampom to the confluence with the Trinity River.	November 1 through March 31.	0 Chinook Salmon. 2 hatchery trout or hatchery steelhead**

(51) Special Order Regarding Take of Chinook Salmon in Anadromous Waters of the Klamath River Basin Downstream of Iron Gate and Lewiston dams.
Notwithstanding subsection (b)(50) of Section 7.40, between January 1 and August 14 on the Klamath River and between January 1 and August 31 on the Trinity River, and South Fork Trinity River, Chinook Salmon may not be taken or possessed except as authorized on the identified segments of rivers as listed in the following table. All other restrictions apply.

Body of Water	***Open Season and Special Restrictions***	***Daily Bag and Possession Limit***
(A) Klamath River segment identified in subsection 7.40(b)(50)(E)2.b.	July 1 through August 14	1 Chinook Salmon 2 Chinook Salmon in possession
(B) Trinity River segment identified in subsection 7.40(b)(50)(E)6.b.	July 1 through August 31	1 Chinook Salmon 2 Chinook Salmon in possession

Body of Water	***Open Season and Special Restrictions***	***Daily Bag and Possession Limit***
(C) Trinity River segment identified in subsection 7.40(b)(50)(E)6.c.	July 1 through August 31	1 Chinook Salmon 2 Chinook Salmon in possession
(D) Trinity River segment identified in subsection 7.40(b)(50)(E)6.e.	July 1 through August 31	1 Chinook Salmon 2 Chinook Salmon in possession
(52) Laguna de Santa Rosa (Sonoma Co. tributary to Russian River) upstream from Guerneville Road bridge.	Last Saturday in Apr. through Nov. 15.	Open to fishing for non-salmonids only. Closed to the take of trout, and steelhead.
(53) Lagunitas Creek and tributaries (Marin Co).	Closed to all fishing all year.	
(54) Limekiln Creek and tributaries above Highway 1 (Monterey Co.). Also see Low-Flow Restrictions, Section 8.00(c)(9).	Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(55) Little River (Humboldt Co.) downstream from the County Road bridge at Crannell, excluding tributaries.	Fourth Saturday in May through Mar. 31. Cutthroat trout minimum size limit: 10 inches total length. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.	2 cutthroat trout 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(56) Little Sur River and tributaries above Coast Road (Monterey Co.).	Fourth Saturday in May through Oct. 31. Only artificial lures with barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
	Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used.	0 trout
(57) Llagas Creek (Santa Clara Co.). Also see Low-Flow Restrictions, Section 8.00(c)(5).		

Body of Water	***Open Season and Special Restrictions***	***Daily Bag and Possession Limit***
(A) From mouth to Monterey Highway Bridge.	Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(B) From Monterey Highway Bridge to Chesbro Dam.	Closed to all fishing all year.	
(58) Los Osos Creek (San Luis Obispo Co.).	Closed to all fishing all year.	
(59) Los Padres Reservoir (Monterey Co.).	Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used.	5 brown trout, 0 rainbow trout.
(60) Mad River and tributaries (Humboldt Co.).		
(A) Mad River from the mouth to 200 yards upstream.	Jan. 1 through Mar. 31. Only artificial lures with barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(B) Mad River main stem, from 200 yards above its mouth upstream to the confluence with Cowan Creek, excluding tributaries. Also see Low-Flow Restrictions, Section 8.00(a)(4).	Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(C) Mad River main stem, from the confluence with Cowan Creek to the confluence with Deer Creek, excluding tributaries.	Closed to all fishing all year.	
(D) Mad River main stem from the confluence with Deer Creek to Ruth Dam.	Fourth Saturday in May through Oct. 31. Only artificial lures with barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(61) Mattole River (Humboldt Co.). Also see Section 8.00(a).		

Body of Water	***Open Season and Special Restrictions***	***Daily Bag and Possession Limit***
(A) Mattole River main stem from the mouth to 200 yards upstream.	Closed to all fishing all year.	
(B) Mattole River main stem from 200 yards upstream of mouth to confluence with Stansberry Creek.	Jan. 1 through Mar. 31. Only artificial lures with barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(C) Mattole River main stem from confluence with Stansberry Creek to confluence with Honeydew Creek.	Jan. 1 through Mar. 31 and Fourth Saturday in May through Aug. 31. Only artificial lures with barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(62) McDonald Creek (Humboldt Co.).	Closed to fishing all year.	
(63) Merced River (Merced Co.).		
(A) From Crocker-Huffman Dam downstream to the Schaffer bridge on Oakdale Road.	Jan. 1 through Oct. 31. Only artificial lures with barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(B) From the Schaffer bridge on Oakdale Road downstream to the mouth.	Jan. 1 through Oct. 31. Bait may be used from Jan. 1 through Oct. 31. However, from April 1 through the Friday preceding the fourth Saturday in May, bait may be used only with single hooks having a gap between 1/2 and 1 inch, or with multiple hooks having a gap between 1/4 and 1/2 inch.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(64) Mill Creek (Tehama Co.).		
(A) From the Lassen National Park boundary downstream to the U.S. Geological Survey gauging station cable crossing at the mouth of Mill Creek Canyon.	Last Saturday in April through Nov. 15. Only artificial lures with barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(B) From U.S. Geological Survey gauging station cable crossing at mouth of Mill Creek Canyon	June 16 through Sept. 30.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or

Body of Water	***Open Season and Special Restrictions***	***Daily Bag and Possession Limit***
downstream to the mouth of Mill Creek.		hatchery steelhead** in possession.
(65) Mitchell Creek and tributaries (Contra Costa Co.).	Closed to all fishing all year.	
(66) Mokelumne River (San Joaquin Co.).		
(A) From Camanche Dam to Elliot Road.	Jan. 1 through Mar. 31.	1 hatchery trout or hatchery steelhead**
	Fourth Saturday in in May through July 15.	1 hatchery trout or hatchery steelhead**
	July 16 through Oct. 15.	1 hatchery trout or hatchery steelhead**. 2 Chinook Salmon. 4 Chinook Salmon in possession.
(B) From Elliot Road to the Woodbridge Irrigation District Dam including Lodi Lake.	Jan. 1 through July 15.	1 hatchery trout or hatchery steelhead**
	July 16 through Dec. 31.	1 hatchery trout or hatchery steelhead**. 2 Chinook Salmon. 4 Chinook Salmon in possession.
(C) Between the Woodbridge Irrigation District Dam and the Lower Sacramento Road bridge.	Closed to all fishing all year.	
(D) From the Lower Sacramento Road bridge to the mouth. For purposes of this regulation, this river segment is defined as Mokelumne River and its tributary sloughs downstream of the Lower Sacramento Road bridge and east of Highway 160 and north of Highway 12.	Jan. 1 through July 15.	1 hatchery trout or hatchery steelhead**
	July 16 through Dec. 16.	1 hatchery trout or hatchery steelhead**. 2 Chinook Salmon. 4 Chinook Salmon in possession.
	Dec. 17 through Dec. 31.	1 hatchery trout or hatchery steelhead**
(67) Nacimiento River (Monterey and San Luis Obispo cos.)		
Main stem below Nacimiento Dam, downstream to its confluence with the Salinas River.	Saturday preceding Memorial Day through October 31. Only artificial	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or

Body of Water	***Open Season and Special Restrictions***	***Daily Bag and Possession Limit***
	lures with barbless hooks may be used.	hatchery steelhead** in possession.
(68) Napa River and tributaries (Napa Co.). Also see Section 8.00(b).		
(A) Main stem above the Oakville Cross Road Bridge near Yountville and all Napa River tributaries.	Closed to all fishing all year.	
(B) From the Oakville Cross Road Bridge near Yountville to the Trancas Bridge. Note: The Napa River below the Trancas Bridge is tidewater, and is under the regulations for the Ocean and San Francisco Bay District (see Sections 1.53 and 27.00).	Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(69) Navarro River (Mendocino Co.). Also see Low-Flow Restrictions, Section 8.00(b)(1). Main stem below the Greenwood Road bridge.	Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(70) Noyo River (Mendocino Co.). Also see Low-Flow Restrictions, Section 8.00(b)(1).		
(A) Noyo River main stem from the mouth to the Georgia-Pacific logging road bridge one mile east of Highway 1.	Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(B) Noyo River main stem from the Georgia-Pacific logging road bridge one mile east of Highway 1 to the confluence with the South Fork Noyo River.	Fourth Saturday in May through Oct. 1. Only artificial lures with barbless hooks may be used.	2 hatchery trout or hatchery steelhead** 4 hatchery trout or hatchery steelhead** in possession

Body of Water	***Open Season and Special Restrictions***	***Daily Bag and Possession Limit***
(C) Noyo River main stem from the confluence with the South Fork Noyo River to the Sonoma/Mendicino Boy Scout Council Camp.	Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(71) Pajaro River (Monterey, Santa Clara, Santa Cruz and San Benito Cos.) from mouth to Uvas Creek. Also see Low-Flow Restrictions, Section 8.00(c)(5).	Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(72) Upper Penitencia Creek (Santa Clara Co.) a tributary to Coyote Ck. Also see Section 8.00(c).	Closed to all fishing all year.	
(73) Pescadero Creek (San Mateo Co.) from mouth to the Stage Road bridge at Pescadero. Also see Low-Flow Restrictions, Section 8.00(c)(2).	Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(74) Pescadero Creek tributaries and main stem above the Stage Road bridge at Pescadero (Santa Clara and San Mateo Cos.).	Closed to all fishing all year.	
(75) Pinole Creek (Contra Costa Co.) and tributaries.	Closed to all fishing all year.	
(76) Redwood Creek and tidewaters (Marin Co.)	Closed to all fishing all year.	
(77) Redwood Creek (Humboldt Co.). Also see Section 8.00(a).		
(A) Redwood Creek main stem, within a radius of 200 yards of its mouth.	Jan. 1 through Mar. 31. Only artificial lures with barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.

Body of Water	***Open Season and Special Restrictions***	***Daily Bag and Possession Limit***
(B) Redwood Creek main stem, from 200 yards above the mouth to the mouth of Prairie Creek.	Fourth Saturday in May through Mar. 31. Only barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(C) Redwood Creek main stem, from the mouth of Prairie Creek to the mouth of Bond Creek.	Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(D) Redwood Creek and tributaries, above the mouth of Bond Creek.	Closed to all fishing all year.	
(78) Russian Gulch and tributaries (Sonoma Co.). Main stem below the confluence of the East Branch. Also see Section 8.00(b).	Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(79) Russian River and tributaries (Sonoma and Mendocino Cos.). Also see Section 8.00(b).		
(A) Russian River main stem below the confluence of the East Branch Russian River.	All Year. Only artificial lures with barbless hooks may be used from Apr. 1 through Oct. 31 Only barbless hooks may be used from Nov. 1 through Mar. 31.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(B) Russian River main stem above the confluence of the East Branch and all River tributaries. (See Laguna de Santa Rosa 7.40(b)(51) and Santa Rosa Creek 7.40(b)(97) for non-salmonids only.)	Closed to all fishing all year.	
(C) Russian River within 250 feet of the Healdsburg Memorial Dam.	Closed to all fishing all year.	

Body of Water	***Open Season and Special Restrictions***	***Daily Bag and Possession Limit***
(80) Sacramento River and tributaries below Keswick Dam (Butte, Colusa, Contra Costa, Glenn, Sacramento, Shasta, Solano, Sutter,Tehama and Yolo Cos.).		
(A) Sacramento River from Keswick Dam to 650 feet below Keswick Dam.	Closed to all fishing all year.	
(B) Sacramento River from 650 feet below Keswick Dam to the Deschutes Road bridge.		
1. Sacramento River from 650 feet below Keswick Dam to the Highway 44 bridge.	Closed to all fishing from Apr. 1 through July 31.	
	Jan. 1 to Mar. 31. Only barbless hooks may be used. Aug. 1 to Dec. 31. Only barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession. 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
2. Sacramento River from the Highway 44 bridge to the Deschutes Road bridge.	All year. Only barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(C) Sacramento River from the Deschutes Road bridge to the Red Bluff Diversion Dam.	Jan. 1 through July 31.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
	Aug. 1 through Dec. 31.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession. 2 Chinook Salmon. 4 Chinook Salmon in possession.

Body of Water	***Open Season and Special Restrictions***	***Daily Bag and Possession Limit***
(D) Sacramento River from the Red Bluff Diversion Dam to the Hwy 113 bridge near Knights Landing.	Jan. 1 through July 15.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
	July 16 through Dec. 16.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession. 2 Chinook Salmon. 4 Chinook Salmon in possession.
	Dec. 17 through Dec. 31.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(E) Sacramento River from the Hwy 113 bridge near Knights Landing to the Carquinez Bridge (includes Suisun Bay, Grizzly Bay and all tributary sloughs west of Highway 160).	Jan. 1 through July 15.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
	July 16 through Dec. 16.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession. 2 Chinook Salmon. 4 Chinook Salmon in possession.
	Dec. 17 through Dec. 31.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(81) Salinas River and tributaries (Monterey and San Luis Obispo Cos.). Also see Section 8.00(c).		
(A) The main stem Salinas River.	Dec. 1 through Mar. 7, but only on Sat., Sun.,Wed., legal holidays and opening and closing days. Only barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.

Body of Water	***Open Season and Special Restrictions***	***Daily Bag and Possession Limit***
(B) All Salinas River tributaries upstream of Arroyo Seco River confluence (including the San Antonio River below San Antonio Reservoir and Dam, Paso Robles Creek and tributaries, Atascadero Creek, Santa Margarita Creek and tributaries but excluding the Nacimiento River) See 7.40(b)(66).	Last Saturday in Apr. through Nov. 15. Only barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(82) Salmon Creek and tributaries (Sonoma Co.). Also see Section 8.00(b).		
(A) Salmon Creek main stem below Highway 1.	Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(B) Salmon Creek main stem above Highway 1 and all Salmon Creek tributaries.	Closed to all fishing all year.	
(83) Salmon River (Siskiyou Co.).	See Klamath River 7.50(b)(50).	
(84) San Benito River and tributaries (San Benito Co.).	Last Saturday in Apr. through Nov. 15.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(85) San Clemente Creek and tributaries (Monterey Co.) except for Trout Lake.	Last Saturday in Apr. through Nov. 15 Only artificial lures with barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(86) San Diego Creek (Orange Co.). Downstream of the MacArthur Blvd. bridge only.	Saturday preceding Memorial Day through Nov. 30. Only artificial lures with barbless hooks may be used.	Open to fishing for non-salmonids only. Closed to the take of trout, and steelhead.

Body of Water	***Open Season and Special Restrictions***	***Daily Bag and Possession Limit***
(87) San Francisquito Creek and tributaries (Santa Clara and San Mateo Cos.)	Closed to all fishing all year.	
(88) San Gabriel River (Los Angeles and Orange Cos.) Upstream of the Highway 22 bridge to the start of concrete-lined portion of the river channel.	Saturday preceding Memorial Day through Nov. 30. Only artificial lures with barbless hooks may be used.	Open to fishing for non-salmonids only. Closed to the take of trout, and steelhead.
(89) San Gregorio Creek (San Mateo Co.) from the mouth to the Stage Road bridge at San Gregorio. Also see Low-Flow Restrictions, Section 8.00(c)(2).	Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(90) San Joaquin River (Fresno, Madera, Merced, San Joaquin, and Stanislaus Cos.).		
(A) From Friant Dam downstream to the Highway 140 bridge.	All year.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(B) From the Highway 140 bridge downstream to the Interstate 5 bridge at Mossdale.	All year.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(91) San Juan Creek main stem (Orange Co.).	Closed to all fishing all year.	
(92) San Lorenzo River (Santa Cruz Co.) from the mouth to the Lomond Street bridge in the town of Boulder Creek. Also see Section 8.00(c).	Dec. 1 through Mar. 7, but only on Sat., Sun.,Wed., legal holidays and opening and closing days. Only barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(93) San Luis Obispo Creek (San Luis Obispo Co.) from mouth to the first and most southwestern highway 1/101 bridge.	Dec. 1 through Mar. 7, but only Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(94) San Luis Rey River (San Diego Co.).	Closed to all fishing all year.	

Body of Water	***Open Season and Special Restrictions***	***Daily Bag and Possession Limit***
(95) San Mateo Creek and tributaries downstream from the falls between the Tenaja Road crossing and Fisherman's Camp (San Diego and Riverside cos.).	Closed to all fishing all year.	
(96) San Simeon Creek (San Luis Obispo Co.) from mouth to the pedestrian bridge in San Simeon Beach State Park.	Dec. 1 through Mar. 7, but only Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(97) Santa Margarita River and tributaries downstream from the Interstate 15 bridge (San Diego and Riverside cos.).	Closed to all fishing all year.	
(98) Santa Rosa Creek (Sonoma Co. tributary to Russian River) from Laguna de Santa Rosa to Highway 12 bridge.	Last Saturday in Apr. through Nov. 15.	Open to fishing for non-salmonids only. Closed to the take of trout, and steelhead.
(99) Santa Ynez River and tributaries downstream from Bradbury Dam (Santa Barbara Co.).	Closed to all fishing all year.	
(100) Scott Creek (Santa Cruz Co.) from mouth to confluence with Big Creek. Also see Low-Flow Restrictions, Section 8.00(c)(3).	Dec. 1 through Mar. 7, but only Sat., Sun.,Wed., legal holidays and opening and closing days. Only barbless hooks may be used.	0 trout
(101) Scott River (Siskiyou Co.).	See Klamath River 7.40(b)(50).	
(102) See Canyon Creek (San Luis Obispo Co.).	Closed to all fishing all year.	
(103) Shasta River (Siskyou Co.).	See Klamath River 7.40(b)(50).	
(104) Sisquoc River and tributaries (Santa Barbara Co.).	Closed to all fishing all year.	
(105) Smith River (Del Norte Co.) Yearly limits apply for entire river.	Low-Flow Restrictions, Section 8.00, also apply, see below for more detail.	
(A) Main stem from the mouth to confluence of Middle and South	Fourth Saturday in May through Apr. 30. Only	2 hatchery trout or hatchery steelhead**. 4

Body of Water	***Open Season and Special Restrictions***	***Daily Bag and Possession Limit***
forks. Also see Low-Flow Restrictions, Section 8.00(a)(7).	artificial lures with barbless hooks may be used from the fourth Saturday in May through Aug. 31. Only barbless hooks may be used from Sep. 1 through Apr. 30.	hatchery trout or hatchery steelhead** in possession. 2 cutthroat trout minimum size limit: 10 inches total length. 1 Chinook Salmon and no more than 5 wild Chinook Salmon* over 22 inches per year.
(B) Middle Fork Smith River		
1. from mouth to Patrick Creek Also see Low-Flow Restrictions, Section 8.00(a)(7).	Fourth Saturday in May through Apr. 30. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Aug. 31. Only barbless hooks may be used from Sep. 1 through Apr. 30.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession. 2 Cutthroat Trout minimum size limit: 10 inches total length. 1 Chinook Salmon and no more than 5 wild Chinook Salmon* over 22 inches per year.
2. above the mouth of Patrick Creek. Also see Low-Flow Restrictions, Section 8.00(a)(7).	Fourth Saturday in May through Oct. 31. Only artificial lures with barbless hooks may be used.	2 cutthroat trout minimum size limit: 10 inches total length. 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(C) South Fork Smith River		
1. from the mouth upstream approximately 1,000 feet to the County Road (George Tryon) bridge and Craigs Creek to Jones Creek. Also see Low-Flow Restrictions, Section 8.00(a)(7).	Fourth Saturday in May through Apr. 30. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Aug. 31. Only barbless hooks may be used from Sep. 1 through Apr. 30.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession. 2 Cutthroat Trout minimum size limit: 10 inches total length. 1 Chinook Salmon and no more than 5 wild Chinook Salmon* over 22 inches per year.
2. from the George Tryon bridge upstream to the mouth of Craigs	Closed to fishing all year.	

Body of Water	***Open Season and Special Restrictions***	***Daily Bag and Possession Limit***
Creek. Also see Low-Flow Restrictons, Section 8.00(a)(7).		
3. above the mouth of Jones Creek. Also see Low-Flow Restrictions, Section 8.00(a)(7).	Fourth Saturday in May through Oct. 31. Only artificial lures with barbless hooks may be used.	2 cutthroat trout minimum size limit: 10 inches total length. 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(D) North Fork Smith River.		
1. from the mouth to Stony Creek. Also see Low-Flow Restrictions, Section 8.00(a)(7).	Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Aug. 31. Only barbless hooks may be used from Sep. 1 through Mar. 31.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession. 2 cutthroat trout minimum size limit: 10 inches total length. 1 Chinook salmon and no more than 5 wild Chinook salmon* over 22 inches per year.
2. above the mouth of Stony Creek.	Fourth Saturday in May through Oct. 31. Only artificial lures with barbless hooks may be used.	2 cutthroat trout minimum size limit: 10 inches total length. 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(106) Sonoma Creek and tributaries (Sonoma Co.).		
Sonoma Creek and tributaries between the Sonoma Creek seasonal waterfall in Sugarloaf Ridge State Park (located 0.2 miles upstream of the west end of the Canyon Trail) and the Highway 121 bridge. Note: Sonoma Creek below the Highway 121 Bridge is tidewater, and is regulated by regulations for the Ocean and San Francisco Bay	Closed to all fishing year.	

Body of Water	***Open Season and Special Restrictions***	***Daily Bag and Possession Limit***
District (see sections 1.53 and 27.00).		
(107) Soquel Creek (Santa Cruz Co.) from mouth to confluence of East and West branch. Also see Low-Flow Restrictions, Section 8.00(c)(4).	Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks maybe used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(108) Stanislaus River		
(A) From Goodwin Dam down-stream to the Highway 120 bridge in Oakdale.	Jan. 1 through Oct. 31. Only artificial lures with barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(B) From the Highway 120 bridge in Oakdale to the mouth.	Jan. 1 through Oct. 31. Bait may be used from Jan. 1 through Oct. 31. However, from April 1 through the Friday preceding the fourth Saturday in May, bait may be used only with single hooks having a gap between 1/2 and 1 inch, or with multiple hooks having a gap between 1/4 and 1/2 inch.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(109) Stevens Creek (Santa Clara Co.) downstream of Stevens Reservoir.	Last Saturday in April through Nov. 15. Only artificial lures with barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(110) Stone Lagoon (Humboldt Co.).	All year. Only artificial lures with barbless hooks may be used. Cutthroat trout minimum size limit: 14 inches.	2 cutthroat trout 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(111) Ten Mile River Mendocino Co.). Also see Section 8.00(b)(1). Ten Mile River main stem below the confluence with the Ten Mile River North Fork, and the Ten Mile	Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct 31. Only	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.

Body of Water	***Open Season and Special Restrictions***	***Daily Bag and Possession Limit***
River North Fork below the confluence with Bald Hill Creek.	barbless hooks may be used from Nov. 1 through May 31.	
(112) Topanga Canyon Creek and tributaries (Los Angeles Co.).	Closed to all fishing all year.	
(113) Trabuco Creek (a.k.a. Arroyo Trabuco Creek) (Orange Co.). Downstream of the I-5 bridge to the confluence with San Juan Creek	Closed to all fishing all year.	
(114) Trinity River and tributaries downstream of Lewiston Dam.	See Klamath River 7.40(b)(50).	
(115) Tuolumne River (Stanislaus and Tuolumne Cos.).		
(A) From La Grange Dam downstream to Hickman bridge.	Jan. 1 through Oct. 31. Only artificial lures with barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(B) From Hickman bridge to the mouth.	Jan. 1 through Oct. 31. Bait may be used from Jan. 1 through Oct. 31. However, from April 1 through the Friday preceding the fourth Saturday in May, bait may be used only with single hooks having a gap between 1/2 and 1 inch, or with multiple hooks having a gap between 1/4 and 1/2 inch.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(116) Usal Creek and tributaries (Mendocino Co.). Also see Section 8.00(b). Usal Creek main stem below the Usal-Shelter Cove Road	Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.

Body of Water	***Open Season and Special Restrictions***	***Daily Bag and Possession Limit***
(117) Uvas or Carnadero Creek (Santa Clara Co.) Also see Low-Flow Restrictions, Section 8.00(c)(5).		
(A) From Highway 152 Bridge to Uvas Dam.	Closed to all fishing all year.	
(B) From mouth to Highway 152 Bridge.	Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(118) Van Duzen River (Humboldt Co.).	See Eel River 7.40(b)(40) and Section 8.00(a).	
(119) Waddell Creek (Santa Cruz Co.) from mouth to Highway 1 bridge. Also see Low-Flow Restrictions, Section 8.00(c)(3).	Dec. 1 through Mar. 7, but only Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(120) Walker Creek and tributaries (Marin Co.) Also see Section 8.00(b).		
(A) Walker Creek main stem below Highway 1.	Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(B) Walker Creek main stem above Highway 1 and all Walker Creek tributaries.	Closed to fishing all year.	
(121) Walnut Creek (Contra Costa Co.).		
(A) Upstream of the confluence with Grayson Creek.	Fourth Saturday in May through Mar. 31. Only artificial lure with barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.

Body of Water	***Open Season and Special Restrictions***	***Daily Bag and Possession Limit***
(B) Downstream of the confluence with Grayson Creek.	All year.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(122) Wildcat Creek and tributaries (Contra Costa Co.).	Closed all year to fishing.	
(123) Yuba River (Yuba and Nevada Cos.) from mouth to Englebright Dam.		
(A) From mouth to the Highway 20 bridge.	All year. Only artificial lures with barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.
(B) From Highway 20 bridge to Englebright Dam.	Dec. 1 through Aug. 31. Only artificial lures with barbless hooks may be used.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.

* Wild Chinook Salmon are those not showing a healed adipose fin clip and not showing a healed left ventral fin clip.
**Hatchery trout or steelhead in anadromous waters are those showing a healed adipose fin clip (adipose fin is absent). Unless otherwise provided, all other trout and steelhead must be immediately released. Wild trout or steelhead are those not showing a healed adipose fin clip (adipose fin is present).
Note: Authority cited: Sections 200, 205, 265, 270, 315, 316.5 and 399, Fish and Game Code.
Reference: Sections 200, 205, 265, 270 and 316.5, Fish and Game Code.

Proposed Regulatory Language

Section 7.50, Title 14, CCR, is amended to read:

§ 7.50. Alphabetical List of Trout Waters with Special Fishing Regulations.
(a) General Provisions:
~~(1) Every body of water listed below is closed to the take of trout and trout fishing, unless otherwise noted.~~
(~~2~~1) Every body of water listed below is closed to all fishing except during the open season as shown. Unless otherwise provided, waters shown as open to trout fishing below, are open to fishing for other species. ~~Every body of water listed below is closed to all fishing except during the open season as shown.~~ Gear restrictions listed in this section apply to the take of all species of fish unless otherwise noted.
(~~3~~2) Unless otherwise provided, waters closed to trout fishing are closed to fishing for all other species, except that these closures do not apply to fishing for amphibians (see Section 5.05), freshwater clams (see Section 5.20), crayfish (see Section 5.35), and lamprey (see Section 5.40), using legal fishing methods other than hook-and-line fishing, and saltwater clams, crabs, ghost shrimp, and blue mud shrimp (see Ocean Regulations Booklet ~~Sections~~sections 29.20 to 29.87). Crabs may only be taken using hoop nets or by hand, and Dungeness crab may only be taken within the North Coast District and Sonoma and Mendocino counties.
(~~4~~3) Daily bag and possession limits, unless otherwise noted, mean the total number of trout.
(~~5~~4) Unless otherwise provided, it is unlawful to possess more than one daily bag limit.
(~~6~~5) These waters may also be subject to restrictions on fishing methods and gear (sections 2.00 through 2.40), fishing hours (~~section~~Section 3.00), and the use of bait (sections 4.00 through 4.30).
(b)

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
(1) Alambique Creek (San Mateo Co.).	~~Last Saturday in Apr. through Nov. 15~~Saturday preceding Memorial Day through September 30. Only artificial lures with barbless hooks may be used.	~~5 trout~~0 trout	**F6**
(~~1.5~~2) Alameda Creek and tributaries (Alameda and Santa Clara ~~Cos.~~cos.).			
(A) Alameda Creek mainstem and all tributaries downstream of San Antonio, Calaveras, and Del Valle ~~Reservoirs~~reservoirs except for Arroyo Del Valle between Bernal Ave. and the Thiessen St. intersection with Vineyard Ave.	Closed to all fishing all year.		**J**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
1. Arroyo Del Valle between Bernal Ave. and the Thiessen St. intersection with Vineyard Ave.	All year. Only artificial lures with barbless hooks may be used.	0 trout	**A6**
(B) Alameda Creek tributaries upstream of San Antonio, Calaveras, and Del Valle ~~Reservoirs~~reservoirs.	~~Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used.~~Saturday preceding Memorial Day through September 30. Only artificial lures with barbless hooks may be used.	0 trout	**F6**
(C) San Antonio and Calaveras reservoirs.	All year. Only artificial lures with barbless hooks may be used.	0 trout	**A6**
~~(2) Albion River (Mendocino Co.). Also see Section 8.00(b). Main stem below the confluence of South Fork Albion.~~	~~Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(3) Alder Creek (Mendocino Co.). Also see Section 8.00(b). Main stem below Tramway Gulch.~~	~~Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
(4~~.~~3) Almanor Lake tributaries (Lassen, Plumas, and Shasta ~~Cos.~~cos.) upstream to the first lake.	Saturday preceding Memorial Day through ~~Nov. 15~~September 30.	5 trout ~~per day 10 trout in possession.~~	**F1**
(4~~.5~~) American River, North Fork, Middle Fork, South Fork and their tributaries above Folsom Lake (Placer, Eldorado, Amador, and Alpine ~~Cos.~~cos.), except Caples Creek (See Section 7.50(b)(24).	~~Last Saturday in Apr. through Nov. 15.~~ ~~Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used.~~Saturday preceding Memorial Day through September 30.	5 trout ~~per day 10 trout in possession.~~	**F1**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
	October 1 through the Friday preceding Memorial Day. Only artificial lures with barbless hook may be used.	0 trout	**I6**
~~(5) American River (Sacramento Co.)~~			
~~(A) From Nimbus Dam to the U.S. Geological Survey gauging station cable crossing about 300 yards downstream from the Nimbus Hatchery fish rack site.~~	~~Closed to all fishing all year.~~		**HSS**
~~(B) From the U.S. Geological Survey gauging station cable crossing about 300 yards down- stream from the Nimbus Hatchery fish rack site to the SMUD power line crossing at the southwest boundary of Ancil Hoffman Park.~~	~~Jan. 1 through July 15. Only barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead** 4 hatchery trout or. hatchery steelhead** in possession.~~	**HSS**
	~~July 16 through Oct. 31. Only barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession. 1 Chinook Salmon. 2 Chinook Salmon in possession.~~	**HSS**
~~(C) From the SMUD power line crossing at the southwest boundary of Ancil Hoffman Park down-stream to the Jibboom Street bridge.~~	~~Jan. 1 through July 15.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
	~~July 16 through Dec. 31.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in~~	**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
		~~possession. 1 Chinook Salmon. 2 Chinook Salmon in possession.~~	
~~(D) From the Jibboom Street bridge to the mouth.~~	~~Jan. 1 through July 15.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
	~~July 16 through Dec. 16.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession. 1 Chinook Salmon. 2 Chinook Salmon in possession.~~	**HSS**
	~~Dec. 17 through Dec. 31.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(6) Antelope Creek (Tehama Co.).~~			
~~(A) From confluence with North Fork downstream to U.S. Geological Survey gauging station cable crossing at mouth of Antelope Creek Canyon.~~	~~Last Saturday in April through Nov. 15. Only artificial lures with barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(B) From U.S. Geological Survey gauging station cable crossing at mouth of Antelope Creek Canyon downstream to mouth of Antelope Creek.~~	~~June 16 through September 30.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
(~~6.~~5) Antelope Lake tributaries (Plumas Co.).	~~Saturday preceding Memorial Day through Nov. 15~~ Saturday preceding Memorial Day through September 30.	5 trout ~~per day. 10 trout in possession.~~	**F1**
~~(7) Applegate River and tributaries (Siskiyou Co.).~~	~~Last Saturday in Apr. through Nov. 15~~	~~5 trout per day. 10 trout in possession.~~	**SR**
~~(8) Aptos Creek (Santa Cruz Co.) from mouth to bridge on Aptos Creek Road. Also see Low-Flow Restrictions, Section 8.00(c)(4).~~	~~Dec. 1 through Mar. 7, but only on Sat., Sun. ,Wed., legal holidays and opening and closing days. Only barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(9) Arroyo de los Frijoles above Lake Lucerne (San Mateo Co.).~~	~~Last Saturday in Apr. through Nov. 15.~~	~~5 trout~~	**SR**
~~(10) Arroyo Grande Creek (San Luis Obispo Co.).~~			
~~(A) Above Lopez Reservoir.~~	~~Last Saturday in Apr. through Nov. 15.~~	~~5 trout. 2 salmon.~~	**SR/Del**
~~(B) From mouth to Lopez Canyon Dam.~~	~~Closed to all fishing all year.~~		**HSS**
~~(11) Arroyo Leon (San Mateo Co.).~~	~~Closed to all fishing all year.~~		**HSS**
(6) Arroyo Seco River (Monterey Co.). Also see Section 8.00(c). ~~(A)~~ The main stem Arroyo Seco and tributaries above the waterfall located approximately 3.5 miles upstream from the U.S. Forest Service Ranger Station.	~~Last Saturday in Apr. through Nov. 15.~~Saturday preceding Memorial Day through September 30.	5 trout	**F1**
~~(B) The main stem Arroyo Seco and tributaries below the waterfall located approximately 3.5 miles upstream from the U.S. Forest Service Ranger Station.~~	~~Dec. 1 through Mar. 7,but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
~~(12.5) Auburn Ravine Creek and tributaries (Placer Co.) east of Nelson Lane.~~	~~Fourth Saturday in May through Oct. 15.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(13) Balm of Gilead Creek (Trinity Co.).~~	~~See Eel River 7.50(b)(63).~~		**Del01**
~~(13.5) Bass Lake (Siskiyou Co.).~~	~~Feb. 1 through Sept. 30.~~	~~5 trout~~	**SL**
~~(14) Battle Creek (Shasta and Tehama Cos.).~~			
~~(A) From mouth to Coleman Fish Hatchery weir.~~	~~Closed to all fishing all year.~~		**HSS**
~~(B) From 250 feet upstream from the Coleman National Fish Hatchery upstream to Angel Falls (near Mineral) on the South Fork and to Ponderosa Way Bridge on the North Fork.~~	~~Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
(~~15~~7) Bear Creek and tributaries (Shasta and Siskiyou ~~Cos.~~cos.) between Ponderosa Way bridge and confluence with Fall River.	~~Saturday preceding Memorial Day through Nov. 15~~Saturday preceding Memorial Day through September 30. Only artificial lures may be used.	2 trout~~ per day. 10 trout in possession.~~	**F3**
(~~17~~8) Bear Creek (San Bernardino Co.) from Big Bear Dam to confluence of Santa Ana River.	All year. Only artificial lures~~ with barbless hooks~~ may be used.	2 trout	**A3**
~~(18) Bear River (Humboldt Co.) downstream from County Road Bridge at Capetown, excluding tributaries.~~	~~Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
(~~18.5~~9) Bear River and tributaries (Placer Co.)			
~~(A)~~ From Highway 20 south (downstream) 2.5 miles to the abandoned concrete dam (the Boardman Diversion Dam).	~~Last Saturday in Apr. through Nov. 15. Maximum size limit: 14 inches total length.~~ Saturday preceding Memorial Day through the last day in February.	5 trout	**G1**
~~(B) From Highway 65 to the South Sutter Irrigation District Diversion Dam.~~	~~Fourth Saturday in May through Oct. 15.~~	~~2 hatchery trout or hatchery steelhead**, 4 hatchery trout or hatchery steelhead** in possession,~~	**HSS**
(~~19~~10) Berryessa Lake tributaries (Lake and Napa ~~Cos.~~cos.).	~~Last Saturday in Apr. through Nov. 15~~Last Saturday in April through September 30.	~~5 trout~~ 2 trout. 4 trout in possession.	**F2**
~~(19.5) Big Bear Lake tributaries (San Bernardino Co.)~~	~~Saturday preceding Memorial Day through last day of Feb.~~	~~5 trout per day. 10 trout in possession.~~	**SR**
~~(20) Big Chico Creek (Butte Co.).~~			
~~(A) From mouth to Bear Hole, located approximately one mile downstream from the upper end of Bidwell Park~~	~~June 16 through Feb. 15. Only artificial lures with barbless hooks may be used from Oct. 16 through Feb. 15.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(B) From Bear Hole to the upper boundary of the Big Chico Creek Ecological Reserve~~	~~Nov. 1 through April 30. Only artificial lures with barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(C) From the upper boundary of the Big Chico Creek Ecological Reserve to Higgins Hole Falls,~~	~~Closed to all fishing all year.~~		**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
~~located about one-half mile upstream from Ponderosa Way.~~			
~~(21) Big Lagoon (Humboldt Co.). For purposes of this regulation, the boundary between Big Lagoon and Maple Creek is the first private road bridge, located approximately 1/2 mile southeast of the Highway 101 bridge crossing.~~	~~All year. Only barbless hooks may be used. Cutthroat trout minimum size limit: 10 inches.~~	~~2 cutthroat trout. 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(22) Big River (Mendocino Co.). Also see Section 8.00(b). Main stem below the confluence of Two Log Creek.~~	~~Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
(11) Big Sur River (Monterey Co.). ~~(A)~~ Big Sur River and tributaries above the upstream end of the gorge pool at the boundary of Pfeiffer Big Sur State Park within the Ventana Wilderness Area.	~~Fourth Saturday in May through Oct. 31.~~ Saturday preceding Memorial Day through September 30. Only artificial lures with barbless hooks may be used.	0 trout	**F6**
~~(B) Big Sur river within Pfeiffer Big Sur State Park, east of the Highway 1 bridge, to its boundary within the Ventana Wilderness Area.~~	~~Closed to fishing all year.~~		**HSS**
(~~23.5~~12) Big Tree Creek (Calaveras Co.) within Calaveras Big Trees State Park (upstream of the Highway 4 culvert crossing).	Closed to all fishing all year.		**J**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
(~~24~~13) Big Trees Creek (Tuolumne Co.) upstream from the confluence of Beaver Creek.	Closed to all fishing all year.		**J**
~~(25) Black Butte River and tributaries (Glenn Co.) except Cold Creek.~~	~~Closed to all fishing all year~~		**HSS**
~~(25.3) Bodfish Creek and tributaries (Santa Clara Co.)~~	~~Closed to all fishing all year.~~		**HSS**
(~~25.5~~14) Boggy Creek (Fresno Co.) and tributaries (tributary to Thomas Edison Lake).	~~June 1 through October 15.~~Saturday preceding Memorial Day through September 30.	5 trout~~ per day. 10 trout in possession.~~	**F1**
~~(26) Bogus Creek (Siskiyou Co.).~~	~~See Klamath River 7.50(b)(91.1).~~		**HSS**
(15) Boulder Creek (San Diego Co.) upstream of El Capitan Reservoir, and all of its tributaries.	All year. Only artificial lures may be used.	2 trout	**A3**
(~~26.5~~16) Bridgeport Reservoir and tributaries (Mono Co.)~~. All Bridgeport Reservoir tributaries~~ except Swauger Creek~~,~~ from Bridgeport Reservoir upstream to Highway 395, and Swauger Creek~~,~~ from Bridgeport Reservoir upstream to the private property fence line above the Forest Service campground.	~~Last Saturday in April through the Friday preceding Memorial Day and Oct. 1 through Nov. 15. Minimum size limit: 18 inches total length. Only artifical lures with barbless hooks may be used.~~ Last Saturday in April through November 15.	~~1 trout.~~5 trout	**B1**
	~~Saturday preceding Memorial Day through Sep. 30.~~	~~5 trout per day. 10 trout in possession.~~	**Del02**
~~(27) Brush Creek (Mendocino Co.). Main stem below the Lawson bridge. Also see Section 8.00(c).~~	~~Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(27.5) Bucks Lake.~~	~~All year.~~	~~5 trout per day. 10 trout in possession. 10 landlocked~~	**SL**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
		~~salmon per day. 20 landlocked salmon in possession.~~	
(~~28~~17) Bucks Lake tributaries (Plumas Co.).	Saturday preceding Memorial Day through ~~Sept.~~September 30.	~~5 trout per day. 10 trout in possession.~~ 5 trout	**F1**
(~~28.5~~18) Burney Creek (Shasta Co.) from Burney Creek Falls downstream to Lake Britton.	~~Last Saturday in April through Nov. 15.~~ All year. Only artificial lures with barbless hooks may be used.	~~2 trout Maximum size limit: 14 inches total length.~~ 0 trout	**A6**
(~~2~~19) Butano Creek (San Mateo Co.).			
~~(A)~~ Above Butano Falls.	~~Last Saturday in Apr. through Nov. 15.~~Saturday preceding Memorial Day through September 30. Only artificial lures with barbless hooks may be used.	~~5 trout~~0 trout	**F6**
~~(B) From mouth to county bridge on Pescadero-Bean Hollow Road. Also see Low- Flow Restrictions, Section 8.00(c)(2)~~	~~Dec. 1 through Mar. 7, but only on Sat., Sun.,Wed.,legal holidays and opening and closing days. Only barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
(~~30~~20) Butt Creek and Butt Valley Reservoir Powerhouse Outfall (Plumas Co.).			
(A) Butt Creek.	Saturday preceding Memorial Day through ~~Nov. 15.~~September 30.	5 trout ~~per day. 10 trout in possession.~~	**F1**
(B) Butt Valley Reservoir powerhouse outfall, from the powerhouse downstream to a marker adjacent to Ponderosa Flat Campground.	Saturday preceding Memorial Day through ~~Feb. 28.~~the last day in February.	2 trout. 4 trout in possession.	**G2**
(~~3~~21) Butt Valley Reservoir (Plumas Co.).	All year.	2 trout. 4 trout in possession.	**A2**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
~~(32) Butte Creek (Butte and Sutter Cos.).~~			
~~(A) From the Oro-Chico Road bridge crossing south of Chico to the Centerville Head Dam, located 300 yards downstream from the DeSabla Powerhouse below DeSabla Reservoir.~~	~~November 15 through February 15. Only artificial lures with barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(B) From the Oro-Chico Road bridge crossing south of Chico to the point that Butte Creek enters the Sacramento River both via Butte Slough outfall gates at Moon's Bend and through Butte Slough, thence both the East and West Canals of the Sutter Bypass, thence Sacramento Slough.~~	~~All year~~	~~Open to fishing for non-salmonids only. Closed to the take of trout, and steelhead.~~	**HSS**
(~~33~~22) By-Day Creek and tributaries (Mono Co.).	Closed to all fishing all year.		**J**
(~~34~~23) Cache Creek and tributaries (Lake Co.).	~~Last Saturday in Apr. through Nov. 15~~Saturday preceding Memorial Day through September 30.	5 trout	**F1**
~~(35) Calaveras River downstream from New Hogan Dam and the diverting canal (Mormon Slough) from Bellota Weir downstream to Interstate Highway 5 (Calaveras and San Joaquin cos.).~~	~~Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(35.5) Calleguas Creek and tributaries (Ventura Co.).~~	~~Saturday preceding Memorial Day through November 30. Only artificial lures with barbless hooks may be used.~~	~~Open to fishing for non-salmonids only. Closed to the take of trout and steelhead~~	**SR**
~~(35.6) Canyon Creek upstream of the falls~~	~~Last Saturday in April through November 15.~~	~~2 trout~~	**SR**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
~~located about four miles north of the wilderness area boundary. (Trinity Co.)~~			
(24) Caples Creek from the confluence with the Silver Fork American River upstream to Caples Lake Dam (El Dorado and Alpine cos.)	All year. Only artificial lures with barbless hooks may be used.	0 trout	**A6**
~~(35.7) Caribou Reservoir (Plumas County)~~	~~Last Saturday in Apr. through Nov. 15~~	~~2 trout~~	**SL**
~~(36) Carmel River and tributaries above Los Padres Dam (Monterey Co.).~~	~~Last Saturday in Apr. through Nov. 15. No rainbow trout less than 10 inches or greater than 16 inches total length may be kept. Only artificial lures with barbless hooks may be used.~~	~~5 trout, no more than 2 of which may be rainbow trout.~~ .	**HSS**
~~(37) Carmel River below Los Padres Dam. (Monterey Co.)~~			
~~(A) Carmel River tributaries below Los Padres Dam and main stem from Los Padres Dam to the bridge at Robles Del Rio/Esquiline roads (Rosie's Bridge).~~	~~Closed to all fishing all year.~~		**HSS**
~~(B) Carmel River main stem below the bridge at Robles Del Rio/Esquiline roads (Rosie's Bridge). Also see Section 8.00(c).~~	~~Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., and opening and closing days. Only artificial lures with barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
(~~38~~25) Carson River, East Fork and tributaries (Alpine Co.).			
(A) Carson River, East Fork and tributaries above Carson Falls.	Closed to all fishing all year.		**J**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
(B) Carson River, East Fork from Hangman's Bridge downstream to Nevada State Line.	All year. ~~Only artificial lures with barbless hooks may be used.~~ Only artificial lures may be used. Minimum size limit: 14 inches total length.	~~0 trout~~2 trout	**A4**
~~(39.3) Castle Creek (Shasta Co.)~~	~~Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used.~~	~~0 trout~~	**Del03**
(~~39.5~~26) ~~Ceder~~ Cedar Creek and tributaries upstream from Moon Lake access road (Lassen Co.).	~~Closed to all fishing all year~~ Saturday preceding Memorial Day through the last day in February. Only artificial lures may be used.	2 trout	**G3**
~~(40) Chorro Creek (San Luis Obispo Co.) from the point that Chorro Creek enters Midway Marina in Morro Bay upstream to the twin bridges on South Bay Boulevard.~~	~~Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
(~~42~~27) Clear Lake tributaries (Lake Co.).	~~Last Saturday in Apr. through Nov. 15~~ All year. Only artificial lures with barbless hooks may be used.	~~5 trout~~ 0 trout	**A6**
~~(42.3) Codornices Creek (Alameda Co.).~~	~~Closed to all fishing all year~~		**HSS**
(~~42.5~~28) Cold Creek (Fresno Co.) and tributaries (tributary to Thomas Edison Lake).	~~June 1 through October 15.~~ Saturday preceding Memorial Day through September 30.	5 trout ~~per day. 10 trout in possession.~~	**F1**
(~~43~~29) Convict Creek (Mono Co.).			
(A) Convict Creek, including side channels and meanders, in the U.C. study area as posted. This area begins about 1/2 mile above the Highway 395 bridge and extends upstream about 1/2 mile.	Closed to all fishing all year.		**J**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
(B) Convict Creek downstream of the U.C. study area.	~~Last Saturday in April through the Friday preceding Memorial Day and Oct. 1 through Nov. 15. Minimum size limit: 18 inches total length. Only artificial lures with barbless hooks may be used.~~Saturday preceding Memorial Day through September 30.	~~2 trout~~ 5 trout	**F1**
	~~Saturday preceding Memorial Day through Sept. 30~~	~~5 per day 10 in possession.~~	**Del04**
~~(C) Convict Creek upstream of the U.C. study area.~~	~~Last Saturday in April through Nov. 15.~~	~~5 trout per day. 10 trout in possession~~	**SR**
(30) Convict Lake (Mono Co.).	Last Saturday in April through November 15.	5 trout	**B1**
~~(43.5) Coon Creek and tributaries (Placer Co.) east of Highway 65.~~	~~Fourth Saturday in May through Oct. 15.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(43.6) Coon Creek (San Luis Obispo Co.)~~	~~Closed to all fishing all year.~~		**HSS**
(44~~3~~1) Corral Valley Creek and tributaries (Alpine Co.).	Closed to all fishing all year.		**J**
~~(45) Corralitos Creek (Santa Cruz Co.) from mouth to Browns Valley Road. Also see Low-Flow Restrictions, Section 8.00(c)(5).~~	~~Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(46) Cosumnes River (Sacramento Co.) from Highway 99 bridge upstream to the Latrobe vehicle bridge.~~	~~Jan. 1 through Oct. 15. Only barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery~~	**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
		~~steelhead** in possession.~~	
~~(47) Cottoneva Creek (Mendocino Co.). Main stem below the confluence of South Fork Cottoneva Creek. Also see Section 8.00(b).~~	~~Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
(~~48~~32) Cottonwood Creek and all tributaries upstream from the confluence of the main stem Cottonwood Creek and Little Cottonwood Creek, including the unnamed tributaries flowing through Horseshoe Meadow (Inyo Co.).	All year. Only artificial lures may be used.	2 trout	**A3**
~~(A) Cottonwood Creek main stem between mouth of Little Cottonwood Creek and South Fork of Cottonwood Creek.~~	~~July 1 through Nov. 15. Only artificial lures with barbless hooks may be used~~	~~0 trout~~	**Del05**
~~(B) Cottonwood Creek~~ and ~~(1) and tributaries upstream from the confluence of South Fork,~~	~~July 1 through Nov. 15. Only artificial lures with barbless hooks may be used~~	~~5 trout~~	**Del05**
~~(2) Little Cottonwood Creek and tributaries,~~			**Del05**
~~(3) the South Fork of Cottonwood Creek and tributaries, and~~			**Del05**
~~(4) the unnamed tributary flowing through Horseshoe Meadow.~~			**Del05**
(~~49~~33) Cottonwood Creek drainage lakes (Inyo Co.).			
(A) Cottonwood Lakes 1, 2, 3 and 4 and their tributaries (Inyo Co.).	~~July 1 through Nov. 15. Only artificial lures with barbless hooks may be used.~~ September	~~0 trout~~2 trout	**H4**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
	1 through November 30. Only artificial lures may be used. Minimum size limit: 14 inches total length.		
(B) All remaining Cottonwood Creek drainage lakes.	~~July 1 through Nov. 15. Only artificial lures with barbless hooks may be used~~ All year. Only artificial lures may be used.	~~5 trout~~2 trout	**A3**
~~(49.5) Cottonwood Creek and tributaries (Modoc Co.).~~	~~Saturday preceding Memorial Day through Nov. 15. Only artificial lures with barbless hooks may be used.~~	~~0 trout~~	**Del06**
(~~50~~34) Cottonwood Creek, North Fork and tributaries (White Mountains, Mono Co.).	Closed to all fishing all year.		**J**
(~~50.5~~35) Cow Creek and tributaries upstream from Forest Service Road 9S10 (Fresno Co.).	Closed to all fishing all year.		**J**
~~(50.8) Coyote Creek (Santa Clara Co.) Also see Low-Flow Restrictions, Section 8.00(c)(1).~~	~~Last Saturday in April through November 15. Only artificial lures and barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
(~~51~~36) Coyote Valley Creek and tributaries (Alpine Co.).	Closed to all fishing all year.		**J**
(~~52~~37) Crooked Creek (Mono Co.).			
(A) Crooked Creek below the City of Los Angeles gauging station.	Closed to all fishing all year.		**J**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
(B) Crooked Creek and tributaries above the City of Los Angeles gauging station.	~~Last Saturday in April through Nov. 15. Only artificial lures with barbless hooks may be used.~~All year. Only artificial flies with barbless hooks may be used.	0 trout	**A7**
(~~53~~38) Crowley Lake (Mono Co.). (See individual listings for regulations on tributary waters which include: Convict, Crooked, Hilton, Hot, McGee, and Whiskey creeks and the upper Owens River).			
(A) Crowley Lake within 1,800 feet of the outlet dam (this area is marked with a series of buoys).	Closed to all fishing all year for safety purposes.		**J**
(B) Crowley Lake, except for the closed area near the outlet dam (see above).	Last Saturday in April through July 31.	5 trout~~ per day. 10 trout in possession.~~	**D1**
	~~Aug. 1 through Nov. 15. Minimum size limit:18 inches total length. Only artificial lures with barbless hooks may be used.~~August 1 through November 15. Only artificial lures may be used. Minimum size limit: 18 inches total length.	2 trout	**E5**
(~~53.5~~39) Davis Creek (Goose Lake tributary) and tributaries (Modoc Co.).	Saturday preceding Memorial Day through~~ November 15. Only artificial lures with barbless hooks may be used.~~ the last day in February.	~~0 trout~~5 trout	**G1**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
(~~54~~40) Davis Lake tributaries (Plumas Co.).	Saturday preceding Memorial Day through ~~Nov. 15.~~ the last day in February.	5 trout ~~per day. 10 trout in possession.~~	**G1**
(~~54.5~~41) Deadman Creek (Mono Co.).			
(A) Deadman Creek downstream from Hwy. 395. See Owens River 7.50(b)(104).	~~Last Saturday in April through Nov. 15. Maximum size limit: 16 inches total length. Only artificial lures with barbless hooks may be used.~~All year. Only artificial lures with barbless hooks may be used.	~~2 trout~~0 trout	**A6**
	~~Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used.~~	~~0 trout~~	
~~(B) Deadman Creek upstream from Hwy. 395.~~	~~Last Saturday in April through Nov. 15.~~	~~5 trout per day. 10 trout in possession.~~	**SR**
(~~55~~42) Deep Creek (San Bernardino Co.) from headwaters at Little Green Valley to confluence of Willow Creek.	All year. Only artificial lures ~~with barbless hooks~~ may be ~~use~~used.	2 trout	**A3**
~~(56) Deer Creek (Tehama Co.).~~			
~~(A) From 250 feet below Upper Deer Creek Falls and fishway (located 1.5 miles upstream from Potato Patch Campground) downstream 31 miles to U.S. Geological Survey gauging station cable crossing at mouth of Deer Creek Canyon (see Section 2.35 for closure at Upper Deer Creek Falls).~~	~~Last Saturday in April through Nov. 15. Only artificial lures with barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(B) From U.S. Geological Survey gauging station~~	~~June 16 through Sept. 30.~~	~~2 hatchery trout or hatchery~~	**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
~~cable crossing at mouth of Deer Creek Canyon downstream to mouth of Deer Creek.~~		~~steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	
~~(57) Deer Creek (Yuba and Nevada Cos.) from mouth to Smartville-Englebright Dam road crossing.~~	~~Fourth Saturday in May through Oct. 15. Only artificial lures with barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(58) Diaz Lake (Inyo Co.).~~	~~First Saturday in Mar. through Nov. 15.~~	~~5 trout per day. 10 trout in possession.~~	**SL**
	~~Nov. 16 through the Friday preceding the first Saturday in Mar.~~	~~5 trout~~	
~~(59) [Reserved]~~			
(43) Dismal Creek (Modoc Co.).	Saturday preceding Memorial Day through the last day in February. Only artificial lures with barbless hooks may be used.	0 trout	**G6**
~~(59.5) Dry Creek and tributaries (Placer Co.) east of the Atkinson Street Bridge in Roseville.~~	~~Fourth Saturday in May through Oct. 15.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(60) Dry Creek (Yuba and Nevada Co.) from mouth to Sid Smith Dam about one mile above junction of Scott Forbes and Peoria roads.~~	~~Fourth Saturday in May through Oct. 15.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(61~~44) Eagle Lake and tributaries (Lassen Co.).			

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
(A) Eagle Lake.	Saturday preceding Memorial Day through ~~Dec. 31.~~ the last day in February.	2 trout. 4 trout in possession.	**G2**
(B) Eagle Lake inside the break-water at the Gallatin Marina ~~and Pine Creek Slough and Pine Creek below State Highway 44~~.	Closed to all fishing all year.		**J**
(C) Eagle Lake tributaries, including Pine Creek ~~above State Hwy. 44~~.	~~Saturday preceding Memorial Day through Nov. 15.~~ Saturday preceding Memorial Day through the last day in February.	5 trout ~~per day. 10 trout in possession.~~	**G1**
~~(61.5) Earl Lake/Talawa (Del Norte Co.).~~	~~All year. Only barbless hooks may be used. Cutthroat trout minimum size limit: 10 inches.~~	~~2 cutthroat trout. 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(62.5) Edson Creek and all tributaries (Siskiyou Co.).~~	~~See McCloud River 7.50(b)(115).~~		**Del07**
(~~63~~45) Eel River (Humboldt, Lake, Mendocino and Trinity cos.).	~~Low-Flow Restrictions, Section 8.00, also apply, see below for more detail.~~		
~~ALL WATERS OF THE EEL RIVER DRAINAGE EXCEPT THOSE LISTED BELOW ARE CLOSED TO ALL FISHING.~~			
~~(A) Main stem.~~			
~~1. From mouth to Fulmor Road, at its paved junction with the south bank of the Eel River.~~	~~All year. Only artificial lures with barbless hooks may be used from April 1 through the Friday preceding the fourth Saturday in May. Only barbless hooks may be used from fourth Saturday in May through Mar. 31.~~	~~Catch and Release of Chinook Salmon 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
~~2. From Fulmor Road, at its paved junction with the south bank of the Eel River, to South Fork Eel River. Also see Low-Flow Restrictions, Section 8.00(a)(1).~~	~~All year. Only artificial lures with barbless hooks may be used from Apr. 1 through Sept. 30. Only barbless hooks may be used from Oct. 1 through Mar. 31.~~	~~Catch and Release of Chinook Salmon 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~3. From South Fork Eel River to Cape Horn Dam. (See also Pillsbury Lake tributaries (7.50(b)(138).~~	~~Jan. 1 through Mar. 31 and Fourth Saturday in May through Sept. 30. Only artificial lures with barbless hooks may be used.~~	~~Catch and Release of Chinook Salmon 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
	~~Apr. 1 through the Fourth Friday in May and Oct. 1 through Dec. 31.~~	~~Closed to all fishing.~~	
(A) Eel River above Lake Pillsbury and tributaries to Lake Pillsbury (Lake Co.).	Saturday preceding Memorial Day through the last day in February. Only artificial lures may be used.	2 trout	**G3**
(B) Van Duzen River.			
~~1.~~ Main stem and tributaries ~~above~~upstream of Eaton Falls, located about ½ mile upstream of the mouth of the South Fork (Little Van Duzen) and 2 ½ miles ~~west~~downstream of Dinsmore (Humboldt and Trinity cos).	~~Last Saturday in Apr. through Nov. 15.~~ Saturday preceding Memorial Day through September 30. Only artificial lures may be used.	~~5 trout~~2 trout	**G3**
~~2. Main stem from its junction with the Eel River to the end of Golden Gate Drive near Bridgeville (approximately 4,000 feet upstream from the Little Golden Gate Bridge). Also~~	~~Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Sept. 30. Only barbless hooks may be used from Oct. 1 through Mar. 31.~~	~~Catch and Release of Chinook salmon 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery~~	**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
~~see Low-Flow Restrictions, Section 8.00(a)(3).~~		~~steelhead** in possession.~~	
~~(C) South Fork Eel River from mouth to Rattlesnake Creek. Also see Low-Flow Restrictions, Section 8.00(a)(2).~~	~~Apr. 1 to Fourth Friday in May. Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Sept. 30. Only barbless hooks may be used from Oct. 1 through Mar. 31.~~	~~Closed to all fishing Catch and Release of Chinook salmon 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
	~~Apr. 1 to Fourth Friday in May.~~	~~Closed to all fishing~~	
~~(D) Middle Fork Eel River.~~ (C) Eel River Middle Fork. ~~1. Middle Fork main stem from mouth to Bar Creek. Also see Low-Flow Restrictions, Section 8.00(a)(2).~~	~~Jan. 1 through May 31 and July 16 through Sept. 30. At all times, only artificial lures with barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
	~~Jun. 1 through July 15 and Oct. through Dec. 31.~~	~~Closed to all fishing~~	
~~2. Middle Fork tributaries above Indian Dick/Eel River Ranger Station Road~~ 1. Eel River Middle Fork tributaries (Hammerhorn Creek, Rattlesnake Creek, Beaver Creek, Fly Creek, and Bar Creek) upstream of USFS M1 Road crossing (Mendocino and Trinity cos).	~~Last Saturday in Apr. through Nov.15. Maximum size limit:14 inches total length.~~Saturday preceding Memorial Day through the last day in February. Only artificial lures may be used.	~~5 trout~~2 trout	**G3**
~~3. Middle Fork and tributaries above mouth of Uhl Creek.~~ 2. Eel River Middle Fork and tributaries upstream of mouth of Uhl Creek (Trinity Co.)	~~Last Saturday in Apr. through Nov. 15. Maximum size limit:14 inches total length. Only artificial lures with barbless hooks may be used.~~Saturday preceding Memorial Day through the last day in	2 trout	**G3**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
	February. Only artificial lures may be used.		
~~4.~~ 3. Balm of Gilead Creek~~, and tributaries above falls 1 1/4 miles from mouth.~~upstream of falls located 1.2 mile from mouth and one mile downstream of Wright's Valley Trail crossing (Trinity Co.)	~~Last Saturday in Apr. through Nov. 15. Maximum size limit: 14 inches total length. Only artificial lures with barbless hooks may be used.~~Saturday preceding Memorial Day through the last day in February. Only artificial lures may be used.	2 trout	**G3**
~~5. North Fork of Middle Fork and tributaries above mouth of Willow Creek.~~ 4. Eel River North Fork of the Middle Fork upstream of mouth of Willow Creek (Trinity Co.)	~~Last Saturday in Apr. through Nov. 15. Maximum size limit: 14 inches total length. Only artificial lures with barbless hooks may be used.~~Saturday preceding Memorial Day through the last day in February. Only artificial lures may be used.	2 trout	**G3**
(~~64~~46) El Estero Lake (Monterey Co.) portions of the lake south of the Pearl Street bridge known as Camino Aquajito Arm and Camino El Estero finger.	Closed to all fishing all year.		**J**
~~(65) Elk Creek (Mendocino Co.). Also see Section 8.00(b). Main stem below the confluence of South Fork Elk Creek.~~	~~Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(66) Elk River (Humboldt Co.) downstream from Highway 101 bridge, excluding tributaries.~~	~~Nov. 1 through Mar. 31. Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Oct. 1 through Mar. 31.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or 4 hatchery steelhead** in possession.~~	**HSS**
(~~64~~7) Fall River Complex (Shasta Co.).			

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
~~(A)~~ Fall River from its origin at Thousand Springs downstream to the ~~mouth of the Tule River and including Spring Creek and excluding all other tributaries.~~PG&E Pit #1 Diversion Dam, including all lakes, tributaries, and springs, excluding Bear Creek.	~~Last Saturday in Apr. through Nov. 15. Maximum size limit:14 inches total length. Only artificial lures with barbless hooks may be used.~~Saturday preceding Memorial Day through September 30. Only artificial lures may be used.	2 trout	**F3**
	October 1 through the Friday preceding Memorial Day. Only artificial lures with barbless hooks may be used.	0 trout	**I6**
~~(68) Feather River below Fish Barrier Dam (Butte, Sutter and Yuba cos.).~~			
~~(A) From Fish Barrier Dam to Table Mountain bicycle bridge in Oroville.~~	~~Closed to all fishing all year~~		**HSS**
~~(B) From Table Mountain bicycle bridge to Highway 70 bridge.~~	~~Jan. 1 through July 15. Only barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(C) From Highway 70 bridge to the unimproved boat ramp above the Thermalito Afterbay Outfall.~~	~~All year.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout orhatchery steelhead** in possession.~~	**HSS**
~~(D) From the unimproved boat ramp above the Thermalito Afterbay Outfall to 200 yards above the Live Oak boat ramp.~~	~~Jan. 1 through July 15~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
	~~July 16 through Oct. 15.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession. 3 Chinook Salmon. 6 Chinook Salmon in possession.~~	
	~~Oct. 16 through Dec. 31.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	
~~(E) From 200 yards above Live Oak boat ramp to the mouth. For purposes of this regulation, the lower boundary is defined as a straight line drawn from the peninsula point on the west bank to the Verona Marine boat ramp.~~	~~Jan. 1 through July 15.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
	~~July 16 through Dec. 16.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession. 3 Chinook Salmon. 6 Chinook Salmon in possession.~~	
	~~Dec. 17 to Dec. 31.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	
~~(68.1) Feather River, Middle Fork (Plumas Co.), from the Union Pacific~~	~~First Saturday in April through Nov. 15. possession.~~	~~5 trout per day. 10 trout in~~	**SR**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
~~Railroad Bridge (1/4 mile upstream of County A-23 bridge) to the Mohawk Bridge.~~			
(~~68.2~~48) Feather River North Fork from Belden Bridge downstream to Cresta Powerhouse (excluding reservoirs) (Butte and Plumas ~~Cos.~~cos.).	~~Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used.~~Saturday preceding Memorial Day through the last day in February. Only artificial lures with barbless hooks may be used.	0 trout	**G6**
(~~68.3~~49) Fish Slough (Mono Co.).			
(A) The portions of Fish Slough which lie within the ~~Owens Valley Native Fishes Sanctuary and~~ BLM Springs.	Closed to all fishing all year.		**J**
(B) All other portions of Fish Slough. Also, see Section 5.00(b)(10) for black bass regulations.	~~Last Saturday in Apr. through Nov. 15.~~All year	5 trout	**A1**
	~~Nov. 16 through the Friday preceding the last Saturday in Apr.~~	~~0 trout~~	
~~(69) Freshwater Creek (Humboldt Co.) downstream from bridge at "3 Corners" on the Old Arcata Road, excluding tributaries.~~	~~Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.~~	~~2 hatchery trout hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(69.5) Freshwater Lagoon (Humboldt Co.).~~	~~All year.~~	~~5 trout per day. 10 trout in possession.~~	**SL**
~~(70) Garcia River (Mendocino Co.). Also see Section 8.00(b). Main stem below the Eureka Hill Road bridge.~~	~~Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
(50) George Lake (Lake George, Mono Co.)	Last Saturday in April through November 15.	5 trout	**B1**
(~~7~~151) Golden Trout Wilderness Area (Tulare Co.), excluding the main stem Kern River (see subsection 7.50(b)(69), and the Tule River drainage (See subsection 7.50(b)(154)).	~~Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used.~~ All year. Only artificial lures may be used.	~~5 trout~~2 trout	**A3**
(52) Goose Lake and tributaries (Modoc Co.) excluding Davis Creek (See subsection 7.50(b)(39), and Pine Creek (See subsection 7.50(b)(106)).	Saturday preceding Memorial Day through the last day in February. Only artificial lures with barbless hooks may be used.	0 trout	**G6**
(53) Grant Lake (Mono Co.).	Last Saturday in April through November 15.	5 trout	**B1**
(54) Gull Lake (Mono Co.).	Last Saturday in April through November 15.	5 trout	**B1**
~~(71.5) Grass Valley Creek Reservoir (Trinity Co.).~~	~~All year. Only artificial lures may be used.~~	~~2 trout~~	**SR**
~~(72) Greenwood Creek (Mendocino Co.). Also see Section 8.00(b).~~			
~~Main stem below the log bridge about 1 1/2 miles east of Highway 1.~~	~~Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(72.5) Guadalupe River below Guadalupe Reservoir (Santa Clara Co.) including Los Gatos Ck. Below Vasona Lake, and Alamitos Ck. and Arroyo Calero below Calero Reservoir.~~	~~Last Saturday in April through November 15. Only artificial lures and barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
~~(73) Gualala River (Mendocino and Sonoma cos.). Also see Section 8.00(b). Main stem below the confluence of Wheatfield and South Forks.~~	~~Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31. Fishing from a flotation device is prohibited from Nov. 15 through Feb. 28 from the confluence of the North Fork to the Highway 1 bridge.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
(~~74~~55) Hat Creek (Shasta Co.) from Lake Britton upstream to Baum Lake, exclusive of the concrete Hat No. 2 intake canal between Baum Lake and the Hat No. 2 Powerhouse.	~~Last Saturday in Apr. through Nov.15. Minimum size limit:18 inches total length. Only artificial lures with barbless hooks may be used. Aquatic invertebrates of the orders Plecoptera (stoneflies), Ephemeroptera (mayflies) and Trichoptera (caddisflies) may not be taken or possessed~~ All year. Only artificial lures with barbless hooks may be used.	~~2 trout~~0 trout	**A6**
~~(75) Hat Creek No.1 and Cassel Forebays (Shasta Co.). Those portions of Hat Creek known as No. 1 Forebay and Cassel Forebay.~~	~~Last Saturday in Apr. through Nov. 15~~	~~5 trout per day. 10 trout in possession.~~	**SR**
(~~7~~56) Heenan Lake and tributaries (Alpine Co.).			
(A) Heenan Lake.	~~Only on Fridays, Saturdays, and Sundays from the Friday before Labor Day through the last Sunday in October. Fishing hours: Only from sunrise to sunset. Only artificial lures with barbless hooks may be used.~~September 1 through November 30. Only artificial lures with barbless hooks may be used.	0 trout	**H6**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
(B) Heenan Lake tributaries.	Closed to all fishing all year.		
(~~7~~57) Hennessey Lake tributaries (Napa Co.).	~~Last Saturday in Apr. through Nov. 15~~Saturday preceding Memorial Day through September 30.	~~5 trout.~~ 2 trout. 4 trout in possession.	**F2**
(~~77.3~~58) Hilton Creek (Mono Co.).			
~~(A)~~ Hilton Creek downstream from Crowley Lake Drive.	~~Last Saturday in April through the Friday preceding Memorial Day and Oct. 1 through Nov. 15. Minimum size limit: 18 inches total length. Only artificial lures with barbless hooks may be used.~~ Saturday preceding Memorial Day through September 30.	~~2 trout~~ 5 trout	**F1**
	~~Saturday preceding Memorial Day through Sept. 30. Only artificial lures with barbless hooks may be used.~~	~~5 per day, 10 in possession~~	**Del08**
~~(B) Hilton Creek upstream from Crowley Lake Drive.~~	~~Last Saturday in April through Nov. 15.~~	~~5 trout per day. 10 trout in possession~~	**SR**
(~~77.5~~59) Hobart Creek (Tuolumne Co.), tributary to Spicer Meadows Reservoir.	~~July 1 through Nov. 15.~~ Saturday preceding Memorial Day through September 30. Only artificial lures may be used.	~~5 trout per day. 10 trout in possession.~~ 2 trout	**F3**
(60) Horseshoe Lake (Mono Co.).	Last Saturday in April through November 15.	5 trout	**B1**
(~~78~~61) Hot Creek (Mono Co.). Hot Creek from the State hatchery property line to the confluence with the Owens River.	All year. Only artificial flies with barbless hooks may be used.	0 trout	**A7**
(~~79~~62) Illinois River and tributaries (Del Norte Co.).	Closed to all fishing all year.		**J**
(~~80~~63) Independence Lake and tributaries	NOTE: ALL LAHONTAN CUTTHROAT TROUT TAKEN		

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
(Nevada and Sierra ~~Cos.~~cos.).	SHALL BE IMMEDIATELY RETURNED TO THE WATER		
(A) Independence Lake tributaries and Independence Lake within 300 feet of the mouths of all tributaries.	Closed to all fishing all year.		**J**
(B) Independence Lake except Independence Lake within 300 feet of the mouths of all tributaries.	~~All year Only artificial lures with barbless hooks may be used~~ Saturday preceding Memorial Day through September 30. Only artificial lures with barbless hooks may be used.	~~5 trout per day. 10 trout in possession~~ 0 trout	**F6**
(~~81~~64) Indian Tom Lake (Siskiyou Co.).	All year.	2 trout. 4 trout in possession.	**A2**
~~(82) Inyo County, Southwestern Portion, in all waters bounded by the Inyo County line on the south and west, Independence Creek on the north (open to fishing), and Highway 395 on the east (also see Cottonwood Creek and Diaz Lake Restrictions.)~~	~~First Sat. in March through Nov. 15.~~	~~5 trout per day. 10 trout in possession.~~	**SL, SR**
~~(83) Islay Creek (San Luis Obispo Co.).~~	~~Closed to all fishing all year~~		**HSS**
(65) Isabella Lake (Lake Isabella, Kern Co.)	All year.	5 trout	**A1**
(~~84~~66) Junction Lake and tributaries (Mono Co.) including the lake's outlet stream to Highway 108.	Closed to all fishing all year.		**J**
(67) June Lake (Mono Co.).	Last Saturday in April through November 15.	5 trout	**B1**
~~(84.5) Kaweah River and tributaries (Tulare Co.).~~	~~All year.~~	~~5 trout per day. 10 trout in possession.~~	**SR**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
(~~85~~68) Kent Lake tributaries (Marin Co.).	~~Last Saturday in Apr. through Nov. 15~~Saturday preceding Memorial Day through September 30.	~~5 trout~~2 trout. 4 trout in possession.	**F2**
(~~86~~69) Kern River (Kern and Tulare ~~Cos.~~cos.)			
(A) From Lake Isabella upstream to the Johnsondale bridge.	All year.	5 trout ~~per day. 10 trout in possession.~~	**A1**
(B) From Johnsondale bridge upstream to the ~~point where U.S. Forest Service Trail 33E30 heads east to joint the Rincon Trail.~~Sequoia National Park boundary near the Kern Canyon Ranger Station.	~~Last Saturday in Apr. through Nov. 15. Minimum size limit:14 inches total length.~~ All year. Only artificial lures ~~with barbless hooks~~ may be used.	2 trout	**A3**
	~~Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used.~~	~~0 trout~~	
(C) Downstream of Lake Isabella.	All year.	5 trout	**A1**
~~(C) From the point where U.S. Forest Service Trail 33E30 heads east to join the Rincon Trail upstream to the mouth of Tyndall Creek.~~	~~Last Saturday in Apr. through Nov. 15. Maximum size limit: 10 inches total length for rainbow trout only. Only artificial lures with barbless hooks may be used.~~	~~2 trout~~	**Del09**
(~~87~~70) Kings River (Fresno Co.).			
(A) Kings River, South Fork from its confluence with Copper Creek downstream to the Highway 180 crossing at Boyden Cave.	All year.	2 trout. 4 trout in possession.	**A2**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
(B) Kings River South Fork, from the Highway 180 crossing at Boyden Cave downstream to the main stem; Middle Fork, from the western boundary of Kings Canyon National Park downstream to the main stem; and main stem, from the confluence of the South and Middle forks downstream to Garnet Dike Campground.	All year. Only artificial lures with barbless hooks may be used.	0 trout	**A6**
(C) Kings River, from Garnet Dike Campground downstream to Pine Flat Lake.	All year.	2 trout. 4 trout in possession.	**A2**
(D) Kings River from Pine Flat Dam downstream to U. S. Army Corps of Engineers Bridge on Pine Flat Road.	~~Last Saturday in Apr. through Nov. 15.~~Closed to all fishing all year.	~~5 trout~~	**J**
(E) 1. Kings River from the U.S. Army Corps of Engineers Bridge on Pine Flat Road downstream to Cobbles (Alta) Weir.	All year.	5 trout	**A1**
~~(E)~~2. Kings River Thorburn Spawning Channel, the 2,200-foot-long channel located 5 miles downstream from Pine Flat Dam, and the reach of river within a 200-foot radius of the channel exit.	Closed to all fishing all year.		**J**
(F) Kings River, from Cobbles (Alta) Weir downstream to the Highway 180 crossing.	All year. Only artificial lures with barbless hooks may be used.	0 trout	**A6**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
(G) Kings River from the Highway 180 crossing downstream.	All year.	5 trout	**A1**
~~(88) Reserved.~~			
(~~89~~71) Kirman (Carmen) Lake and all its tributaries (Mono Co.).	Last Saturday in April~~.~~ through ~~Nov.~~ November 15. Only artificial lures may be used. Minimum size limit: ~~16~~ 18 inches total length. ~~Only artificial lures with barbless hooks may be use~~	2 trout	**B5**
~~(90) Kirman (Carmen) Lake tributaries (Mono Co.).~~	~~Closed to all fishing all year.~~		**Del10**
(72) Kitchen Creek (San Diego Co.) upstream of Lake Morena, and all its tributaries.	All year. Only artificial lures may be used.	2 trout	**A3**
(~~91~~73) Klamath River ~~Regulations (See Section 1.74 for salmon punch card requirements.~~			
~~(A)~~ Klamath River main stem and all tributaries above Iron Gate Dam~~,~~ ~~except Shovel Creek and tributaries. The Klamath River main stem within 250 feet of the mouth of Shovel Creek is closed to all fishing November 16 through June 15~~.	~~Last Saturday in Apr. through Nov. 15~~Saturday preceding Memorial Day through September 30.	5 trout ~~per day. 10 trout in possession.~~	**F1**
	October 1 through the Friday preceding Memorial Day. Only artificial lures with barbless hooks maybe used.	0 trout	**I6**
~~(B) Shovel Creek and tributaries above mouth of Panther Creek.~~	~~Last Saturday in Apr. through Nov. 15.~~	~~5 trout~~	**Del11**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
~~(C) Shovel Creek and tributaries up to and including Panther Creek.~~	~~Closed to all fishing all year~~		**Del11**

~~(91.1) Anadromous Waters of the Klamath River Basin Downstream of Iron Gate and Lewiston dams. The regulations in this subsection apply only to waters of the Klamath River Basin which are accessible to anadromous salmonids. They do not apply to waters of the Klamath River Basin which are inaccessible to anadromous salmon and trout, portions of the Klamath River system upstream of Iron Gate Dam, portions of the Trinity River system upstream of Lewiston Dam, and the Shasta River and tributaries upstream of Dwinnel Dam. Fishing in these waters is governed by the General Regulations for non-anadromous waters of the North Coast District (see Section 7.00, subsection (a)(4)).~~

~~(A) Restrictions and Requirements.~~

~~1. Only barbless hooks may be used. (For definitions regarding legal hook types, hook gaps and rigging see Chapter 2, Article 1, Section 2.10.)~~

~~2. During closures to the take of adult salmon, it shall be unlawful to remove any adult Chinook Salmon from the water by any means.~~

~~3. See Section 1.74 for sport fish report card requirements.~~

~~(B) General Area Closures.~~

~~1. No fishing is allowed within 750 feet of any Department of Fish and Wildlife fish-counting weir.~~

~~2. No fishing is allowed from the Ishi Pishi Road bridge upstream to and including Ishi Pishi Falls from August 15 through December 31. EXCEPTION: members of the Karuk Indian Tribe listed on the current Karuk Tribal Roll may fish at Ishi Pishi Falls using hand-held dip nets.~~

~~3. No fishing is allowed from September 15 through December 31 in the Klamath River within 500 feet of the mouths of the Salmon, the Shasta and the Scott rivers and Blue Creek.~~

~~4. No fishing is allowed from June 15 through September 14 in the Klamath River from 500 feet above the mouth of Blue Creek to 500 feet downstream of the mouth of Blue Creek.~~

~~(C) Klamath River Basin Possession Limits.~~

~~1. Trout Possession Limits.~~

~~a. The Brown Trout possession limit is 20.~~

~~b. The hatchery trout or hatchery steelhead possession limits are as follows:~~

~~(i) Klamath River - 4 hatchery trout or hatchery steelhead.~~

~~(ii) Trinity River - 4 hatchery trout or hatchery steelhead.~~

~~2. Chinook Salmon Possession Limits.~~

~~a. Klamath River downstream of the Highway 96 bridge at Weitchpec from January 1 to August 14 and the Trinity River downstream of the Old Lewiston Bridge to the confluence of the South Fork Trinity River from January 1 to August 31: 2 Chinook Salmon.~~

~~b. Klamath River from August 15 to December 31 and Trinity River from September 1 to December 31: 6 Chinook Salmon. No more than 3 Chinook Salmon over 23~~

~~inches total length may be retained when the take of salmon over 23 inches total length is allowed.~~

~~(D) Klamath River Basin Chinook Salmon Quotas.~~

~~The Klamath River fall-run Chinook Salmon take is regulated using quotas. Accounting of the tribal and non-tribal harvest is closely monitored from August 15 through December 31 each year. These quota areas are noted in subsection (b)(91.1)(E) with "Fall Run Quota" in the *Open Season and Special Regulations* column.~~

~~1. Quota for Entire Basin.~~

~~The 2020 Klamath River Basin quota is 7,6371,296 Klamath River fall-run Chinook Salmon over 23 inches total length. The department shall inform the Commission, and the public via the news media, prior to any implementation of restrictions triggered by the quotas. (NOTE: A department status report on progress toward the quotas for the various river sections is updated weekly, and available at 1-800-564-6479.)~~

~~2. Subquota Percentages.~~

~~a. The subquota for the Klamath River upstream of the Highway 96 bridge at Weitchpec and the Trinity River is 50% of the total Klamath River Basin quota.~~

~~(i) The subquota for the Klamath River from 3,500 feet downstream of the Iron Gate Dam to the Highway 96 bridge at Weitchpec is 17% of the total Klamath River Basin quota.~~

~~(ii) The subquota for the Trinity River main stem downstream of the Old Lewiston Bridge to the Highway 299 West bridge at Cedar Flat is 16.5% of the total Klamath River Basin quota.~~

~~(iii) The subquota for the Trinity River main stem downstream of the Denny Road bridge at Hawkins Bar to the confluence with the Klamath River is 16.5% of the total Klamath River Basin quota.~~

~~b. The subquota for the lower Klamath River downstream of the Highway 96 bridge at Weitchpec is 50% of the total Klamath River Basin quota.~~

~~(i) The Spit Area (within 100 yards of the channel through the sand spit formed at the Klamath River mouth) will close when 15% of the total Klamath River Basin quota is taken downstream of the Highway 101 bridge.~~

~~(E) Klamath River Basin Open Seasons and Bag Limits.~~

~~All anadromous waters of the Klamath River Basin are closed to all fishing for all year except those areas listed in the following table. Bag limits are for trout and Chinook Salmon in combination unless otherwise specified.~~

~~***Body of Water***~~	~~***Open Season and Special Restrictions***~~	~~***Daily Bag Limit***~~
~~1. Bogus Creek and tributaries.~~	~~Fourth Saturday in May through August 31. Only artificial lures with barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead.**~~
~~2. Klamath River main stem from 3,500 feet downstream of Iron Gate Dam to the mouth.~~		

~~a. Klamath River from 3,500 feet downstream of the Iron Gate Dam to the Highway 96 bridge at Weitchpec.~~	~~January 1 to August 14.~~	~~0 Chinook Salmon~~ ~~2 hatchery trout or hatchery steelhead**~~
	~~Fall Run Quota 220 Chinook Salmon August 15 to December 31, 2020.~~	~~2 Chinook Salmon - no more than 1 fish over 23 inches total length until subquota is met, then 0 fish over 23 inches total length.~~ ~~2 hatchery trout or hatchery steelhead**~~
	~~Fall Run Quota Exception: Chinook Salmon over 23 inches total length may be retained from 3,500 feet downstream of Iron Gate Dam to the Interstate 5 bridge when the department determines that the adult fall-run Chinook Salmon spawning escapement at Iron Gate Hatchery exceeds 8,000 fish. Daily bag and possession limits specified for fall-run Chinook Salmon apply during this exception.~~	
~~b. Klamath River downstream of the Highway 96 bridge at Weitchpec.~~	~~January 1 to August 14.~~	~~2 Chinook Salmon~~ ~~2 hatchery trout or hatchery steelhead**~~
	~~Fall Run Quota 648 Chinook Salmon August 15 to December 31, 2020.~~	~~2 Chinook Salmon - no more than 1 fish over 23 inches total length until subquota is met, then 0 fish over 23 inches total length.~~ ~~2 hatchery trout or hatchery steelhead**~~
	~~Fall Run Quota Exception: Spit Area (within 100 yards of the channel through the sand spit formed at the Klamath River mouth). This area will be closed to all fishing after 15% of the Total Klamath River Basin Quota has been taken.~~	

	~~All legally caught Chinook Salmon must be retained. Once the adult (greater than 23 inches) component of the total daily bag limit has been retained anglers must cease fishing in the spit area.~~	
~~3. Salmon River main stem, main stem of North Fork downstream of Sawyer's Bar bridge, and main stem of South Fork downstream of the confluence of the East Fork of the South Fork.~~	~~November 1 through February 28.~~	~~2 hatchery trout or hatchery steelhead**~~
~~4. Scott River main stem downstream of the Fort Jones-Greenview bridge to the confluence with the Klamath River.~~	~~Fourth Saturday in May through February 28.~~	~~2 hatchery trout or hatchery steelhead**~~
~~5. Shasta River main stem downstream of the Interstate 5 bridge north of Yreka to the confluence with the Klamath River.~~	~~Fourth Saturday in May through August 31 and November 16 through February 28.~~	~~2 hatchery trout or hatchery steelhead**~~
~~6. Trinity River and tributaries.~~		
~~a. Trinity River main stem from 250 feet downstream of Lewiston Dam to the Old Lewiston Bridge.~~	~~April 1 through September 15. Only artificial flies with barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**~~
~~b. Trinity River main stem downstream of the Old Lewiston Bridge to the Highway 299 West bridge at Cedar Flat.~~	~~January 1 to August 31.~~	~~2 Chinook Salmon~~ ~~10 Brown Trout~~ ~~2 hatchery trout or hatchery steelhead**~~
	~~Fall Run Quota 214 Chinook Salmon September 1 to December 31, 2020.~~	~~2 Chinook Salmon - no more than 1 fish over 23 inches total length until subquota is met, then 0 fish over 23 inches total length.~~ ~~10 Brown trout~~ ~~2 hatchery trout or hatchery steelhead**~~

	~~Fall Run Quota Exception: Chinook Salmon over 23 inches total length may be retained downstream of the Old Lewiston Bridge to the mouth of Indian Creek when the department determines that the adult fall-run Chinook Salmon spawning escapement at Trinity River Hatchery exceeds 4,800 fish. Daily bag and possession limits specified for fall-run Chinook Salmon apply during this exception.~~	
~~c. Trinity River main stem downstream of the Highway 299 West bridge at Cedar Flat to the Denny Road bridge at Hawkins Bar.~~	~~January 1 through August 31.~~	~~2 Chinook Salmon~~ ~~10 Brown Trout~~ ~~2 hatchery trout or hatchery steelhead**~~
	~~September 1 through December 31.~~	~~Closed to all fishing.~~
~~d. New River main stem downstream of the confluence of the East Fork to the confluence with the Trinity River.~~	~~September 15 through November 15. Only artificial lures with barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**~~
~~e. Trinity River main stem downstream of the Denny Road bridge at Hawkins Bar to the mouth of the South Fork Trinity River.~~	~~January 1 to August 31.~~	~~2 Chinook Salmon~~ ~~10 Brown Trout~~ ~~2 hatchery trout or hatchery steelhead**~~
	~~Fall Run Quota 214 Chinook Salmon September 1 through December 31, 2020. This is the cumulative quota for subsections 6.e. and 6.f. of this table.~~	~~2 Chinook Salmon - no more than 1 fish over 23 inches total length until subquota is met, then 0 fish over 23 inches total length.~~ ~~10 Brown Trout~~ ~~2 hatchery trout or hatchery steelhead**~~
~~f. Trinity River main stem downstream of the mouth of the South Fork Trinity River to the confluence with the Klamath River.~~	~~January 1 to August 31.~~	~~0 Chinook Salmon~~ ~~10 Brown Trout~~ ~~2 hatchery trout or hatchery steelhead**~~

	~~Fall Run Quota 214 Chinook Salmon September 1 through December 31, 2020. This is the cumulative quota for subsections 6.e. and 6.f. of this table.~~	~~2 Chinook Salmon - no more than 1 fish over 23 inches total length until subquota is met, then 0 fish over 23 inches total length.~~ ~~10 Brown Trout~~ ~~2 hatchery trout or hatchery steelhead**~~
~~g. Hayfork Creek main stem downstream of the Highway 3 bridge in Hayfork to the confluence with the South Fork Trinity River.~~	~~November 1 through March 31. Only artificial lures with barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**~~
~~h. South Fork Trinity River downstream of the confluence with the East Fork of the South Fork Trinity River to the South Fork Trinity River bridge at Hyampom.~~	~~November 1 through March 31. Only artificial lures with barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**~~
~~i. South Fork Trinity River downstream of the South Fork Trinity River bridge at Hyampom to the confluence with the Trinity River.~~	~~November 1 through March 31.~~	~~0 Chinook Salmon.~~ ~~2 hatchery trout or hatchery steelhead**~~

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
~~(91.2) Special Order Regarding Take of Chinook Salmon in Anadromous Waters of the Klamath River Basin Downstream of Iron Gate and Lewiston dams.~~	~~Notwithstanding subsection (b)(91.1) of Section 7.50, between January 1 and August 14 on the Klamath River and between January 1 and August 31 on the Trinity River, and South Fork Trinity River, Chinook Salmon may not be taken or possessed except as authorized on the identified segments of rivers as listed in the following table. All other restrictions apply.~~		**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
~~(A) Klamath River segment identified in subsection 7.50(b)(91.1)(E)2.b.~~	~~July 1 through August 14~~	~~1 Chinook Salmon 2 Chinook Salmon in possession~~	**HSS**
~~(B) Trinity River segment identified in subsection 7.50(b)(91.1)(E)6.b.~~	~~July 1 through August 31~~	~~1 Chinook Salmon 2 Chinook Salmon in possession~~	**HSS**
~~(C) Trinity River segment identified in subsection 7.50(b)(91.1)(E)6.c.~~	~~July 1 through August 31~~	~~1 Chinook Salmon 2 Chinook Salmon in possession~~	**HSS**
~~(D) Trinity River segment identified in subsection 7.50(b)(91.1)(E)6.e.~~	~~July 1 through August 31~~	~~1 Chinook Salmon 2 Chinook Salmon in possession~~	**HSS**
(~~92~~74) Klopp Lake (Humboldt Co.).	All year. Only artificial lures with barbless hooks may be used.	2 trout	**A6**
~~(93) Laguna de Santa Rosa (Sonoma Co. tributary to Russian River) upstream from Guerneville Road bridge.~~	~~Last Saturday in Apr. through Nov. 15.~~	~~Open to fishing for non- salmonids only. Closed to the take of trout, and steelhead.~~	**HSS**
~~(95) Lagunitas Creek and tributaries (Marin Co).~~	~~Closed to all fishing all year~~		**HSS**
(~~96~~75) Lagunitas Lake (Marin Co.).	All year. ~~Maximum size limit: 14 inches total length. Only artificial lures with barbless hooks may be used~~ Only artificial lures may be used.	2 trout	**A3**
(~~96.5~~76) Lane Lake (Mono Co.).	~~Last Saturday in Apr. through Nov. 15.~~ All year. Only artificial lures may be used.	2 trout	**A3**
~~(98) Lassen Creek and tributaries (Modoc Co.)~~	~~Saturday preceding Memorial Day through Nov. 15. Only artificial lures with barbless hooks may be used.~~	~~0 trout~~	**Del12**
(~~98.5~~77) Laurel Lakes and tributaries (Mono Co.).	~~Last Saturday in Apr. through Nov. 15. Minimum size limit: 14 inches total length. Only artificial lures with barbless hooks may be used~~All year.	2 trout	**A4**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
	Only artificial lures may be used. Minimum size limit: 14 inches total length.		
(~~98.6~~78) Lee Vining Creek from the Lee Vining conduit downstream to Mono Lake (Mono Co.).	~~Last Saturday in Apr. through Nov. 15.~~ Saturday preceding Memorial Day through September 30.	2 trout. 4 trout in possession.	**F2**
	October 1 through the Friday preceding Memorial Day. Only artificial lures with barbless hooks may be used.	0 trout	**I6**
~~(99) Limekiln Creek and tributaries above Highway 1 (Monterey Co.). Also see Low-Flow Restrictions, Section 8.00(c)(9).~~	~~Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
(~~100~~79) Little Butano Creek above the diversion dam at Butano State Park (San Mateo Co.).	~~Last Saturday in Apr. through Nov. 15~~Saturday preceding Memorial Day through September 30. Only artificial lures with barbless hooks may be used.	~~5 trout~~0 trout	**F6**
~~(101) Little Cottonwood Creek and tributaries (Inyo Co.).~~	~~See Cottonwood Creek 7.50(b)(48).~~		
~~(102) Little River (Humboldt Co.) downstream from the County Road bridge at Crannell, excluding tributaries.~~	~~Fourth Saturday in May through Mar. 31. Cutthroat trout minimum size limit: 10 inches total length. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.~~	~~2 cutthroat trout 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(103) Little Sur River and tributaries above Coast Road (Monterey Co.).~~	~~Fourth Saturday in May through Oct. 31. Only artificial lures with barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
(~~103.5~~80) Little Truckee River (Sierra and Nevada ~~Cos.~~cos.) from Stampede Reservoir Dam downstream to Boca Reservoir.	~~Last Saturday in Apr. through Nov. 15. Maximum size limit: 14 inches total length~~. All year. Only artificial lures with barbless hooks may be used.	~~2 trout~~0 trout	**A6**
	~~Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used.~~	~~0 trout~~	**Del13**
~~(104) Llagas Creek (Santa Clara Co.). Also see Low-Flow Restrictions, Section 8.00(c)(5).~~			
~~(A) From mouth to Monterey Highway Bridge.~~	~~Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(B) From Monterey Highway Bridge to Chesbro Dam.~~	~~Closed to all fishing all year~~		**HSS**
~~(104.3) Los Angeles Aqueduct from Owens River to Alabama Gates (Inyo County).~~	~~First Saturday in Mar. through Nov. 15.~~	~~5 trout per day. 10 trout in possession.~~	**SR**
	~~Nov. 16 through the Friday preceding the first Saturday in Mar.~~	~~5 trout~~	
(81) Los Gatos Creek (Santa Clara Co.) upstream of Camden Avenue drop including Lexington Reservoir and all tributaries.	All year. Only artificial lures with barbless hooks may be used.	0 trout	**A6**
~~(104.5) Los Osos Creek (San Luis Obispo Co.).~~	~~Closed to all fishing all year.~~		**HSS**
~~(105) Los Padres Reservoir (Monterey Co.).~~	~~Last Saturday in Apr. through Nov. 15. No rainbow trout less than 10 inches or greater than~~	~~5 trout, no more than 2 of which may be rainbow trout.~~	**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
	~~16 inches total length may be kept. Only artificial lures with barbless hooks may be used.~~		
(82) Lundy Lake (Mono Co.).	Last Saturday in April through November 15.	5 trout	**B1**
(83) Lytle Creek and tributaries upstream of Interstate 15 bridge. (San Bernardino Co.).	All year.	5 trout	**A1**
(~~106~~84) Macklin Creek (Nevada Co.), arising near Milton-Bowman Tunnel alignment, flowing north-westerly and having its junction with the Middle Fork Yuba River about 2 1/4 miles downstream from Milton Reservoir.	Closed to all fishing all year.		**J**
~~(107) Mad River and tributaries (Humboldt Co.).~~			
~~(A) Mad River from the mouth to 200 yards upstream.~~	~~Jan. 1 through Mar. 31. Only artificial lures with barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(B) Mad River main stem, from 200 yards above its mouth upstream to the confluence with Cowan Creek, excluding tributaries. Also see Low-Flow Restrictions, Section 8.00(a)(4).~~	~~Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(C) Mad River main stem, from the confluence with Cowan Creek to the confluence with Deer Creek, excluding tributaries.~~	~~Closed to all fishing all year.~~		**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
~~(D) Mad River main stem from the confluence with Deer Creek to Ruth Dam.~~	~~Fourth Saturday in May through Oct. 31. Only artificial lures with barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(E) Mad River and tributaries above Ruth Dam.~~	~~Last Saturday in May through Nov. 15.~~	~~5 trout per day. 10 trout in possession.~~	**SR**
(85) Mamie Lake (Lake Mamie, Mono Co.).	Last Saturday in April through November 15.	5 trout	**B1**
(~~109~~86) Mammoth Pool (Fresno and Madera ~~Cos.~~cos.).	~~June 16 through Apr. 30.~~All year.	5 trout ~~per day. 10 trout in possession.~~	**A1**
~~(110) Mammoth Pool tributaries (Fresno and Madera Cos.~~cos.~~) from their mouths to a point 300 feet upstream.~~	~~June 16 through Nov. 15~~	~~5 trout per day. 10 trout in possession.~~	**SR**
(~~111~~87) Martis Creek from the Martis Lake dam downstream to the confluence with the Truckee River (Nevada Co.).	~~Last Saturday in Apr. through Nov. 15. Minimum size limit: 14 inches total length. Only artificial lures with barbless hooks may be used.~~All year. Only artificial lures with barbless hooks may be used.	~~2 trout~~ 0 trout	**A6**
(~~112~~88) Martis Lake ~~and~~ tributaries (Nevada and Placer ~~Cos.~~cos.).	All year. Only artificial lures with barbless hooks may be used.	0 trout	
~~(A) Martis Lake.~~	~~Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used~~	~~0 trout~~	**SL**
~~(B) Martis Lake tributaries~~.	~~Closed to all fishing all year~~All year. Only artificial lures with barbless hooks may be used.	0 trout	**A6**
(89) Mary Lake (Lake Mary, Mono Co.).	Last Saturday in April through November 15.	5 trout	**B1**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
~~(113) Mattole River (Humboldt Co.). Also see Section 8.00(a).~~			
~~(A) Mattole River main stem from the mouth to 200 yards upstream.~~	~~Closed to all fishing all year.~~		**HSS**
~~(B) Mattole River main stem from 200 yards upstream of mouth to confluence with Stansberry Creek.~~	~~Jan. 1 through Mar. 31. Only artificial lures with barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(C) Mattole River main stem from confluence with Stansberry Creek to confluence with Honeydew Creek.~~	~~Jan. 1 through Mar. 31 and Fourth Saturday in May through Aug. 31. Only artificial lures with barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
(~~115~~90) McCloud River and tributaries (Shasta and Siskiyou ~~Cos.~~cos.).	~~Also see Sierra District General Regulations Section 7.00(b)).~~		
(A) Moosehead Creek and all tributaries.	Closed to all fishing all year.		**J**
~~(B) McKay Creek and all tributaries including Sheepheaven Spring.~~	~~Closed to all fishing all year.~~		**Del14**
(~~C~~B) Edson Creek ~~and all tributaries, excluding Dry Creek~~.	Closed to all fishing all year.		**J**
(~~D~~C) Swamp Creek and all tributaries.	~~Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used.~~Saturday preceding Memorial Day through the last day in February. Only artificial lures with barbless hooks may be used.	0 trout	**G6**
(D) Sheephaven Creek.	Closed to all fishing all year.		**J**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
(E) Bull Creek and tributaries.	Closed to all fishing all year.		**J**
(F) Dry Creek south of upper McCloud River.	Closed to all fishing all year.		**J**
(~~E~~G) McCloud River from McCloud Dam downstream to confluence of Ladybug Creek.	~~Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used.~~Saturday preceding Memorial Day through September 30. Only artificial lures may be used.	2 trout	**F3**
	October 1 through the Friday preceding Memorial Day. Only artificial lures with barbless hooks may be used.	0 trout	**I6**
(~~F~~H) McCloud River from confluence of Ladybug Creek downstream to ~~lower boundary of the U.S. Forest Service loop (southern boundary of Section 36, T38N, R3W).~~Shasta Lake.	~~Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used.~~All year. Only artificial lures with barbless hooks may be used.	0 trout	**A6**
~~(G) McCloud River from the lower boundary of the U.S. Forest Service loop (southern boundary of Section 36, T38N, R3W) downstream to the upper boundary of the McCloud River Club (southern boundary of Section 14, T37N, R3W).~~	~~Closed to all fishing all year.~~		**Del15**
~~(115.2) McDonald Creek (Humboldt Co.).~~	~~Closed to fishing all year.~~		**HSS**
(~~115.3~~91) McGee Creek (Mono Co.).			
~~(A)~~ McGee Creek downstream from Highway 395.	~~Last Saturday in April through Friday preceding Memorial Day and Oct. 1 through Nov. 15. Minimum size limit: 18 inches total length. Only artificial lures with barbless hooks may be~~	~~2 trout~~5 trout	**F1**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
	~~used.~~Saturday preceding Memorial Day through September 30.		
	~~Saturday preceding Memorial Day through Sept. 30.~~	~~5 trout per day. 10 trout in possession.~~	**Del16**
~~(B) McGee Creek upstream from Highway 395.~~	~~Last Saturday in April through Nov. 15.~~	~~5 trout per day. 10 trout in possession.~~	**SR**
~~(115.4) McKay Creek and all tributaries (Siskiyou Co.)~~	~~See McCloud River 7.50(b)(115).~~		**Del17**
(~~115.6~~92) McLeod Lake (Mono Co.).	~~Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used.~~All year. Only artificial lures with barbless hooks may be used.	0 trout	**A6**
(~~115.8~~93) Meiss Lake (Alpine Co.).	~~Closed to all fishing all year~~ Saturday preceding Memorial Day through September 30. Only artificial lures with barbless hooks may be used.	0 trout	**F6**
~~(116) Mendocino Lake tributaries (Mendocino Co.).~~	~~Last Saturday in Apr. through Nov. 15~~	~~5 trout~~	**SL**
~~(117) Merced River (Mariposa Co.).~~			
~~(A) From the Happy Isles footbridge downstream to the western boundary of Yosemite National Park at El Portal.~~	~~Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used.~~	~~0 rainbow trout. 5 brown trout per day. 10 brown trout in possession.~~	**SR**
~~(B) From the western boundary of Yosemite National Park at El Portal boundary downstream to the Foresta bridge.~~	~~All year. Only artificial lures with barbless hooks may be used.~~	~~0 rainbow trout. 5 brown trout per day. 10 brown trout in possession.~~	**SR**
~~(C) From Foresta bridge downstream to Lake McClure.~~	~~Last Saturday in April through November 15. November 16 through the Friday preceding the last Saturday in April.~~	~~5 trout per day. 10 trout in possession.~~	**SR**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
~~(118) Merced River (Merced Co.).~~			
~~(A) From Crocker-Huffman Dam downstream to the Schaffer bridge on Oakdale Road.~~	~~Jan. 1 through Oct. 31. Only artificial lures with barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(B) From the Schaffer bridge on Oakdale Road downstream to the mouth.~~	~~Jan. 1 through Oct. 31. Bait may be used from Jan. 1 through Oct. 31. However, from April 1 through the Friday preceding the fourth Saturday in May, bait may be used only with single hooks having a gap between 1/2 and 1 inch, or with multiple hooks having a gap between 1/4 and 1/2 inch.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
(~~118.2~~94) Milk Ranch Creek and tributaries (Alpine Co.) above the confluence with the North Fork Mokelumne River.	Closed to all fishing all year.		**J**
(~~118.5~~95) Mill Creek (Mono Co. tributary to West Walker River) and tributaries upstream from confluence with Lost Cannon Creek.	~~Closed to all fishing all year~~ All year. Only artificial flies with barbless hooks may be used.	0 trout	**A7**
~~(119) Mill Creek (Tehama Co.).~~			
~~(A) From the Lassen National Park boundary downstream to the U.S. Geological Survey gauging station cable crossing at the mouth of Mill Creek Canyon.~~	~~Last Saturday in April through Nov. 15. Only artificial lures with barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(B) From U.S. Geological Survey gauging station cable crossing at mouth of Mill Creek Canyon~~	~~June 16 through Sept. 30.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or~~	**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
~~downstream to the mouth of Mill Creek.~~		~~hatchery steelhead** in possession.~~	
(96) Miller Canyon Creek from Silverwood Lake upstream (San Bernardino Co.)	All year.	5 trout	**A1**
(~~120~~97) Milton Lake and Middle Fork Yuba River between Milton Lake and Jackson Meadows Dam (Nevada and Sierra ~~Cos.~~cos.).	~~Last Saturday in Apr. through Nov. 15. Maximum size limit: 12 inches total length. Only artificial lures with barbless hooks may be used~~ All year. Only artificial lures with barbless hooks may be used.	~~2 trout~~ 0 trout	**A6**
(~~122~~98) Mitchell Creek and tributaries (Contra Costa Co.).	Closed to all fishing all year.		**HSS**
~~(124) Mokelumne River (San Joaquin Co.).~~			
~~(A) From Camanche Dam to Elliot Road.~~	~~Jan. 1 through Mar. 31.~~	~~1 hatchery trout or hatchery steelhead**~~	**HSS**
	~~Fourth Saturday in in May through July 15.~~	~~1 hatchery trout or hatchery steelhead**~~	
	~~July 16 through Oct. 15.~~	~~1 hatchery trout or hatchery steelhead**. 2 Chinook salmon.~~	
~~(B) From Elliot Road to the Woodbridge Irrigation District Dam including Lodi Lake.~~	~~Jan. 1 through July 15.~~	~~1 hatchery trout or hatchery steelhead**~~	**HSS**
	~~July 16 through Dec. 31.~~	~~1 hatchery trout or hatchery steelhead**. 2 Chinook salmon.~~	
~~(C) Between the Woodbridge Irrigation District Dam and the~~	~~Closed to all fishing all year~~		**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
~~Lower Sacramento Road bridge.~~			
~~(D) From the Lower Sacramento Road bridge to the mouth. For purposes of this regulation, this river segment is defined as Mokelumne River and its tributary sloughs downstream of the Lower Sacramento Road bridge and east of Highway 160 and north of Highway 12.~~	~~Jan. 1 through July 15.~~	~~1 hatchery trout or hatchery steelhead**~~	**HSS**
	~~July 16 through Dec. 16.~~	~~1 hatchery trout or hatchery steelhead**. 2 Chinook salmon.~~	
	~~Dec. 17 through Dec. 31.~~	~~1 hatchery trout or hatchery steelhead**~~	
(~~125~~99) Mono Creek (Fresno Co.) and tributaries from Edison Lake upstream to the confluence with the North Fork Mono Creek.	~~June 1 through October 15.~~Saturday preceding Memorial Day through September 30.	5 trout ~~per day. 10 trout in possession.~~	**F1**
~~(125.5) Moosehead Creek and tributaries (Shasta and Siskiyou cos.).~~	~~See McCloud River 7.50(b)(115).~~		**Del18**
(~~126~~100) Murray Canyon Creek and tributaries (Alpine Co.) upstream from the falls located about 1/4 mile above the confluence with the East Fork Carson River.	Closed to all fishing all year.		**J**
~~(128) Nacimiento River (Monterey and San Luis Obispo Cos.)~~			
~~(A) From the headwaters in the Los Padres National Forest, downstream to the southern border of Fort Hunter-Liggett Military Reservation.~~	~~Last Saturday in Apr. through Nov. 15~~	~~5 trout~~	**SR**
~~(B) Nacimiento Lake, and the main stem Nacimiento River upstream to the~~	~~All year.~~	~~5 trout~~	**SL**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
~~southern boundary of Fort Hunter-Liggett.~~			
~~(C) Main stem below Nacimiento Dam, downstream to its confluence with the Salinas River.~~	~~Saturday preceding Memorial Day through October 31. Only artificial lures with barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(129) Napa River and tributaries (Napa Co.). Also see Section 8.00(b).~~			
~~(A) Main stem above the Oakville Cross Road Bridge near Yountville and all Napa River tributaries.~~	~~Closed to all fishing all year.~~		**HSS**
~~(B) From the Oakville Cross Road Bridge near Yountville to the Trancas Bridge. Note: The Napa River below the Trancas Bridge is tidewater, and is under the regulations for the Ocean and San Francisco Bay District (see Sections 1.53 and 27.00).~~	~~Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(130) Navarro River (Mendocino Co.). Also see Low-Flow Restrictions, Section 8.00(b)(1). Main stem below the Greenwood Road bridge.~~	~~Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
(~~130.5~~101) Nelson Corral Reservoir and tributary (Lassen Co.).			
(A) Nelson Corral Reservoir.	All year.	2 trout. 4 trout in possession.	**A2**
(B) Nelson Corral Reservoir tributary (the unnamed tributary	Closed to all fishing all year.		**J**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
entering the reservoir at the north end).			
~~(130.6) New Bullards Bar Reservoir.~~	~~All year.~~	~~5 trout. 10 landlocked salmon per day. 20 landlocked salmon in possession.~~	**SL**
(~~131~~102) Newlands Lake tributaries (Lassen Co.).	Closed to all fishing all year.		**J**
(~~132~~103) Nicasio Lake tributaries (Marin Co.).	~~Last Saturday in Apr. through Nov. 15~~ Saturday preceding Memorial Day through September 30.	~~5 trout~~ 2 trout. 4 trout in possession.	**F2**
~~(133) Noyo River (Mendocino Co.). Also see Low-Flow Restrictions, Section 8.00(b)(1).~~			
~~(A) Noyo River main stem from the mouth to the Georgia-Pacific logging road bridge one mile east of Highway 1.~~	~~Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(B) Noyo River main stem from the Georgia-Pacific logging road bridge one mile east of Highway 1 to the confluence with the South Fork Noyo River.~~	~~Fourth Saturday in May through Oct. 1. Only artificial lures with barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead** 4 hatchery trout or hatchery steelhead** in possession~~	**HSS**
~~(C) Noyo River main stem from the confluence with the South Fork Noyo River to the Sonoma/Mendicino Boy Scout Council Camp.~~	~~Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
(~~134~~104) Owens River (Inyo and Mono ~~C~~cos.), ~~including Pleasant Valley and Tinemaha lakes,~~ except (A), (B), (C), and (D) ~~and (E)~~ below.	~~First Saturday in Mar. through Oct. 31.~~All year.	5 trout ~~per day. 10 trout in possession.~~	**A1**
	~~Nov. 1 through the Friday preceding the first Saturday in Mar.~~	~~5 trout~~	**SR**
(A) Upper Owens River from Benton Bridge road crossing upstream to Big Springs. Above Big Springs, see Deadman Creek 7.50(b)(41).	~~Last Saturday in April through Nov. 15. Maximum size limit: 16 inches total length. Only artificial lures with barbless hooks may be used.~~All year. Only artificial lures with barbless hooks may be used.	~~2 trout~~ 0 trout	**A6**
	~~Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used.~~	~~0 trout~~	
(B) Upper Owens River from Benton Bridge road crossing ~~downstream to upper Owens River fishing monument.~~ to Crowley Lake.	~~Saturday preceding Memorial Day through Sep. 30.~~Last Saturday in April through July 31.	5 trout ~~per day. 10 trout in possession.~~	**D1**
	August 1 through November 15. Only artificial lures may be used. Minimum size limit: 18 inches total length.	2 trout	**E5**
~~(C) Upper Owens River from fishing monument (located about 1/4 mile upstream from maximum lake level) to Crowley Lake.~~	~~Last Saturday in April through July 31. Aug. 1 through Nov. 15. Minimum size limit: 18 inches total length. Only artificial lures with barbless hooks may be used.~~	~~5 trout per day. 10 trout in possession. 2 trout~~	**Del19**
(~~D~~C) From Pleasant Valley Dam downstream to footbridge at lower end of Pleasant Valley Campground.	~~Jan. 1 through Sept. 30.~~ Last Saturday in April through November 15.	2 trout. 4 trout in possession.	**B2**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
	~~Oct. 1 through Dec. 31. Only artificial lures with barbless hooks may be used.~~November 16 through the Friday preceding the last Saturday in April. Only artificial lures with barbless hooks may be used.	0 trout	**C6**
(~~E~~D) From footbridge at lower end of Pleasant Valley Campground east (downstream) ~~3.3 miles along Chalk Bluffs Road to the redwood sport fishing regulations sign.~~ to 5 Bridges Road.	All year. Only artificial lures with barbless hooks may be used.	0 trout	**A6**
~~(135) Pajaro River (Monterey, Santa Clara, Santa Cruz and San Benito Cos.) from mouth to Uvas Creek. Also see Low-Flow Restrictions, Section 8.00(c)(5).~~	~~Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(135.4) Lake Pardee.~~	~~All year.~~	~~5 trout. 10 landlocked salmon per day. 20 landlocked salmon in possession.~~	**SL**
(~~135.5~~105) Parker Creek (Mono Co.)~~. from the Lee Vining Conduit to Rush Creek.~~ from Parker Lake to the confluence with Rush Creek.	~~Last Saturday in Apr. though Nov. 15. Only artificial lures with barbless hooks may be used~~ All year. Only artificial lures with barbless hooks may be used.	0 trout	**A6**
~~(135.8) Upper Penitencia Creek (Santa Clara Co.) a tributary to Coyote Ck. Also see Section 8.00(c).~~	~~Closed to all fishing all year~~		**HSS**
~~(136) Pescadero Creek (San Mateo Co.) from mouth to the Stage Road bridge at Pescadero. Also see Low-Flow Restrictions, Section 8.00(c)(2).~~	~~Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless . hooks may be used~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
~~(137) Pescadero Creek tributaries and main stem above the Stage Road bridge at Pescadero (Santa Clara and San Mateo Cos.).~~	~~Closed to all fishing all year.~~		**HSS**
~~(138) Pillsbury Lake tributaries (Lake Co.).~~	~~Last Saturday in Apr. 5 through Nov. 15.~~	~~5 trout~~	**Del20**
~~(139) Pine Creek and Pine Creek Slough (Lassen Co.) See Eagle Lake 7.50(b)(61).~~			**Del21**
~~(A) Pine Creek Slough and Pine Creek below State Highway 44.~~	~~Closed to fishing all year.~~		
~~(B) Pine Creek above State Highway 44.~~	~~Saturday preceding Memorial Day through Nov. 15.~~	~~5 trout per day. 10 trout in possession.~~	
(~~139.5~~106) Pine Creek (Goose Lake Tributary) and tributaries (Modoc Co.).	~~Saturday preceding Memorial Day through November 15. Only artificial lures with barbless hooks may be used.~~Saturday preceding Memorial Day through the last day in February.	~~0 trout~~5 trout	**G1**
(107) Pine Valley Creek (San Diego Co.) upstream of Barrett Lake and all its tributaries.	All year. Only artificial lures may be used.	2 trout	**A3**
~~(139.7) Pinole Creek (Contra Costa Co.) and tributaries.~~	~~Closed to all fishing all year~~		**HSS**
(~~140~~108) Piru Creek (Los Angeles and Ventura ~~Cos.~~cos.).			
(A) Piru Creek and tributaries upstream of Pyramid Lake.	All year. Only artificial lures may be used.	2 trout	**A3**
(B) From Pyramid Dam downstream to the bridge approximately 300 yards below Pyramid Lake.	Closed to all fishing all year.		**J**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
(C) From the bridge approximately 300 yards below Pyramid Lake downstream to the falls about above the old Highway 99 bridge.	All year. Only artificial lures with barbless hooks may be used.	0 trout	**A6**
(~~141~~109) Pit River (Shasta and Modoc cos.).			
~~(A) Pit River (Modoc Co.) from the Hwy 395 bridge/South Fork Pit River crossing near the town of Likely downstream to the Highway 299 (Canby) bridge/Pit River crossing.~~	~~All year.~~	~~0 trout~~	**SR**
(A) Pit River, South Fork (Modoc Co.) and tributaries upstream of the Highway 395 bridge in Likely.	Saturday preceding Memorial Day through the last day in February.	5 trout	**G1**
(B) Pit River, North Fork (Modoc Co.) and tributaries from the confluence with the South Fork in Alturas upstream to (including) Franklin Creek.	Saturday preceding Memorial Day through the last day in February. Only artificial lures may be used.	2 trout	**G3**
(~~B~~C) From Pit No. 3 (Britton Dam) downstream to the outlet of the Pit No. 3 Powerhouse.	~~Last Saturday in Apr. through Nov. 15. Minimum size limit: 18 inches total length.~~ All year. Only artificial lures with barbless hooks may be used.	~~2 trout~~ 0 trout	**A6**
	~~Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used.~~	~~0 trout~~	
(~~C~~D) Pit River, from Pit No. 3 Powerhouse downstream to ~~Pit No. 7 dam~~Shasta Lake.	~~Last Saturday in Apr. through Nov. 15.~~ All year.	~~5 trout~~ 2 trout. 4 trout in possession.	**A2**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
	~~Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used.~~	~~0~~	
~~(D) From Pit No. 7 dam downstream to Shasta Lake.~~	~~All year~~	~~5~~	**Del22**
(~~143~~110) Pole Creek and tributaries (Placer Co.)	Closed to all fishing all year.		**J**
(~~144~~111) Portuguese Creek, West Fork (Madera Co.) from headwaters downstream to confluence with the East Fork Portuguese Creek.	~~Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used~~ Saturday preceding Memorial Day through the last day in February. Only artificial lures with barbless hooks may be used.	0 trout	**G6**
(~~145~~112) Prosser Creek from the Prosser Reservoir dam downstream to the confluence with the Truckee River (Nevada Co.)	~~Last Saturday in Apr. through Nov. 15. Minimum size limit: 14 inches total length. Only artificial lures with barbless hooks may be used.~~ All year. Only artificial lures with barbless hooks may be used.	~~2 trout.~~0 trout	**A6**
(~~146~~113) Purisima Creek (San Mateo Co.).	~~Last Saturday in Apr. through Nov. 15~~ Saturday preceding Memorial Day through September 30. Only artificial lures with barbless hooks may be used.	~~5 trout~~0 trout	**F6**
(~~147~~114) Putah Creek (Solano and Yolo ~~Cos.~~cos.) ~~from~~ Solano Lake to Monticello Dam.	All year. Only artificial lures ~~and~~with barbless hooks may be used.	0 trout	**A6**
(~~148~~115) Redwood Creek and tributaries (Alameda Co.).	Closed to all fishing all year.		**J**
~~(149) Redwood Creek and tidewaters (Marin Co.)~~	~~Closed to all fishing all year~~		**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
(~~150~~116) Redwood Creek (Humboldt Co.). ~~Also see Section 8.00(a).~~ and tributaries above the mouth of Bond Creek.	Closed to all fishing all year.		**J**
~~(A) Redwood Creek main stem, within a radius of 200 yards of its mouth.~~	~~Jan. 1 through Mar. 31. Only artificial lures with barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(B) Redwood Creek main stem, from 200 yards above the mouth to the mouth of Prairie Creek.~~	~~Fourth Saturday in May through Mar. 31. Only barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(C) Redwood Creek main stem, from the mouth of Prairie Creek to the mouth of Bond Creek.~~	~~Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(D) Redwood Creek and tributaries, above the mouth of Bond Creek.~~	~~Closed to all fishing all year.~~		**HSS**
(~~150.5~~117) Robinson Creek (Mono Co.).			
(A) From the U.S. Forest Service boundary downstream to Upper Twin Lake.	~~Last Saturday in April through Sept. 14~~ Saturday preceding Memorial Day through September 30.	5 trout	**F1**
	~~Sept. 15 through Nov. 15. Only artificial lures with barbless hooks may be used.~~	~~0 trout.~~	
(B) Between Upper and Lower Twin Lakes.	~~Last Saturday in April through Sept. 14.~~Saturday preceding Memorial Day through September 30.	5 trout	**F1**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
(~~151~~118) Rock Creek Diversion Channel (Mono Co.)~~. Rock Creek Diversion Channel~~ from its source below Tom's Place to its confluence with Crooked Creek.	Closed to all fishing all year.		**J**
(119) Rock Creek Lake (Mono Co.).	Last Saturday in April through November 15.	5 trout	**B1**
(~~151.5~~120) Rock Creek in the Hat Creek Drainage (Shasta Co.) from Rock Creek spring (origin) downstream to Baum Lake.	Closed to all fishing all year.		**J**
(~~152~~121) Rock Creek (Shasta Co.) from its confluence with Pit River to Rock Creek Falls (about one mile upstream).	Closed to all fishing all year.		**J**
(~~152.5~~122) Roosevelt Lake (Mono Co.).	~~Last Saturday in Apr. through Nov. 15.~~All year. Only artificial lures may be used.	2 trout	**A3**
~~(153~~123) Rush Creek (Mono Co.)			
(A) only from Grant Lake Dam downstream to Mono Lake.	~~Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used~~ All year. Only artificial lures with barbless hooks may be used.	0 trout	**A6**
(B) Rush Creek (Mono Co.) between Silver Lake and Grant Lake	Saturday preceding Memorial Day through September 30.	5 trout	**F1**
~~(154) Russian Gulch and tributaries (Sonoma Co.). Main stem below the confluence of the East~~	~~Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery~~	**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
~~Branch. Also see Section 8.00(b).~~	~~barbless hooks may be used from Nov. 1 through Mar. 31.~~	~~steelhead** in possession.~~	
~~(155) Russian River and tributaries (Sonoma and Mendocino Cos.). Also see Section 8.00(b).~~			
~~(A) Russian River main stem below the confluence of the East Branch Russian River. (See also Mendocino Lake tributaries (7.50(b)(116)).~~	~~All Year. Only artificial lures with barbless hooks may be used from Apr. 1 through Oct. 31 Only barbless hooks may be used from Nov. 1 through Mar. 31.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(B) Russian River main stem above the confluence of the East Branch and all River tributaries. (See Laguna de Santa Rosa 7.50(b)(93) and Santa Rosa Creek 7.50(b)(172) for non-salmonids only.)~~	~~Closed to all fishing all year.~~		**HSS**
~~(C) Russian River within 250 feet of the Healdsburg Memorial Dam.~~	~~Closed to all fishing all year.~~		**HSS**
(124) Sabrina Lake (Lake Sabrina, Inyo Co.).	Last Saturday in April through November 15.	5 trout	**B1**
(~~156~~125) Sacramento River and tributaries above Keswick Dam (Shasta and Siskiyou ~~Cos.~~cos.).	~~Also see Sierra District General Regulations (See Section 7.00(b)).~~		
(A) Sacramento River and tributaries from Box Canyon Dam downstream to the Scarlett Way bridge in Dunsmuir.	All Year. Only artificial lures with barbless hooks may be used.	0 trout	**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
(B) Sacramento River and tributaries ~~excluding Soda Creek~~ from Scarlett Way bridge downstream to the county bridge at Sweetbriar ~~(See Soda Creek 7.50(b)(180.5))~~.	~~Last Saturday in Apr. through Nov. 15.~~Saturday preceding Memorial Day through September 30.	5 trout ~~per day. 10 trout in possession.~~	**F1**
	October 1 through the Friday preceding Memorial Day. Only artificial lures may be used.	2 trout	**I3**
(C) Sacramento River ~~mainstem (excluding tributaries)~~ and tributaries from the ~~Scarlett Way bridge downstream to the~~ county bridge at Sweetbriar downstream to Shasta Lake.	~~Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used.~~All year. Only artificial lures may be used.	~~0 trout~~2 trout	**A3**
~~(D) Sacramento River and tributaries excluding Castle Creek from the county bridge at Sweetbriar downstream to Shasta Lake (See Castle Creek 7.50(b)(39.3)).~~	~~Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used.~~	~~2 trout~~	**Del23**
~~(E) Sacramento River mainstem (excluding all tributaries) from the county bridge at Sweetbriar downstream to Shasta Lake.~~	~~Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used.~~	~~0 trout~~	
~~(156.5) Sacramento River and tributaries below Keswick Dam (Butte, Colusa, Contra Costa, Glenn, Sacramento, Shasta, Solano, Sutter, Tehama and Yolo Cos.). [Use new language]~~	~~Also see Sierra District General Regulations (See Section 7.00(b)).~~		**HSS**
~~(A) Sacramento River from Keswick Dam to 650 feet below Keswick Dam.~~	~~Closed to all fishing all year.~~		**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
~~(B) Sacramento River from 650 feet below Keswick Dam to the Deschutes Road bridge.~~			**HSS**
~~1. Sacramento River from 650 feet below Keswick Dam to the Highway 44 bridge.~~	~~Jan. 1 to Mar. 31. Only barbless hooks may be used. Closed to all fishing from Apr. 1 through July 31. Aug. 1 to Dec. 31. Only barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession. 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~2. Sacramento River from the Highway 44 bridge to the Deschutes Road bridge.~~	~~All year. Only barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(C) Sacramento River from the Deschutes Road bridge to the Red Bluff Diversion Dam.~~	~~Jan. 1 through July 31.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
	~~Aug. 1 through Dec. 31.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession. 2 Chinook Salmon. 4 Chinook Salmon in possession.~~	
~~(D) Sacramento River from the Red Bluff~~	~~Jan. 1 through July 15.~~	~~2 hatchery trout or hatchery~~	**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
~~Diversion Dam to the Hwy 113 bridge near Knights Landing.~~		~~steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	
	~~July 16 through Dec. 16.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession. 1 Chinook Salmon. 2 Chinook Salmon in possession.~~	
	~~Dec. 17 through Dec. 31.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	
~~(E) Sacramento River from the Hwy 113 bridge near Knights Landing to the Carquinez Bridge (includes Suisun Bay, Grizzly Bay and all tributary sloughs west of Highway 160).~~	~~Jan. 1 through July 15.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
	~~July 16 through Dec. 16.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession. 1 Chinook Salmon. 2 Chinook Salmon in possession.~~	
	~~Dec. 17 through Dec. 31.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery~~	

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
		~~steelhead** in possession.~~	
(~~157~~126) Sagehen Creek (Nevada Co.).			
(A) From the stream gauging station (located about 1/8 ~~one-eighth~~ mile below Sagehen Creek Station Headquarters) upstream to about 1/8 ~~one-eighth~~ of a mile above the station headquarters at a point where the stream splits into two sections.	Closed to all fishing all year.		**J**
(B) From the Highway 89 bridge upstream to the gauging station at the east boundary of the Sagehen Creek Station.	~~Last Saturday in Apr. through Nov. 15 Only artificial lures with barbless hooks may be used~~ All year. Only artificial lures with barbless hooks may be used.	0 trout	**A6**
~~(158) Salinas River and tributaries (Monterey and San Luis Obispo Cos.). Also see Section 8.00(c).~~			
~~(A) The main stem Salinas River.~~	~~Dec. 1 through Mar. 7, but only on Sat., Sun.,Wed., legal holidays and opening and closing days. Only barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(B) All Salinas River tributaries upstream of Arroyo Seco River confluence (including the San Antonio River below San Antonio Reservoir and Dam, Paso Robles Creek and tributaries, Atascadero Creek, Santa Margarita Creek and~~	~~Last Saturday in Apr. through Nov. 15. Only barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
~~tributaries but excluding the Nacimiento River) See 7.50(b)(128).~~			
~~(159) Salmon Creek and tributaries (Sonoma Co.). Also see Section 8.00(b).~~			
~~(A) Salmon Creek main stem below Highway 1.~~	~~Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(B) Salmon Creek main stem above Highway 1 and all Salmon Creek tributaries.~~	~~Closed to all fishing all year~~		**HSS**
(~~160~~127) Salmon Creek and tributaries above Highway 1 (Monterey Co.).	~~Last Saturday in Apr. through Nov. 15~~ Saturday preceding Memorial Day through September 30. Only artificial lures with barbless hooks may be used.	~~5 trout~~0 trout	**F6**
~~(161) Salmon River (Siskiyou Co.)~~	~~See Klamath River 7.50(b)(91.1).~~		**HSS**
~~(163) San Benito River and tributaries (San Benito Co.).~~	~~Last Saturday in Apr. through Nov. 15~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(164) San Clemente Creek and tributaries (Monterey Co.) except for Trout Lake.~~	~~Last Saturday in Apr. through Nov. 15 Only artificial lures with barbless hooks may be used~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(165.2) San Diego Creek (Orange Co.). Downstream of the~~	~~Saturday preceding Memorial Day through Nov. 30.Only artificial lures with barbless hooks may be used.~~	~~Open to fishing for non- salmonids only. Closed to the~~	**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
~~MacArthur Blvd. bridge only.~~		~~take of trout, and steelhead.~~	
~~(166) San Francisquito Creek and tributaries (Santa Clara and San Mateo Cos.)~~	~~Closed to all fishing all year~~		**HSS**
(~~167~~128) San Gabriel River, West Fork and tributaries (Los Angeles Co.).			
(A) Upstream of Cogswell Dam (including Cogswell Reservoir and its tributaries).	All year. Only artificial lures may be used.	2 trout	**A3**
(B) From Cogswell Dam downstream to the second bridge upstream from the Highway 39 bridge.	All year. Only artificial lures with barbless hooks may be used.	0 trout	**A6**
~~(167.2) San Gabriel River (Los Angeles and Orange Cos.) Upstream of the Highway 22 bridge to the start of concrete-lined portion of the river channel.~~	~~Saturday preceding Memorial Day through Nov. 30. Only artificial lures with barbless hooks may be used.~~	~~Open to fishing for non- salmonids only. Closed to the take of trout, and steelhead.~~	**HSS**
~~(168) San Gregorio Creek (San Mateo Co.) from the mouth to the Stage Road bridge at San Gregorio. Also see Low-Flow Restrictions, Section 8.00(c)(2).~~	~~Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(168.5) San Joaquin River (Fresno, Madera, Merced, San Joaquin, and Stanislaus Cos.).~~			
~~(A) From Friant Dam downstream to the Highway 140 bridge.~~	~~All year.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
~~(B) From the Highway 140 bridge downstream to the Interstate 5 bridge at Mossdale.~~	~~All year.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(168.6) San Juan Creek main stem (Orange Co.).~~	~~Closed to all fishing all year.~~		**HSS**
~~(169) San Lorenzo River (Santa Cruz Co.) from the mouth to the Lomond Street bridge in the town of Boulder Creek. Also see Section 8.00(c).~~	~~Dec. 1 through Mar. 7, but only on Sat., Sun.,Wed., legal holidays and opening and closing days. Only barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(170) San Luis Obispo Creek (San Luis Obispo Co.) from mouth to the first and most southwestern highway 1/101 bridge.~~	~~Dec. 1 through Mar. 7, but only Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(170.1) San Luis Rey River (San Diego Co.).~~	~~Closed to all fishing all year.~~		**HSS**
(129) San Luis Rey River West Fork (San Diego Co.).	All year. Only artificial lures may be used.	2 trout	**A3**
~~(170.5) San Mateo Creek and tributaries downstream from the falls between the Tenaja Road crossing and Fisherman's Camp (San Diego and Riverside cos.).~~	~~Closed to all fishing all year.~~		**HSS**
~~(171) San Simeon Creek (San Luis Obispo Co.) from mouth to the pedestrian bridge in San Simeon Beach State Park.~~	~~Dec. 1 through Mar. 7, but only Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
(130) Santa Ana River and tributaries upstream above Seven Oaks Dam. (San Bernardino County). This does not include Bear Creek. See Subsection 7.50(b)(8), Bear Creek (San Bernardino Co.) for additional info.	All year.	5 trout	**A1**
~~(171.6) Santa Margarita River and tributaries downstream from the Interstate 15 bridge (San Diego and Riverside cos.).~~	~~Closed to all fishing all year.~~		**HSS**
~~(171.7) Santa Paula Creek and tributaries above the falls located 3 miles upstream from the Highway 150 bridge (Ventura Co.).~~	~~All year.~~	~~5 trout~~	**SR**
~~(172) Santa Rosa Creek (Sonoma Co. tributary to Russian River) from Laguna de Santa Rosa to Highway 12 bridge.~~	~~Last Saturday in Apr. through Nov. 15.~~	~~Open to fishing for non- salmonids only. Closed to the take of trout, and steelhead.~~	**HSS**
~~(172.3) Santa Ynez River and tributaries downstream from Bradbury Dam (Santa Barbara Co.).~~	~~Closed to all fishing all year.~~		**HSS**
(~~172.5~~131) Santa Ynez River and tributaries upstream of Gibraltar Dam (Santa Barbara Co.).	All year.	2 trout. 4 trout in possession.	**A2**
(~~172.7~~132) Sausal Creek and tributaries (Alameda Co.).	Closed to all fishing all year.		**J**
~~(173) Scott Creek (Santa Cruz Co.) from mouth to confluence with Big Creek. Also see Low-Flow Restrictions, Section 8.00(c)(3).~~	~~Dec. 1 through Mar. 7, but only Sat., Sun.,Wed., legal holidays and opening and closing days. Only barbless hooks may be used~~	~~0 trout~~	**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
~~(174) Scott River (Siskiyou Co.).~~	~~See Klamath River 7.50(b)(91.1).~~		**HSS**
~~(174.1) Scotts Flat Reservoir, upper~~	~~All year.~~	~~5 trout per day. 10 trout in possession. 10 landlocked salmon per day. 20 landlocked salmon in possession.~~	**SL**
~~(174.3) See Canyon Creek (San Luis Obispo Co.).~~	~~Closed to all fishing all year.~~		**HSS**
(~~174.5~~133) Sespe Creek and tributaries above Alder Creek confluence. (Ventura Co.).	All year. Only artificial lures with barbless hooks may be used.	0 trout	**A6**
~~(175) Shasta Lake (Shasta Co.).~~	~~All year~~	~~5 trout~~	**SL**
~~(176) Shasta River (Siskyou Co.).~~	~~See Klamath River 7.50(b)(91.1).~~		**HSS**
~~(176.5) Sheepheaven Spring (Siskiyou Co.).~~	~~See McCloud River 7.50(b)(115).~~		**Del24**
~~(177) Shovel Creek and tributaries (Siskiyou Co.).~~	~~See Klamath River 7.50(b)(91).~~		**Del25**
(~~177.2~~134) Silver Creek (Mono Co.), tributary to West Walker River, and tributaries upstream from Silver Falls.	Closed to all fishing all year.		**J**
(~~177.5~~135) Silver Creek ~~between Sworinger Lake and Lost Lake~~ and all other tributaries to Sworinger Lake (Modoc and Lassen ~~Cos.~~cos.).	~~Closed to all fishing all year~~ Saturday preceding Memorial Day through the last day in February. Only artificial lures may be used.	2 trout	**G3**
(~~178~~136) Silver King Creek and tributaries (Alpine Co.) upstream of the confluence with Snodgrass Creek.	Closed to all fishing all year.		**J**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
(137) Silver Lake (Mono Co.).	Last Saturday in April through November 15.	5 trout	**B1**
~~(178.5) Sisquoc River and tributaries (Santa Barbara Co.).~~	~~Closed to all fishing all year.~~		**HSS**
(~~179~~138) Slinkard Creek and tributaries (Mono Co.) upstream from a Department of Fish and ~~Game cable crossing located about 2.7 miles south of a point on Highway 89 two miles west of its junction with Highway 395 (the cable is located about 600 feet below a rock dam on Clinkard Creek within the south half of Section 21, T9N, R22E).~~Wildlife rock gabbion barrier (38.606976°N, 119.567687°W). The barrier is located approximately 5-6 miles upstream from the Hwy 89 and 395 junction.	~~Aug. 1 through Nov. 15. Only artificial flies with barbless hooks may be used.~~All year. Only artificial flies with barbless hooks may be used.	0 trout	**A7**
~~(180) Smith River (Del Norte Co.) Yearly limits apply for entire river.~~	~~Low-Flow Restrictions, Section 8.00, also apply, see below for more detail.~~		
~~(A) Main stem from the mouth to confluence of Middle and South forks. Also see Low-Flow Restrictions, Section 8.00(a)(7).~~	~~Fourth Saturday in May through Apr. 30. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Aug. 31. Only barbless hooks may be used from Sep. 1 through Apr. 30.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession. 2 cutthroat trout minimum size limit: 10 inches total length. 1 Chinook Salmon and no more than 5 wild Chinook Salmon*~~	**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
		~~over 22 inches per year.~~	
~~(B) Middle Fork Smith River~~			
~~1. from mouth to Patrick Creek Also see Low-Flow Restrictions, Section 8.00(a)(7).~~	~~Fourth Saturday in May through Apr. 30. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Aug. 31. Only barbless hooks may be used from Sep. 1 through Apr. 30.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession. 2 cutthroat trout minimum size limit: 10 inches total length. 1 Chinook Salmon and no more than 5 wild Chinook salmon* over 22 inches per year.~~	**HSS**
~~2. above the mouth of Patrick Creek. Also see Low-Flow Restrictions, Section 8.00(a)(7).~~	~~Fourth Saturday in May through Oct. 31. Only artificial lures with barbless hooks may be used.~~	~~2 cutthroat trout minimum size limit: 10 inches total length. 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(C) South Fork Smith River~~			
~~1. from the mouth upstream approximately 1,000 feet to the County Road (George Tryon) bridge and Craigs Creek to Jones Creek. Also see Low-Flow Restrictions, Section 8.00(a)(7).~~	~~Fourth Saturday in May through Apr. 30. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Aug. 31. Only barbless hooks may be used from Sep. 1 through Apr. 30.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession. 2 cutthroat trout minimum size limit: 10 inches total length. 1 Chinook salmon and no~~	**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
		~~more than 5 wild Chinook salmon* over 22 inches per year.~~	
~~2. from the George Tryon bridge upstream to the mouth of Craigs Creek. Also see Low-Flow Restrictons, Section 8.00(a)(7).~~	~~Closed to fishing all year.~~		**HSS**
~~3. above the mouth of Jones Creek. Also see Low-Flow Restrictions, Section 8.00(a)(7).~~	~~Fourth Saturday in May through Oct. 31. Only artificial lures with barbless hooks may be used.~~	~~2 cutthroat trout minimum size limit: 10 inches total length. 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(D) North Fork Smith River.~~			
~~1. from the mouth to Stony Creek. Also see Low-Flow Restrictions, Section 8.00(a)(7).~~	~~Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Aug. 31. Only barbless hooks may be used from Sep. 1 through Mar. 31.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession. 2 cutthroat trout minimum size limit: 10 inches total length. 1 Chinook salmon and no more than 5 wild Chinook salmon* over 22 inches per year.~~	**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
~~2. above the mouth of Stony Creek.~~	~~Fourth Saturday in May through Oct. 31. Only artificial lures with barbless hooks may be used.~~	~~2 cutthroat trout minimum size limit: 10 inches total length. 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(180.5) Soda Creek (Shasta Co.)~~	~~Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used.~~	~~0 trout~~	**Del26**
(~~180.6~~139) Solano Lake (Solano Co.).	All year. Only artificial lures and barbless hooks may be used.	0 trout	**A6**
(~~181~~140) Sonoma Creek and tributaries (Sonoma Co.)~~.~~ ~~(A) Sonoma Creek and tributaries~~ above the Sonoma Creek seasonal waterfall in Sugarloaf Ridge State Park (located 0.2 miles upstream of the west end of the Canyon Trail).	~~Last Saturday in Apr. through Nov. 15.~~Saturday preceding Memorial Day through September 30. Only artificial lures with barbless hooks may be used.	~~5 trout~~0 trout	**F6**
~~(B) Sonoma Creek and tributaries between the Sonoma Creek seasonal waterfall in Sugarloaf Ridge State Park (located 0.2 miles upstream of the west end of the Canyon Trail) and the Highway 121 bridge. Note: Sonoma Creek below the Highway 121 Bridge is tidewater, and is regulated by regulations for the Ocean and San Francisco Bay District (see sections 1.53 and 27.00).~~	~~Closed to all fishing year.~~		**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
(~~181.8~~141) Sonoma Lake (Sonoma Co.).	All year	2 trout. 4 trout in possession.	**A2**
(~~182~~142) Sonoma Lake tributaries (Sonoma Co.).	~~Last Saturday in April through Apr. 15.~~Saturday preceding Memorial Day through September 30. Only artificial lures may be use.	2 trout	**F3**
(~~184~~143) Soulajoule Lake tributaries (Marin Co.).	~~Last Saturday in Apr. through Nov. 15~~Saturday preceding Memorial Day through September 30.	~~5 trout~~2 trout. 4 trout in possession.	**F2**
(144) South Lake (Inyo Co.).	Last Saturday in April through November 15.	5 trout	**B1**
(~~185~~145) Squaw Valley Creek and tributaries (Shasta Co.). ~~only from the bridge crossing on U. S. Forest Service road (#39N21) located one-eighth mile upstream of the mouth of Cabin Creek (Northwest 1/4 of Section 14, T38N, R3W) downstream to an including Tom Dow Creek.~~	~~Last Saturday in Apr. through Nov. 15~~All year. Only artificial lures with barbless hooks may be used.	~~2 trout~~0 trout	**A6**
~~(186) Stanislaus River (Calaveras, San Joaquin, Stanislaus and Tuolumne Cos.).~~			
~~(A) From Goodwin Dam down- stream to the Highway 120 bridge in Oakdale.~~	~~Jan. 1 through Oct. 31. Only artificial lures with barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(B) From the Highway 120 bridge in Oakdale to the mouth.~~	~~Jan. 1 through Oct. 31. Bait may be used from Jan. 1 through Oct. 31. However, from April 1 through the Friday preceding the fourth Saturday in May, bait may be used only~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery~~	**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
	~~with single hooks having a gap between 1/2 and 1 inch, or with multiple hooks having a gap between 1/4 and 1/2 inch.~~	~~steelhead** in possession.~~	
(~~187~~146) Stanislaus River, Middle Fork (Tuolumne Co.).			
(A) From Beardsley Dam downstream to the U. S. Forest Service footbridge at Spring Gap (including the Beardsley Afterbay).	~~Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used.~~All year. Only artificial lures may be used.	2 trout	**A3**
(B) From the U.S. Forest Service footbridge at Spring Gap to New Melones Reservoir.	~~Last Saturday in Apr. through Nov. 15~~All year.	2 trout. 4 trout in possession.	**A2**
~~(187.5) Stevens Creek (Santa Clara Co.) downstream of Stevens Reservoir.~~	~~Last Saturday in April through Nov. 15. Only artificial lures with barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(188) Stone Lagoon (Humboldt Co.).~~	~~All year. Only artificial lures with barbless hooks may be used. Cutthroat trout minimum size limit: 14 inches.~~	~~2 cutthroat trout 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
(147) Stevens Creek and all tributaries upstream of Stevens Creek Reservoir (Santa Clara Co.).	All year. Only artificial lures with barbless hooks may be used.	0 trout	**A6**
(~~189~~148) Stony Creek, and tributaries (including the North, South, and Middle forks) from the headwaters downstream to the diversion dam west of Stonyford in the center of Section 35, T18N, R7W	All year. Only artificial lures with barbless hooks may be used.	0 trout	**A6**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
(Colusa, Glenn and Lake ~~Cos~~cos.).			
~~(A) From the headwaters downstream to the diversion dam west of Stonyford in the center of Section 35, T18N, R7W, except the portion of Stony Creek Middle Fork from Red Bridge upstream.~~	~~Last Saturday in April through Nov. 15.~~	~~5 trout per day. 10 trout in possession.~~	**Del27**
	~~Nov. 16 through the Friday preceding the last Saturday in April. Only artificial lures with barbless hooks may be used.~~	~~0 trout~~	
~~(B) Stony Creek Middle Fork from Red Bridge upstream.~~	~~Last Saturday in April through Nov. 15. Only artificial lures with barbless hooks may be used.~~	~~2 trout~~	**Del27**
	~~Nov. 16 through the Friday preceding the last Saturday in April. Only artificial lures with barbless hooks may be used.~~	~~0 trout~~	
(~~189.5~~149) Susan River (Lassen ~~County~~Co.) ~~from the confluence of Willard Creek and the Susan River, downstream to the Bizz Johnson trail bridge located approx. 1/4 mi. downstream from the 3 mi. marker on the Bizz Johnson trail. Also, see Section 8.10 for special open season for youths participating in Youth Fishing Derby.~~	~~Last Saturday in April through November 15. Only artificial lures with barbless hooks may be used.~~Saturday preceding Memorial Day through the last day in February.	~~0 trout~~5 trout	**G1**
~~(189.8) Swamp Creek and all tributaries (Siskiyou Co.).~~	~~See McCloud River 7.50(b)(115).~~		**Del28**
(~~190~~150) Sweetwater River and tributaries ~~downstream~~ upstream of ~~from the~~ Sweetwater ~~Dam~~ Reservoir (San Diego Co.).	~~Closed to all fishing all year.~~All year. Only artificial lures may be used.	2 trout	**A3**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
~~(191) Sworinger Lake tributaries (Modoc and Lassen cos.) upstream to the first lake.~~	~~Closed to all fishing all year~~.		**Del29**
(~~192~~151) Tahoe Lake and tributaries (Placer and El Dorado cos.).			
(A) Tahoe Lake tributaries upstream to the first lake.	~~July 1 through Sept. 30~~ Saturday preceding Memorial Day through September 30. Only artificial lures with barbless hooks may be used.	~~5 trout per day. 10 trout in possession.~~0 trout	**F6**
~~(B) Tahoe Lake except (192)(C) below.~~	~~All year.~~	~~5 trout~~	**SL**
(~~C~~B) Tahoe Lake within 300 feet of the mouth of its tributaries.	~~July 1 through Sept. 30.~~ Saturday preceding Memorial Day through September 30. Only artificial lures with barbless hooks may be used.	~~5, trout but no more than 2 mackinaw trout.~~0 trout	**F6**
~~(193) Ten Mile River Mendocino Co.). Also see Section 8.00(b)(1). Ten Mile River main stem below the confluence with the Ten Mile River North Fork, and the Ten Mile River North Fork below the confluence with Bald Hill Creek.~~	~~Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct 31. Only barbless hooks may be used from Nov. 1 through May 31.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(193.5) Topanga Canyon Creek and tributaries (Los Angeles Co.).~~	~~Closed to all fishing all year.~~		**HSS**
~~(194) Topaz Lake (Mono Co.).~~	~~Jan. 1 through Sept. 30~~	~~5 trout~~	**SL**
~~(194.5) Trabuco Creek (a.k.a. Arroyo Trabuco Creek) (Orange Co.). Downstream of the I-5 bridge to the confluence with San Juan Creek~~	~~Closed to all fishing all year.~~		**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
~~(194.6) Trinity Reservoir.~~	~~All year.~~	~~5 trout per day. 10 trout in possession. 10 landlocked salmon per day. 20 landlocked salmon in possession.~~	**SL**
~~(195) Trinity River and tributaries downstream of Lewiston Dam.~~	~~See Klamath River 7.50(b)(91.1)~~		**HSS**
(~~195.1~~152) Trinity River, above Trinity ~~Dam~~Lake (Trinity Co.) from the confluence with Tangle Blue Creek, (Hwy. 3), downstream (south) to the mouth of Trinity Lake, approximately 13.8 miles.	~~Last Saturday in Apr. through Nov. 15.~~Saturday preceding Memorial Day through September 30.	5 trout~~ per day.10 trout in possession.~~	**F1**
	~~Nov. 16 through the Friday preceding the last Saturday in April. Only artificial lures with barbless hooks may be used.~~October 1 through the Friday preceding Memorial Day. Only artificial lures with barbless hooks may be used.	0 trout	**I6**
~~(195.5) Trout Lake (Siskiyou Co.).~~	~~Only Wednesdays and weekends from the last Saturday in April through Sept. 30. Only artificial lures may be used.~~	~~2 trout~~	**SL**
(~~196~~153) Truckee River (Nevada, Placer, and Sierra ~~Cos.~~cos.).			
(A) Truckee River for 1,000 feet below the Lake Tahoe outlet dam.	Closed to all fishing all year.		**J**
~~NOTE: THE AREA FROM 1,000 FEET BELOW THE LAKE TAHOE OUTLET DAM DOWNSTREAM TO TROUT CREEK IS REGULATED BY THE DISTRICT GENERAL REGULATIONS.~~			

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
(B) Truckee River from the confluence of Trout Creek downstream to the ~~Glenshire Bridge.~~ mouth of Prosser Creek.	~~Last Saturday in Apr. through Nov. 15. Minimum size limit: 14 inches total length. Only artificial lures with barbless hooks may be used.~~ All year. Only artificial lures with barbless hooks may be used.	~~2 trout~~0 trout	**A6 (Option 1)**
	~~Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used.~~	~~0 trout~~	
(B) Truckee River from the confluence of Trout Creek downstream to the ~~Glenshire Bridge.~~ mouth of Prosser Creek.	**~~Last Saturday in Apr. through Nov. 15. Minimum size limit: 14 inches total length. Only artificial lures with barbless hooks may be used.~~ All year. Only artificial flies with barbless hooks may be used.**	**~~2 trout~~0 trout**	**(Option 2)**
	~~Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used.~~	**~~0 trout~~**	
~~(C) Truckee River from the Glenshire Bridge downstream to the mouth of Prosser Creek.~~	~~Last Saturday in Apr. through Nov. 15. Minimum size limit: 14 inches total length. Only artificial flies with barbless hooks may be used.~~	~~2 trout~~	**Del30**
	~~Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial flies with barbless hooks may be used.~~	~~0 trout~~	
(~~D~~C) Truckee River from the mouth of Prosser Creek downstream to the Nevada State Line.	~~Last Saturday in Apr. through Nov. 15. Minimum size limit: 14 inches total length. Only artificial lures with barbless hooks may be used.~~ All year. Only artificial lures may be used.	2 trout	**A3 (Option 1)**
	~~Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used.~~	~~0 trout~~	

Body of Water	*Open Season and Special ~~Regulations~~ Restrictions*	*Daily Bag and Possession Limit*	Menu option
(~~D~~C) Truckee River from the mouth of Prosser Creek downstream to the Nevada State Line.	**~~Last Saturday in Apr. through Nov. 15. Minimum size limit: 14 inches total length. Only artificial lures with barbless hooks may be used.~~ All year. Only artificial lures with barbless hooks may be used.**	**~~2 trout~~ 0 trout**	**A6 (Option 2)**
	~~Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used.~~	**~~0 trout~~**	
(~~197~~154) Tule River and tributaries (Tulare Co.).			
~~(A)~~ Tule River, North Fork (Tulare Co.), only in the North Fork Tule River and all its forks and tributaries above the confluence with Pine Creek (about 50 yards upstream from the Blue Ridge road bridge, about 12 1/4 miles north of Springville).	All year. Only artificial ~~flies with barbless hooks may be used~~lures may be used.	2 trout	**A3**
~~(B) All remaining portions of the Tule River and tributaries.~~	~~All year.~~	~~5 trout per day. 10 trout in possession.~~	**SR**
(~~198~~155) Tuolumne River (Stanislaus and Tuolumne Cos.cos.)~~.~~ from O'Shaughnessy Dam (Hetch Hetchy Reservoir) downstream to ~~Early Intake Dam~~ Clavey River Falls.	All year. Only artificial lures may be used.	2 trout	**A3**
~~(A) From O'Shaughnessy Dam (Hetch Hetchy Reservoir) downstream to Early Intake Dam~~	~~Last Saturday in April through Nov. 15. Maximum size limit: 12 inches total length. Only artificial lures with barbless hooks may be used.~~	~~2 trout~~	**Del31**
	~~Nov. 16 through the Friday preceding the last Saturday in~~	~~0 trout~~	

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
	~~Apr. Only artificial lures with barbless hooks may be used.~~		
~~(B) From Early Intake Dam downstream to Lumsden Bridge.~~	~~Last Saturday in April through Nov. 15.~~	~~5 trout~~	**Del31**
	~~Nov. 16 through the Friday preceding the last Saturday in April. Only artificial lures with barbless hooks may be used.~~	~~0 trout~~	
~~(C) From Lumsden Bridge downstream to Clavey River Falls.~~	~~Last Saturday in Apr. through Nov. 15. Maximum size limit: 12 inches total length Only artificial lures with barbless hooks may be used.~~	~~2 trout~~	**Del31**
	~~Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used.~~	~~0 trout~~	
~~(D) From La Grange Dam downstream to Hickman bridge.~~	~~Jan. 1 through Oct. 31. Only artificial lures with barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(E) From Hickman bridge to the mouth.~~	~~Jan. 1 through Oct. 31. Bait may be used from Jan. 1 through Oct. 31. However, from April 1 through the Friday preceding the fourth Saturday in May, bait may be used only with single hooks having a gap between 1/2 and 1 inch, or with multiple hooks having a gap between 1/4 and 1/2 inch.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
(156) Twelvemile Creek (Modoc Co.).	Saturday preceding Memorial Day through the last day in February. Only artificial lures with barbless hooks may be used.	0 trout	**G6**
(157) Twin Lakes (Mammoth, Mono Co.).	Last Saturday in April through November 15.	5 trout	**B1**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
(158) Twin Lakes, Upper and Lower (Bridgeport, Mono Co).	Last Saturday in April through November 15.	5 trout	**B1**
(~~199~~159) Upper Otay Lake (San Diego Co.).	All year. Only artificial lures with barbless hooks may be used.	~~0 for all species~~0 trout	**A6**
(~~199.5~~160) Upper Truckee River and tributaries upstream from confluence with Showers Creek (Alpine and El Dorado ~~Cos.~~cos.).	~~July 1 through Sept. 30. Only artificial lures with barbless hooks may be used.~~Saturday preceding Memorial Day through September 30. Only artificial lures with barbless hooks may be used.	0 trout	**F6**
(161) Virginia Lakes, Upper and Lower (Mono Co.).	Last Saturday in April through November 15.	5 trout	**B1**
~~(200) Usal Creek and tributaries (Mendocino Co.). Also see Section 8.00(b). Usal Creek main stem below the Usal-Shelter Cove Road~~	~~Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(201) Uvas or Carnadero Creek (Santa Clara Co.) Also see Low-Flow Restrictions, Section 8.00(c)(5).~~			
~~(A) From Highway 152 Bridge to Uvas Dam.~~	~~Closed to all fishing all year~~		**HSS**
~~(B) From mouth to Highway 152 Bridge.~~	~~Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(202) Van Duzen River (Humboldt Co.). (203.5) Waddell Creek (Santa Cruz Co.) from mouth to Highway 1 bridge. Also see Low-Flow~~	~~See Eel River 7.50(b)(63) and Section 8.00(a). Dec. 1 through Mar. 7, but only Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
~~Restrictions, Section 8.00(c)(3).~~			
~~(204) Walker Creek and tributaries (Marin Co.) Also see Section 8.00(b).~~			
~~(A) Walker Creek main stem below Highway 1.~~	~~Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(B) Walker Creek main stem above Highway 1 and all Walker Creek tributaries.~~	~~Closed to fishing all year.~~		**HSS**
(~~204.5~~162) Walker Creek (Mono Co.)~~. from the Lee Vining Conduit to Rush Creek.~~ from the private property line (fence) to the confluence with Rush Creek.	~~Last Saturday in April through Nov. 15. Only artificial lures with barbless hooks may be used.~~All year. Only artificial lures with barbless hooks may be used.	0 trout	**A6**
(~~205~~163) Walker River, East Fork (Mono ~~County~~Co.) from Bridgeport Dam to Nevada State Line.	Last Saturday in ~~Apr.~~April through ~~Nov.~~November 15. Only artificial lures may be used. Minimum size limit: 18 inches total length. ~~Only artificial lures with barbless hooks may be used.~~ NOTE: BOW AND ARROW FISHING FOR CARP ONLY IS PERMITTED.	~~1~~2 trout	**B5**
	~~Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used. NOTE: BOW AND ARROW FISHING FOR CARP ONLY IS PERMITTED.~~	~~0 trout~~	

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
~~(205.5) West Walker River (Mono County) from the confluence with the Little Walker River (Hwy. 395 bridge at mile marker 96) downstream (north) to the inlet of Topaz Lake.~~	~~Nov. 16 through the Friday preceding the last Saturday in April. Only artificial lures with barbless hooks may be used.~~	~~0 trout~~	**SR**
~~(206) Walnut Creek (Contra Costa Co.) .~~			
~~(A) Upstream of the confluence with Grayson Creek.~~	~~Fourth Saturday in May through Mar. 31. Only artificial lure with barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(B) Downstream of the confluence with Grayson Creek.~~	~~All year.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
(~~206.5~~164) Whiskey Creek (Mono Co.). ~~(A) Whiskey Creek~~ downstream from Crowley Lake Drive (old Highway 395).	~~Last Saturday in April through the Friday preceding Memorial Day and Oct. 1 through Nov. 15. Minimum size limit: 18 inches total length. Only artificial lures with barbless hooks may be used.~~Saturday preceding Memorial Day through September 30.	~~2 trout~~5 trout	**F1**
	~~Saturday preceding Memorial Day through Sept. 30.~~	~~5 trout per day. 10 trout in possession~~	
~~(B) Whiskey Creek upstream from Crowley Lake Drive.~~	~~Last Saturday in April through Nov. 15.~~	~~5 trout per day. 10 trout in possession.~~	**SR**
~~(207) Wildcat Creek and tributaries (Contra Costa Co.)~~	~~Closed all year to fishing~~		**HSS**
~~(208) Willow Creek and tributaries (tributary to Goose Lake, Modoc Co.).~~	~~Saturday preceding Memorial Day through Nov. 15. Only~~	~~0 trout~~	**Del32**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
	~~artificial lures with barbless hooks may be used.~~		
~~(208.5~~165) Wolf Creek and tributaries (tributary to West Walker River) (Mono Co.).	~~August 1 through November 15. Only artificial flies with barbless hooks may be used.~~All year. Only artificial flies with barbless hooks may be used.	0 trout	**A7**
(~~208.6~~166) Wolf Creek Lake (~~tributary to Wolf Creek~~at the headwaters of Wolf Creek, tributary to the West Walker River) (Mono Co.).	Closed to all fishing all year.		
(~~209~~167) Yellow Creek (Plumas Co.) from Big Springs downstream to the marker at the lower end of Humbug Meadow.	~~Last Saturday in Apr. through Nov. 15 Maximum size limit: 10 inches total length. Only artificial lures with barbless hooks may be used.~~Saturday preceding Memorial Day through the last day in February. Only artificial lures with barbless hooks may be used.	~~2 trout~~0 trout	**G6**
(~~210~~168) Yuba River, Middle Fork (Nevada and Sierra ~~Cos.~~cos.) from Jackson Meadows Dam downstream to Milton Lake.	See Milton Lake 7.50(b)(97).		
(~~211~~169) Yuba River, North Fork (Sierra and Yuba ~~Cos.~~cos.) ~~(A) From~~from the western boundary of Sierra City to the confluence with Ladies Canyon Creek.	~~Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used~~ All year. Only artificial lures may be used.	2 trout	**A3**
~~(B) From Ladies Canyon Creek downstream to New Bullards Bar Reservoir.~~	~~Last Saturday in Apr. through Nov. 15.~~	~~5 trout~~	**SR**
	~~Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used.~~	~~0 trout~~	**SR**

Body of Water	***Open Season and Special ~~Regulations~~ Restrictions***	***Daily Bag and Possession Limit***	Menu option
~~(212) Yuba River (Yuba and Nevada Cos.) from mouth to Englebright Dam.~~			
~~(A) From mouth to the Highway 20 bridge.~~	~~All year. Only artificial lures with barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**
~~(B) From Highway 20 bridge to Englebright Dam.~~	~~Dec. 1 through Aug. 31. Only artificial lures with barbless hooks may be used.~~	~~2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.~~	**HSS**

~~* Wild Chinook Salmon are those not showing a healed adipose fin clip and not showing a healed left ventral fin clip.~~
~~**Hatchery trout or steelhead in anadromous waters are those showing a healed adipose fin clip (adipose fin is absent). Unless otherwise provided, all other trout and steelhead must be immediately released. Wild trout or steelhead are those not showing a healed adipose fin clip (adipose fin is present).~~

Note: Authority cited: Sections 200, 205, 265, 270, 315, 316.5 and 399, Fish and Game Code. Reference: Sections 200, 205, 265, 270 and 316.5, Fish and Game Code.

Proposed Regulatory Language

Section 8.10, Title 14, CCR, is amended to read:

§ 8.10. Youth Fishing Derby, Susan River (Lassen County).
The Susan River, from the second railroad tunnel (the westernmost) on the Biz Johnson Trail downstream to the Riverside Bridge in the City of Susanville, is open to fishing on the Saturday preceding the ~~last Saturday in April~~ trout season opener on the Saturday preceding Memorial Day, only to persons under 16 years of age who are registered for the fishing derby sponsored by the Lassen County Sportsmen's Club. See subsection 7.50(b)(149), for fishing regulations for the Susan River.
Note: Authority cited: Sections 200, 202, 205, 215, 220, 240 and 315, Fish and Game Code. Reference: Sections 200, 205, 206 and 215, Fish and Game Code.

California Department of Fish and Wildlife
Title 14, Section 7.50(b), Alphabetical List of Trout Waters with Special Fishing Regulations; "Decision Matrix"
Fish and Game Commission June 25, 2020 Meeting

The Trout Menu summarized below is divided into an updated Statewide Regulation, Seasons, and Bag/ Possession Limits (plus gear restrictions and size limits).
Note: Only trout waters with a proposed change are shown in this table (refer to the "Menu Option" column shown in the amended subsection 7.50(b) regulatory text table for all changes)

Statewide Regulation for Trout - Replaces much of the statewide regulation in the Fishing Districts subsections 7.00(a) through (g)

"SL" for Lakes and Reservoirs (proposed in amended subsection 5.85(a)(1)): Open all year, five trout daily bag limit, 10 trout in possession.

"SR" for Rivers and Streams (proposed in amended subsection 5.85(a)(2)): From the last Saturday in April through November 15, five trout daily bag limit, 10 trout in possession; and, from November 16 through the Friday preceding the last Saturday in April, 0 trout bag limit, artificial lures with barbless hooks only and trout must be released unharmed and not removed from the water.

Exceptions to Statewide Trout Angling Regulation – "Special Regulations/ Waters" coding

Seasons are described as follows, and designated by capital letters A-J:

A. All year

B. Last Saturday in April through November 15

C. November 16 through the Friday preceding the last Saturday in April

D. Last Saturday in April through July 31

E. August 1 through November 15

F. Saturday preceding Memorial Day through September 30

G. Saturday preceding Memorial Day through the last day in February

H. September 1 through November 30

I. October 1 through the Friday preceding Memorial Day

J. Closed to fishing all year

Bag and Possession Limits and Gear Restrictions are described as follows, and designated by numbers 1-7:

1. 5 trout, no gear restrictions

2. 2 trout per day, 4 trout in possession, no gear restrictions

3. 2 trout, artificial lures

4. 2 trout with 14" total length minimum, artificial lures

5. 2 trout with 18" total length minimum, artificial lures

6. 0 trout, artificial lures with barbless hooks

7. 0 trout, artificial flies with barbless hooks

As shown in the columns, "2020 Proposed," combined options for season (letter) and bag/possession limit and gear limitation (number) present as a capital letter-number code. For example, "B5" would signify a water with a season from the last Saturday in April through November 15, a bag/possession limit of 2 trout with 18" minimum size, and a gear restriction of artificial lures.

Seasons abbreviated: A = All year; B = Last Sat. Apr – Nov 15; C = Nov 16 – Fri preceding last Sat in Apr; D = Last Sat in Apr – Jul 31; E = Aug 1 – Nov 15; F = Sat preceding Mem. Day – Sep 30; G = Sat preceding Mem. Day – last day Feb; H = Sep 1 – Nov 30; I = Oct 1 – Fri preceding Mem Day; J = CLOSED
Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

New Waters Added to the Special Fishing Regulations are highlighted in green and indicated by "NEW"

***Bold asterisk** and **bold text** indicates change since January 2020 WRC Meeting*

A Second Regulatory Option for the Truckee River, Subsection (196), is highlighted in Orange

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
(1) Alambique Creek (San Mateo Co.).	Last Saturday in Apr. through Nov. 15	5 trout	Saturday preceding Memorial Day through September 30	0 trout, artificial lures with barbless hooks	Saturday preceding Memorial Day through September 30 **F**	0 trout, artificial lures with barbless hooks **6**	A summer only angling season to protect spring and fall spawning fish populations. Maximum restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	The low seasonal flow and sporadic densities of small wild trout is the purpose for reducing the take of trout on Alambique Creek. This is not a trophy trout water and only small wild trout are maintained.
(1.5) Alameda Creek and tributaries (Alameda and Santa Clara ~~Cos.~~cos.). (A) Alameda Creek mainstem, and all tributaries downstream of San Antonio, Calaveras, and Del Valle ~~Reservoirs~~reservoirs except for Arroyo Del Valle between Bernal Ave. and the Thiessen St. intersection with Vineyard Ave.	Closed to all fishing all year.		Closed to all fishing all year		Closed to all fishing all year **J**			Change includes clarification to area boundary. No change to current regulation.
(B) Alameda Creek tributaries upstream of San Antonio, Calaveras, and Del Valle ~~Reservoirs~~reservoirs~~-~~.	Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used.	0	Saturday preceding Memorial Day through September 30	0 trout, artificial lures with barbless hooks	Saturday preceding Memorial Day through September 30 **F**	0 trout, artificial lures with barbless hooks **6**	A summer only angling season to protect spring and fall spawning fish populations. Maximum restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	

Seasons abbreviated: A = All year; B = Last Sat. Apr – Nov 15; C = Nov 16 – Fri preceding last Sat in Apr; D = Last Sat in Apr – Jul 31; E = Aug 1 – Nov 15; F = Sat preceding Mem. Day – Sep 30; G = Sat preceding Mem. Day – last day Feb; H = Sep 1 – Nov 30; I = Oct 1 – Fri preceding Mem Day; J = CLOSED
Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
(4) Almanor Lake tributaries (Lassen, Plumas and Shasta ~~Cos.~~cos.) upstream to the first lake.	Saturday preceding Memorial Day through Nov. 15	5 per day, 10 in possession	Saturday preceding Memorial Day through the last day in February	5 trout, no gear restrictions	Saturday preceding Memorial Day through September 30 **F**	5 trout, no gear restrictions **1**	A summer only angling season to protect spring and fall spawning fish populations. Minimum restrictions on harvest and gear for robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries where the maximum catch can be harvested sustainably.	As winter snows shift later into the season, Plumas County fisheries frequently remain accessible into December. A September 30 closure protects spawning populations of wild Brown Trout.
(4.5) American River, North Fork, Middle Fork, South Fork and their tributaries above Folsom Lake (Placer, Eldorado, Amador, and Alpine cos.), except Caples Creek. (See Section 7.50(b)(X)	Last Saturday in Apr. through Nov. 15.	5 per day, 10 in possession	All year	5 trout, no gear restrictions	Saturday preceding Memorial Day through September 30 **F**	5 trout, no gear restrictions **1**	A summer only angling season to protect spring and fall spawning fish populations. Minimum restrictions on harvest and gear for robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries where the maximum catch can be harvested sustainably.	
	Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used.	0			October 1 through the Friday preceding Memorial Day **I**	0 trout bag, artificial lures with barbless hooks **6**	A fall through spring angling season in conjunction with a separate summer season to segregate harvest and maximize opportunity. Significant restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations during these seasons, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	These are wild, tail water fisheries, growing in popularity, and potentially important to the conservation of American River steelhead. Adult fish run from Folsom and spawn mostly in tributaries. On the South Fork, Rainbow and Chinook run from December to March, with adults in the 20-30" range. This is near the Sacramento Metro area and word of the size, number and season is spreading, and fishing pressure is increasing. As fishing pressure increases, it is important to continue to protect the spawning run for these wild fisheries.

Seasons abbreviated: A = All year; B = Last Sat. Apr – Nov 15; C = Nov 16 – Fri preceding last Sat in Apr; D = Last Sat in Apr – Jul 31; E = Aug 1 – Nov 15; F = Sat preceding Mem. Day – Sep 30; G = Sat preceding Mem. Day – last day Feb; H = Sep 1 – Nov 30; I = Oct 1 – Fri preceding Mem Day; J = CLOSED
Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
(6.5) Antelope Lake tributaries (Plumas Co.).	Saturday preceding Memorial Day through Nov. 15	5 per day, 10 in possession	Saturday preceding Memorial Day through the last day in February	5 trout, no gear restrictions	Saturday preceding Memorial Day through September 30 **F**	5 trout, no gear restrictions **1**	A summer only angling season to protect spring and fall spawning fish populations. Minimum restrictions on harvest and gear for robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries where the maximum catch can be harvested sustainably.	As winter snows shift later into the season, Plumas County fisheries frequently remain accessible into December. A September 30 closure protects spawning populations of wild Brown Trout.
***(7) Applegate River and tributaries (Siskiyou Co.).**	Last Saturday in Apr. through Nov. 15	5 per day, 10 in possession	Move to statewide reg		**Move to statewide reg for rivers, streams, and creeks SR**		**Alignment with traditional season, previous district regulations, and Commission Policy, for both wild and stocked fisheries with a goal of sustainable harvest, while allowing catch and release angling during the other part of the year in an effort to increase angling opportunities while reducing population level effects stemming from over-harvest and or associated hooking mortality.**	**Provides opportunity for catch and release angling in the winter.**
***(9) Arroyo de los Frijoles above Lake Lucerne (San Mateo Co.).**	Last Saturday in Apr. through Nov. 15.	5 trout	Move to statewide reg		**Move to statewide reg for rivers, streams, and creeks SR**		**Alignment with traditional season, previous district regulations, and Commission Policy, for both wild and stocked fisheries with a goal of sustainable harvest, while allowing catch and release angling during the other part of the year in an effort to increase angling opportunities while reducing population level effects stemming from over-harvest and or associated hooking mortality.**	**Provides opportunity for catch and release angling in the winter.**
***(10) Arroyo Grande Creek (San Luis Obispo Co.) (A) above Lopez Reservoir.**	Last Saturday in Apr. through Nov. 15.	5 trout. 2 salmon			**Move to statewide reg for rivers, streams, and creeks**		**Alignment with traditional season, previous district regulations, and Commission Policy, for both wild and stocked fisheries with a goal of sustainable harvest, while allowing catch and release angling during the**	**Kokanee Salmon are no longer stocked in the reservoir and no salmon are present in the creek.**

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
					SR		**other part of the year in an effort to increase angling opportunities while reducing population level effects stemming from over-harvest and or associated hooking mortality.**	
(12) Arroyo Seco River (Monterey Co.). Also see Section 8.00(c). ~~(A)~~ The main stem Arroyo Seco and tributaries above the waterfall located approximately 3.5 miles upstream from the U.S. Forest Service Ranger Station.	Last Saturday in Apr. through Nov. 15.	5	Move to statewide reg		**Saturday preceding Memorial Day through September 30 F**	**5 trout, no gear restrictions 1**	**A summer only angling season to protect spring and fall spawning fish populations. Limited daily harvest without additional possession for less productive self-sustaining fisheries where there is moderate concern regarding harvest with minimal threat to total population.**	**This is not a stocked or self-sustaining fishery. Recommendation is to keep the current regulation.**
(13.5) Bass Lake (Siskiyou Co.).	Feb. 1 through Sept. 30.	5	Saturday preceding Memorial Day through September 30	5 trout, no gear restrictions	**Move to statewide reg for lakes and reservoirs SL**		Waters with self-sustaining and stocked fisheries where the maximum catch can be harvested sustainably, with an emphasis on fisheries with high natural production and or some level of stocking.	
***(15) Bear Creek and tributaries (Shasta and Siskiyou ~~Cos.~~cos.) between Ponderosa Way bridge and confluence with Fall River.**	Saturday preceding Memorial Day through Nov. 15	5 per day, 10 in possession	Saturday preceding Memorial Day through September 30	5 trout, no gear restrictions	Saturday preceding Memorial Day through September 30 **F**	**2 trout, artificial lures 3**	A summer only angling season to protect spring and fall spawning fish populations. Limited daily harvest without additional possession for less productive self-sustaining fisheries where there is moderate concern regarding harvest with minimal threat to total population.	Public input suggested this regulation to help to protect spawning of Bear Creek trout (brook, rainbow, brown), which includes migratory trout from the Fall River Complex. Harvest is allowed during the summer months.
(17) Bear Creek (San Bernardino Co.) from Big Bear Dam to confluence of Santa Ana River.	All year. Only artificial lures with barbless hooks may be used.	2	All year.	2 trout, artificial lures	All year **A**	2 trout, artificial lures **3**		Essentially no change to the current regulation, except for the removal of the requirement for barbless hooks.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
(18.5) Bear River and tributaries (Placer Co.). (A) From Highway 20 south (downstream) 2.5 miles to the abandoned concrete dam (the Boardman Diversion Dam).	Last Saturday in April through Nov. 15 Maximum size limit: 14 inches total length	5 per day, 10 in possession	Saturday preceding Memorial Day through the last day in February	5 trout, no gear restrictions	Saturday preceding Memorial Day through the last day in February **G**	5 trout, no gear restrictions **1**	A spring angling closure to protect spawning fish populations. Minimum restrictions on harvest and gear for robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries where the maximum catch can be harvested sustainably.	
(19) Berryessa Lake tributaries (Lake and Napa ~~Cos~~.cos.).	Last Saturday in Apr. through Nov. 15	5	Saturday preceding Memorial Day through September 30	2 trout, 4 trout in possession, no gear restrictions	Saturday preceding Memorial Day through September 30 **F**	2 trout, 4 trout in possession, no gear restrictions **2**	A summer only season to protect spring and fall spawning fish populations. Limited daily harvest but with additional possession for waters with hatchery supplemented or moderately productive self-sustaining fisheries where there is moderate concern regarding harvest but minimal threat to total population.	Berryessa Lake tributaries fishery is dependent upon wild trout populations. Until trout population can be fully assessed for these tributaries, the bag limit was reduced from 5 fish to 2 fish to help maintain a sustainable fishery.
(19.5) Big Bear Lake tributaries (San Bernardino Co.)	Saturday preceding Memorial Day through last day of Feb.	5 per day, 10 in possession	Move to statewide reg		**Move to statewide reg for rivers, streams, and creeks SR**		**Alignment with traditional season, previous district regulations, and Commission Policy, for both wild and stocked fisheries with a goal of sustainable harvest, while allowing catch and release angling during the other part of the year in an effort to increase angling opportunities while reducing population level effects stemming from over-harvest and or associated hooking mortality.**	The proposed change does not significantly reduce angler opportunity and aligns with the simplification goals.
(23) Big Sur River (Monterey Co.). ~~(A) Big Sur River~~ and tributaries above the upstream end of the gorge pool at the boundary of Pfeiffer Big Sur State Park within the Ventana Wilderness Area.	Fourth Saturday in May through October 31.	0 trout, only artificial lures with barbless hooks may be used.			Saturday preceding Memorial Day through September 30 **F**	0 trout, artificial lures with barbless hooks **6**	A summer only angling season to protect spring and fall spawning fish populations. Maximum restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	The proposed change does not significantly reduce angler opportunity and aligns with the simplification goals.

Seasons abbreviated: A = All year; B = Last Sat. Apr – Nov 15; C = Nov 16 – Fri preceding last Sat in Apr; D = Last Sat in Apr – Jul 31; E = Aug 1 – Nov 15; F = Sat preceding Mem. Day – Sep 30; G = Sat preceding Mem. Day – last day Feb; H = Sep 1 – Nov 30; I = Oct 1 – Fri preceding Mem Day; J = CLOSED

Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
(25.5) Boggy Creek (Fresno Co.) and tributaries (tributary to Thomas Edison Lake).	June 1 through October 15.	5 per day, 10 in possession	Saturday preceding Memorial Day through September 30	5 trout, no gear restrictions	Saturday preceding Memorial Day through September 30 **F**	5 trout, no gear restrictions **1**	A summer only angling season to protect spring and fall spawning fish populations. Minimum restrictions on harvest and gear for robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries where the maximum catch can be harvested sustainably.	The proposed change does not significantly reduce angler opportunity and aligns with the simplification goals.
NEW (X) - Boulder Creek (San Diego Co.) upstream of El Capitan Reservoir, and all its tributaries.	All year	2	All year	2 trout, artificial lures	All year **A**	2 trout, artificial lures **3**	A year-round angling season to maximize opportunity with limited daily harvest, without additional possession, for less productive self-sustaining fisheries where there is moderate concern regarding harvest with minimal threat to total population.	This water is being moved from the District General Regulations. There is no change to the current regulation, except for the removal of the requirement for barbless hooks.
* **NEW** (26.5) Bridgeport Reservoir **and** tributaries (Mono Co.). ~~**All Bridgeport Reservoir tributaries**~~ except Swauger Creek~~,~~ from Bridgeport Reservoir upstream to Highway 395, and Swauger Creek~~,~~ from Bridgeport Reservoir upstream to the private property fence line above the Forest Service campground.	Last Saturday in April through the Friday preceding Memorial Day and Oct. 1 through Nov. 15. Minimum size limit: 18 inches total length. Only artificial lures **with** barbless hooks may be used.	**1**	Saturday preceding Memorial Day through September 30	5 trout, no gear restrictions	**Last Saturday in April through Nov. 15 B**	**5 trout, no gear restrictions 1**	Waters with self-sustaining and stocked fisheries where the maximum catch can be harvested sustainably, with an emphasis on fisheries with high natural production and or some level of stocking.	**In response to public input, DFW is proposing to keep the current trout season for resort lakes in Inyo and Mono cos. to support local economic needs, public safety concerns, and local business operations.** Bridgeport Reservoir is moved from the Sierra District Regulation to join its tributaries and keep the traditional trout season of April-November. Higher summer bag limit reduced for simplification purposes.
	Saturday preceding Memorial Day through Sep. 30.	5 per day, 10 in possession	October 1 through the Friday preceding Memorial Day	0 trout, artificial lures with barbless hooks	-	-		Winter, and spring opportunity was considered in 2019, then decided to close to fishing to maintain the trout opener, and to keep it closed for safety during the winter.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
(27.5) Bucks Lake	All year.	5 trout per day. 10 trout in possession. 10 landlocked salmon per day. 20 landlocked salmon in possession.			Move to statewide reg for lakes and reservoirs **SL**		Waters with self-sustaining and stocked fisheries where the maximum catch can be harvested sustainably, with an emphasis on fisheries with high natural production and or some level of stocking.	No change to current regulation.
(28) Bucks Lake tributaries (Plumas Co.).	Saturday preceding Memorial Day through Sept. 30.	5 per day, 10 in possession	Saturday preceding Memorial Day through September 30	5 trout, no gear restrictions	Saturday preceding Memorial Day through September 30 **F**	5 trout, no gear restrictions **1**	A summer only angling season to protect spring and fall spawning fish populations. Minimum restrictions on harvest and gear for robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries where the maximum catch can be harvested sustainably.	No change to current regulation, except for removal of possession limit.
(28.5) Burney Creek (Shasta Co.) from Burney Creek Falls downstream to Lake Britton.	Last Saturday in April through Nov. 15. Only artificial lures with barbless hooks may be used.	2 trout Maximum size limit: 14 inches total length.	All year	0 trout, artificial lures with barbless hooks	All year **A**	0 trout, artificial lures with barbless hooks **6**	A year-round angling season to maximize opportunity while at the same time utilizing restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Reduced bag and gear restrictions to protect resident and lake run wild trout populations.
(29) Butano Creek (San Mateo County) (A) Above Butano Falls	Last Saturday in April through Nov. 15	5 per day, 10 in possession	Saturday preceding Memorial Day through September 30	0 trout, artificial lures with barbless hooks	Saturday preceding Memorial Day through September 30 **F**	0 trout, artificial lures with barbless hooks **6**	A summer only angling season to protect spring and fall spawning fish populations. Maximum restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	The low seasonal flow and sporadic densities of small wild trout is the purpose for reducing the take of trout on Butano Creek. Further scientific investigation is warranted. This is not a trophy trout water and only small wild trout are maintained.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14” min art. lures; 5 = 2 trout 18” min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
(30) Butt Creek and Butt Valley Reservoir Powerhouse Outfall (Plumas Co.).								
(A) Butt Creek.	Saturday preceding Memorial Day through Nov. 15.	5 per day, 10 in possession	Saturday preceding Memorial Day through the last day in February	5 trout, no gear restrictions	Saturday preceding Memorial Day through September 30 **F**	5 trout, no gear restrictions **1**	A summer only angling season to protect spring and fall spawning fish populations. Minimum restrictions on harvest and gear for robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries where the maximum catch can be harvested sustainably.	As winter snows shift later into the season, Plumas County fisheries frequently remain accessible into December. A September 30 closure protects spawning populations of wild Brown Trout.
(B) Butt Valley Reservoir powerhouse outfall, from the powerhouse, downstream to a marker adjacent to Ponderosa Flat Campground.	Saturday preceding Memorial Day through Feb. 28.	2	Saturday preceding Memorial Day through the last day in February	2 trout, 4 trout possession limit, no gear restrictions	Saturday preceding Memorial Day through the last day in February **G**	2 trout, 4 trout possession limit, no gear restrictions **2**	Spring angling closure to protect spawning fish populations. Limited daily harvest, with additional possession, for waters with hatchery supplemented or moderately productive self-sustaining fisheries where there is moderate concern regarding harvest but minimal threat to total population.	No change to current regulation except for an added possession limit.
(31) Butt Valley Reservoir (Plumas Co.).	All year	2	All year	2 trout, 4 trout possession limit, no gear restrictions	All year **A**	2 trout, 4 trout possession limit, no gear restrictions **2**	A year-round angling season to maximize opportunity with limited daily harvest, with additional possession, for waters with hatchery supplemented or moderately productive self-sustaining fisheries where there is moderate concern regarding harvest but minimal threat to total population.	No change to current regulation except for an added possession limit.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14” min art. lures; 5 = 2 trout 18” min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
(34) Cache Creek and tributaries (Lake Co.).	Last Saturday in Apr. through Nov. 15	5	Move to statewide reg		Saturday preceding Memorial Day through September 30 **F**	5 trout, no gear restrictions **1**	A summer only angling season to protect spring and fall spawning fish populations. Minimum restrictions on harvest and gear for robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries where the maximum catch can be harvested sustainably.	The proposed angling season would protect important adult spawning periods, which are critical to maintaining these trout populations. The proposed change does not significantly reduce angler opportunity and aligns with the simplification goals.
***(35.6) Canyon Creek upstream of the falls located about four miles north of the wilderness area boundary. (Trinity Co.)**	Last Saturday in April through November 15.	2	Move to statewide reg		**Move to statewide reg for rivers, streams, and creeks SR**		**Alignment with traditional season, previous district regulations, and Commission Policy, for both wild and stocked fisheries with a goal of sustainable harvest, while allowing catch and release angling during the other part of the year in an effort to increase angling opportunities while reducing population level effects stemming from over-harvest and or associated hooking mortality.**	Although a popular trailhead ascending into the Trinity Alps, the remoteness and seasonal access will limit harvest potential.
NEW (X)- Caples Creek from the confluence with the Silver Fork American River upstream to Caples Lake Dam (El Dorado and Alpine cos.)	Last Saturday in Apr. through Nov. 15.	5 per day, 10 in possession			All year **A**	0 trout, artificial lures with barbless hooks **6**	A year-round angling season to maximize opportunity while at the same time utilizing restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Caples Creek is a California Fish and Game Commission designated Wild Trout Stream. The fishery is managed for wild Rainbow Trout, Brown Trout, and Brook Trout. Recent surveys (2017) found the upper section near the confluence with Kirkwood Creek is shifting to a predominantly wild Brook Trout fishery from a predominantly wild Rainbow Trout and wild Brown Trout fishery with somewhat low densities, particularly Brown Trout. The management objective for Caples Creek is to maintain a

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
								catch rate of 2 fish per hour and the recommended daily bag, possession limit and gear restriction is to align the regulation with the management objective.
	Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used.	0						
(35.7) Caribou Reservoir (Plumas County)	Last Saturday in Apr. through Nov. 15	2	Move to statewide reg		Move to statewide reg for lakes and reservoirs **SL**		Waters with self-sustaining and stocked fisheries where the maximum catch can be harvested sustainably, with an emphasis on fisheries with high natural production and or some level of stocking.	
(38) Carson River, East Fork and tributaries (Alpine Co.). (B) Carson River, East Fork from Hangman's Bridge downstream to Nevada State Line.	All year. Only artificial lures with barbless hooks may be used.	0	Move to statewide reg		All year **A**	2 trout, artificial lures, 14 inch minimum **4**	A year-round angling season to maximize opportunity with limited selected harvest and protection for smaller age classes. Allows most individuals to spawn prior to entering the fishery.	Protect populations of wild Brown and Rainbow Trout and Mountain Whitefish while still allowing harvest of hatchery fish, 100% of which were over 10" (Weaver and Mehalick, 2008) which may have entered this area.
~~(39.3) Castle Creek (Shasta Co.)~~	~~Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used.~~	~~0~~	-	-				Covered under Sacramento River regulation above Shasta Lake 7.50(b) 156.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
(39.5) ~~Ceder~~ Cedar Creek and tributaries upstream from Moon Lake access road (Lassen Co.).	Closed to all fishing all year		Saturday preceding Memorial Day through the last day in February	5 trout, no gear restrictions	Saturday preceding Memorial Day through the last day in February **G**	2 trout, artificial lures **3**	A spring angling closure to protect spawning fish populations. Limited daily harvest without additional possession for less productive self-sustaining fisheries where there is moderate concern regarding harvest with minimal threat to total population.	Stream is not stocked, more protection for wild trout while providing angling opportunity.
(42) Clear Lake tributaries (Lake Co.).	Last Saturday in Apr. through Nov. 15	5	Move to statewide reg		All year **A**	0 trout, artificial lures with barbless hooks **7**	A year-round angling season to maximize opportunity while at the same time utilizing restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Wild Rainbow Trout in Clear Lake tributaries encounter diversions, poor water quality and high temperatures. The proposed bag and gear limits are intended to provide protection to those fish.
(42.5) Cold Creek (Fresno Co.) and tributaries (tributary to Thomas Edison Lake).	June 1 through October 15.	5 per day, 10 in possession	Saturday preceding Memorial Day through September 30	5 trout, no gear restrictions	Saturday preceding Memorial Day through September 30 **F**	5 trout, no gear restrictions **1**	A summer only angling season to protect spring and fall spawning fish populations. Minimum restrictions on harvest and gear for robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries where the maximum catch can be harvested sustainably.	The proposed change does not significantly reduce angler opportunity and aligns with the simplification goals.
(43) Convict Creek (Mono Co.).								
(B) Convict Creek downstream of the U.C. study area.	Last Saturday in April through the Friday preceding Memorial Day and Oct. 1 through Nov. 15. Minimum size limit: 18 inches	2	Saturday preceding Memorial Day through September 30	5 trout, no gear restrictions	Saturday preceding Memorial Day through September 30 **F**	5 trout, no gear restrictions **1**	A summer only angling season to protect spring and fall spawning fish populations. Minimum restrictions on harvest and gear for robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries where the maximum catch can be harvested sustainably.	Fall, winter, and spring opportunity was considered in 2019, then decided to close to fishing in fall, winter and spring to protect spawning fish (Rainbow Trout, Lahontan Cutthroat Trout and Brown Trout).

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
	total length. Only artificial lures with barbless hooks may be used.							
	Saturday preceding Memorial Day through Sept. 30.	5 per day, 10 in possession.	October 1 through the Friday preceding Memorial Day	0 trout, artificial lures with barbless hooks	-	-		Closed to protect spawning trout populations.
***(C) Convict Creek upstream of the U.C. study area.**	Last Saturday in April through Nov. 15.	5 per day, 10 in possession.	Move to statewide reg		**Move to statewide reg for rivers, streams, and creeks SR**		**Alignment with traditional season, previous district regulations, and Commission Policy, for both wild and stocked fisheries with a goal of sustainable harvest, while allowing catch and release during the other part of the year in an effort to increase angling opportunities while reducing population level effects stemming from over-harvest and or associated hooking mortality.**	Stocked water through campgrounds and resort area. Wilderness section above lake inaccessible in winter. Provides opportunity for catch and release angling in the winter.
***NEW (X) - Convict Lake (Mono County)**	**Last Saturday in Apr. through Nov. 15**	**5 per day, 10 in possession**			**Last Saturday in April through Nov. 15 B**	**5 trout, no gear restrictions 1**		Convict Lake is moved from the Sierra District Regulation. **In response to public input, DFW is proposing to keep the current trout season for resort lakes in Inyo and Mono cos. to support local economic needs, public safety concerns, and local business operations.**

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
(48) Cottonwood Creek (Inyo Co.) and all tributaries upstream from the confluence of the main stem Cottonwood Creek and Little Cottonwood Creek, including the unnamed tributaries flowing through Horseshoe Meadow.					All year **A**	2 trout, artificial lures **3**	A year-round angling season to maximize opportunity with limited daily harvest, without additional possession, for less productive self-sustaining fisheries where there is moderate concern regarding harvest with minimal threat to total population.	
~~(A) Cottonwood Creek main stem between mouth of Little Cottonwood Creek and South Fork of Cottonwood Creek.~~	~~July 1 through Nov. 15. Only artificial lures with barbless hooks may be used~~	~~0~~	Move to statewide reg	-		-		(A) and (B) combined into subparagraph for Cottonwood Creek above.
~~(B) Cottonwood Creek (1) and tributaries upstream from the confluence of South Fork Cottonwood Creek, (2) Little Cottonwood Creek and tributaries, (3) the South Fork of Cottonwood Creek and tributaries, and (4) the unnamed tributary flowing through Horseshoe Meadow.~~	~~July 1 through Nov. 15. Only artificial lures with barbless hooks may be used~~	~~5~~	Move to statewide reg	-	-	-		(A) and (B) combined into paragraph for Cottonwood Creek above.
(49) Cottonwood Creek drainage lakes (Inyo Co.).								
(A) Cottonwood Lakes 1, 2, 3 and 4 and their tributaries (Inyo Co.).	July 1 through Nov. 15. Only artificial lures with barbless hooks may be used.	0	All year	2 trout, 4 trout in possession, no gear restrictions	September 1 through November 30 **H**	2 trout, artificial lures, 14 inch minimum **4**	A fall season to allow angling during the fall when summer temperatures make angling impacts more significant with limited selected harvest and protection for smaller age classes. Allows most individuals to spawn prior to entering the fishery.	California's only broodstock lakes for California Golden Trout.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14” min art. lures; 5 = 2 trout 18” min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
(B) All remaining Cottonwood Creek drainage lakes.	July 1 through Nov. 15. Only artificial lures with barbless hooks may be used	5	Move to statewide reg		All year **A**	2 trout, artificial lures **3**	A year-round angling season to maximize opportunity with limited daily harvest, without additional possession, for less productive self-sustaining fisheries where there is moderate concern regarding harvest with minimal threat to total population.	Limit take to increase size of Golden Trout.
~~(49.5) Cottonwood Creek and tributaries (Modoc Co.).~~	~~Saturday preceding Memorial Day through Nov. 15. Only artificial lures with barbless hooks may be used.~~	~~0~~	-	-				Covered under new "Goose Lake tributaries" regulation.
(52) Crooked Creek (Mono Co.). (B) Crooked Creek and tributaries above the Los Angeles gauging station.	Last Saturday in April through Nov. 15. Only artificial lures with barbless hooks may be used.	0	All year	0 trout, artificial lures with barbless hooks	All year **A**	0 trout, artificial flies and barbless hooks **7**	A year-round angling season to maximize opportunity while at the same time utilizing restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Provides angling opportunity in the winter.
(53) Crowley Lake (Mono Co.). (See individual listings for regulations on tributary waters which include: Convict, Crooked, Hilton, Hot, McGee, and Whiskey creeks and the upper Owens River).								

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
(B) Crowley Lake, except for the closed area near the outlet dam (see above).	Last Saturday in Apr. through July 31.	5 per day, 10 in possession	Saturday preceding Memorial Day through September 30	5 trout, no gear restrictions	Last Saturday in April through July 31 **D**	5 trout, no gear restrictions **1**	Minimum restrictions on harvest and gear for robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries where the maximum catch can be harvested sustainably. Crowley Lake management plan still valid for protection of fall run Rainbow Trout and Brown Trout.	Alignment with the traditional trout opener and maintain current regulation to support local economic needs, public safety concerns, and local business operations.
	Aug. 1 through Nov. 15. Minimum size limit:18 inches total length. Only artificial lures with barbless hooks may be used.	2	October 1 through the Friday preceding Memorial Day	0 trout, artificial lures with barbless hooks	August 1 through November 15 **E**	2 trout, artificial lures, 18 inch minimum **5**	Summer and fall season to allow for limited/selected harvest or closures to protect spawning runs, thermal refuges, or periods of elevated water temperatures. Limited selected harvest with protection for smaller age classes in high productivity systems that can produce large fish. Allows individuals to spawn prior to trophy sized harvest.	Maintain current regulation to support local economic needs, public safety concerns, and local business operations. Crowley Lake management plan still valid for protection of fall run Rainbow Trout and Brown Trout.
(53.5) Davis Creek (Goose Lake tributary) and tributaries (Modoc Co.)	Saturday preceding Memorial Day through Nov. 15.	0	Saturday preceding Memorial Day through the last day in February	5 trout, no gear restrictions	Saturday preceding Memorial Day through the last day in February **G**	5 trout, no gear restrictions **1**	A spring angling closure to protect spawning fish populations. Minimum restrictions on harvest and gear for robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries where the maximum catch can be harvested sustainably.	Mixed trout species. Public opportunity to catch and keep trout in the area. Bag limit and gear restrictions to allow for take of Brown Trout which are more prevalent than native Goose Lake Redband Trout.
(54) Davis Lake tributaries (Plumas Co.).	Saturday preceding Memorial Day through Nov. 15.	5 per day, 10 in possession	Saturday preceding Memorial Day through the last day in February	5 trout, no gear restrictions	Saturday preceding Memorial Day through the last day in February **G**	5 trout, no gear restrictions **1**	A spring angling closure to protect spawning fish populations. Minimum restrictions on harvest and gear for robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries where the maximum catch can be harvested sustainably.	Increase in angling opportunity while protecting spring spawners.
(54.5) Deadman Creek (Mono Co.).								

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
(A) Deadman Creek downstream from Hwy. 395. See Owens River 7.50(b)(134).	Last Saturday in April through Nov. 15. Maximum size limit: 16 inches total length. Only artificial lures with barbless hooks may be used.	2	All year	0 trout, artificial lures with barbless hooks	All year **A**	0 trout, artificial lures with barbless hooks **6**	A year-round angling season to maximize opportunity while at the same time utilizing restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Deadman Creek is often dry above Big Springs. The goal is to protect fish when present, namely Rainbow Trout and Brown Trout.
	Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used	0	-					
***(B) Deadman Creek upstream from Hwy. 395.**	Last Saturday in April through Nov. 15.	5 per day, 10 in possession.	Move to statewide reg		**Move to statewide reg for rivers, streams, and creeks SR**		**Alignment with traditional season, previous district regulations, and Commission Policy, for both wild and stocked fisheries with a goal of sustainable harvest, while allowing catch and release angling during the other part of the year in an effort to increase angling opportunities while reducing population level effects stemming from over-harvest and or associated hooking mortality.**	Extending the angling season will increase angling opportunity on a stocked water that goes through a USFS campground. Provides opportunity for catch and release angling in the winter.
(55) Deep Creek (San Bernardino Co.) from headwaters at Little Green Valley to confluence of Willow Creek.	All year. Only artificial lures with barbless hooks-may be use	2	All year.	2 trout, artificial lures	All year. **A**	2 trout, artificial lures **3**	A year-round angling season to maximize opportunity with limited daily harvest, without additional possession, for less productive self-sustaining fisheries where there is moderate	Essentially no change to the current regulation, except for the removal of the requirement for barbless hooks.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
							concern regarding harvest with minimal threat to total population.	
(58) Diaz Lake (Inyo Co.).	First Saturday in Mar. through Nov. 15.	5 per day, 10 in possession	Move to statewide reg		Move to statewide reg for lakes and reservoirs **SL**		Waters with self-sustaining and stocked fisheries where the maximum catch can be harvested sustainably, with an emphasis on fisheries with high natural production and or some level of stocking.	Currently open year-round. Cold water fishery in winter (trout stocked). Warm water fishery in summer (trout not stocked due to temp). Proposed change would allow a 10 fish possession limit year-round.
	Nov. 16 through the Friday preceding the first Saturday in Mar.	5						Moved to a statewide regulation for lakes and reservoirs.
NEW – (X) Dismal Creek (Modoc County)	Saturday preceding Memorial Day through Nov. 15	5 per day, 10 in possession	Saturday preceding Memorial Day through the last day in February	0 trout, artificial lures with barbless hooks	Saturday preceding Memorial Day through the last day in February **G**	0 trout, artificial lures with barbless hooks **6**	A spring angling closure to protect spawning fish populations. Maximum restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Special regulation to protect Warner Lake Redband Trout.
(61) Eagle Lake and tributaries (Lassen Co.).								
(A) Eagle Lake.	Saturday preceding Memorial Day through Dec. 31.	2 per day, 4 in possession.	Saturday preceding Memorial Day through the last day in February	2 trout, 4 trout in possession, no gear restrictions	Saturday preceding Memorial Day through the last day in February **G**	2 trout, 4 trout in possession, no gear restrictions **2**	A spring angling closure to protect spawning fish populations. Limited daily harvest, with additional possession, for waters with hatchery supplemented or moderately productive self-sustaining fisheries where there is moderate concern regarding harvest but minimal threat to total population.	Public comments noted. Winter angling activity will likely be minimal due to cold conditions and poor access (winter road conditions), impacts from take during this time are anticipated to be insignificant; safety issues may arise if ice fishing is possible,

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
								however people have ice fished on the lake previously during the existing season.
(B) Eagle Lake inside the break-water at the Gallatin Marina~~ and Pine Creek Slough and Pine Creek below State Highway 44~~.	Closed to all fishing all year.		Closed to all fishing all year.		Closed to all fishing all year.			Change includes clarification to water area boundary.
(C) Eagle Lake tributaries, including Pine Creek~~ above State Hwy. 44~~.	Saturday preceding Memorial Day through Nov. 15.	5 per day, 10 in possession	Closed all year		Saturday preceding Memorial Day through the last day in February **G**	5 trout, no gear restrictions **1**	A spring angling closure to protect spawning fish populations. Minimum restrictions on harvest and gear for robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries where the maximum catch can be harvested sustainably.	This section was proposed for closure during Eagle Lake Rainbow Trout restoration efforts. Restoration has been delayed/changed; therefore, continued angling with take will not hinder restoration efforts at this time. Public comments noted.
(63) Eel River (Humboldt, Lake, Mendocino and Trinity cos.).								
***(X) Eel River above Lake Pillsbury and tributaries to Lake Pillsbury (Lake Co.).**					**Saturday preceding Memorial Day through the last day in February G**	**2 trout, artificial lures 3**	**A spring angling closure to protect spawning fish populations. Minimum restrictions on harvest and gear for robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries where the maximum catch can be harvested sustainably.**	**Not a stocked water. Reduce harvest to protect small population of native Rainbow Trout.**
(B) Van Duzen River								
***1 Mainstem and tributaries ~~above~~ upstream of Eaton Falls, located about 1/2 mile upstream of the mouth of the South Fork (Little Van Duzen) and 2 1/2 miles ~~west~~**	Last Saturday in Apr. through Nov. 15.	5	Saturday preceding Memorial Day through September 30	5 trout, no gear restrictions	Saturday preceding Memorial Day through September 30 **F**	**2 trout, artificial lures 3**	A summer only angling season to protect spring and fall spawning fish populations. Minimum restrictions on harvest and gear for robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries where the maximum catch can be harvested sustainably.	**Not a stocked water. Reduce harvest to protect small population of native Rainbow Trout.**

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
downstream of Dinsmore (Humboldt and Trinity cos.)								
(D) Middle Fork Eel River ~~1. Middle Fork main stem from mouth to Bar Creek. Also see Low-Flow Restrictions, Section 8.00(a)(2).~~								
***2. ~~Middle Fork tributaries above Indian Dick/Eel River Ranger Station Road~~ Eel River Middle Fork tributaries (Hammerhorn Creek, Rattlesnake Creek, Beaver Creek, Fly Creek, and Bar Creek) upstream of USFS M1 Road crossing (Mendocino and Trinity cos.)**	Last Saturday in Apr. through Nov. 15. Maximum size limit: 14 inches total length.	5	Saturday preceding Memorial Day through the last day in February	2 trout, artificial lures	Saturday preceding Memorial Day through the last day in February **G**	2 trout, artificial lures **3**	A spring angling closure to protect spawning fish populations. Limited daily harvest without additional possession for less productive self-sustaining fisheries where there is moderate concern regarding harvest with minimal threat to total population.	**Not a stocked water. Reduce harvest to protect small population of native Rainbow Trout.**
3. ~~Middle Fork and tributaries above mouth of Uhl Creek~~ Eel River Middle Fork and tributaries upstream of mouth of Uhl Creek (Trinity Co.)	Last Saturday in Apr. through Nov. 15. Maximum size limit: 14 inches total length. Only artificial lures with barbless hooks may be used.	2	Saturday preceding Memorial Day through the last day in February	2 trout, artificial lures	Saturday preceding Memorial Day through the last day in February **G**	2 trout, artificial lures **3**	A spring angling closure to protect spawning fish populations. Limited daily harvest without additional possession for less productive self-sustaining fisheries where there is moderate concern regarding harvest with minimal threat to total population.	.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
4. Balm of Gilead Creek~~, and tributaries above falls 1 ¼ miles from mouth (Trinity Co.).~~upstream of falls located 1.2 miles from mouth and one mile downstream of Wright's Valley Trail crossing (Trinity Co.)	Last Saturday in Apr. through Nov. 15. Maximum size limit: 14 inches total length. Only artificial lures with barbless hooks may be used.	2	Saturday preceding Memorial Day through the last day in February	2 trout, artificial lures	Saturday preceding Memorial Day through the last day in February **G**	2 trout, artificial lures **3**	A spring angling closure to protect spawning fish populations. Limited daily harvest without additional possession for less productive self-sustaining fisheries where there is moderate concern regarding harvest with minimal threat to total population.	
5. ~~Eel River North Fork of Middle Fork above Willow Creek (Trinity Co.)~~ Eel River North Fork of the Middle Fork upstream of mouth of Willow Creek (Trinity Co.)	Last Saturday in Apr. through Nov. 15. Maximum size limit: 14 inches total length. Only artificial lures with barbless hooks may be used.	2	Saturday preceding Memorial Day through the last day in February	2 trout, artificial lures	Saturday preceding Memorial Day through the last day in February **G**	2 trout, artificial lures **3**	A spring angling closure to protect spawning fish populations. Limited daily harvest without additional possession for less productive self-sustaining fisheries where there is moderate concern regarding harvest with minimal threat to total population.	Provides angling opportunity in the winter while protecting spring spawners.
(67) Fall River Complex (Shasta Co.).								Public input to add terminology "Complex" to better describe the unique watercourse and simplify the regulations.
(A) Fall River from its origin at Thousand Springs downstream to the ~~mouth of the Tule River and including Spring Creek and excluding all other tributaries~~ PG&E Pit #1 Diversion Dam, including all lakes, tributaries, and springs, excluding Bear Creek.	Last Saturday in Apr. through Nov. 15. Maximum size limit:14 inches total length. Only artificial lures with barbless hooks may be used.	2	All year	0 trout, artificial lures with barbless hooks	Saturday preceding Memorial Day through September 30 **F**	2 trout, artificial lures **3**	A summer only angling season to protect spring and fall spawning fish populations. Limited daily harvest without additional possession for less productive self-sustaining fisheries where there is moderate concern regarding harvest with minimal threat to total population.	Public input about treating a single Fall River Complex as a single unit, more recent information from UCD PIT tag and genetic data indicating a Rainbow Trout population that moves and utilizes the Complex, regulations changes reflect this biological information.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
					October 1 through the Friday preceding Memorial Day **I**	0 trout, artificial lures with barbless hooks **6**	A fall through spring angling season in conjunction with a separate summer season to segregate harvest and maximize opportunity. Significant restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations during these seasons, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Public input about treating a single Fall River Complex as a single unit, more recent information from UCD PIT tag and genetic data indicating a Rainbow Trout population that moves and utilizes the Complex, regulations changes reflect this biological information.
***(68.1) Feather River, Middle Fork (Plumas Co.), from the Union Pacific Railroad Bridge (1/4 mile upstream of County A-23 bridge) to the Mohawk Bridge.**	First Saturday in April through Nov. 15.	5 per day, 10 in possession	Move to statewide reg		**Move to statewide reg for rivers, streams, and creeks SR**		**Alignment with traditional season, previous district regulations, and Commission Policy, for both wild and stocked fisheries with a goal of sustainable harvest, while allowing catch and release angling during the other part of the year in an effort to increase angling opportunities while reducing population level effects stemming from over-harvest and or associated hooking mortality.**	Provides opportunity for catch and release angling in the winter.
(68.2) Feather River North Fork from Belden Bridge downstream to Cresta Powerhouse (excluding reservoirs) (Butte and Plumas ~~Cos.~~cos.).	Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used.	0	Saturday preceding Memorial Day through the last day in February	0 trout, artificial lures with barbless hooks	Saturday preceding Memorial Day through the last day in February **G**	0 trout, artificial lures with barbless hooks **6**	A spring angling closure to protect spawning fish populations. Maximum restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Provides additional angling opportunity in the winter while still protecting spring spawners.
(68.3) Fish Slough (Mono Co.).								

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
A) The portions of Fish Slough which lie within the ~~Owens Valley Native Fishes Sanctuary and~~ BLM Springs.	Closed to all fishing all year.							Change includes clarification to water area boundary. No change to current regulation.
*** (B) All other portions of Fish Slough. Also, see Section 5.00(b)(16) for black bass regulations.**	Last Saturday in Apr. through Nov. 15.	5	Move to statewide reg		**All year A**	**5 trout, no gear restrictions 1**	**A year-round angling season with minimum restrictions on harvest and gear to maximize opportunity on waters with robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries with maximum sustainable harvest.**	**This is a warm water fishery. Trout are not present or stocked and therefore this water should not fall under the statewide regulation for streams. This water provides access to year-round bass angling.**
	Nov. 16 through the Friday preceding the last Saturday in Apr.	0						
(69.5) Freshwater Lagoon (Humboldt Co.).	All year.	5 per day, 10 in possession	Move to statewide reg		Move to statewide reg for lakes and reservoirs **SL**		Waters with self-sustaining and stocked fisheries where the maximum catch can be harvested sustainably, with an emphasis on fisheries with high natural production and or some level of stocking.	No change to current to the current regulation.
***NEW (X) - George Lake (Lake George, Mono Co.)**	**Last Saturday in Apr. through Nov. 15**	**5 per day, 10 in possession**			**Last Saturday in April through Nov. 15 B**	**5 trout, no gear restrictions 1**		**Moved from Sierra District regulation. In response to public input, DFW is proposing to keep the current trout season for resort lakes in Inyo and Mono cos. to support local economic needs, public safety concerns, and local business operations.**

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
***(71) Golden Trout Wilderness Area (Tulare Co.), excluding the main stem Kern River (see subsection 7.50(b)(86), and the Tule River drainage (See subsection 7.50(b)(197)).**	Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used.	5	Saturday preceding Memorial Day through the last day in February	5 trout, no gear restrictions	**All year A**	**2 trout, artificial lures 3**	A year-round angling season to maximize opportunity with limited daily harvest, without additional possession, for less productive self-sustaining fisheries where there is moderate concern regarding harvest with minimal threat to total population.	**Reduce daily bag limit to protect small and vulnerable populations of native Golden Trout.**
NEW (X) - Goose Lake and tributaries (Modoc County), excluding Pine Creek and Davis Creek (See subsections 7.50(b)(X) and (7.50(b)(X)).					Saturday preceding Memorial Day through the last day in February **G**	0 trout, artificial lures with barbless hooks **6**	A spring angling closure to protect spawning fish populations. Maximum restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Protection of Goose Lake Redband Trout.
***NEW (X) - Grant Lake (Mono Co.)**	**Last Saturday in Apr. through Nov. 15**	**5 per day, 10 in possession**			**Last Saturday in April through Nov. 15 B**	**5 trout, no gear restrictions 1**		**Moved from Sierra District regulation. In response to public input, DFW is proposing to keep the current trout season for resort lakes in Inyo and Mono cos. to support local economic needs, public safety concerns, and local business operations.**
***(71.5) Grass Valley Creek Reservoir (Trinity Co.)**	All year. Only artificial lures with barbless hooks may be used.	2 trout.			**Move to statewide reg for rivers, streams, and creeks SR**		**Alignment with traditional season, previous district regulations, and Commission Policy, for both wild and stocked fisheries with a goal of sustainable harvest, while allowing catch and release angling during the other part of the year in an effort to increase angling opportunities while reducing population level effects stemming from over-harvest and or associated hooking mortality.**	Grass Valley Creek Reservoir is located behind a locked gate. The only access is from walk-in anglers. Minimal harvest/mortality changes expected from the proposed regulation.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
***NEW (X) - Gull Lake (Mono Co.)**	**Last Saturday in Apr. through Nov. 15**	**5 per day, 10 in possession**			**Last Saturday in April through Nov. 15 B**	**5 trout, no gear restrictions 1**		**Moved from Sierra District regulation. In response to public input, DFW is proposing to keep the current trout season for resort lakes in Inyo and Mono cos. to support local economic needs, public safety concerns, and local business operations.**
(74) Hat Creek (Shasta Co.) from Lake Britton upstream to Baum Lake, exclusive of the concrete Hat No. 2 intake canal between Baum Lake and the Hat No. 2 Powerhouse.	Last Saturday in Apr. through Nov.15. Minimum size limit:18 inches total length. Only artificial lures with barbless hooks may be used. Aquatic invertebrates of the orders Plecoptera (stoneflies), Ephemeroptera (mayflies) and Trichoptera (caddisflies) may not be taken or possessed	2	All year	2 trout, artificial lures	All year **A**	0 trout, artificial lures with barbless hooks **6**	A year-round angling season to maximize opportunity while at the same time utilizing restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Special regulation to protect a very popular fishery that supports a self-sustaining population of wild trout. General public input about protecting spawning fish. Maintains HQ desire to keep open year-round for opportunity but addresses public input. Justification: Hat Creek is a popular fishery that is accessible all year; weather will not limit access in the winter. Increased angling opportunity and gear restrictions, 0 bag minimize negative effects to population.
***(75) Hat Creek No.1 and Cassel Forebays (Shasta Co.). Those portions of Hat Creek known as No. 1 Forebay and Cassel Forebay.**	Last Saturday in Apr. through Nov. 15	5 per day, 10 in possession	Move to statewide reg		**Move to statewide reg for rivers, streams, and creeks**		**Alignment with traditional season, previous district regulations, and Commission Policy, for both wild and stocked fisheries with a goal of sustainable harvest, while allowing catch and release angling during the**	Provides opportunity for catch and release angling in the winter.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
					SR		**other part of the year in an effort to increase angling opportunities while reducing population level effects stemming from over-harvest and or associated hooking mortality.**	
(76) Heenan Lake and tributaries (Alpine Co.). (A) Heenan Lake.	Only on Fridays, Saturdays, and Sundays from the Friday before Labor Day through the last Sunday in October. Fishing hours: Only from sunrise to sunset. Only artificial lures with barbless hooks may be used.	0	September 1 through November 30	0 trout, artificial lures with barbless hooks	September 1 through November 30 **H**	0 trout, artificial lures with barbless hooks **6**	A fall season to allow angling during the fall when summer temperatures make angling impacts more significant, at the same time utilizing restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Surveys suggest the fish population is large and 3000 Lahontan Cutthroat Trout are planted back in the lake each year after being spawned in the hatchery. Public comments requested a longer open season.
(77) Hennessey Lake tributaries (Napa Co.).	Last Saturday in Apr. through Nov. 15	5	Saturday preceding Memorial Day through September 30	2 trout, 4 trout possession limit, no gear restrictions	Saturday preceding Memorial Day through September 30 **F**	2 trout, 4 trout possession limit, no gear restrictions **2**	A summer only angling season to protect spring and fall spawning fish populations. Limited daily harvest but with additional possession for waters with hatchery supplemented or moderately productive self-sustaining fisheries where there is moderate concern regarding harvest but minimal threat to total population.	Hennessey Lake tributaries fishery is dependent upon wild trout populations. Until trout population can be fully assessed for these tributaries, the bag limit was reduced from 5 fish to 2 fish to help maintain a sustainable fishery.
(77.3) Hilton Creek (Mono Co.).								
(A) Hilton Creek downstream from Crowley Lake Drive.	Last Saturday in April through the Friday preceding Memorial Day	2	Saturday preceding Memorial Day through	5 trout, no gear restrictions	Saturday preceding Memorial Day through	5 trout, no gear restrictions **1**	A summer only angling season to protect spring and fall spawning fish populations. Minimum restrictions on harvest and gear for robust, self-sustaining fisheries with low to	Fall, winter, and spring opportunity was considered in 2019, then decided to close to fishing in fall, winter and spring to protect spawning fish (Rainbow Trout,

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14” min art. lures; 5 = 2 trout 18” min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
	and Oct. 1 through Nov. 15. Minimum size limit: 18 inches total length. Only artificial lures with barbless hooks may be used.		September 30		September 30 **F**		moderate angling, or stocked fisheries where the maximum catch can be harvested sustainably.	Lahontan Cutthroat Trout and Brown Trout).
	Saturday preceding Memorial. Day through Sept. 30.	5 per day, 10 in possession.	October 1 through the Friday preceding Memorial Day	0 trout, artificial lures with barbless hooks	-	-		Closed to protect spawning trout populations.
***(B) Hilton Creek upstream from Crowley Lake Drive.**	Last Saturday in April through Nov. 15.	5 per day, 10 in possession.	Move to statewide reg		**Move to statewide reg for rivers, streams and creeks SR**		**Alignment with traditional season, previous district regulations, and Commission Policy, for both wild and stocked fisheries with a goal of sustainable harvest, while allowing catch and release angling during the other part of the year in an effort to increase angling opportunities while reducing population level effects stemming from over-harvest and or associated hooking mortality.**	Wilderness section above Crowley Lake Drive inaccessible in winter. Provides opportunity for catch and release angling in the winter.
***(77.5) Hobart Creek (Tuolumne Co.), tributary to Spicer Meadows Reservoir.**	July 1 through Nov. 15.	5 per day, 10 in possession	Move to statewide reg		**Saturday preceding Memorial Day through September 30 F**	**2 trout, artificial lures 3**	**A summer only angling season to protect spring and fall spawning fish populations. Limited daily harvest without additional possession for less productive self-sustaining fisheries where there is moderate concern regarding harvest with minimal threat to total population.**	Access is limited seasonally due to snow and affords seasonal protection to spring spawning fish. Public has voiced concerns the regulation change will not protect spawning fish.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
***NEW –(X) - Horseshoe Lake (Mono Co.)**	**Last Saturday in Apr. through Nov. 15**	**5 per day, 10 in possession**			**Last Saturday in April through Nov. 15 B**	**5 trout, no gear restrictions 1**		**Moved from Sierra District regulation. In response to public input, DFW is proposing to keep the current trout season for resort lakes in Inyo and Mono cos. to support local economic needs, public safety concerns, and local business operations.**
(80) Independence Lake and tributaries (Nevada and Sierra ~~Cos.~~cos.).	NOTE: ALL LAHONTAN CUTTHROAT TROUT TAKEN SHALL BE IMMEDIATELY RETURNED TO THE WATER							
(B) Independence Lake except Independence Lake within 300 feet of the mouths of all tributaries.	All year Only artificial lures with barbless hooks may be used	5 per day, 10 in possession	Saturday preceding Memorial Day through September 30	0 trout, artificial lures with barbless hooks	Saturday preceding Memorial Day through September 30 **F**	0 trout, artificial lures with barbless hooks **6**	A summer only angling season to protect spring and fall spawning fish populations. Maximum restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Due to winter snow and high elevation, this lake is already de-facto closed from early fall through late May. There is already a 0 trout bag limit for Lahontan Cutthroat Trout; Brown Trout, and Brook Trout removal is nearing completion. A 0 trout bag limit is proposed throughout the watershed (which is owned by The Nature Conservancy and managed for native species).
(81) Indian Tom Lake (Siskiyou Co.).	All year.	2 trout	All year	2 trout	All year **A**	2 trout. 4 trout in possession. **2**	A year-round angling season to maximize opportunity with limited daily harvest, with additional possession, for waters with hatchery supplemented or moderately productive self-sustaining fisheries where there is moderate concern regarding harvest but minimal threat to total population.	Essentially no change to the current regulation, except for an added possession limit.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
(82) Inyo County, Southwestern Portion, in all waters bounded by the Inyo County line on the south and west, Independence Creek on the north, and Highway 395 on the east (also see Cottonwood Creek Restrictions.)	First Sat. in March through Nov. 15.	5 per day, 10 in possession	Move to statewide reg		Move to statewide reg for lakes and reservoirs and rivers, streams and creeks **SR**, **SL**		Waters with self-sustaining and stocked fisheries where the maximum catch can be harvested sustainably, with an emphasis on fisheries with high natural production and or some level of stocking.	Stocked waters. All accessible in winter up to ~7,000 feet. Provides opportunity for catch and release angling in the winter.
***NEW (X) - Isabella Lake (Lake Isabella, Kern Co.)**	**All year**	**5**			**All year A**	**5 trout, no gear restrictions 1**	**A year-round angling season with minimum restrictions on harvest and gear to maximize opportunity on waters with robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries with maximum sustainable harvest.**	**This water will be moved to the Special Fishing Regulations instead of the statewide regulation for lakes and reservoirs that would allow a 10 trout possession limit. This will result in no change to the current season and bag limit.**
***NEW (X) - June Lake (Mono Co.)**	**Last Saturday in Apr. through Nov. 15**	**5 per day, 10 in possession**			**Last Saturday in April through Nov. 15 B**	**5 trout, no gear restrictions 1**		**Moved from Sierra District regulation. In response to public input, DFW is proposing to keep the current trout season for resort lakes in Inyo and Mono cos. to support local economic needs, public safety concerns, and local business operations.**
***(84.5) Kaweah River and tributaries (Tulare Co.).**	All year.	5 per day, 10 in possession	Move to statewide reg		**Move to statewide reg for rivers, streams, and creeks SR**		**Alignment with traditional season, previous district regulations, and Commission Policy, for both wild and stocked fisheries with a goal of sustainable harvest, while allowing catch and release angling during the other part of the year in an effort to increase angling opportunities while reducing population level effects stemming from over-harvest and or associated hooking mortality.**	Sequoia National Park (SNP) sets its own regulations. Current SNP regulations below 9,000 feet in elevation have a 0 bag limit on Rainbow Trout and 5 trout limit on non-native trout with artificial, barbless hooks required. In areas of SNP above 9,000 feet in elevation, fishing regulations default to CDFW's district regulations.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
(85) Kent Lake tributaries (Marin Co.).	Last Saturday in Apr. through Nov. 15	5	Saturday preceding Memorial Day through September 30	2 trout, 4 trout in possession, no gear restrictions	Saturday preceding Memorial Day through September 30 **F**	2 trout, 4 trout in possession, no gear restrictions **2**	A summer only angling season to protect spring and fall spawning fish populations. Limited daily harvest but with additional possession for waters with hatchery supplemented or moderately productive self-sustaining fisheries where there is moderate concern regarding harvest but minimal threat to total population.	Kent Lake tributaries fishery is dependent upon wild trout populations. Until trout population can be fully assessed for these tributaries, the bag limit was reduced from 5 fish to 2 fish to help maintain a sustainable fishery.
(86) Kern River (Kern and Tulare ~~Cos.~~cos.).								
***(A) From Lake Isabella upstream to the Johnsondale bridge.**	All year.	5 per day, 10 in possession	Move to statewide reg		**All year A**	**5 trout, no gear restrictions 1**	**A year-round angling season with minimum restrictions on harvest and gear to maximize opportunity on waters with robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries with maximum sustainable harvest.**	Removes the current 10 fish possession limit.
***(B) From Johnsondale bridge upstream to the ~~point where U.S. Forest Service Trail 33E30 heads east to joint the Rincon Trail.~~ Sequoia National Park boundary near the Kern Canyon Ranger Station.**	Last Saturday in Apr. through Nov. 15. Minimum size limit:14 inches total length. Only artificial lures with barbless hooks may be used.	2	Saturday preceding Memorial Day through the last day in February	2 trout, artificial lures	**All year A**	**2 trout, artificial lures 3**	**A year-round angling season to maximize opportunity with limited daily harvest, without additional possession, for less productive self-sustaining fisheries where there is moderate concern regarding harvest with minimal threat to total population.**	The water area boundary is being amended to end at the Sequoia National Park boundary. The National Park Service has established fishing regulations within SNP that would otherwise be in conflict with state fishing regulations.
	Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless	0						

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
	hooks may be used.							
***(C) Downstream of Lake Isabella.**	**All year**	**5**			**All year A**	**5 trout, no gear restrictions 1**	**A year-round angling season with minimum restrictions on harvest and gear to maximize opportunity on waters with robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries with maximum sustainable harvest.**	**The Kern River below Lake Isabella is currently open year-round under the District Regulations. If moved to the statewide reg for rivers, it would eliminate harvest of hatchery trout in the winter. This water is heavily stocked with hatchery trout. This proposed change would keep the current regulation in place which allows harvest of hatchery trout year-round.**
~~(C) From the point where U.S. Forest Service Trail 33E30 heads east to join the Rincon Trail upstream to the mouth of Tyndall Creek.~~	~~Last Saturday in Apr. through Nov. 15. Maximum size limit: 10 inches total length for rainbow trout only. Only artificial lures with barbless hooks may be used.~~	~~2~~	-	-				Combined paragraphs (B) and (C) for Kern River for simplification purposes.
(87) Kings River (Fresno Co.).								

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
(A) Kings River, South Fork from its confluence with Copper Creek downstream to the Highway 180 crossing at Boyden Cave.	All year.	2	All year	2 trout, 4 trout in possession, no gear restrictions	All year **A**	2 trout, 4 trout in possession, no gear restrictions **2**	A year-round angling season to maximize opportunity with limited daily harvest, with additional possession, for waters with hatchery supplemented or moderately productive self-sustaining fisheries where there is moderate concern regarding harvest but minimal threat to total population.	Sequoia National Park (SNP) sets its own regulations. Current SNP regulations below 9,000 feet in elevation have a 0 bag limit on Rainbow Trout and 5 trout limit on non-native trout with artificial, barbless hooks required. In areas of SNP above 9,000 feet in elevation, fishing regulations default to CDFW's district regulations.
(C) Kings River, from Garnet Dike Campground downstream to Pine Flat Lake.	All year.	2	All year	2 trout, 4 trout in possession, no gear restrictions	All year **A**	2 trout, 4 trout in possession, no gear restrictions **2**	A year-round angling season to maximize opportunity with limited daily harvest, with additional possession, for waters with hatchery supplemented or moderately productive self-sustaining fisheries where there is moderate concern regarding harvest but minimal threat to total population.	Essentially no change to the current regulation except for the added possession limit.
(D) Kings River from Pine Flat Dam downstream to U. S. Army Corps of Engineers Bridge on Pine Flat Road.	Last Saturday in Apr. through Nov. 15.	5	Closed to all fishing all year		Closed to all fishing all year **J**			Area has been closed by Homeland Security since 2002.
***(E) 1. Kings River from the U.S. Army Corps of Engineers Bridge on Pine Flat Road downstream to Cobbles (Alta) Weir.**					**All year A**	**5 trout, no gear restrictions 1**	**A year-round angling season with minimum restrictions on harvest and gear to maximize opportunity on waters with robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries with maximum sustainable harvest.**	**This section of the Kings River is currently open to angling year-round under the District Regulations. If moved to the new statewide reg for rivers, it would eliminate harvest in the winter. This water is heavily stocked with hatchery trout. This proposed change will keep the current reg in place allowing harvest of hatchery trout year-round.**

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
2. Kings River Thorburn Spawning Channel, the 2,200-foot-long channel located 5 miles downstream from Pine Flat Dam, and the reach of river within a 200-foot radius of the channel exit.	Closed to all fishing all year.				**J**			**No change to current regulation, just re-numbering.**
***(G) Kings River from the Highway 180 crossing downstream.**	**All year**	**5**			**All year A**	**5 trout, no gear restrictions 1**	**A year-round angling season with minimum restrictions on harvest and gear to maximize opportunity on waters with robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries with maximum sustainable harvest.**	**This section of the Kings River is currently open to angling year- round under the District General Regulations. If moved to the new statewide reg for rivers, it would eliminate harvest in the winter. This water is heavily stocked with hatchery trout. This proposed change will keep the river open to angling all year to allow take of hatchery stocked trout in the winter.**
(89) Kirman (Carmen) Lake <u>and all its tributaries</u> (Mono Co.).	Last Saturday in Apr. through Nov. 15. Minimum size limit: 16 inches total length. Only artificial lures with barbless hooks may be use	2	All year	2 trout, 14 inch minimum	**Last Saturday in April through November 15 B**	2 trout, artificial lures, 18 inch minimum **5**	**A spring and summer angling season for both stocked and wild fish. Managed for large fish with limited harvest and protection for smaller age classes for a highly productivity systems that can produce large fish. Allows individuals to spawn prior to trophy sized harvest. Protects fall spawning fish and winter schooling fish.**	Trophy Brook Trout and Lahontan Cutthroat Trout fishery. Maintain trophy status in face of stocking issues. Mostly inaccessible in winter. Tributaries to Kirman Lake are also wrapped into this paragraph. Keep waters closed in winter for safety purposes and to protect fisheries.
~~(90) Kirman (Carmen) Lake tributaries (Mono Co.).~~	~~Closed to all fishing all year.~~	-	-	-	-	-		Redundant with (89) above, which now includes tributaries to Kirman Lake.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
NEW (X) -Kitchen Creek (San Diego Co.) upstream of Lake Morena, and all its tributaries.			All year	2 trout, artificial lures	All year **A**	2 trout, artificial lures **3**	A year-round angling season to maximize opportunity with limited daily harvest, without additional possession, for less productive self-sustaining fisheries where there is moderate concern regarding harvest with minimal threat to total population.	This water is being moved from the Southern District Regulations to keep current 2 trout bag limit. There is no change to current regulation, except for the removal of the requirement for barbless hooks.
(91) Klamath River ~~Regulations (See Section 1.74 for salmon punch card requirements.~~								
(A) Klamath River main stem and all tributaries above Iron Gate Dam~~, except Shovel Creek and tributaries. The Klamath River main stem within 250 feet of the mouth of Shovel Creek is closed to all fishing November 16 through June 15.~~	Last Saturday in Apr. through Nov. 15	5 per day, 10 in possession	Saturday preceding Memorial Day through September 30	5 trout, no gear restrictions	Saturday preceding Memorial Day through September 30 **F**	5 trout, no gear restrictions **1**	A summer only angling season to protect spring and fall spawning fish populations. Minimum restrictions on harvest and gear for robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries where the maximum catch can be harvested sustainably.	Remote fishery with little pressure. Allow take during non-spawn season, similar to previous reg. Zero limit for the remainder of the year to protect spawning fish and allow angling opportunity. Self-sustaining, wild trout fishery.
					October 1 through the Friday preceding Memorial Day **I**	0 trout, artificial lures with barbless hooks **6**	A fall through spring angling season in conjunction with a separate summer season to segregate harvest and maximize opportunity. Significant restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations during these seasons, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
~~(B) Shovel Creek and tributaries above mouth of Panther Creek.~~	~~Last Saturday in Apr. through Nov. 15.~~	~~5~~	-	-				Combined paragraphs (B) and (C) for Klamath River for simplification purposes.
~~(C) Shovel Creek and tributaries up to and including Panther Creek.~~	~~Closed to all fishing all year~~							Not applicable with revisions to A of this subsection.
(96) Lagunitas Lake (Marin Co.).	All year. Maximum size limit: 14 inches total length. Only artificial lures with barbless hooks may be used	2	All year	2 trout, artificial lures	All year **A**	2 trout, artificial lures **3**	A year-round angling season to maximize opportunity with limited daily harvest, without additional possession, for less productive self-sustaining fisheries where there is moderate concern regarding harvest with minimal threat to total population.	Lagunitas Lake is stocked by CDFW with hatchery trout to maintain a "Put-And-Take" fishery. "Put-And -Take" fisheries are meant for anglers to harvest the stocked fish. A maximum size limit and barbless hook requirements work counter to the objective of this fishery. Since this lake has a lower a number of stocking events, a 2 fish limit may allow more trout to persist throughout the regional stocking season versus a 5 trout limit.
(96.5) Lane Lake (Mono Co.).	Last Saturday in Apr. through Nov. 15.	2	All year	2 trout, artificial lures	All year **A**	2 trout, artificial lures **3**	A year-round angling season to maximize opportunity with limited daily harvest, without additional possession, for less productive self-sustaining fisheries where there is moderate concern regarding harvest with minimal threat to total population.	
~~(98) Lassen Creek and tributaries (Modoc Co.)~~	~~Saturday preceding Memorial Day through Nov. 15. Only artificial lures with~~	~~0~~	-	-				Covered under new “Goose Lake and tributaries” regulation.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14” min art. lures; 5 = 2 trout 18” min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
	~~barbless hooks may be used.~~							
(98.5) Laurel Lakes and tributaries (Mono Co.)	Last Saturday in Apr. through Nov. 15. Minimum size limit: 14 inches total length. Only artificial lures with barbless hooks may be used	2	All year	2 trout, artificial lures, 14 inch minimum	All year **A**	2 trout, artificial lures, 14 inch minimum **4**	A year-round angling season to maximize opportunity with limited selected harvest and protection for smaller age classes. Allows most individuals to spawn prior to entering the fishery.	Golden Trout fishery. Often contains large Golden Trout. Inaccessible in winter. Low use.
(98.6) Lee Vining Creek from the Lee Vining conduit downstream to Mono Lake (Mono Co.)	Last Saturday in Apr. through Nov. 15.	2	All year	0 trout, artificial lures with barbless hooks	Saturday preceding Memorial Day through September 30 **F**	2 trout, 4 trout in possession, no gear restrictions **2**	A summer only angling season to protect spring and fall spawning fish populations. Limited daily harvest but with additional possession for waters with hatchery supplemented or moderately productive self-sustaining fisheries where there is moderate concern regarding harvest but minimal threat to total population.	Added a 2 trout summer season to provide a safe walk to water for the children living in Lee Vining. Public input, children's safety, kids fishing opportunity.
					October 1 through the Friday preceding Memorial Day **I**	0 trout, artificial lures with barbless hooks **6**	A fall through spring angling season in conjunction with a separate summer season to segregate harvest and maximize opportunity. Significant restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations during these seasons, mitigate high use areas, seasonally eliminate harvest of	Aligns with other Mono Lake tributaries. Rush, Parker, Walker all catch and release. LADWP monitoring sites.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
							spawning fish, or to achieve fast action or trophy fisheries.	
(100) Little Butano Creek above the diversion dam at Butano State Park (San Mateo Co.).	Last Saturday in Apr. through Nov. 15	5 trout	Saturday preceding Memorial Day through September 30	0 trout, artificial lures with barbless hooks	Saturday preceding Memorial Day through September 30 **F**	0 trout, artificial lures with barbless hooks **6**	A summer only angling season to protect spring and fall spawning fish populations. Maximum restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	The low seasonal flow and sporadic densities of small wild trout is the purpose for reducing the take of trout on Little Butano Creek.
(101) Little Cottonwood Creek and tributaries (Inyo Co.).	See Cottonwood Creek 7.50(b)(48).							Redundant with Cottonwood Creek
(103.5) Little Truckee River (Sierra and Nevada ~~Cos.~~cos.) from Stampede Reservoir Dam Downstream to Boca Reservoir.	Last Saturday in Apr. through Nov. 15. Maximum size limit: 14 inches total length. Only artificial lures with barbless hooks may be used.	2	All year	0 trout, artificial lures with barbless hooks	All year **A**	0 trout, artificial lures with barbless hooks **6**	A year-round angling season to maximize opportunity while at the same time utilizing restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Protect the larger Rainbow and Brown Trout (14 inches and greater).
	Nov. 16 through the Friday preceding the last Saturday in Apr. Only	0						Moved to a year-round regulation.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
	artificial lures with barbless hooks may be used.							
***(104.3) Los Angeles Aqueduct from Owens River to Alabama Gates (Inyo County).**	First Saturday in Mar. through Nov. 15.	5 per day, 10 in possession	Move to statewide reg		**Move to statewide reg for rivers, streams, and creeks SR**		**Alignment with traditional season, previous district regulations, and Commission Policy, for both wild and stocked fisheries with a goal of sustainable harvest, while allowing catch and release angling during the other part of the year in an effort to increase angling opportunities while reducing population level effects stemming from over-harvest and or associated hooking mortality.**	Provides opportunity for catch and release angling in the winter.
	Nov. 16 through the Friday preceding the first Saturday in Mar.	5						Moved to state-wide regulation
NEW (X) - Los Gatos Creek (Santa Clara Co.) upstream of Camden Avenue drop including Lexington Reservoir and all tributaries.	Last Saturday in Apr. through Nov. 15	5 per day, 10 in possession	Saturday preceding Memorial Day through September 30	2 trout, 4 fish in possession, no gear restrictions	All year **A**	0 trout, artificial lures with barbless hooks **6**	A year-round angling season to maximize opportunity while at the same time utilizing restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Moved from the District General Regulations. Protect sensitive population that provides angling opportunity in densely populated Bay Area County. Comments referenced this watershed has small to moderate sized trout populations and is highly impacted by urbanization since it flows through highly developed urban/suburban area in Silicon Valley. DFW concurs with assessment.
***NEW (X)- Lundy Lake (Mono County)**	**Last Saturday in Apr. through Nov. 15**	**5 per day, 10 in possession**			**Last Saturday in April**	**5 trout, no gear restrictions**		**Moved from Sierra District regulation. In response to public input, DFW is proposing to keep**

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
					through Nov. 15 B	**1**		**the current trout season for resort lakes in Inyo and Mono cos. to support local economic needs, public safety concerns, and local business operations.**
***NEW (X) Lytle Creek and tributaries upstream of Interstate 15 bridge. (San Bernardino Co.)**	**All year**	**5**			**All year A**	**5 trout, no gear restrictions 1**	**A year-round angling season with minimum restrictions on harvest and gear to maximize opportunity on waters with robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries with maximum sustainable harvest.**	**Moved from the District General Regulations. No change to the current regulation.**
***(107) Mad River and tributaries (Humboldt Co.). (E) Mad River and tributaries above Ruth Dam.**	Last Saturday in May through Nov. 15.	5 per day, 10 in possession	Move to statewide reg		**Move to statewide reg for rivers, streams, and creeks SR**		**Alignment with traditional season, previous district regulations, and Commission Policy, for both wild and stocked fisheries with a goal of sustainable harvest, while allowing catch and release angling during the other part of the year in an effort to increase angling opportunities while reducing population level effects stemming from over-harvest and or associated hooking mortality.**	Provides opportunity for catch and release angling in the winter.
***NEW (X)- Mamie Lake (Lake Mamie, Mono County)**	**Last Saturday in Apr. through Nov. 15**	**5 per day, 10 in possession**			**Last Saturday in April through Nov. 15 B**	**5 trout, no gear restrictions 1**		**Moved from Sierra District regulation. In response to public input, DFW is proposing to keep the current trout season for resort lakes in Inyo and Mono cos. to support local economic needs, public safety concerns, and local business operations.**
***(109) Mammoth Pool (Fresno and Madera cos.).**	June 16 through Apr. 30.	5 per day, 10 in possession	Saturday preceding Memorial Day through	5 trout, no gear restrictions	**All year A**	5 trout, no gear restrictions **1**	**A year-round angling season with minimum restrictions on harvest and gear to maximize opportunity on waters with robust, self-sustaining fisheries with low to moderate**	**The fishery is a put and grow fishery and no need for protection for spawning populations of fish in the lake. The current closure of May**

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
			the last day in February				**angling, or stocked fisheries with maximum sustainable harvest.**	**1- June 15 is in place to protect migratory deer crossing the lake and was done in collaboration with the USFS which closes all campgrounds/facilities around the lake during this period. It would be up to the USFS to determine if they want to continue the campground/ facilities closure during this period.**
***(110) Mammoth Pool tributaries (Fresno and Madera ~~Cos.~~cos,) from their mouths to a point 300 feet upstream.**	June 16 through Nov. 15	5 per day, 10 in possession	Saturday preceding Memorial Day through the last day in February	5 trout, no gear restrictions	**Move to statewide reg for rivers, streams, and creeks SR**		**Alignment with traditional season, previous district regulations, and Commission Policy, for both wild and stocked fisheries with a goal of sustainable harvest, while allowing catch and release angling during the other part of the year in an effort to increase angling opportunities while reducing population level effects stemming from over-harvest and or associated hooking mortality.**	**Provides opportunity for catch and release angling in the winter.**
(111) Martis Creek from the Martis Lake dam downstream to the confluence with the Truckee River (Nevada Co.)	Last Saturday in Apr. through Nov. 15. Minimum size limit: 14 inches total length. Only artificial lures with barbless hooks may be used.	2	All year	0 trout, artificial lures with barbless hooks	All year **A**	0 trout, artificial lures with barbless hooks **6**	A year-round angling season to maximize opportunity while at the same time utilizing restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Protect larger spawning Rainbow and Brown Trout. Opened all year is consistent with the Truckee River regulation.
(112) Martis Lake and tributaries (Nevada and Placer ~~Cos~~cos.)								

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
(A) Martis Lake.	Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used	0	Move to statewide reg		Move to statewide reg for lakes and reservoirs **SL**		Waters with self-sustaining and stocked fisheries where the maximum catch can be harvested sustainably, with an emphasis on fisheries with high natural production and or some level of stocking.	
(B) Martis Lake tributaries.	Closed to all fishing all year		All year	0 trout, artificial lures with barbless hooks	All year **A**	0 trout, artificial lures with barbless hooks **6**	A year-round angling season to maximize opportunity while at the same time utilizing restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Consistency with the Martis Lake regulation and to increase fishing opportunities. Zero bag limit to protect trout.
***NEW (X) - Mary Lake (Lake Mary, Mono Co.)**	**Last Saturday in Apr. through Nov. 15**	**5 per day, 10 in possession**			**Last Saturday in April through Nov. 15 B**	**5 trout, no gear restrictions 1**		**Moved from Sierra District regulation. In response to public input, DFW is proposing to keep the current trout season for resort lakes in Inyo and Mono cos. to support local economic needs, public safety concerns, and local business operations.**
(115) McCloud River and tributaries (Shasta and Siskiyou cos.).	~~Also see Sierra District General Regulations Section 7.00(b)).~~							
~~(B) McKay Creek and all tributaries including Sheepheaven Spring.~~	~~Closed to all fishing all year.~~		Closed to all fishing all year		Closed to all fishing all year			Stream is mainly dry year-round and was added to protect Sheephaven Spring/Creek. Sheephaven Creek has been officially named by the USGS and now has its own regulation which will provide the protection intended.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
(C) Edson Creek~~ and all tributaries~~.	Closed to all fishing all year.		Closed to all fishing all year		Closed to all fishing all year **J**			No change to the current regulation.
(D) Swamp Creek and all tributaries.	Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used.	0	Saturday preceding Memorial Day through the last day in February	0 trout, artificial lures with barbless hooks	Saturday preceding Memorial Day through the last day in February **G**	0 trout, artificial lures with barbless hooks **6**	A spring fishing closure to protect spawning fish populations. Maximum restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	
NEW (E) - Sheephaven Creek					Closed to all fishing all year **J**			Added newly named stream to protect McCloud Redband Trout. Officially named Sheephaven Creek by USGS.
NEW (F)- Bull Creek and tributaries					Closed to all fishing all year **J**			Protection for McCloud Redband Trout.
NEW (G) Dry Creek south of upper McCloud River					Closed to all fishing all year **J**			Protection for McCloud Redband Trout. Two Dry Creeks in the upper McCloud River Watershed.
(~~E~~H) McCloud River from McCloud Dam downstream to confluence of Ladybug Creek.	Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used.	2	Saturday preceding Memorial Day through the last day in February	2 trout, artificial lures	Saturday preceding Memorial Day through September 30 **F**	2 trout, artificial lures **3**	A summer only angling season to protect spring and fall spawning fish populations. Limited daily harvest without additional possession for less productive self-sustaining fisheries where there is moderate concern regarding harvest with minimal threat to total population.	Public input, year-round fishery opportunity, split season/harvest for additional spawning protection, consistency with other year-round fisheries for simplification.

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Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
					October 1 through the Friday preceding Memorial Day **I**	0 trout, artificial lures with barbless hooks **6**	A fall through spring angling season in conjunction with a separate summer season to segregate harvest and maximize opportunity. Significant restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations during these seasons, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Public input, year-round fishery opportunity, split season/harvest for additional spawning protection, consistency with other year-round fisheries for simplification.
(~~F~~I) McCloud River from confluence of Ladybug Creek downstream to ~~lower boundary of the U.S. Forest Service loop (southern boundary of section 36, T38N, R3W).~~Shasta Lake.	Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used.	0	Saturday preceding Memorial Day through the last day in February	0 trout, artificial lures with barbless hooks	All year **A**	0 trout, artificial lures with barbless hooks **6**	A year-round angling season to maximize opportunity while at the same time utilizing restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Public input, year-round fishery opportunity, split season/harvest for additional spawning protection, consistency with other year-round fisheries for simplification. Removed partial section for consistency with lower McCloud regs. Should fair better with any fish above Shasta/NMFS.
~~(G) McCloud River from the lower boundary of the U.S. Forest Service loop (southern boundary of section 36, T38N, R3W) downstream to the upper boundary of the McCloud River Club (southern boundary of section 14, T37N, R3W).~~	~~Closed to all fishing all year.~~							Remove section for consistency with lower McCloud regulations.
(115.3) McGee Creek (Mono Co.).								

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14” min art. lures; 5 = 2 trout 18” min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
(A) McGee Creek downstream from Highway 395.	Last Saturday in April through Friday preceding Memorial Day and Oct. 1 through Nov. 15. Minimum size limit: 18 inches total length. Only artificial lures with barbless hooks may be used.	2	Saturday preceding Memorial Day through September 30	5 trout, no gear restrictions	Saturday preceding Memorial Day through September 30 **F**	5 trout, no gear restrictions **1**	A summer only angling season to protect spring and fall spawning fish populations. Minimum restrictions on harvest and gear for robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries where the maximum catch can be harvested sustainably.	Fall, winter, and spring opportunity was considered in 2019, then decided to close to fishing in fall, winter and spring to protect spawning fish (Rainbow Trout, Lahontan Cutthroat Trout and Brown Trout).
	Saturday preceding Memorial Day through Sept. 30.	5 per day, 10 in possession.	October 1 through the Friday preceding Memorial Day	0 trout, artificial lures with barbless hooks				Closed for fall, winter, spring opportunity
***(B) McGee Creek upstream from Highway 395.**	~~Last Saturday in April through Nov. 15.~~	~~5 per day, 10 in possession~~	Move to statewide reg		**Move to statewide reg for rivers, streams, and creeks SR**		**Alignment with traditional season, previous district regulations, and Commission Policy, for both wild and stocked fisheries with a goal of sustainable harvest, while allowing catch and release angling during the other part of the year in an effort to increase angling opportunities while reducing population level effects stemming from over-harvest and or associated hooking mortality.**	Stocked water. Through campground, pack station, and trailhead. Provides opportunity for catch and release angling in the winter.
~~(115.4) McKay Creek and all tributaries (Siskiyou Co.)~~	~~See McCloud River 7.50(b)(115).~~							Since Sheephaven Creek has been officially named (USGS) we can modify this to be just Sheephaven Creek and drop McKay Creek from 7.50(b).

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
(115.6) McLeod Lake (Mono Co.).	Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used.	0	All year	0 trout, artificial lures with barbless hooks	All year **A**	0 trout, artificial lures with barbless hooks **6**	A year-round angling season to maximize opportunity while at the same time utilizing restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Inaccessible Dec. through May in normal year. Proposed regulation creates additional angling opportunity in years when snow is late or during low snow years.
(115.8) Meiss Lake (Alpine Co.).	Closed to all fishing all year		Saturday preceding Memorial Day through September 30	0 trout, artificial lures with barbless hooks	Saturday preceding Memorial Day through September 30 **F**	0 trout, artificial lures with barbless hooks **6**	A summer only angling season to protect spring and fall spawning fish populations. Maximum restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Meiss Lake is on a tributary to the Upper Truckee River. Consistency with the Upper Truckee River regulation.
(116) Mendocino Lake tributaries (Mendocino Co.).	Last Saturday in Apr. through Nov. 15	5	Move to statewide reg		Move to statewide reg for lakes and reservoirs **SL**		Waters with self-sustaining and stocked fisheries where the maximum catch can be harvested sustainably, with an emphasis on fisheries with high natural production and or some level of stocking.	Stocked multiple times a year. This will increase angling opportunity by allowing angling year-round.
(117) Merced River (Mariposa Co.).								
***(A) From the Happy Isles footbridge downstream to the western boundary of Yosemite National Park at El Portal.**	Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used.	0 rainbow trout 5 brown per day 10 brown trout in possession	Move to statewide reg		**Move to statewide reg for rivers, streams, and creeks SR**		**Alignment with traditional season, previous district regulations, and Commission Policy, for both wild and stocked fisheries with a goal of sustainable harvest, while allowing catch and release angling during the other part of the year in an effort to increase angling opportunities while reducing population level effects**	

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
							stemming from over-harvest and or associated hooking mortality.	
***(B) From the western boundary of Yosemite National Park at El Portal boundary downstream to the Foresta bridge.**	All year. Only artificial lures with barbless hooks may be used.	0 rainbow trout 5 brown trout per day 10 brown trout in possession	Move to statewide reg		**Move to statewide reg for rivers, streams, and creeks SR**		**Alignment with traditional season, previous district regulations, and Commission Policy, for both wild and stocked fisheries with a goal of sustainable harvest, while allowing catch and release angling during the other part of the year in an effort to increase angling opportunities while reducing population level effects stemming from over-harvest and or associated hooking mortality.**	
***(C) From Foresta bridge downstream to Lake McClure.**	Last Saturday in April through November 15. November 16 through the Friday preceding the last Saturday in April.	5 per day, 10 in possession	Move to statewide reg		**Move to statewide reg for rivers, streams, and creeks SR**		**Alignment with traditional season, previous district regulations, and Commission Policy, for both wild and stocked fisheries with a goal of sustainable harvest, while allowing catch and release angling during the other part of the year in an effort to increase angling opportunities while reducing population level effects stemming from over-harvest and or associated hooking mortality.**	Provides opportunity for catch and release angling in the winter.
(118.5) Mill Creek (Mono Co. tributary to West Walker River) and tributaries upstream from confluence with Lost Cannon Creek.	Closed to all fishing all year		All year	0 trout, artificial flies and barbless hooks	All year **A**	0 trout, artificial flies and barbless hooks **7**	A year-round angling season to maximize opportunity while at the same time utilizing restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Proposed regulation creates additional angling opportunity. Inaccessible Dec. through May in normal year. Lahontan Cutthroat Trout water. Enough fish to handle catch and release fishing. Inaccessible Dec. through May in normal year.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14” min art. lures; 5 = 2 trout 18” min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
***NEW (X) Miller Canyon Creek from Silverwood Lake upstream (San Bernardino Co.)**	**All year**	**5**			**All year A**	**5 trout, no gear restrictions 1**	**A year-round angling season with minimum restrictions on harvest and gear to maximize opportunity on waters with robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries with maximum sustainable harvest.**	**Moved from the District General Regulations. No change to the current regulation.**
(120) Milton Lake and Middle Fork Yuba River between Milton Lake and Jackson Meadows Dam (Nevada and Sierra ~~Cos.~~cos.).	Last Saturday in Apr. through Nov. 15. Maximum size limit: 12 inches total length. Only artificial lures with barbless hooks may be used	2	All year	0 trout, artificial lures with barbless hooks	All year **A**	0 trout, artificial lures with barbless hooks **6**	A year-round angling season to maximize opportunity while at the same time utilizing restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Proposed regulation creates additional angling opportunity. A zero bag limit will protect larger trout (greater than 12 inches).
***(125) Mono Creek (Fresno Co.) and tributaries from Edison Lake upstream to the confluence with the North Fork Mono Creek.**	June 1 through October 15.	5 per day, 10 in possession	Saturday preceding Memorial Day through the last day in February	5 trout, no gear restrictions	**Saturday preceding Memorial Day through September 30 F**	5 trout, no gear restrictions **1**	A spring angling closure to protect spawning fish populations. Minimum restrictions on harvest and gear for robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries where the maximum catch can be harvested sustainably.	**Protection of spawning Brown Trout**.
~~(125.5) Moosehead Creek and all tributaries (Shasta and Siskiyou cos.).~~	~~See McCloud River 7.50(b)(115)~~							Covered under regulation for McCloud River.
(128) Nacimiento River (Monterey and San Luis Obispo cos.) from Nacimiento Reservoir.								
***(A) From the headwaters in the Los Padres National Forest, downstream to the**	Last Saturday in Apr. through Nov. 15.	5	Saturday preceding Memorial	5 trout, no gear restrictions	**Move to statewide reg for**		**Alignment with traditional season, previous district regulations, and Commission Policy, for both wild**	**Proposed regulation will increase angler opportunity and closely aligns with the season**

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
southern border of Fort Hunter-Liggett Military Reservation.			Day through the last day in February		**rivers, streams, and creeks SR**		**and stocked fisheries with a goal of sustainable harvest, while allowing catch and release angling during the other part of the year in an effort to increase angling opportunities while reducing population level effects stemming from over-harvest and or associated hooking mortality.**	**for Nacimiento River upstream of Nacimiento Lake to the southern boundary of Fort Hunter-Ligget.**
(B) Nacimiento Lake, and the main stem Nacimiento River upstream to the southern boundary of Fort Hunter-Liggett.	All year.	5	Move to statewide reg		Move to statewide reg for lakes and reservoirs **SL**		Waters with self-sustaining and stocked fisheries where the maximum catch can be harvested sustainably, with an emphasis on fisheries with high natural production and or some level of stocking.	Proposed regulation mirrors current regulation and maintains angler opportunity.
(130.5) Nelson Corral Reservoir and tributary (Lassen Co.). (A) Nelson Corral Reservoir.	All year.	2 trout	All year	2 trout, 4 trout possession limit, no gear restrictions	All year **A**	2 trout, 4 trout possession limit, no gear restrictions **2**	A year-round angling season to maximize opportunity with limited daily harvest, with additional possession, for waters with hatchery supplemented or moderately productive self-sustaining fisheries where there is moderate concern regarding harvest but minimal threat to total population.	Nicasio Lake tributaries fishery is dependent upon wild trout populations. Until trout population can be fully assessed for these tributaries, the bag limit was reduced from 5 fish to 2 fish to help maintain a sustainable fishery.
(130.6) New Bullards Bar Reservoir	All year.	5 trout. 10 landlocked salmon per day. 20 landlocked salmon in possession.			Move to statewide reg for lakes and reservoirs **SL**		Waters with self-sustaining and stocked fisheries where the maximum catch can be harvested sustainably, with an emphasis on fisheries with high natural production and or some level of stocking.	No change to current regulation.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14” min art. lures; 5 = 2 trout 18” min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
(132) Nicasio Lake tributaries (Marin Co.).	Last Saturday in Apr. through Nov. 15	5	Saturday preceding Memorial Day through September 30	2 trout, 4 trout in possession, no gear restrictions	Saturday preceding Memorial Day through September 30 **F**	2 trout, 4 trout in possession, no gear restrictions **2**	A summer only season to protect spring and fall spawning fish populations. Limited daily harvest but with additional possession for waters with hatchery supplemented or moderately productive self-sustaining fisheries where there is moderate concern regarding harvest but minimal threat to total population.	Nicasio Lake tributaries fishery is dependent upon wild trout populations. Until trout population can be fully assessed for these tributaries, the bag limit was reduced from 5 fish to 2 fish to help maintain a sustainable fishery.
***(134) Owens River (Inyo and Mono Cos.), ~~including Pleasant Valley and Tinemaha lakes,~~ except (A), (B), (C), and (D) ~~and (E)~~below.**	First Saturday in Mar. through Oct. 31.	5 per day, 10 in possession	Move to statewide reg		**All year A**	**5 trout, no gear restrictions 1**	**A year-round angling season with minimum restrictions on harvest and gear to maximize opportunity on waters with robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries with maximum sustainable harvest.**	**Only slight change to current regulation with minimal reduction in angling opportunity.**
	Nov. 1 through the Friday preceding the first Saturday in Mar.	5						
(134) Owens River (Inyo and Mono cos.)								
***(A) Upper Owens River from Benton Bridge road crossing upstream to Big Springs. Above Big Springs, see Deadman Creek 7.50(b)(54.5).**	Last Saturday in April through Nov. 15. Maximum size limit: 16 inches total length. Only artificial lures with barbless hooks may be used.	2	All year	0 trout, artificial flies and barbless hooks	All year **A**	**0 trout, artificial lures and barbless hooks 6**	A year-round angling season to maximize opportunity while at the same time utilizing restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	**The Owens River upstream of Crowley Lake (Upper Owens) supports a resident, fluvial, and adfluvial (lake-run) fishery that also supports the lake fishery. The Upper Owens can, at any point of the year, have a lake-run form of trout utilizing the habitat for either spawning or thermal refugia. The proposed regulations were set to segregate the river and help to**

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
								ameliorate angling effects over these different runs and areas. CDFW believes it prudent to use conservative gear restrictions (barbless artificial lures only) and bag limits (0) for the river upstream of the Benton Bridge to protect the runs and life history stages of the various trout species that use the upper river. The majority of anglers utilizing the river above Benton Bridge are catch & release anglers, while the river below the bridge tend towards traditional bait and lure anglers with some fly anglers.
	Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used.	0						Moved to year-round regulation
(B) Upper Owens River from Benton Bridge road crossing ~~downstream to upper Owens River fishing monument.~~ to Crowley Lake.	Saturday preceding Memorial Day through Sep. 30.	5 per day 10 in possession.	Saturday preceding Memorial Day through September 30	5 trout, no gear restrictions	Last Saturday in April through July 31 **D**	5 trout, no gear restrictions **1**	Alignment with the traditional trout opener to support local economic needs, public safety concerns, and local business operations. Minimum restrictions on harvest and gear for robust, self-sustaining fisheries with low to moderate angling, or stocked	Allow take in summer. Lake level varies. Consistent with upper Owens River in fall, winter and spring.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14” min art. lures; 5 = 2 trout 18” min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
							fisheries where the maximum catch can be harvested sustainably.	
			October 1 through the Friday preceding Memorial Day	0 trout, artificial lures with barbless hooks	August 1 through November 15 **E**	2 trout, artificial lures, 18 inch minimum **5**	Summer and fall angling season to allow for limited/selected harvest or closures to protect spawning runs, thermal refuges, or periods of elevated water temperatures. Limited selected harvest with protection for smaller age classes in high productivity systems that can produce large fish. Allows individuals to spawn prior to trophy sized harvest.	Reduce take to protect spawning Rainbow Trout, Lahontan Cutthroat Trout and Brown Trout. Lake level varies. Consistent with upper Owens River in fall, winter and spring.
~~(C) Upper Owens River from fishing monument (located about 1/4 mile upstream from maximum lake level) to Crowley Lake.~~	~~Last Saturday in April through July 31.~~	~~5 per day 10 in possession.~~	-	-				Combined paragraph (C) into (B) for Owens River for simplification purposes.
-	~~Aug. 1 through Nov. 15. Minimum size limit: 18 inches total length. Only artificial lures with barbless hooks may be used.~~	~~2~~	-	-				
(~~D~~C) From Pleasant Valley Dam downstream to footbridge at lower end of Pleasant Valley Campground.	Jan. 1 through Sept. 30.	2	All year	2 trout, artificial lures	**Last Saturday in April through November 15. B**	2 trout, 4 trout in possession, no gear restrictions **2**	A year-round angling season to maximize opportunity with limited daily harvest, without additional possession, for less productive self-sustaining fisheries where there is moderate concern regarding harvest with minimal threat to total population.	Below PVR, above wild trout section. Through popular campground. Allow limited take in traditional campground fishing area. Consistent with entire Owens River open year-round. **Catch and release in winter to protect spawning fish.**

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
	Oct. 1 through Dec. 31. Only artificial lures with barbless hooks may be used.	0			**November 16 through the Friday preceding the last Saturday in April. C**	**0 trout, artificial lures with barbless hooks 6**	**Winter angling season used in conjunction with a spring and summer angling season to implement more restrictive bag limits and gear restrictions during spring and fall spawning. A zero bag limit to eliminate harvest of spawning fish.**	Below PVR, above wild trout section. Through popular campground. Allow limited take in traditional campground fishing area. Consistent with entire Owens River open year-round. **Catch and release in winter to protect spawning fish.**
~~(E~~D) From footbridge at lower end of Pleasant Valley Campground east (downstream) ~~3.3 miles along Chalk Bluffs Road to the redwood sport fishing regulations sign~~ to 5 Bridges Road.	All year. Only artificial lures with barbless hooks may be used.	0	All year	0 trout, artificial lures with barbless hooks	All year **A**	0 trout, artificial lures with barbless hooks **6**	A year-round angling season to maximize opportunity while at the same time utilizing restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Designated Wild Trout Water. Move lower boundary to simplify section start and end. Never freezes.
(135.4) Lake Pardee	All year.	5 trout. 10 landlocked salmon per day. 20 landlocked salmon in possession.			Move to statewide reg for lakes and reservoirs **SL**		Waters with self-sustaining and stocked fisheries where the maximum catch can be harvested sustainably, with an emphasis on fisheries with high natural production and or some level of stocking.	No change to current regulation.
***(135.5) Parker Creek (Mono Co.)~~. from the Lee Vining Conduit to Rush Creek.~~ from Parker Lake to the confluence with Rush Creek.**	Last Saturday in Apr. though Nov. 15. Only artificial lures with barbless hooks may be used	0	All year	0 trout, artificial lures with barbless hooks	All year	0 trout, artificial lures with barbless hooks	A year-round angling season to maximize opportunity while at the same time utilizing restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Consistent with SWRBC monitoring criteria. Same reg. for all Mono Lake tributaries, except Lee Vining Creek. Parker Lake is designated Wild Trout Water.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
~~(138) Pillsbury Lake tributaries (Lake Co.).~~	~~Last Saturday in Apr. through Nov. 15.~~	~~5~~	~~Move to statewide reg~~	-	~~Move to statewide reg~~	-	~~Waters with self-sustaining and stocked fisheries where the maximum catch can be harvested sustainably, with an emphasis on fisheries with high natural production and or some level of stocking.~~	Moved under Eel River regulations for simplification purposes.
~~(139) Pine Creek and Pine Creek Slough (Lassen Co.) See Eagle Lake 7.50(b)(61).~~	~~Closed to all fishing all year.~~							
~~(A) Pine Creek Slough and Pine Creek below State Highway 44.~~	~~Closed to fishing all year~~							Moved under Eagle Lake regulations for simplification purposes.
~~(B) Pine Creek above State Highway 44.~~	~~Saturday preceding Memorial Day through Nov. 15.~~	~~5 per day 10 in possession~~	-	-				Moved under Eagle Lake regulations for simplification purposes.
(139.5) Pine Creek (Goose Lake Tributary) and tributaries (Modoc Co.).	Saturday preceding Memorial Day through November 15. Only artificial lures with barbless hooks may be used.	0			Saturday preceding Memorial Day through the last day in February **G**	5 trout, no gear restrictions **1**	A spring angling closure to protect spawning fish populations. Minimum restrictions on harvest and gear for robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries where the maximum catch can be harvested sustainably.	Mixed trout species. Public opportunity to catch and keep trout in the area. Bag limit and gear restrictions to allow for take of Brown Trout which are more prevalent than native Goose Lake Redband Trout.
NEW (X) - Pine Valley Creek (San Diego Co.) upstream of Barrett Lake, and all its tributaries.	All year. Only artificial lures with barbless hooks may be used.	2	All year	2 trout, artificial lures	All year **A**	2 trout, artificial lures **3**	A year-round angling season to maximize opportunity with limited daily harvest, without additional possession, for less productive self-sustaining fisheries where there is moderate concern regarding harvest with minimal threat to total population.	This water was moved from the Southern District Regulations. There is no change to the current regulation, except for the removal of the requirement for barbless hooks.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
(141) Pit River (Shasta and Modoc cos.).								
***~~(A)~~ Pit River (Modoc County) from the Hwy 395 bridge/South Fork Pit River crossing near the town of Likely downstream to the Highway 299 (Canby) bridge/Pit River crossing.**	All year	0	All year	0 trout, artificial lures with barbless hooks	**Move to statewide reg for rivers, streams, and creeks SR**		**Alignment with traditional season, previous district regulations, and Commission Policy, for both wild and stocked fisheries with a goal of sustainable harvest, while allowing catch and release angling during the other part of the year in an effort to increase angling opportunities while reducing population level effects stemming from over-harvest and or associated hooking mortality.**	This section of river supports a fishery more typical of a warm water fishery, trout are not common. Most anglers seek sunfish and catfish, this section of river should be moved to statewide reg. The purpose of the old regulation was to provide an extended season for species other than trout; with the new statewide year-round season, this reg is not needed. Other sections of the upper Pit River need to be addressed (upper North and South forks)
NEW (A) Pit River, South Fork (Modoc Co.) and tributaries upstream of the Highway 395 bridge in Likely.					Saturday preceding Memorial Day through the last day in February **G**	5 trout, no gear restrictions **1**	A spring angling closure to protect spawning fish populations. Minimum restrictions on harvest and gear for robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries where the maximum catch can be harvested sustainably.	(Addition from public) waters not listed would fall under statewide reg, year-round season; could have adverse impacts on wild trout populations in tributaries due to over-fishing/harvest during spawning season. Provide opportunity for stocked trout (in SF Pit) and wild Brown Trout (upper tributaries) angling.
NEW (B) - Pit River, North Fork (Modoc Co.) and tributaries from the confluence with the South Fork in Alturas upstream to (including) Franklin Creek.					Saturday preceding Memorial Day through the last day in February **G**	2 trout, artificial lures **3**	A spring angling closure to protect spawning fish populations. Limited daily harvest without additional possession for less productive self-sustaining fisheries where there is moderate concern regarding harvest with minimal threat to total population.	Waters not listed would fall under statewide reg, year-round season, 5/10 bag/possession, no gear restrictions; could have adverse impacts on wild native trout populations due to over-fishing/harvest. Provide angling opportunity while giving some

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
								protection to wild/native Redband Trout, avoiding spawning season with a small bag limit.
(~~B~~C) From Pit No. 3 (Britton Dam) downstream to the outlet of the Pit No. 3 Powerhouse.	Last Saturday in Apr. through Nov. 15. Minimum size limit: 18 inches total length. Only artificial lures with barbless hooks may be used.	2			All year **A**	0 trout, artificial lures with barbless hooks **6**	A year-round angling season to maximize opportunity while at the same time utilizing restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Reduced bag limit to provide reprieve to a popular fishery while allowing a year-round angling opportunity and simplifying the regulations.
	Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used.	0						Moved to a year-round regulation.
(~~C~~D) Pit River, from Pit No. 3 Powerhouse downstream to ~~Pit No. 7 dam~~ Shasta Lake.	Last Saturday in Apr. through Nov. 15.	5			All year **A**	2 trout, 4 trout in possession, no gear restrictions **2**	A year-round angling season to maximize opportunity with limited daily harvest, with additional possession, for waters with hatchery supplemented or moderately productive self-sustaining fisheries where there is moderate concern regarding harvest but minimal threat to total population.	Reduced bag limit was a compromise to allow year-round harvest.
-	Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures	0						Moved to a year-round regulation.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
	with barbless hooks may be used.							
~~(D) From Pit No. 7 dam downsteam to Shasta Lake.~~	~~All year.~~	~~5~~	-	-				Combined former paragraphs (D) into new paragraph (D) for Pit River for simplification purposes.
(144) Portuguese Creek, West Fork (Madera Co.) from headwaters downstream to confluence with the East Fork Portuguese Creek.	Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used	0	Saturday preceding Memorial Day through the last day in February	0 trout, artificial lures with barbless hooks	Saturday preceding Memorial Day through the last day in February **G**	0 trout, artificial lures with barbless hooks **6**	A spring angling closure to protect spawning fish populations. Maximum restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Proposed regulation protects spawning populations of Lahontan Cutthroat Trout with minimal loss of angler opportunity in the spring season and provides additional angling opportunity in the winter.
***(145) Prosser Creek from the Prosser Reservoir dam downstream to the confluence with the Truckee River (Nevada Co.).**	Last Saturday in Apr. through Nov. 15. Minimum size limit: 14 inches total length. Only artificial lures with barbless hooks may be used.	2	All year	2 trout, 4 fish possession limit, no gear restrictions	All year **A**	**0 trout, artificial lures with barbless hooks 6**	**A year-round angling season to maximize opportunity while at the same time utilizing restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.**	**Significant restoration was recently completed in Prosser Creek to increase spawning habitat for trout. A zero trout limit will protect spawning populations of wild trout and migrating trout searching out coldwater refuge from the Truckee River.**
(146) Purisima Creek (San Mateo Co.).	Last Saturday in Apr. through Nov. 15	5 trout	Saturday preceding Memorial Day through September 30	0 trout, artificial lures with barbless hooks	Saturday preceding Memorial Day through September 30 **F**	0 trout, artificial lures with barbless hooks **6**	A summer only angling season to protect spring and fall spawning fish populations. Maximum restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	The low seasonal flow and sporadic densities of small wild trout is the purpose for reducing the take of trout on Purisima Creek.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
(147) Putah Creek (Solano and Yolo ~~Cos.~~cos.) ~~from~~ Solano Lake to Monticello Dam.	All year. Only artificial lures ~~and~~ with barbless hooks may be used.	0 trout			All year **A**	**0 trout, artificial lures with barbless hooks 6**		Amend area boundary description to clarify that the regulation includes Solano Lake.
(150.5) Robinson Creek (Mono Co.).								
(A) From the U.S. Forest Service boundary downstream to Upper Twin Lake.	Last Saturday in April through Sept. 14	5	Saturday preceding Memorial Day through September 30	5 trout, no gear restrictions	Saturday preceding Memorial Day through September 30 **F**	5 trout, no gear restrictions **1**	A summer only angling season to protect spring and fall spawning fish populations. Minimum restrictions on harvest and gear for robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries where the maximum catch can be harvested sustainably.	Essentially no change to the current regulation, except for slightly shorter season.
	Sept. 15 through Nov. 15. Only artificial lures with barbless hooks may be used.	0	October 1 through the Friday preceding Memorial Day	0 trout, artificial lures with barbless hooks	-			Fall, winter, and spring opportunity was considered in 2019, then decided to close to fishing in fall, winter and spring to protect spawning fish (Rainbow Trout, Lahontan Cutthroat Trout, Brown Trout, and Kokanee Trout).
(B) Between Upper and Lower Twin Lakes.			Saturday preceding Memorial Day through September 30	5 trout, no gear restrictions	Saturday preceding Memorial Day through September 30 **F**	5 trout, no gear restrictions **1**	A summer only angling season to protect spring and fall spawning fish populations. Minimum restrictions on harvest and gear for robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries where the maximum catch can be harvested sustainably.	Fall, winter, and spring opportunity was considered in 2019, then decided to close to fishing in fall, winter and spring to protect spawning fish (Rainbow Trout, Lahontan Cutthroat Trout, Brown Trout).

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
	Last Saturday in April through Sept. 14.	5	October 1 through the Friday preceding Memorial Day	0 trout, artificial lures with barbless hooks				Closed for fall, winter, spring opportunity
***NEW (X) - Rock Creek Lake (Inyo Co.)**	**Last Saturday in Apr. through Nov. 15**	**5 per day, 10 in possession**	-	-	**Last Saturday in April through Nov. 15 B**	**5 trout, no gear restrictions 1**		**Moved from Sierra District regulation. In response to public input, DFW is proposing to keep the current trout season for resort lakes in Inyo and Mono cos. to support local economic needs, public safety concerns, and local business operations.**
(152.5) Roosevelt Lake (Mono Co.).	Last Saturday in Apr. through Nov. 15.	2	All year	2 trout, artificial lures	All year **A**	2 trout, artificial lures **3**	A year-round angling season to maximize opportunity with limited daily harvest, without additional possession, for less productive self-sustaining fisheries where there is moderate concern regarding harvest with minimal threat to total population.	Stocked water. Along Walker River trial. Hike to water. Mostly inaccessible in winter. Same as Lane Lake.
(153) Rush Creek (Mono Co.) only from Grant Lake Dam downstream to Mono Lake.	Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used	0	All year	0 trout, artificial lures with barbless hooks	All year **A**	0 trout, artificial lures with barbless hooks **6**	A year-round angling season to maximize opportunity while at the same time utilizing restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Consistent with SWRCB monitoring criteria. Same regulation for all Mono Lake tributaries, except Lee Vining Creek.
NEW (X) - Rush Creek (Mono Co.) between Silver Lake and Grant Lake	Last Saturday in Apr. through Nov. 15	5 per day, 10 in possession	Saturday preceding Memorial Day through September 30	5 trout, no gear restrictions	Saturday preceding Memorial Day through September 30 **F**	5 trout, no gear restrictions **1**	A summer only angling season to protect spring and fall spawning fish populations. Minimum restrictions on harvest and gear for robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries	Stocked in summer. Provide opportunity in high use area. Closed in spring to protect spawning Rainbow and Lahontan Cutthroat Trout. Closed in fall to protect spawning Brown Trout. Maintain wild trout component in

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
							where the maximum catch can be harvested sustainably.	June Loop. "Sustainable" fishing per Mono Co. Fish Commission.
			October 1 through the Friday preceding Memorial Day	0 trout, artificial lures with barbless hooks				Fall, winter, and spring opportunity was considered in 2019, then decided to close to fishing in fall, winter and spring to protect fish mentioned above.
***NEW (X) - Sabrina Lake (Lake Sabrina, Inyo Co.)**	**Last Saturday in Apr. through Nov. 15**	**5 per day, 10 in possession**			**Last Saturday in April through Nov. 15 B**	**5 trout, no gear restrictions 1**		**Moved from Sierra District regulation. In response to public input, DFW is proposing to keep the current trout season for resort lakes in Inyo and Mono cos. to support local economic needs, public safety concerns, and local business operations.**
(156) Sacramento River and tributaries above Keswick Dam (Shasta, and Siskiyou ~~Cos~~cos.~~.~~).	Also see Sierra District General Regulations (See Section 7.00(b)).							
(B) Sacramento River and tributaries ~~excluding Soda Creek~~ from Scarlett Way bridge downstream to the county bridge at Sweetbriar ~~(See Soda Creek 7.50(b)(180.5))~~.	Last Saturday in Apr. through Nov. 15.	5 per day 10 in possession	Saturday preceding Memorial Day through September 30	5 trout, no gear restrictions	Saturday preceding Memorial Day through September 30 **F**	5 trout, no gear restrictions **1**	A summer only angling season to protect spring and fall spawning fish populations. Minimum restrictions on harvest and gear for robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries where the maximum catch can be harvested sustainably.	Put and take section to allow harvest. Agreement with Dunsmuir for designation.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
			October 1 through the Friday preceding Memorial Day	2 trout, artificial lures	October 1 through the Friday preceding Memorial Day **I**	2 trout, artificial lures **3**	A fall through spring angling season in conjunction with a separate summer season to segregate harvest and maximize opportunity. Significant restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations during these seasons, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	
(C) Sacramento River ~~mainstem (excluding tributaries)~~ and tributaries from the ~~Scarlett Way bridge downstream to the~~ county bridge at Sweetbriar downstream to Shasta Lake.	Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used.	0	All year	2 trout, artificial lures	All year **A**	2 trout, artificial lures **3**	A year-round angling season to maximize opportunity with limited daily harvest, without additional possession, for less productive self-sustaining fisheries where there is moderate concern regarding harvest with minimal threat to total population.	
~~(D) Sacramento River and tributaries excluding Castle Creek from the county bridge at Sweetbriar downstream to Shasta Lake (See Castle Creek 7.50(b)(39.3)).~~	~~Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used.~~	~~2~~	-	-				Combined former paragraphs (D) and (E) into new paragraph (C) for Sacramento River and tributaries for simplification purposes

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14” min art. lures; 5 = 2 trout 18” min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
~~(E) Sacramento River mainstem (excluding all tributaries) from the county bridge at Sweetbriar downstream to Shasta Lake.~~	~~Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used.~~	~~0~~	-	-				
(157) Sagehen Creek (Nevada Co.).								
(A) From the stream gauging station (located about 1/8 ~~one-eighth~~ mile below Sagehen Creek Station Headquarters) upstream to about 1/8 ~~one-eighth~~ of a mile above the station headquarters at a point where the stream splits into two sections.	Closed to all fishing all year.							Essentially no change to the current regulation
(B) From the Highway 89 bridge upstream to the gauging station at the east boundary of the Sagehen Creek Station.	Last Saturday in Apr. through Nov. 15 Only artificial lures with barbless hooks may be used	0	All year	0 trout, artificial lures with barbless hooks	All year **A**	0 trout, artificial lures with barbless hooks **6**	A year-round angling season to maximize opportunity while at the same time utilizing restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Provides opportunity for catch and release angling in the winter.
***(160) Salmon Creek and tributaries above Highway 1 (Monterey Co.).**	Last Saturday in Apr. through Nov. 15	5 trout	Saturday preceding Memorial Day through September 30	5 trout, no gear restrictions	Saturday preceding Memorial Day through September 30	**0 trout, artificial lures with barbless hooks 6**	A summer only angling season to protect spring and fall spawning fish populations. Maximum restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas,	**Change to catch and release angling to protect spawning steelhead populations that congregate below Salmon Falls.**

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14” min art. lures; 5 = 2 trout 18” min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
					F		seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	
NEW (X)- San Luis Rey River West Fork (San Diego Co.)	All year. Only artificial lures with barbless hooks may be used.	2	All year	2 trout, artificial lures	All year **A**	2 trout, artificial lures **3**	A year-round angling season to maximize opportunity with limited daily harvest, without additional possession, for less productive self-sustaining fisheries where there is moderate concern regarding harvest with minimal threat to total population.	This water was moved from the Southern District Regulations. There is no change to the current regulation, except for the removal of the requirement for barbless hooks.
***(NEW (X) Santa Ana River and tributaries upstream above Seven Oaks Dam. (San Bernardino County). This does not include Bear Creek. See (X) Bear Creek (San Bernardino Co.) for additional info.**	**All year**	**5**			**All year A**	**5 trout, no gear restrictions 1**	**A year-round angling season with minimum restrictions on harvest and gear to maximize opportunity on waters with robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries with maximum sustainable harvest.**	**This water was moved from the Southern District Regulations. There is no change to the current regulation.**
***(171.7) Santa Paula Creek and tributaries above the falls located 3 miles upstream from the Highway 150 bridge (Ventura Co.).**	All year.	5	Move to statewide reg		**Move to statewide reg for rivers, streams, and creeks SR**		**Alignment with traditional season, previous district regulations, and Commission Policy, for both wild and stocked fisheries with a goal of sustainable harvest, while allowing catch and release angling during the other part of the year in an effort to increase angling opportunities while reducing population level effects stemming from over-harvest and or associated hooking mortality.**	This change would remove the opportunity for harvest in the winter.
(172.5) Santa Ynez River and tributaries upstream of Gibraltar Dam (Santa Barbara County).	All year	2	All year	2 trout, 4 trout possession limit, no gear restrictions	All year **A**	2 trout, 4 trout in possession, no gear restrictions **2**	A year-round angling season to maximize opportunity with limited daily harvest, with additional possession, for waters with hatchery supplemented or moderately productive self-sustaining fisheries where there is moderate	No change to the current regulation, except for an added possession limit.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
							concern regarding harvest but minimal threat to total population.	
(174.1) Scotts Flat Reservoir, upper	All year.	5 trout. 10 trout in possession. 10 landlocked salmon per day. 20 landlocked salmon in possession.			Move to statewide reg for lakes and reservoirs **SL**		Waters with self-sustaining and stocked fisheries where the maximum catch can be harvested sustainably, with an emphasis on fisheries with high natural production and or some level of stocking.	No change to the current regulation.
(175) Shasta Lake (Shasta Co.).	All year	5	Move to statewide reg		Move to statewide reg for lakes and reservoirs **SL**		Waters with self-sustaining and stocked fisheries where the maximum catch can be harvested sustainably, with an emphasis on fisheries with high natural production and or some level of stocking.	No change to the current regulation except for an added possession limit.
~~(176.5) Sheepheaven Spring (Siskiyou Co.).~~	~~See McCloud River 7.50(b)(115).~~							Covered under regulation for McCloud River.
~~(177) Shovel Creek and tributaries (Siskiyou Co.).~~	~~See Klamath River 7.50(b)(91).~~							Angler use is minimal and restricted. Now grouped with Klamath River regulations.
(177.5) Silver Creek ~~between Sworinger Lake and Lost Lake~~ and all other tributaries to Sworinger Lake (Modoc and Lassen cos.).	Closed to all fishing all year		Saturday preceding Memorial Day through the last day in February	5 trout, no gear restrictions	Saturday preceding Memorial Day through the last day in February **G**	2 trout, artificial lures **3**	A spring angling closure to protect spawning fish populations. Limited daily harvest without additional possession for less productive self-sustaining fisheries where there is moderate concern regarding harvest with minimal threat to total population.	Provide angling opportunity while protecting wild trout by avoiding spawning season and small bag limit.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
***NEW (X) - Silver Lake (Mono Co.)**	**Last Saturday in Apr. through Nov. 15**	**5 per day, 10 in possession**			**Last Saturday in April through Nov. 15 B**	**5 trout, no gear restrictions 1**		**This water was moved from the Southern District Regulations. In response to public input, DFW is proposing to keep the current trout season for resort lakes in Inyo and Mono cos. to support local economic needs, public safety concerns, and local business operations.**
(179) Slinkard Creek and tributaries (Mono Co.) upstream from a Department of Fish and ~~Game~~Wildlife ~~cable crossing located about 2.7 miles south of a point on Highway 89 two miles west of its junction with Highway 395 (the cable is located about 600 feet below a rock dam on Clinkard Creek within the south half of Section 21, T9N, R22E).~~ rock gabbion barrier (38.606976°N, 119.567687°W). The barrier is located approximately 5-6 miles upstream from Hwy 89 and 395 junction.	Aug. 1 through Nov. 15. Only artificial flies with barbless hooks may be used.	0	All year	0 trout, artificial lures with barbless hooks	All year **A**	0 trout, artificial flies and barbless hooks **7**	A year-round angling season to maximize opportunity while at the same time utilizing restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Opportunity for catch and release Lahontan Cutthroat Trout fishing. Below this area, stream is hard to access and a statewide reg. Lahontan Cutthroat Trout available for keep.
(180.5) Soda Creek (Shasta Co.)	Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used.	0						Remove. Covered under Sacramento River above Shasta Lake 156(B)(C) for consistency.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
(181) Sonoma Creek and tributaries (Sonoma Co.). ~~(A) Sonoma Creek and tributaries~~ above the Sonoma Creek seasonal waterfall in Sugarloaf Ridge State Park (located 0.2 miles upstream of the west end of the Canyon Trail).	Last Saturday in Apr. through Nov. 15.	5	Saturday preceding Memorial Day through September 30	0 trout, artificial lures with barbless hooks	Saturday preceding Memorial Day through September 30 **F**	0 trout, artificial lures with barbless hooks **6**	A summer only angling season to protect spring and fall spawning fish populations. Maximum restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Sonoma Creek tributaries fishery is dependent upon wild trout populations above a natural barrier. The 2017 wildfire severely burned the headwaters area and had an undermined effect on the trout population. Until trout population can be fully assessed for these tributaries, the bag limit was reduced from 5 fish to 0 fish, with an artificial lure and barbless hook requirement to help maintain a sustainable fishery. Some tributaries are within regional and state park boundaries which promote recreational opportunities. The management decision still provides angling opportunities.
(181.8) Sonoma Lake (Sonoma Co.).	All year	2	All year	2 trout, 4 trout in possession, no gear restrictions	All year **A**	2 trout, 4 trout in possession, no gear restrictions **2**	A year-round angling season to maximize opportunity with limited daily harvest, with additional possession, for waters with hatchery supplemented or moderately productive self-sustaining fisheries where there is moderate concern regarding harvest but minimal threat to total population.	Sonoma Lake fishery is dependent upon wild trout populations. Until trout population can be fully assessed, the bag limit should remain at 2 fish to help maintain a sustainable fishery. No gear restrictions are required as most of the anglers appear to be targeting black bass. Since camping is allowed at Sonoma Lake the 4 fish possession limit is reasonable as some anglers will be on multi-day trips.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14” min art. lures; 5 = 2 trout 18” min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
(182) Sonoma Lake tributaries (Sonoma Co.).	Last Saturday in April through Apr. 15.	2	Saturday preceding Memorial Day through September 30	2 trout, artificial lures	Saturday preceding Memorial Day through September 30 **F**	2 trout, artificial lures **3**	A summer only angling season to protect spring and fall spawning fish populations. Limited daily harvest without additional possession for less productive self-sustaining fisheries where there is moderate concern regarding harvest with minimal threat to total population.	Sonoma Lake tributaries fishery is dependent upon wild trout populations. Until trout population can be fully assessed for these tributaries, the bag limit was reduced from 5 fish to 2 fish to help maintain a sustainable fishery. Artificial lure requirement helps reduce mortality associated with bait fishing.
(184) Soulajoule Lake tributaries (Marin Co.).	Last Saturday in Apr. through Nov. 15	5	Saturday preceding Memorial Day through September 30	2 trout, 4 trout in possession, no gear restrictions	Saturday preceding Memorial Day through September 30 **F**	2 trout, 4 trout in possession, no gear restrictions **2**	A summer only season to protect spring and fall spawning fish populations. Limited daily harvest but with additional possession for waters with hatchery supplemented or moderately productive self-sustaining fisheries where there is moderate concern regarding harvest but minimal threat to total population.	Soulajoule Lake tributaries fishery is dependent upon wild trout populations. Until trout population can be fully assessed for these tributaries, the bag limit was reduced from 5 fish to 2 fish to help maintain a sustainable fishery.
***NEW (X) - South Lake (Mono Co.)**	**Last Saturday in Apr. through Nov. 15**	**5 per day, 10 in possession**			**Last Saturday in April through Nov. 15 B**	**5 trout, no gear restrictions 1**		**This water was moved from the Sierra District Regulations. In response to public input, DFW is proposing to keep the current trout season for resort lakes in Inyo and Mono cos. to support local economic needs, public safety concerns, and local business operations.**
(185) Squaw Valley Creek and tributaries (Shasta Co.) ~~only from the bridge crossing on U S Forest Service road (#39N21) located one-eighth mile upstream of the mouth of Cabin Creek (Northwest 1/4 of Section 14, T38N, R3W)~~	Last Saturday in Apr. through Nov. 15	2	Saturday preceding Memorial Day through September 30	2 trout, 4 trout in possession, no gear restrictions	All year **A**	0 trout, artificial lures with barbless hooks **6**	A year-round angling season to maximize opportunity while at the same time utilizing restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Public input and consistency with lower McCloud River regulations.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
~~downstream to and including Tom Dow Creek.~~								
(187) Stanislaus River, Middle Fork (Tuolumne Co.).								
(A) From Beardsley Dam downstream to the U. S. Forest Service footbridge at Spring Gap.	Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used.	2	All year	2 trout, artificial lures	All year **A**	2 trout, artificial lures **3**	A year-round angling season to maximize opportunity with limited daily harvest, without additional possession, for less productive self-sustaining fisheries where there is moderate concern regarding harvest with minimal threat to total population.	Proposed regulation change increases angling opportunity in a highly productive reach. Access is limited in during winter months and maintaining a two trout limit will prevent overharvest. Local NGO's advocate a winter closure, additional gear restrictions and size limits to protect larger size class fishes.
(B) From the U.S. Forest Service footbridge at Spring Gap to New Melones Reservoir.	Last Saturday in Apr. through Nov. 15	2	All year	2 trout, 4 trout in possession, no gear restrictions	All year **A**	2 trout, 4 trout in possession, no gear restrictions **2**	A year-round angling season to maximize opportunity with limited daily harvest, with additional possession, for waters with hatchery supplemented or moderately productive self-sustaining fisheries where there is moderate concern regarding harvest but minimal threat to total population.	
NEW (X) - Stevens Creek and all tributaries upstream of Stevens Creek Reservoir (Santa Clara Co.).	Last Saturday in Apr. through Nov. 15	5	Saturday preceding Memorial Day through September 30	2 trout, 4 trout in possession, no gear restrictions	All year **A**	0 trout, artificial lures with barbless hooks **6**	A year-round angling season to maximize opportunity while at the same time utilizing restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Several comments noted this was a sensitive stream close to highly populated area, with small native trout population, and also pointed out regulation change proposal would open fishing only during warm months. DFW concurs with these concerns and as a

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
								precaution proposes changing bag limit to 0 fish to protect this population and to change the season to year-round.
***(189) Stony Creek, and tributaries (including the North, South, and Middle forks) from the headwaters downstream to the diversion dam west of Stonyford in the center of Section 35, T18N, R7W (Colusa, Glenn and Lake cos.).**	Last Saturday in April through Nov. 15. Only artificial lures with barbless hooks may be used.	2	All year	0 trout, artificial lures with barbless hooks	All year **A**	0 trout, artificial lures with barbless hooks **6**	A year-round angling season to maximize opportunity while at the same time utilizing restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Stoney Creek is a designated Heritage and Wild Trout Water. It is a unique fishery in that it is one of the few east draining streams from the coastal mountain range with a fully intact native fish assemblage. A zero bag limit will protect the wild native Rainbow Trout which could be susceptible to overharvest during critical spawning periods and elevated thermal episodes.
~~(A) From the headwaters downstream to the diversion dam west of Stonyford in the center of Section 35, T18N, R7W, except the portion of Stony Creek Middle Fork from Red Bridge upstream~~	~~Last Saturday in April through Nov. 15.~~	~~5 per day 10 in possession~~	-	-	-			Combined paragraph (A) into (189) for Stony Creek for simplification purposes.
-	~~Nov. 16 through the Friday preceding the last Saturday in April. Only artificial lures with barbless hooks may be used.~~	~~0~~	-	-	-			Moved to a year-round regulation.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14” min art. lures; 5 = 2 trout 18” min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
~~(B) (189) Stony Creek Middle Fork from Red Bridge upstream.~~	~~Last Saturday in April through Nov. 15. Only artificial lures with barbless hooks may be used.~~	~~2~~						Moved to a year-round regulation.
	~~Nov. 16 through the Friday preceding the last Saturday in April. Only artificial lures with barbless hooks may be used.~~	~~0~~						Moved to a year-round regulation.
(189.5) Susan River (Lassen ~~County~~Co.) ~~from the confluence of Willard Creek and the Susan River, downstream to the Bizz Johnson trail bridge located approx. 1/4 mi. downstream from the 3 mi. marker on the Bizz Johnson trail. Also, see Section 8.10 for special open season for youths participating in Youth Fishing Derby.~~	Last Saturday in April through November 15. Only artificial lures with barbless hooks may be used.	0	Saturday preceding Memorial Day through the last day in February	5 trout, no gear restrictions	Saturday preceding Memorial Day through the last day in February **G**	5 trout, no gear restrictions **1**	A spring angling closure to protect spawning fish populations. Minimum restrictions on harvest and gear for robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries where the maximum catch can be harvested sustainably.	One regulation for the entire river will eliminate the catch and release section, which is a section of river with poor summer water conditions and routinely needs to be stocked with hatchery trout to restart the population. The catch and release section does not make sense from a management perspective and is catering to a very small segment of the local angling community. End points of the current sections are confusing to anglers. Keep Section 8.10, change date so the Susan River Kids Fishing Derby will be the Saturday before the trout opener in May.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14” min art. lures; 5 = 2 trout 18” min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
~~(189.8) Swamp Creek and all tributaries (Siskiyou Co.)~~	~~See McCloud River 7.50(b)(115).~~							Covered under regulation for McCloud River.
NEW (X) Sweetwater River and tributaries ~~downstream~~ upstream of ~~from the~~ Sweetwater ~~Dam~~ Reservoir (San Diego Co.).	All year	2	All year	2 trout, artificial lures	All year **A**	2 trout, artificial lures **3**	A year-round angling season to maximize opportunity with limited daily harvest, without additional possession, for less productive self-sustaining fisheries where there is moderate concern regarding harvest with minimal threat to total population.	Moved from the District General Regulations. No change to the current regulation.
~~(191) Sworinger Lake tributaries (Modoc and Lassen Cos.) upstream to the first lake~~	~~Closed to all fishing all year~~		Saturday preceding Memorial Day through the last day in February	5 trout, no gear restrictions				Remove (191); essentially same reg as in (177.5)
(192) Tahoe Lake and tributaries (Placer and El Dorado Cos.).								
(A) Tahoe Lake tributaries upstream to the first lake.	July 1 through Sept. 30	5 per day 10 in possession	Saturday preceding Memorial Day through September 30	5 trout, no gear restrictions	Saturday preceding Memorial Day through September 30 **F**	0 trout, artificial lures with barbless hooks **6**	A summer only angling season to protect spring and fall spawning fish populations. Maximum restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Lake Tahoe is a wild trout fishery dependent on tributary spawning. The spring spawning run in Tahoe extends beyond Memorial Day, often well into June, and occasionally into July.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14” min art. lures; 5 = 2 trout 18” min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
(B) Tahoe Lake except (192)(C) below.	All year.	5, but no more than 2 mackinaw trout	Move to statewide reg		Move to statewide reg for lakes and reservoirs **SL**		Waters with self-sustaining and stocked fisheries where the maximum catch can be harvested sustainably, with an emphasis on fisheries with high natural production and or some level of stocking.	Essentially no change to the current regulation except for an added possession limit.
(~~C~~B) Tahoe Lake within 300 feet of the mouth of its tributaries.	July 1 through Sept. 30.	5, but no more than 2 mackinaw trout	Saturday preceding Memorial Day through September 30	5 trout, no gear restrictions	Saturday preceding Memorial Day through September 30 **F**	0 trout, artificial lures with barbless hooks **6**	A summer only angling season to protect spring and fall spawning fish populations. Maximum restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Lake Tahoe is a wild trout fishery dependent on tributary spawning. The spring spawning run in Tahoe extends beyond Memorial Day, often well into June, and occasionally into July.
(194) Topaz Lake (Mono Co.).	Jan. 1 through Sept. 30	5	Move to statewide reg		Move to statewide reg for lakes and reservoirs **SL**		Waters with self-sustaining and stocked fisheries where the maximum catch can be harvested sustainably, with an emphasis on fisheries with high natural production and or some level of stocking.	
(194.6) Trinity Reservoir	All year.	5 trout per day. 10 trout in possession. 10 landlocked salmon per day. 20 landlocked salmon in possession.	Move to statewide reg		Move to statewide reg for lakes and reservoirs **SL**		Waters with self-sustaining and stocked fisheries where the maximum catch can be harvested sustainably, with an emphasis on fisheries with high natural production and or some level of stocking.	No change to the current regulation.

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Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
(195.1) Trinity River above Trinity ~~Dam~~ Lake ~~-~~(Trinity County) from the confluence with Tangle Blue Creek (Hwy 3) downstream (south) to the mouth of Trinity Lake, approximately 13.8 miles	Last Saturday in April through November 15	5 per day, 10 in possession	Saturday preceding Memorial Day through September 30	5 trout, no gear restrictions	Saturday preceding Memorial Day through September 30 **F**	5 trout, no gear restrictions **1**	A summer only angling season to protect spring and fall spawning fish populations. Minimum restrictions on harvest and gear for robust, self-sustaining fisheries with low to moderate angling, or stocked fisheries where the maximum catch can be harvested sustainably.	Essentially no change to the current regulation except for a slightly shorter season for harvest.
	November 16 through the Friday preceding the last Saturday in April. Only artificial lures with barbless hooks may be used.	0 trout	October 1 through the Friday preceding Memorial Day	0 trout, artificial lures with barbless hooks	October 1 through the Friday preceding Memorial Day **I**	0 trout, artificial lures with barbless hooks **6**	A fall through spring angling season in conjunction with a separate summer season to segregate harvest and maximize opportunity. Significant restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations during these seasons, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	
(195.5) Trout Lake (Siskiyou County)	Only Wednesdays and weekends from the last Saturday in April through Sept. 30	2	Saturday preceding Memorial Day through September 30	2 trout, artificial lures	Move to statewide reg for lakes and reservoirs **SL**		Waters with self-sustaining and stocked fisheries where the maximum catch can be harvested sustainably, with an emphasis on fisheries with high natural production and or some level of stocking.	R1 does not want to manage land use on wildlife areas through fishing regulations, therefore recommends moving to Statewide Regs.
(196) Truckee River (Nevada, Placer and Sierra ~~Cos.~~cos.).								
(B) Truckee River from the confluence of Trout Creek downstream ~~to the Glenshire Bridge~~ to the mouth of Prosser Creek.	Last Saturday in Apr. through Nov. 15. Minimum size limit: 14 inches total length. Only artificial lures with	2	All year	0 trout, artificial lures with barbless hooks	All year **A**	0 trout, artificial lures with barbless hooks **6**	A year-round angling season to maximize opportunity while at the same time utilizing restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Maintain all year season without increasing harvest. Can harvest trout downstream of Prosser Creek.

Seasons abbreviated: A = All year; B = Last Sat. Apr – Nov 15; C = Nov 16 – Fri preceding last Sat in Apr; D = Last Sat in Apr – Jul 31; E = Aug 1 – Nov 15; F = Sat preceding Mem. Day – Sep 30; G = Sat preceding Mem. Day – last day Feb; H = Sep 1 – Nov 30; I = Oct 1 – Fri preceding Mem Day; J = CLOSED
Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
	barbless hooks may be used							
	Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used.	0	-					Moved to a year-round regulation.
(B) Truckee River from the confluence of Trout Creek downstream ~~to the Glenshire Bridge~~ to the mouth of Prosser Creek.	Last Saturday in Apr. through Nov. 15. Minimum size limit: 14 inches total length. Only artificial lures with barbless hooks may be used	2			All year **A**	0 trout, artificial barbless flies **7**		In response to Mr. Osborn's request, the Commission directed DFW to include Mr. Montna's proposed regulation for the Truckee River as an alternative to DFW's proposed regulation above, for consideration during the rulemaking process.
	Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used.	0						

Seasons abbreviated: A = All year; B = Last Sat. Apr – Nov 15; C = Nov 16 – Fri preceding last Sat in Apr; D = Last Sat in Apr – Jul 31; E = Aug 1 – Nov 15; F = Sat preceding Mem. Day – Sep 30; G = Sat preceding Mem. Day – last day Feb; H = Sep 1 – Nov 30; I = Oct 1 – Fri preceding Mem Day; J = CLOSED

Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
~~(C) Truckee River from the Glenshire Bridge downstream to the mouth of Prosser Creek.~~	~~Last Saturday in Apr. through Nov. 15. Minimum size limit: 14 inches total length. Only artificial flies with barbless hooks may be used~~	~~2~~	-	-	-	-		Combined former paragraph (C) into (B) for Truckee River for simplification purposes.
-	~~Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used.~~	~~0~~	-	-				Combined former paragraph (C) into (B) for Truckee River for simplification purposes.
(~~D~~C) Truckee River from the mouth of Prosser Creek downstream to the Nevada State Line.	Last Saturday in Apr. through Nov. 15. Minimum size limit: 14 inches total length. Only artificial lures with barbless hooks may be used.	2	All year	2 trout, artificial lures	All year **A**	2 trout, artificial lures **3**	A year-round angling season to maximize opportunity with limited daily harvest, without additional possession, for less productive self-sustaining fisheries where there is moderate concern regarding harvest with minimal threat to total population.	

Seasons abbreviated: A = All year; B = Last Sat. Apr – Nov 15; C = Nov 16 – Fri preceding last Sat in Apr; D = Last Sat in Apr – Jul 31; E = Aug 1 – Nov 15; F = Sat preceding Mem. Day – Sep 30; G = Sat preceding Mem. Day – last day Feb; H = Sep 1 – Nov 30; I = Oct 1 – Fri preceding Mem Day; J = CLOSED
Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14” min art. lures; 5 = 2 trout 18” min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
	Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used.	0						Moved to a year-round regulation.
(~~D~~C) Truckee River from the mouth of Prosser Creek downstream to the Nevada State Line.	Last Saturday in Apr. through Nov. 15. Minimum size limit: 14 inches total length. Only artificial lures with barbless hooks may be used.	2			All year **A**	0 trout, artificial lures with barbless hooks **7**		In response to Mr. Osborn's request, the Commission directed DFW to include Mr. Montna's proposed regulation for the Truckee River as an alternative to DFW's proposed regulation above, for consideration during the rulemaking process.
	Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used.	0						
(197) Tule River and tributaries (Tulare Co.).								

Seasons abbreviated: A = All year; B = Last Sat. Apr – Nov 15; C = Nov 16 – Fri preceding last Sat in Apr; D = Last Sat in Apr – Jul 31; E = Aug 1 – Nov 15; F = Sat preceding Mem. Day – Sep 30; G = Sat preceding Mem. Day – last day Feb; H = Sep 1 – Nov 30; I = Oct 1 – Fri preceding Mem Day; J = CLOSED
Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
(A) Tule River, North Fork (Tulare Co.), only in the North Fork Tule River and all its forks and tributaries above the confluence with Pine Creek (about 50 yards upstream from the Blue Ridge road bridge, about 12 1/4 miles north of Springville).	All year. Only artificial flies with barbless hooks may be used.	2	All year	2 trout, 4 trout in possession, no gear restrictions	All year **A**	**2** trout**, artificial lures** **3**	A year-round angling season to maximize opportunity with limited daily harvest, with additional possession, for waters with hatchery supplemented or moderately productive self-sustaining fisheries where there is moderate concern regarding harvest but minimal threat to total population.	Proposed change removes the artificial flies only requirement, which expands opportunity to non-fly anglers**. This water can withstand limited take, therefore** a possession limit and **fly only gear restriction is not warranted.**
***(B) All remaining portions of the Tule River and tributaries.**	All year.	5 per day, 10 in possession.	Move to statewide reg		**Move to statewide reg for rivers, streams, and creeks** **SR**		**Alignment with traditional season, previous district regulations, and Commission Policy, for both wild and stocked fisheries with a goal of sustainable harvest, while allowing catch and release angling during the other part of the year in an effort to increase angling opportunities while reducing population level effects stemming from over-harvest and or associated hooking mortality.**	Proposed change removes opportunity for harvest in the winter.
(198) Tuolumne River (Stanislaus and Tuolumne cos.) ~~(A)~~ ~~From~~ from O'Shaughnessy Dam (Hetch Hetchy Reservoir) downstream to ~~Early Intake Dam~~ Clavey River Falls.	Last Saturday in April through Nov 15. Max size limit:12 inches total length. Only artificial lures with barbless hooks may be used.	2	All year	2 trout, artificial lures	All year **A**	2 trout, artificial lures **3**	A year-round angling season to maximize opportunity with limited daily harvest, without additional possession, for less productive self-sustaining fisheries where there is moderate concern regarding harvest with minimal threat to total population.	Proposed regulation maintains angler opportunity, while protecting wild fish with a two fish limit.
	November 16 through the Friday preceding the last Saturday in	0						Combined former paragraphs (A) through (C) into (198) for Tuolumne River for simplification purposes.

Seasons abbreviated: A = All year; B = Last Sat. Apr – Nov 15; C = Nov 16 – Fri preceding last Sat in Apr; D = Last Sat in Apr – Jul 31; E = Aug 1 – Nov 15; F = Sat preceding Mem. Day – Sep 30; G = Sat preceding Mem. Day – last day Feb; H = Sep 1 – Nov 30; I = Oct 1 – Fri preceding Mem Day; J = CLOSED

Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
	April. Only artificial lures with barbless hooks may be used.							
~~(B) From Early Intake Dam downstream to Lumsden Bridge.~~	~~Last Saturday in April through Nov. 15~~	~~5~~	-	-	-	-		Combined former paragraphs (A) through (C) into (198) for Tuolumne River for simplification purposes.
-	~~Nov. 16 through the Friday preceding the last Saturday in April. Only artificial lures with barbless hooks may be used.~~	~~0~~	-	-	-	-		Combined former paragraphs (A) through (C) into (198) for Tuolumne River for simplification purposes.
~~(C) From Lumsden Bridge downstream to Clavey River Falls.~~	~~Last Saturday in April through Nov. 15. Maximum size limit: 12 inches total length. Only artificial lures with barbless hooks may be used.~~	~~2~~	-	-	-	-		Combined former paragraphs (A) through (C) into (198) for Tuolumne River for simplification purposes.
-	~~Nov. 16 through the Friday preceding the last Saturday in April. Only artificial lures with barbless~~	~~0~~	-	-	-	-		Combined former paragraphs (A) through (C) into (198) for Tuolumne River for simplification purposes.

Seasons abbreviated: A = All year; B = Last Sat. Apr – Nov 15; C = Nov 16 – Fri preceding last Sat in Apr; D = Last Sat in Apr – Jul 31; E = Aug 1 – Nov 15; F = Sat preceding Mem. Day – Sep 30; G = Sat preceding Mem. Day – last day Feb; H = Sep 1 – Nov 30; I = Oct 1 – Fri preceding Mem Day; J = CLOSED
Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14” min art. lures; 5 = 2 trout 18” min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
	~~hooks may be used.~~							
NEW (X) - Twelvemile Creek (Modoc Co.)	Saturday preceding Memorial Day through Nov. 15	5 per day, 10 in possession	Saturday preceding Memorial Day through the last day in February	0 trout, artificial lures with barbless hooks	Saturday preceding Memorial Day through the last day in February **G**	0 trout, artificial lures with barbless hooks **6**	A spring angling closure to protect spring spawning fish; Reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Special regulation to protect Warner Lake Redband Trout.
***NEW (X)- Twin Lakes (Mammoth, Mono Co.)**	**Last Saturday in Apr. through Nov. 15**	**5 per day, 10 in possession**			**Last Saturday in April through Nov. 15 B**	**5 trout, no gear restrictions 1**		**This water was moved from the Sierra District Regulations. In response to public input, DFW is proposing to keep current trout season for resort lakes in Inyo and Mono cos. to support local economic needs, public safety concerns, and local business operations.**
***NEW (X) - Twin Lakes, Upper and Lower (Bridgeport, Mono Co.)**	**Last Saturday in Apr. through Nov. 15**	**5 per day, 10 in possession**			**Last Saturday in April through Nov. 15 B**	**5 trout, no gear restrictions 1**		**This water was moved from the Sierra District Regulations. In response to public input, DFW is proposing to keep the current trout season for resort lakes in Inyo and Mono cos. to support local economic needs, public safety concerns, and local business operations.**
(199.5) Upper Truckee River and tributaries upstream from confluence with Showers Creek (Alpine and El Dorado ~~Cos.~~cos.).	July 1 through Sept. 30. Only artificial lures with barbless hooks may be used.	0	Saturday preceding Memorial Day through September 30	0 trout, artificial lures with barbless hooks	Saturday preceding Memorial Day through September 30 **F**	0 trout, artificial lures with barbless hooks **6**	A summer only angling season to protect spring and fall spawning fish populations. Maximum restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of	Proposed change provides angling opportunity in June with continued protection for spring spawners.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
							spawning fish, or to achieve fast action or trophy fisheries.	
***NEW - Virginia Lakes, Upper and Lower (Mono Co.)**	**Last Saturday in Apr. through Nov. 15**	**5 per day, 10 in possession**			**Last Saturday in April through Nov. 15 B**	**5 trout, no gear restrictions 1**		**This water was moved from the Sierra District Regulations. In response to public input, DFW is proposing to keep the current trout season for resort lakes in Inyo and Mono cos. to support local economic needs, public safety concerns, and local business operations.**
*** (204.5) Walker Creek (Mono Co.) ~~from the Lee Vining Conduit to Rush Creek.~~ from the private property line (fence) to the confluence with Rush Creek.**	Last Saturday in April through Nov. 15. Only artificial lures with barbless hooks may be used.	0	All year	0 trout, artificial lures with barbless hooks	All year **A**	0 trout, artificial lures with barbless hooks **6**	A year-round angling season to maximize opportunity while at the same time utilizing restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Consistent with SWRCB monitoring criteria. Same reg. for all Mono Lake tributaries, except Lee Vining Creek. Provides opportunity for catch and release angling in the winter.
***(205) Walker River, East Fork (Mono Co.) From Bridgeport Dam to Nevada State Line.**	Last Saturday in Apr. through Nov. 15. Minimum size limit: 18 inches total length. Only artificial lures with barbless hooks may be used. NOTE: BOW	1	All year	0 trout, artificial lures with barbless hooks	**Last Saturday in April through November 15 B**	**2 trout, artificial lures, 18 inch minimum 5**	**A spring and summer angling season for both stocked and wild fish. Managed for large fish with limited harvest and protection for smaller age classes for a highly productivity systems that can produce large fish. Allows individuals to spawn prior to trophy sized harvest. Protects fall spawning fish and winter schooling fish.**	**Significant reduction in flow during fall leave large spawning fish vulnerable to anglers along with low flow winter periods that create deep water habitat fish aggregations which can lead to extended periods of heavy angling pressure on winter schooling fish along with enforcement issues.**

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
	AND ARROW FISHING FOR CARP ONLY IS PERMITTED.							
	Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used. NOTE: BOW AND ARROW FISHING FOR CARP ONLY IS PERMITTED.	~~0~~						Proposed change provides continued protection for wintering fish.
***(205.5) West Walker River (Mono County) from the confluence with the Little Walker River (Hwy. 395 bridge at mile marker 96) downstream (north) to the inlet of Topaz Lake.**	November 16 through the Friday preceding the last Saturday in April. Only artificial lures with barbless hooks may be used.	0 trout	Move to statewide reg		**Move to statewide reg for rivers, streams, and creeks SR**		**Alignment with traditional season, previous district regulations, and Commission Policy, for both wild and stocked fisheries with a goal of sustainable harvest, while allowing catch and release angling during the other part of the year in an effort to increase angling opportunities while reducing population level effects stemming from over-harvest and or associated hooking mortality.**	Recreational fishing and stocked water.
(206.5) Whiskey Creek (Mono Co.). ~~(A) Whiskey Creek~~ downstream from Crowley Lake Drive (old Highway 395).	Last Saturday in April through the Friday preceding	2	Saturday preceding Memorial Day through	5 trout, no gear restrictions	Saturday preceding Memorial Day through	5 trout, no gear restrictions **1**	A summer only angling season to protect spring and fall spawning fish populations. Minimum restrictions on harvest and gear for robust, self-	Fall, winter, and spring opportunity was considered in 2019, then decided to close to fishing in fall, winter and spring to protect

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
	Memorial Day and Oct. 1 through Nov. 15. Minimum size limit: 18 inches total length. Only artificial lures with barbless hooks may be used.		September 30		September 30 **F**		sustaining fisheries with low to moderate angling, or stocked fisheries where the maximum catch can be harvested sustainably.	spawning fish (Rainbow Trout, Lahontan Cutthroat Trout and Brown Trout).
	Saturday preceding Memorial Day through Sept. 30.	5 per day, 10 in possession.	October 1 through the Friday preceding Memorial Day	0 trout, artificial lures with barbless hooks				Closed to protect spawning trout populations.
***(B) Whiskey Creek upstream from Crowley Lake Drive.**	Last Saturday in April through Nov. 15.	5 per day, 10 in possession.	Move to statewide reg		**Move to statewide reg for rivers, streams, and creeks SR**		**Alignment with traditional season, previous district regulations, and Commission Policy, for both wild and stocked fisheries with a goal of sustainable harvest, while allowing catch and release angling during the other part of the year in an effort to increase angling opportunities while reducing population level effects stemming from over-harvest and or associated hooking mortality.**	Provides opportunity for catch and release angling in the winter.
~~(208) Willow Creek and tributaries (tributary to Goose Lake, Modoc Co.).~~	~~Saturday preceding Memorial Day through Nov. 15. Only artificial lures with barbless hooks may be used.~~	0						Covered under new "Goose Lake and tributaries" regulation.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
(208.5) Wolf Creek and tributaries (tributary to West Walker River) (Mono Co.).	August 1 through November 15. Only artificial flies with barbless hooks may be used.	0	All year	0 trout, artificial flies and barbless hooks	All year **A**	0 trout, artificial flies and barbless hooks **7**	A year-round angling season to maximize opportunity while at the same time utilizing restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Offer angling opportunity and protect Lahontan Cutthroat Trout.
(208.6) Wolf Creek Lake (~~tributary to Wolf Creek~~ at the headwaters of Wolf Creek, tributary to the West Walker River) (Mono Co.).	Closed to all fishing all year.							Change includes clarification to area boundary. No change to current regulation.
(209) Yellow Creek (Plumas Co.) from Big Springs downstream to the marker at the lower end of Humbug Meadow.	Last Saturday in Apr. through Nov. 15 Maximum size limit: 10 inches total length. Only artificial lures with barbless hooks may be used.	2	Saturday preceding Memorial Day through the last day in February	0 trout, artificial lures with barbless hooks	Saturday preceding Memorial Day through the last day in February **G**	0 trout, artificial lures with barbless hooks **6**	A spring angling closure to protect spawning fish populations. Maximum restrictions on harvest and gear to reduce angling impacts to listed or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Expand angling opportunity. Recent surveys indicate low densities in Yellow Creek. Zero bag limit to protect all spawning Rainbow and Brown Trout.
(210) Yuba River, Middle Fork (Nevada and Sierra ~~Cos.~~cos.) from Jackson Meadows Dam downstream to Milton Lake.	See Milton Lake 7.50(b)(120).							No change to current regulation.

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14” min art. lures; 5 = 2 trout 18” min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

Body of Water	Current Open Season and Special Regulations	Current Daily Bag and Possession Limit	2019 Proposed Open Season	2019 Proposed Daily Bag, Possession Limit, & Gear Restrictions	2020 Proposed Open Season	2020 Proposed Daily Bag, Possession Limit, & Gear Restrictions	Justification/ Rationale Based on Fisheries Management Goals and Objectives	Additional Comments and Considerations (e.g., Biological, Public Input, Traditional Values, Socioeconomics)
(211) Yuba River, North Fork (Sierra and Yuba Cos.~~) (A) From~~ from the western boundary of Sierra City to the confluence with Ladies Canyon Creek.	Last Saturday in Apr. through Nov. 15 Only artificial lures with barbless hooks may be used.	2	All year	2 trout, artificial lures	All year **A**	2 trout, artificial lures **3**	A year-round angling season to maximize opportunity with limited daily harvest, without additional possession, for less productive self-sustaining fisheries where there is moderate concern regarding harvest with minimal threat to total population.	
	Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used.	0						
***(B) From Ladies Canyon Creek downstream to New Bullards Bar Reservoir.**	Last Saturday in Apr. through Nov. 15.	5	Move to statewide reg		**Move to statewide reg for rivers, streams, and creeks SR**		**Alignment with traditional season, previous district regulations, and Commission Policy, for both wild and stocked fisheries with a goal of sustainable harvest, while allowing catch and release angling during the other part of the year in an effort to increase angling opportunities while reducing population level effects stemming from over-harvest and or associated hooking mortality.**	Provides opportunity for catch and release angling in the winter.
	Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used.	0						Moved to state-wide regulation

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Bag/Possession/Gear/Size: 1 = 5 trout no gear restrict; 2 = 2 trout bag 4 trout possess. no gear restrict; 3 = 2 trout bag art. lures; 4 = 2 trout 14" min art. lures; 5 = 2 trout 18" min art. lures; 6 = 0 trout art. lures barbless; 7 = 0 trout art. flies barbless

APPENDIX B

Simplification of Statewide Inland Sport Fishing Regulations

Public Outreach Summary

Public Outreach Summary

The Department of Fish and Wildlife (Department) conducted extensive public outreach for the Simplification of Statewide Inland Sport Fishing Regulations Project (Project) prior to submitting the final regulatory package to the Fish and Game Commission (Commission) in June 2020. The Department held a series of public information meetings in 2018 and 2019 to inform stakeholders about the Project and solicit input and suggestions. In addition, the Department regularly provided Project updates at Commission subcommittee and full Commission meetings. This summary describes the stakeholder involvement process and input received.

Statewide Scoping Meetings – 2018

The Department held seven town hall meetings throughout the state in April and May, 2018, to discuss trout management topics with stakeholders. Meetings were advertised through emails to known stakeholders and license sellers, Department announcements, and local radio. One topic was a possible simplification of trout angling regulations statewide. At these meetings, the Department provided a brief presentation and made staff available at stations—which included a visual aid—dedicated to each topic discussed. A questionnaire was provided to capture stakeholder thoughts. In addition, questionnaires were available through the Department's webpage in an online form related to each topic from April 9 through July 6. The Department received 753 responses to the regulations questionnaire, 21 of which were written on forms provided at meetings.

The forms included questions with categorical responses and free-form comment sections. Questions were directed at forms of fishing regulation (bag limits, minimum sizes, etc.), and one broad comment section. Respondents were supportive of regulation simplification (77%), while disagreement was found on what portions of the regulations were in need of revision. Among those not satisfied with current regulations (45% of all respondents), approximately 60% were non-supportive of current bag, size, and gear restrictions. Twenty-five percent were non-supportive of the current open seasons.

Free-form answers to the comment section were grouped to themes. A summary of the most common themes and their related topics are presented in the table below.

Theme (% of total responses)	Topics (% within theme)
Bag (18%)	• More catch-and-release waters (41%) • Decrease bag size (50%)
Enforcement (10%)	• Greater presence needed (85%) • Increase fine amount (11%)
Gear (10%)	• Increased use of barbless hooks (42%) • Increased use of artificial lures (29%) • Increased use of single-hooks (14%)
Season (6%)	• Longer seasons (35%) • Closed during spawning (20%) • Closed during winter (18%) • Shorter seasons (11%)
Other (51%)	• Reiterated support for simplification (22%) • Unrelated to regulations (21%) • Consolidate regulations (17%) • Improve regulation presentation/website presences (15%)

Statewide Public Input Meetings – 2019

In April and May of 2019, the Department held six town hall meetings across the state. At these meetings, the Department presented an overview of the project and solicited input on the Department's draft proposed regulation changes. The meetings focused on the following key areas:

- Objectives of the new regulation framework and species management goals;
- Parameters of the regulation standardization and consolidation process;
- Review of specific proposed changes to regulations; and
- Regulation process and the Fish and Game Commission timeline.

Department personnel were available to answer questions and listen to stakeholder interests, needs, and ideas. All stakeholder input was taken into consideration as a regulation simplification package was developed for formal public review through the Commission. Below is a summary of the 2019 public information meetings.

Bishop – A meeting was held on March 20, 2019. 132 people were in attendance.

Redding – A meeting was held on March 27, 2019. 33 people were in attendance.

Fresno – A meeting was held on April 3, 2019. 21 people were in attendance.

Rancho Cucamonga – A meeting was held on April 6, 2019. 78 people were in attendance.

Sacramento – A meeting was held on April 10, 2019. 21 people were in attendance.

Truckee (County) – A meeting was held on April 23, 2019. 51 people were in attendance.

Online Survey/Questionnaire

Public input on the proposed regulation changes was solicited at the statewide town hall meetings held in March and April 2019. In addition, an online questionnaire was posted on the Regulation Simplification Project webpage (https://wildlife.ca.gov/Fishing/Inland/Trout-Plan/Regulation-Simplification) to increase opportunity for participation. Public input on the proposed changes closed May 3, 2019. During the public input period, CDFW received approximately 3,500 online questionnaires, 150 emails, 150 phone calls, and 100 letters. The table below shows the top 10 waters with the most suggestions and a summary of the public input.

Area/Body of Water	No. of Suggestions	County	Most Common Suggestions
Hot Creek	348	Mono Co.	• Keep fly fishing only.
Crowley Lake	186	Mono Co.	• Don't open to year-round fishing and don't increase the bag limit. • Don't change the regulations.
Kern River	120	Kern and Tulare cos.	• Change the area boundary to protect Kern River Trout. • Don't change the regulations.
Golden Trout Wilderness	116	Tulare Co.	• Keep artificial lure/barbless hook requirement. • Change "All year and no gear restriction" to Saturday preceding Memorial Day through September 30, 0 fish bag, artificial lures with barbless hooks.
Owens River	95	Inyo and Mono cos.	• Don't open to year-round fishing. Protect spawning fish. • Don't change the regulations.
Carson River	76	Alpine Co.	• Keep catch and release fishing only.
McGee Creek	67	Mono Co.	• Keep closed during fall and spring to protect spawning fish.
McCloud River and tributaries	55	Shasta and Siskiyou cos.	• Don't change the regulations.
Merced River	47	Mariposa Co.	• Protect Rainbow Trout and don't open to year-round

			fishing and don't increase the bag limit.
Truckee River	41	Nevada, Placer, and Sierra cos.	• Keep catch and release fishing only. • Keep fly fishing only.

Statewide General Input

The Department also received general input on the proposed regulations changes as well as on the proposed Statewide Regulation for trout, which at the time of the meetings, was proposed as open all year, with a five-trout daily bag limit, a 10 trout possession limit, and no gear restrictions. Below are some of the most frequent suggestions.

Proposed Statewide Regulation for Trout

- Against extending the fishing season, increasing bag limits, and reducing gear restrictions on sensitive trout fisheries;
- Propose a bag limit of 2 fish/day with 4 fish in possession limits for the Statewide Regulation; and
- Need to protect trout and keep waters closed during the spawning season.

General Suggestions

- Don't change the regulations;
- Do not allow multiple hooks on trout streams;
- No regulation changes to existing fly-fishing-only waters; and
- No regulation changes to formally designated Wild & Heritage Trout Waters.

California Fish and Game Commission Meetings

Since 2011, the Department has provided information on the Project at several full Commission meetings and Commission subcommittee meetings. In 2019 and 2020, the CDFW provided updates and information on the Project at the following meetings:

- Wildlife Resources Committee Meeting – January 10, 2019 (Trout Menu presented and supported by the WRC)
- Tribal Committee Meeting – Feb 5, 2019 (Trout Menu presented)
- Commission Meeting – February 6, 2019 (Trout Menu presented)
- Wildlife Resources Committee Meeting – September 10, 2019 (timeline update)
- Wildlife Resources Committee Meeting – January 16, 2020 (draft regulation changes presented and discussed)
- Tribal Committee Meeting – January 17, 2020 (Draft regulation changes presented and discussed)
- Wildlife Resources Committee Meeting – March 5, 2020 (Discussion of proposed regulation changes and recommendation by WRC to move the regulatory package to the full Commission)
- Commission Meeting – April 16, 2020 (Update on proposed changes since the March 5, 2020 WRC meeting)

Other Public Outreach Efforts

- Department personnel attended a Mono County Board of Supervisors Town Hall Meeting on June 19, 2019 in Bridgeport. The Department was requested by the Board to attend this meeting to provide more information on the proposed regulation changes to waters in Inyo and Mono counties.
- Public Meeting announcements were posted in local periodicals.
- The Department posted information about the project on Facebook and Instagram.
- Project information was available on the Department's Regulation Simplification Project webpage including a link to the draft proposed regulation changes, meeting dates, and angler questionnaire.
- Numerous emails and phone calls from stakeholders were responded to.

RECEIVED
CALIFORNIA
FISH AND GAME
COMMISSION

2020 JUL 22 A 7:5

Eric Sklar, President

California Fish and Game Commission

1419 Ninth St., Suite 1320

Sacramento, CA 95814

Dear Eric,

I'm writing to express my support for the Montna Proposal included in the *Initial Statement of Reason* offered for public review by the California Fish and Game Commission. As the Board of Supervisor Elect for District 5 for Nevada County I look forward to working with you on future initiatives to enhance responsible use of resources, habitat, and fisheries here in Nevada County.

Having been a member of the Truckee community for 30 years, it is my belief the users of the river and the entire Truckee angler community are deeply invested in fisheries protection and sustainability.

I have spent years working with the Truckee River Watershed Council now Forivier, the Truckee Donner Land Trust, and large acreage landowners to improve water quality in the Truckee River. I see the suggestions included in Al Montna's proposed regulatory modifications directly supporting the efforts of the entire Truckee-North Community to invest in, care for, and promote a healthy Truckee River ecosystem.

I understand the following local user groups also support the proposal:

- The local Trout Unlimited Chapter
- The Truckee Tahoe Fly Fishing Group
- California Trout
- Fly Fishers International -Northern Calif. Council
- State Senator Glazer
- 11 of the Local Fishing guides from the Truckee

Eric, please feel free to contact me to discuss my support of the Montna Proposal.

Sincerely,

Hardy S. Bullock

Nevada County Board of Supervisors Elect District 5

[redacted]

[redacted] Nevada City, CA 95959

Comments on Proposed Inland Trout Fishing Regulations

Patrick Samuel <psamuel@caltrout.org>

Mon 06/22/2020 10:54 AM

To: FGC <FGC@fgc.ca.gov>
Cc: Curtis Knight <cknight@caltrout.org>; Michael Wier <MWier@caltrout.org>; Al Montna; George Osborn <george@osbornstrategies.com>; Mitchell, Karen@Wildlife <Karen.Mitchell@wildlife.ca.gov>; Bloom, Roger@Wildlife <Roger.Bloom@wildlife.ca.gov>

1 attachments (154 KB)

CT_FGC_TroutRegs_Final.pdf;

Warning: This email originated from outside of CDFW and should be treated with extra caution.

Good morning Executive Director Miller-Henson and President Sklar:

Thank you for the opportunity to comment on the proposed inland trout fishing regulations. We greatly appreciate the time and effort the Department and Commission have taken to hear and incorporate stakeholder input in this process over the past year.

Please find attached California Trout's comments on a handful of waters that we feel require adjustment in the current proposal to achieve stated management goals and support wild trout management for future generations.

Respectfully,

Patrick Samuel

Patrick Samuel
Bay Area Program Manager
CALIFORNIA TROUT
FISH · WATER · PEOPLE
O: 415-392-8887 x 104
M: 916-502-6874

thecurrent
CalTrout's e-magazine
https://caltrout.org/the-current-latest-issue

19 June 2020

President Eric Sklar
California Fish and Game Commission
PO Box 944209
Sacramento, CA 94244-2090

RE: California Inland Trout Fishing Regulation Change/Simplification Process

Dear President Sklar:

On behalf of our thousands of members, supporters, partners, and associated angling businesses across California, we thank you for your leadership and collaborative approach in simplifying the new Inland Trout angling regulations. We applaud the Commission and Roger Bloom and his staff at the Department of Fish & Wildlife for their willingness to encourage public input in this important process.

Since the inception of this process, we have championed protection of our sensitive native and wild trout and attempted to balance that with the need to increase angling opportunities and participation and maintain the opportunity to harvest trout where appropriate. We feel the current revised trout fishing regulations largely balance the goals stated above. Specifically, we strongly support the recent changes made to the 7.0 Statewide Regulations for streams and rivers in California that make all trout streams catch-and-release with artificial lures only during the winter/early spring season. This change reflects our conviction that such measures are appropriate during that season, when trout are especially vulnerable as they congregate and prepare to spawn.

However, the latest revision to the inland trout fishing regulations does not adequately protect wild trout fisheries or meet stated management in a few iconic trout waters. The following comments reflect our strong sentiments, informed by many years of collective experience from our partners across California, regarding these iconic trout streams:

- **Truckee River:** We believe the trophy trout fishery in the Truckee River, which is designated as a Wild and Heritage Trout Water by the Department of Fish and Wildlife, should be managed with a single regulation mandating catch and release angling year-round with barbless lures and flies *with a single hook* to reduce unintended hooking damage and mortality.

360 Pine Street, 4th Floor San Francisco CA 94104
Phone: (415) 392-8887 **Fax:** (415) 392-8895 **E-mail:** info@caltrout.org

Since the provision for single barbless hooks is not currently an option "on the menu" of regulation alternatives, we are requesting year-round catch and release angling with artificial flies with barbless hooks (**Option A, #7**) for the reach from Trout Creek to Prosser Creek. This proposal would simplify the regulations for this reach by making them consistent with the existing fly-fishing-only reach from Glenshire Bridge to the Highway 80 Bridge while adequately protecting wild trout. We feel this reach of the Truckee River meets the stated rationale for use of this most conservative regulation option, namely: need for mitigation of angling impacts on trout in high-use areas, desire to achieve fast action and trophy fisheries, and promoting a unique angling experience in the region.

For the reaches from Lake Tahoe to Trout Creek in Truckee and from Prosser Creek downstream to the Nevada state line, the current proposal would allow anglers to use artificial lures and harvest wild trout. We believe the current proposed regulation will not adequately protect fish from unnecessary hooking mortality associated with barbed lures in these very popular reaches. Therefore, we request adoption of year-round catch and release angling only with artificial, barbless lures (**Option A, #6**) for these reaches. The uppermost reach from Lake Tahoe to Trout Creek contains significant spawning habitat, many sites of significant investment to improve fish habitat, and is subject to significant dryback events during dry and drought years. This regulation would help support sensitive wild trout populations, achievement of the objectives of the Wild and Heritage Designation of the Truckee River, and support numerous businesses and guides that make their living from this resource.

- **Upper Sacramento River:** Rather than 3 different regulations for this river, we recommend instead a unified regulation to support this wild trout-dominated fishery: year-round, 2 fish bag, barbless artificial lures only (**Option A, #3**). This would maintain harvest opportunities while adequately protecting the large spawning fish that migrate up from Shasta Lake and throughout the lower river downstream of Dunsmuir. In addition, we feel this regulation will meet the primary management objective of the 2000 *Fishery Management Plan for the Upper Sacramento River*:

  "1. ... to develop a world-class wild trout fishery. The river is capable of producing abundant wild trout and special angling regulations will be used to maintain the wild trout population at levels producing high quality angling opportunities." (https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=56621&inline) pg. 31.

- **East Walker River:** We are advocating for catch and release angling year-round with barbless artificial lures (**Option A, #6**) on this trophy wild trout fishery. This change would support opportunity for anglers and the local economy in Bridgeport.

- **Mokelumne River:** We propose catch and release angling year-round with artificial, barbless lures (**Option A, #6**) from the Highway 49 Bridge downstream to Lake Pardee at Middle Bar Bridge. There are currently no catch and release fisheries in the Sierra Foothills, and it would serve to fill that gap. This proposal maintains harvest for anglers off Middle Bar Bridge, which provides angling opportunities for persons with disabilities and those requiring wheelchair access.

- **East Fork Carson River**: We recommend maintaining catch and release regulations with artificial lures and barbless hooks (**Option A, #6**) below Hangman Bridge to the Nevada state line. Under this proposal, this trophy trout fishery will continue to draw anglers from far and near and continue to contribute to the local economy in Markleeville. We believe these suggestions would meet two stated management goals of the 1979 *East Fork Carson River Wild Trout Management Plan*:

  "2. To perpetuate a self-sustained, balanced population of rainbow, brown, and Lahontan cutthroat trout.
  3. To provide a quality backcountry angling experience…"
  (https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=56383&inline) pg. 13.

Thank you for your careful consideration of these proposed amendments to the revised inland trout fishing regulations. We look forward to working with you to ensure that California's wild trout continue to thrive now and into the future.

Respectfully,

Patrick Samuel
Bay Area Program Manager
California Trout

360 Pine Street, 4th Floor San Francisco CA 94104
Phone: (415) 392-8887 **Fax:** (415) 392-8895 **E-mail:** info@caltrout.org

Comment on item 23 Aug 19th -Simplification of statewide inland sport fishing

bob minor <[redacted]>

Wed 08/05/2020 03:14 PM

To: FGC <FGC@fgc.ca.gov>
Cc: robert minor <[redacted]>

Warning: This email originated from outside of CDFW and should be treated with extra caution.

Hello,

I am writing to oppose the adoption of the proposed inland sport fishing rules changes. The changes have not been well crafted and
the blanket rules proposed are incorrectly applied.

For example:

The recently proposed "simplified" fresh water fishing regulations would remove essential protection for the Merced River fishery. The Merced is a Wild and Scenic River. The section immediately outside Yosemite National Park has been successfully managed for many years to benefit wild rainbow trout. While it is not clear if the Merced rainbows are truly native, they are certainly wild and adapted to the difficult conditions in the summer heat. This year is particularly harsh with midsummer flows at 1/4 median levels.

It makes no sense to open up this fishery to the statewide minimum regulations (SR) allowing a significant take of a population that is not well understood. The proposed regulations would change a zero limit catch and release fishery to allowing the take of 5 fish per day. This makes no sense!

I have fished the Merced for many years so I feel justified in commenting on it.
There may be other fisheries in the proposed rules change that are also not based on good science.
It appears that in spite of the effort put into trying to simplify the rules and encourage more fishing, the changes have not been carefully considered.

Thank You,

bob minor
[redacted]

Opposition to the 2020 Proposed Change to the Fishing Regulations re. Lk. Almanor Tributaries

Eric See <[redacted]>

Thu 07/30/2020 10:17 PM

To: FGC <FGC@fgc.ca.gov>

1 attachments (1 MB)

Opposition to Proposed 2020 Fishing Regs Change-Almanor Tributaries7-30-20.pdf;

Warning: This email originated from outside of CDFW and should be treated with extra caution.

Hello, I am writing you in opposition to the proposed regulation change to the Almanor Lake tributaries. This proposal would close fishing on over 50 miles of trout streams during one of the best time of the season and for only a minimal benefit, if any, and it exhibits an unfair bias toward lake fishing at the expense of stream fishing.

Please accept the attached letter which further explains my opposition to the proposal to close the Almanor tributaries after September.

Sincerely,

Eric See
[redacted]

Eric See

[redacted]

[redacted]

July 30, 2020

California Fish and Game Commission
P.O Box 944209
Sacramento, CA 94244

Subject: Opposition to Fishing Regulations Change for Almanor Lake Tributaries (and all "F1" proposals)

Dear California Fish and Game Commission,

I own a cabin on one of the tributaries to Lake Almanor and am an avid fly fisherman. I am writing you in opposition to the proposed regulation change to the Almanor Lake tributaries. This proposal would close fishing on over 50 miles of trout streams during one of the best time of the season and for only a minimal benefit, if any, and it exhibits an unfair bias toward lake fishing at the expense of stream fishing.

This proposal demonstrates an unfair bias toward lake fishing and this is evidenced by the unclear rationale behind the proposal. Ostensibly, this fishing closure is intended to protect spawning populations of wild trout, but the regulations still allow lake anglers to harvest 5 trout with a year 'round fishing season. Why is a fishing closure on the stream anglers the solution to improve the fishery, yet the lake anglers are allowed the most liberal bag limits, season, and gear restrictions to be had in California trout waters? This is unfair.

This proposed fishing closure is not consistent with California's approach to trout stream management because it is based on the premise that fishing in these streams will be harmful to spawning trout populations. But if this were true, there wouldn't be open fishing during the spawning seasons on so many of California's best wild trout streams, such as the Upper Sacramento River, Pit, Owens, and East Walker rivers. Hat Creek is even being proposed, in this current regulations cycle, for an expanded season that would allow fishing during the spawning seasons for both rainbow and brown trout. It's true that these streams also have restricted bag limits during these spawning seasons, but why wasn't that proposed instead of a complete fishing closure after September?

This proposal would close off a vast area of streams that are currently open to the public, which contradicts the longstanding Fish and Game Commission Policy of preventing the loss of sport fishing opportunities, referred to as *Al Taucher's Preserving Hunting and Sport Fishing Opportunities Policy (*Section 703 of the California Fish and Game Code). The fact that many miles of these streams are located above migrations barriers really calls into question how much even the Lake Almanor fishery would benefit. This proposal would have uncertain benefits yet it would have a definite negative impact to stream anglers who fish these streams during the fall, after the crowds leave and the forest quiets down. As a cabin owner on one of these streams, I can certainly attest to this and I know that many of my neighbors feel the same way.

A fishing closure is one of the most severe fishery management measures that can be implemented, but it is understandable when protecting sensitive resources, such as with an endangered species. But this fishing closure is being enacted to protect brown trout, an introduced species. And while brown trout are a highly prized recreational fish, the bottom line is that this fishing closure has the intent of providing a benefit to recreational fishing, but the impacts to recreational fishing would far outweigh any benefits that would be derived. It would be devastating to stream anglers to lose so much.

If anything, the Fish and Game Commission should be looking to increase fishing opportunities with an expanded season for the streams in this area. I just saw that this was proposed in 2019 and I wish that I had seen the proposal at that time as I would have strongly supported it, as would my cabin neighbors who also very much enjoy the fall season on these streams. If it is too late for you to reconsider this proposal during this current regulations cycle then I understand, it is my fault for not paying attention and I will consider making this recommendation at a future time.

Note that although my primary focus is on the Almanor Lake tributaries, I oppose this proposed regulation change in all of the other waters where the "F1" option is being proposed, for many of the same reasons.

But in the meantime, please preserve the fishing opportunities during the fall on the 50+ miles of trout streams affected by this proposal - please do not make this change to the fishing regulations for the Almanor Lake tributaries.

Sincerely,

Eric See

From: Jonathan Sloat
Sent: Friday, July 10, 2020 10:22 AM
To: FGC <FGC@fgc.ca.gov>
Subject: Option A6 for Section 156(C)-Comment on Inland Trout Angling Regulation Simplification

Dear Fish & Game Commission:

This comment pertains to proposed special trout fishing regulation 156(C). Opening the Upper Sacramento River from the county bridge at Sweetbriar to Shasta Lake for harvest year-round is not appropriate for this quality fishery. I have fished much of this stretch of river and can attest to the truly wonderful experience it provides anglers. To the extent regulations are changed for this special section of river, greater protection, not less, is needed.

I respectfully request that the Commission adopt Menu Option A6 (All-year, 0 trout, artificial lures with barbless hooks) for section 156(C) of the proposed regulation. If A6 is not adopted, the split season in the current regulations should be retained.

Here's why A6 is the best choice for 156(C):

1. The Upper Sacramento River already provides significant opportunities for harvest year-round in the current and proposed regulations. (See Section 156(B)). It makes sense to eliminate harvest on the lower river year-round to protect spawning fish and protect and improve this unique fishery.

2. Menu Option A6 would enhance simplification since the regulations for the Box Canyon to Scarlett Way (Section 156(A)) stretch of the river are already A6. Two regulations on this river are simpler than 3.

3. The Upper Sacramento is readily accessed along the I-5 corridor and is close to Shasta County's population center. It is therefore important to mitigate impacts of these high use areas.

For the reasons above, Option A6 for 156(C) is most consistent with the stated goals for the regulation changes.

Thank you for your consideration.

Jonathan Sloat

Redding, CA

State of California
Department of Fish and Wildlife

Original on file,
received June 8, 2020

Memorandum

Date: June 4, 2020

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

From: Charlton H. Bonham
Director

Subject: **Five-Year Status Review of Owens Pupfish**

The California Department of Fish and Wildlife (Department) has prepared the attached Five-Year Species Review of Owens Pupfish for the Fish and Game Commission (Commission) pursuant to the California Endangered Species Act (CESA; Fish and G. Code, §2050 et seq.). Pursuant to Fish and Game Code section 2077, subdivision (a), the Department has prepared this Five-Year Species Review to evaluate whether the conditions that led to the original listing of Owens Pupfish as endangered are still present.

In completing this Five-Year Species Review, the Department finds there is sufficient scientific information to indicate that the conditions that led to the listing of Owens Pupfish as endangered are still present. Therefore, the Department recommends no change to the status of Owens Pupfish at this time.

The Department requests that the following item be added to the Commission's June 24-25, 2020 meeting agenda:

- **Owens Pupfish**
  Receive the Department's Five-Year Status Review of Owens Pupfish (*Cyprinodon radiosus*), a native fish listed as endangered under CESA. (Pursuant to Section 2077, Fish and Game Code)

If you have questions or need additional information, please contact Kevin Shaffer, Branch Chief, Fisheries Branch at (916) 376-1654, or by e-mail at Kevin.Shaffer@wildlife.ca.gov.

Enclosure

ec: California Department of Fish and Wildlife

Valerie Termini,
Chief Deputy Director
Valerie.Termini@wildlife.ca.gov

Stafford Lehr, Deputy Director
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State of California
Natural Resources Agency
Department of Fish and Wildlife

REPORT TO THE FISH AND GAME COMMISSION

FIVE-YEAR SPECIES REVIEW OF OWENS PUPFISH (*Cyprinodon radiosus*)

May 2020

Owens Pupfish, photo by Jeff Weaver

Charlton H. Bonham, Director
Department of Fish and Wildlife

TABLE OF CONTENTS

I. EXECUTIVE SUMMARY **2**
II. INTRODUCTION **2**
A. Five-Year Species Review 2
B. Listing and Species Review History 3
C. Notifications and Information Received 3
III. BIOLOGY **3**
A. Taxonomic and Physical Description 3
B. Life History and Ecology 6
C. Habitat Necessary for Species Survival 6
IV. DISTRIBUTION AND ABUNDANCE **7**
A. Range and Distribution 7
B. Population Trend and Abundance 9
V. THREATS AND SURVIVAL FACTORS **10**
A. Factors Affecting Ability to Survive and Reproduce 10
B. Degree and Immediacy of Threats 13
VI. MANAGEMENT AND RECOVERY **14**
A. Impact of Existing Management Efforts 14
i. Owens Pupfish population establishment 14
ii. Owens Pupfish population monitoring 14
iii. Rehabilitation of the River Spring Lakes Ecological Reserve 15
B. Recommendations for Management Activities and Other Recommendations for Recovery of the Species 17
VII. RECOMMENDATION TO THE COMMISSION **17**
VIII. Sources **17**
A. Literature Cited 17
B. Personal Communication 19
C. Other 20
IX. LIST OF FIGURES **20**
X. LIST OF TABLES **20**
XI. LIST OF APPENDICES **20**

I. EXECUTIVE SUMMARY

The Owens Pupfish (*Cyprinodon radiosus* Miller) is a small freshwater fish that is endemic to the Owens Basin in eastern California, near the communities of Mammoth Lakes, Bishop, Big Pine and Lone Pine (Figure 3). Owens Pupfish face ongoing threats, have an exceptionally limited current distribution, and their overall status has remained largely unchanged since their listing under the California Endangered Species Act (CESA) in 1971. Predation by, and competition with, non-native aquatic species within their range, loss of the majority of their historic habitat, genetic factors, water development activities, and predicted outcomes of climate change are the principal threats to Owens Pupfish.

Owens Pupfish is currently listed as endangered under CESA (Fish and G. Code § 2050 et seq.; Cal. Code Regs. tit. 14 § 670.5 subd. (a)(2)(K)). Pursuant to Fish and Game Code section 2077, subd. (a), the California Department of Fish and Wildlife (Department/CDFW) has prepared this Five-Year Species Review to evaluate whether conditions that led to the original listing of Owens Pupfish are still present or have changed. This review is based on the best scientific information currently available to the Department regarding each of the components listed under section 2072.3 of the Fish and Game Code and section 670.1, subds. (d) and (i)(1)(A) of Title 14 of the California Code of Regulations (C.C.R.). In addition, this document contains a review of the identification of habitat that may be essential to the continued existence of the species, and the Department's recommendations for management activities and other recommendations for recovery of the species. (Fish & G. Code, § 2077, subd. (a).)

In completing this Five-Year Species Review for Owens Pupfish, the Department finds there is sufficient scientific information to indicate the conditions and associated threats that led to the listing of Owens Pupfish as endangered are still present and, in some cases, have worsened. The Department, therefore, recommends no change to the status of Owens Pupfish on the list of endangered species at this time.

II. INTRODUCTION

A. Five-Year Species Review

This Five-Year Species Review addresses Owens Pupfish. Upon a specific appropriation of funds by the Legislature, the Department shall, or if other funding is available, in the absence of a specific appropriation, may, review species listed as endangered or threatened under CESA every five years to determine if the conditions that led to the original listing are still present (Fish and G. Code § 2077, subd. (a)). Owens Pupfish is also listed as endangered under the Federal Endangered Species Act. Pursuant to Fish and Game Code section 2077, subd. (b), the United States Department of the Interior, U.S. Fish and Wildlife Service (Service) was contacted in an effort to coordinate this species review with their five-year review process (last completed in 2009). However, the Service does not plan to complete a species review until their Fiscal Year 2021-22 (Bjorn Erickson, USFWS pers. comm. 2019). Consequently, the Department has initiated this independent review.

Using the best scientific information available to the Department, this Five-Year Species Review includes information on the following components pursuant to § 2072.3 and § 2077, subd. (a), of the Fish and Game Code and § 670.1, subd. (d), of Title 14 of the C.C.R.: species' population

trend(s), range, distribution (including a detailed distribution map), abundance, life history, factors affecting the species' ability to survive and reproduce, the degree and immediacy of threats, the impact of existing management efforts, the availability and sources of information, identified habitat essential for the continued existence of the species, and the Department's recommendations for future management activities and other recovery measures to conserve, protect, and enhance the species.

B. Listing and Species Review History

Owens Pupfish was listed as endangered under the Federal Endangered Species Act in 1967 and under the California Endangered Species Act in 1971, among the first group of taxa in the nation to be listed. Owens Pupfish is also a Fully Protected Fish under Fish and Game Code § 5515, subd. (b), but with a take allowance granted under Fish and Game Code §2089.7. The main identified threats to the species at the time of listing are unknown but likely included: habitat loss and associated severely restricted distribution, coupled with threats (predation and competition) from non-native introduced species.

In 1984, the Owens Pupfish Recovery Plan was published (USFWS 1984).

In 1990, the state 5-year status update for Owens Pupfish was published (CDFG 1990).

In 1998, the federal Owens Basin Wetland and Aquatic Species Recovery Plan was published (USFWS 1998). This plan supplanted the 1984 Owens Pupfish Recovery Plan (USFWS 1998).

In 2009, the federal 5-year status update for Owens Pupfish was published (USFWS 2009).

This Five-Year Species Review was initiated in July 2019 and prepared by Jeff Weaver, in the Department's Fisheries Branch, Native Fishes Conservation and Management Program. Nick Buckmaster[a], Environmental Scientist, Steve Parmenter[b], Senior Environmental Scientist (Specialist) and lead biologist for Owens Pupfish, Rob Titus[c], Senior Environmental Scientist (Supervisory) and Claire Ingel[d], Senior Environmental Scientist (Specialist) ([ab]CDFW Inland Deserts Region, Bishop Field Office, [cd]CDFW Fisheries Branch), also contributed substantially to this review.

C. Notifications and Information Received

On November 26, 2019, the Department notified persons who had expressed their interest in CESA actions in writing to the Commission and had provided contact information to the Commission (Fish and G. Code, § 2077(a)). The e-mail notification included a link to the Department's dedicated web page for five-year reviews of threatened and endangered species at https://www.wildlife.ca.gov/Conservation/CESA/Five-Year-Reviews.

III. BIOLOGY

A. Taxonomic and Physical Description

Owens Pupfish are small, deep-bodied, and laterally compressed, members of the killifish family (Cyprinodontidae) that rarely exceed 6 cm (2.5 in) in length (USFWS 2009). The Owens Pupfish was described by Robert Rush Miller (1948) based on a collection from West Spring, Fish Slough, northwest of Bishop, California (Figure 1). Males and females can be easily

distinguished from one another by coloration during breeding season, owing to their distinctive seasonal sexual dimorphism (Miller 1948). Year-round, females are dusky olive-green in color, with purplish iridescence and several dark vertical bars aligned in a row along the sides. During the spring and summer spawning season, males are bright blue with gold or brassy sides and broad vertical bars. During the non-breeding season males resemble females, except barring may be absent (CDFG 1990). Adult males are generally larger and deeper-bodied than adult females (Moyle 2002).

The species is distinguished from other pupfishes by the anterior placement of the dorsal fin, long caudal peduncle (the narrow part of a fish's body to which the caudal or tail fin is attached), absence of spine-like projections on scale circuli (growth rings), and absence of a terminal black band on the caudal fin (USFWS 2009). Owens Pupfish also have a greater number of dorsal, pelvic, pectoral, and anal fin rays than other pupfish species; the specific epithet in their scientific name, "radiosus," refers to the abundance of these fin rays (Miller 1948). The Owens Pupfish is most closely related to the Desert Pupfish (*Cyprinodon macularius*) but may have been isolated from it, and other related pupfishes of the southwestern United States, for over two million years (Moyle 2002).

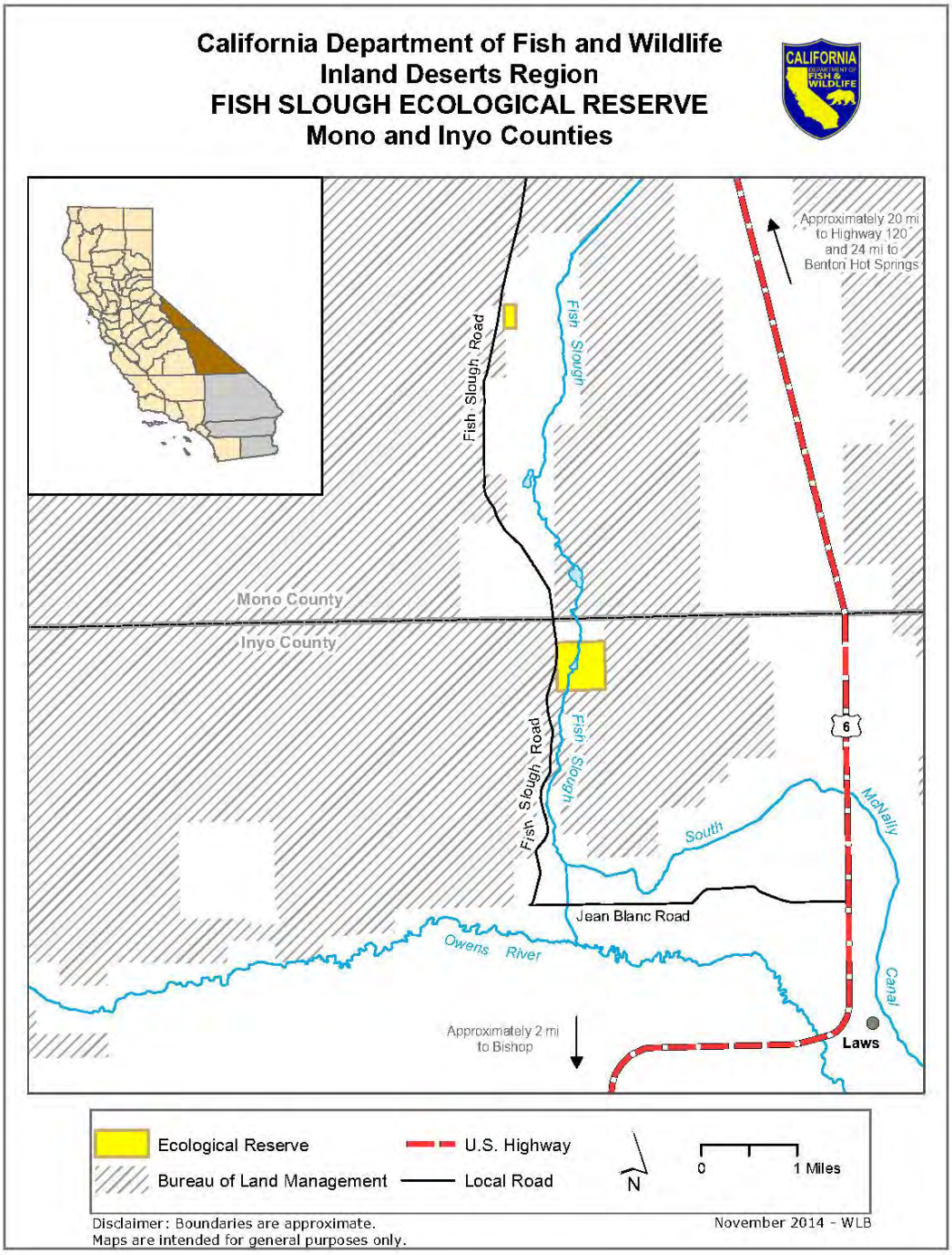


Figure 1. Map of Fish Slough Ecological Reserve, located approximately 2 miles northwest of Bishop, California. Map inset highlights the location of the Owens Basin in Mono and Inyo counties, California.

B. Life History and Ecology

Four fish species comprise the Owens Basin native fish assemblage: Owens Pupfish, Owens Tui Chub (*Siphateles bicolor snyderi),* Owens Speckled Dace (*Rhinichthys osculus* ssp.), and Owens Sucker (*Catostomus fumeiventris*) (USFWS 1998). All are omnivorous and, with the exception of Owens Tui Chub, non-predatory. All four are habitat generalists with presumably little interspecific competition related to habitat utilization, resource partitioning, or demography (USFWS 1998). All Owens Basin fishes are also vagile (highly mobile with the ability to rapidly colonize vacant habitats), and have high reproductive capacity (USFWS 1998), suggesting all four occupied most, if not all, historically available aquatic habitats within their range.

Owens Pupfish congregate in small schools and feed mostly on aquatic insects (Kennedy 1916). Pupfish are, in general, opportunistic omnivores whose diet varies seasonally. They also eat algae, terrestrial insects that fall into the water, crustaceans, plankton, and even their own dead and eggs (Brunnell 1970). No information specific to Owens Pupfish was found in the literature regarding their physiological tolerances. However, pupfishes, in general, are known for their remarkable tolerances to temperature, pH, and other factors. Schoenherr and Feldmeth (1992) studied the thermal tolerances of the closely related Desert Pupfish, noting that their tolerances are “legendary.” They indicated existing published data on critical thermal minima and maxima for Desert Pupfish ranged from extremes of 7°C to 44.6°C (44.6°F to 112.3°F). Moyle (2002) states that water temperatures [in Owens Pupfish habitats] probably ranged annually from about 10°C to 25°C (50°F to 77°F). Moyle (2002) also indicated that, related to the seasonal timing of spawning initiation, temperatures in Owens Pupfish habitats with strong seasonal temperature fluctuations range from about 7°C to 26°C (44.6°F to 80°F). Spawning occurs over soft substrates in spring and summer. Male pupfish are territorial, defending areas of substrate from competing males. Female pupfish occupy habitats along the margins of areas defended by males (Mire 1993). Mire and Millett (1994) observed that female Owens Pupfish may be involved in spawning acts up to 200 times per day, laying 1-2 eggs at a time. Eggs incubate for approximately 6 days before hatching in water temperatures ranging from 24°C to 27°C (75°F to 81°F), with an average of 95 percent of spawned eggs fertilized. Juvenile pupfish grow rapidly to sexual maturity in 3 to 4 months (Barlow 1961). They are usually able to spawn before their first winter and their lifespan is rarely greater than 1 year (Soltz and Naiman 1978). However, Owens Pupfish live as long as 3 years in refuge habitats with more constant thermal regimes (Mire 1993 in USFWS 2009).

C. Habitat Necessary for Species Survival

The key features of Owens Pupfish habitats are slow flowing, high quality fresh waters, with well-developed beds of aquatic plants that provide cover and support abundant aquatic insects for forage (Figure 2). Preferred substrates are comprised of sand, silt, or other fines (USFWS 2009). The habitats they occupy include: springs, lakes, sloughs, ponds, backwaters and other slower waters in the Owens Basin. Adults frequently occupy deeper water than juveniles, but all life stages may be found in the various microhabitats available in the environment with little preference (Sada and Deacon 1994). Miller and Pister (1971) summarized field studies that showed pupfish were most abundant in shallow sloughs bordering the Owens River and marshes and springs adjacent to the river.

There appear to be several differences between the habitats of Owens Pupfish and that of other pupfish species. Aquatic habitats in and adjacent to the Owens River are generally colder, frequently covered by ice during winter, and lower in conductivity and salinity than habitats of other pupfish species (Cole 1981). A fundamental element of the habitat conditions necessary for the survival of Owens Pupfish is the absence of nonnative species that are predatory or may outcompete pupfish, potentially leading to their localized extirpation.

Figure 2. Representative Owens Pupfish habitat. Location: BLM Spring in Fish Slough, northwest of Bishop, CA. Photo courtesy of Nick Buckmaster, CDFW.

IV. DISTRIBUTION AND ABUNDANCE

A. Range and Distribution

Owens Pupfish are endemic to the Owens Basin (comprised of Owens, Round, and Long valleys) in Mono and Inyo counties, California (USFWS 2009). Although the Owens Pupfish was not formally described until 1948, the distribution and relative abundance of Owens Pupfish were noted by early explorers and scientists (USFWS 1998). Fisheries surveys during the early 1900s documented pupfish in habitats throughout the Owens Valley (Kennedy 1916, Snyder 1917). Survey results indicated that Owens Pupfish occupied most valley-floor aquatic habitats from Fish Slough (Figure 1), approximately 19 km (12 mi) north of Bishop, south to Lone Pine (Kennedy 1916, Snyder 1917, Miller 1948), a linear distance of approximately 113 km (70 mi). This early documentation is likely due to the ease with which pupfish can be seen in their relatively shallow clearwater habitats, the seasonally eye-catching bright blue coloration of male pupfish, and their “playful” behavior, which is actually male breeding territory defense behavior. Davidson (1859) reported pupfish as common throughout the Owens River, but absent from tributary streams. Pupfish may have utilized the Owens River Delta at Owens Lake (USFWS 2009) but their historic presence in Owens Lake itself is unknown (Moyle 2002).

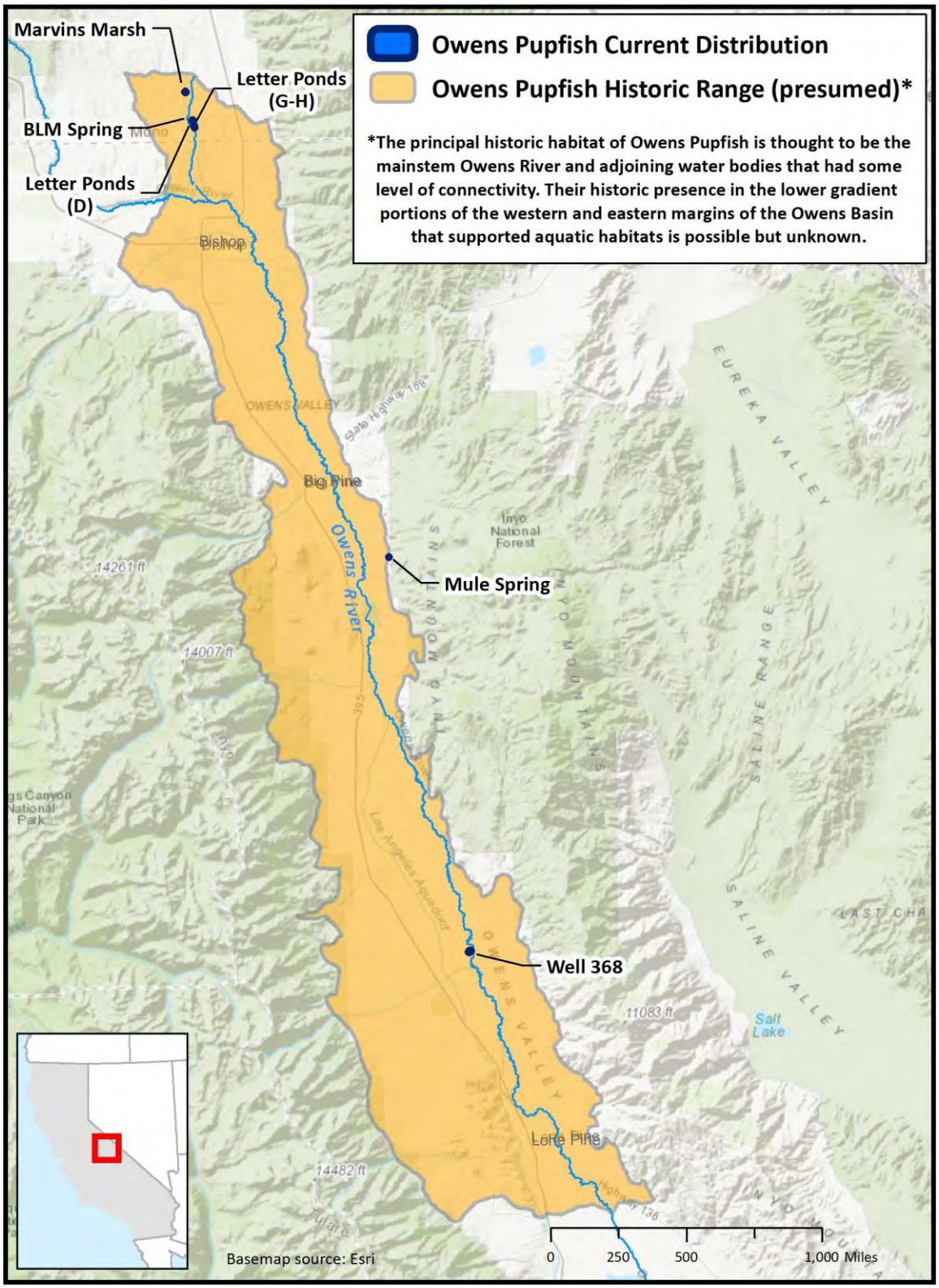


Figure 3. Map of historic range and current distribution of Owens Pupfish in Mono and Inyo counties, California.

Steward (1933) reported that the native Paiute tribe captured large numbers of pupfish with basket-like nets and dried them for use as winter food, indicative of their notable historic abundance. Their range and distribution are now severely restricted (Figure 3), owing to two principal historic and ongoing threats: predation by non-native species and habitat loss.

B. Population Trend and Abundance

Museum records indicate that the period from 1930 to 1970 was characterized by a rapid decline in abundance and distribution of Owens Basin native fishes, including the pupfish (Miller 1969, Sada 1989 in USFWS 1998). However, it should be noted that even earlier declines likely occurred due to undocumented introduction of non-native, predatory and competitive, fishes and other organisms (e.g., bullfrogs and crayfish) during the settlement of the area by European-Americans. The first segments of the Los Angeles Aqueduct, built to divert Owens Basin waters to provide municipal supply to Los Angeles, were completed in 1913 and led to the dewatering of much of the Owens River and associated aquatic habitats. Further declines likely occurred during this period, due to the construction of Long Valley Dam in 1941. Long Valley Dam was built at the head of the Owens River Gorge as part of a hydropower project, which led to the complete dewatering of the Lower Owens Gorge reach from 1953 to 1991. Adjoining marsh and pond complexes were invariably dried in the process of the Owens River dewatering, leading to extensive habitat loss. However, a considerable number of groundwater seeps and springs persisted in the Owens Basin through the 1980s. The dewatering and disappearance of these seeps and springs in recent decades is likely due to excessive groundwater pumping (N. Buckmaster, CDFW, pers. comm., 2019).

Owens Pupfish were believed to be extinct from 1942 until 1964 (Miller 1969), when a single population of approximately 200 individuals was rediscovered in Fish Slough (Miller and Pister 1971). When listed under the Federal Endangered Species Act in 1967, the Owens Pupfish was still limited to this single population. All extant populations have been propagated from this remnant stock (USFWS 1998). As of 2013, five populations of Owens Pupfish were documented to exist (Finger et al. 2013). These populations continue to persist and include: BLM Spring, BLM Ponds, and Marvin's Marsh, the three of which are isolated subpopulations within the broader Fish Slough area; Mule Springs; and Well 368 (Figure 3). The estimated population sizes and trends for these five groups are indicated in Table 1 below (USFWS 2009 and N. Buckmaster, CDFW, pers. comm., 2019). A former refuge population of <100 individuals in Warm Springs was documented to have been extirpated in 2009 (S. Parmenter and N. Buckmaster CDFW, pers. comm., 2019).

Table 1. Descriptions of refuge sites and populations of Owens Pupfish. *Estimated population sizes and trends provided by S. Parmenter, CDFW (in USFWS 2009).

Site	Size (acres)	Introduction year	Estimated population size*	Population trend*
BLM Spring	0.17	1969	1,000-10,000	increasing/stable
BLM Ponds	0.01	1982	100	stable
Marvin's Marsh	0.07	1986	100-1,000	decreasing
Mule Springs	0.01	1995	3,000 (+/-300)	stable
Well 368	0.05	1988	100-1,000	stable

V. THREATS AND SURVIVAL FACTORS

A. Factors Affecting Ability to Survive and Reproduce

Title 14 of the C.C.R. section 670.1(i)(1)(A) requires the Commission to consider the following factors when determining whether a species should be listed as threatened or endangered in California: present or threatened modification or destruction of its habitat; overexploitation; predation; competition; disease; and other natural occurrences or human-related activities.

Modification or destruction of habitat

Many aquatic habitats in the Owens Basin have been substantially degraded or lost due to introduction of non-native species, land use practices, and extensive water development activities. Historic maps of the area show surprisingly extensive wetland complexes around the Owens River and its tributaries (Appendix D), particularly given the naturally arid nature of the Owens Basin. Present or threatened (future) loss of Owens Pupfish habitat may occur primarily as a result of aquatic plant encroachment, groundwater overdraft associated with agricultural or water export operations, as well as continued and potentially increasing surface water diversions.

Aquatic plant encroachment—While cattail (*Typha* sp.) and other aquatic emergent vegetation are native to the area, active management of existing pupfish habitats is required to prevent their encroachment, including routine manual removal and/or prescribed fires to maintain open water habitats that Owens Pupfish require.

Groundwater pumping—Groundwater, or aquifer, pumping is largely associated with agricultural irrigation and municipal supply demands in the Owens Basin. Unregulated groundwater pumping may result in overdraft of the aquifer in the Tri-Valley region of the Owens Valley Groundwater Basin area, which underlies the Benton, Hammil, and Chalfant valleys in Mono County. The remainder of the Owens Valley Groundwater Basin, comprised of Round and Owens valleys in Inyo County, is managed under the “Agreement Between the County of Inyo and the City of Los Angeles and its Department of Water and Power on a Long Term Groundwater Management Plan for Owens Valley and Inyo County” or “Long-Term Water Agreement” (hereafter referred to as Agreement) (N. Buckmaster, CDFW, pers. comm., 2019). In California, groundwater withdrawal must be managed and monitored in those basins that have been adjudicated or are required to develop and implement a Groundwater Sustainability Plan (GSP) under the Sustainable Groundwater Management Act (SGMA; SB 1168, SB 1319, and AB 1739, effective January 1, 2015). Because the aquifer in the Tri-Valley Basin has not been adjudicated and is part of a basin that has been classified as low-priority under SGMA, groundwater withdrawals in this basin are not currently subject to limits pursuant to a court decree or GSP. Without such limits, groundwater pumping could result in a reduction or complete lack of water input to existing isolated springs and headwater springs of streams in the Owens Basin. This change would result in a further reduction or loss of the already extremely limited aquatic habitat occupied by the Owens Pupfish (USFWS 2009). For example, from the early 1900s to the 1960s, there was a 40 percent decrease in water flow from the springs at Fish Slough (Pinter and Keller 1991), which is a principal refuge for the pupfish. In the notably arid region where Owens Pupfish occur, further reductions in aquifer recharge to support surface water habitats may pose a substantial threat to the species.

Surface water diversions—As noted, much of the aquatic habitat in the Owens Valley has been eliminated or modified since the early 1900s. Most of the water rights (and lands) in the Owens

Basin are owned by the City of Los Angeles and operated by the Los Angeles Department of Water and Power (LADWP). LADWP operates and maintains dams, diversion structures, groundwater pumps, and canals to capture and convey much of the water from the Owens Basin to Los Angeles. Currently, the demand for water from the Owens Basin is high and continues to grow, as human population growth and associated metropolitan development in southern California expand. The remaining water (both surface and groundwater) is used extensively for agriculture and municipal purposes in the Owens Basin. These anthropogenic changes to aquatic habitats in the Owens Basin have eliminated much of the suitable habitat for Owens Pupfish. Consequently, their populations were reduced from common and wide-ranging to only a few small populations in heavily managed refuge sites (USFWS 2009).

While some hydrological restoration and mitigation has occurred in the Owens River Basin, the direct benefits to Owens Pupfish have been minimal. For example, in 1991, a ruptured pipeline in LADWP's hydroelectric infrastructure resulted in returned flows to the Owens River (Owens Gorge), the resulting development of the Agreement referenced in the Groundwater pumping subsection of this report, and the preparation of an associated Environmental Impact Report (EIR) to address potential impacts from restored instream flows and modified operations. In 1997, as a result of ongoing disputes related to the adequacy of the EIR and implementation of the Agreement, a Memorandum of Understanding (MOU) among the litigants (LADWP and Inyo County) and interveners (Sierra Club, Owens Valley Committee, California Department of Fish and Game, and California State Lands Commission) required LADWP to release a permanent base flow of 40 cubic feet per second in the lower Owens River. The MOU was incorporated with amendments into an Amended Stipulation and Order by the Superior Court of the State of California, County of Inyo and incorporated into the broader Lower Owens River Project. The LADWP initiated the releases required under the MOU and, in 2007, the court determined that LADWP had complied with the permanent base flow release requirement in the MOU (Inyo County Water Department website). These flows reestablished important aquatic habitat in nearly 60 miles of the lower Owens River, much of which was historical habitat for the Owens Pupfish. Unfortunately, the increase in available habitat has not benefited the Owens Pupfish. The section of river where aquatic habitat was established is now dominated by non-native species, which prey on or compete with the Owens Pupfish (USFWS 2009). In addition, LADWP has not fully implemented components of the project that are specifically intended to benefit imperiled native fishes, including the Owens Pupfish, so realization of the suite of desired outcomes has not yet occurred (N. Buckmaster, CDFW, pers. comm., 2019).

<u>Overexploitation</u>

Overexploitation as a result of commercial, recreational, scientific, or educational activities was not considered a threat at the time of listing, and there is no information to suggest that it has become a threat more recently (USFWS 2009).

<u>Predation and Competition</u>

Non-native predators and competitors are a serious and principal threat to the Owens Pupfish. At the time of listing in 1967, predation by non-native fish, e.g., Largemouth Bass (*Micropterus salmoides*), Smallmouth Bass (*M. dolomieu*), Brown Trout (*Salmo trutta*), and Bluegill Sunfish (*Lepomis macrochirus*), threatened the species. Since listing, non-native Mosquitofish (*Gambusia affinis*), Crayfish (*Pastifasticus leniusculus*), and American Bullfrogs (*Rana catesbeiana*) have been introduced into the pupfish's habitat and pose a threat to Owens Pupfish. Non-native predators eat both young and adult Owens Pupfish; they also compete with Owens Pupfish for food and habitat. Owens Pupfish face direct competition with Mosquitofish,

particularly related to foraging for mosquito (Family Culicidae) larvae, which is an important component of their seasonal diet. Mosquitofish are abundant and widespread in Owens Basin aquatic habitats and occupy the same ecological niche as pupfish, making them a major threat. Owens Pupfish populations are also particularly vulnerable to predation, due to their behavioral traits and evolution in the absence of predators. As an example, a single Largemouth Bass was documented to have reduced the pupfish population in BLM Spring from an estimated >5000 adults and juveniles in early 2017 to 12 observed adults and zero juveniles in early 2018 (N. Buckmaster, CDFW, pers. comm. 2020). All remaining populations may be threatened by the introduction of even a single predator. Non-native predators are currently present in much of the habitat pupfish historically occupied. Therefore, establishing new populations of Owens pupfish will require reintroductions to occur in locations where non-native predators can be excluded (USFWS 2009).

Disease

Disease was not known to be a threat to Owens Pupfish at the time of listing in 1967, and there is no information to suggest that it has become a threat.

Other natural occurrences or human-related activities

Other factors that may negatively affect the ability of Owens Pupfish to persist include genetic threats, climate change and stochasticity.

Genetics—According to Finger et al. (2013) Owens Pupfish are less genetically diverse than most other pupfishes of the desert southwest (including Amargosa, Desert and Sonoyta pupfishes). This study also indicated that Owens Pupfish refuge populations have undergone extreme genetic bottlenecks in the past (e.g., the observed overall population low in 1964 of approximately 200 individuals, from which all current populations are derived). Population bottlenecks occur when there is a drastic reduction in population size and often result in a loss of genetic variation. Bottlenecks are of conservation concern because they increase genetic drift and the chance of inbreeding, which can reduce diversity, fitness, adaptive potential, population viability and, by extension, increase the risk of extinction in small populations (e.g., Quattro and Vrijenhoek 1989; Frankham et al. 2002 in Finger et al. 2013). Additional findings indicated that all refuge populations of Owens Pupfish have differentiated (likely due to their complete isolation from one another and via the process of genetic drift), have also lost genetic diversity and will continue to do so without deliberate and ongoing intervention and management (Finger et al. 2013).

Perhaps of greatest concern is the fact that each refuge population, with the apparent exception of the Well 368 population, possesses unique or “private” alleles (genetic material). As such, intensive human intervention and intentional admixing of populations in accordance with a genetics management plan will be required to maintain maximum genetic diversity. Without this level of management, if any subpopulation is lost or continues to diverge, that population will take with it a portion of the genetic diversity that has been lost by all others (represented by private alleles). Every extant population has been recently and artificially subdivided, and all are subject to potential extirpation, as witnessed at Warm Springs in the recent past (Finger et al. 2013). The extensive distribution of private alleles among the existing refuge populations, unless corrected, may lead to genetic problems that could undermine their long-term persistence. This situation necessitates the creation of additional, larger, and more diverse refuge habitats and associated pupfish populations.

Climate change—Increasing temperatures and more extreme weather patterns associated with climate change are also likely to negatively affect Owens Pupfish, which exist in an already arid region in the "rain shadow" of the Sierra Nevada. Owens Pupfish habitats are fed by aquifers and surface flow, which are dependent on snow melt for recharge. It is predicted that climate change will lead to a reduction in snowpack throughout much of the Sierra Nevada, due to warmer temperatures and a shift in precipitation toward rainfall in late winter and early spring months. Sierra Nevada snowpack levels are already demonstrably variable from year to year, with some of the lowest levels in recorded history during the prolonged and severe drought from 2012 to 2016. However, the Owens Valley is at the base of the southernmost portion of the Sierra Nevada, where the range attains maximum elevations. Thus, the effects of climate change may be mitigated, at least to some extent, by greater accumulation and retention of snowpack in this portion of the range (Moyle et al. 2015). However, Moyle et al. (2013) determined that other Owens Basin fish taxa (such as Owens Speckled Dace and Owens Sucker) are highly vulnerable to climate change, indicating extinction may occur if measures to counter climate change effects are not taken. Given that Owens Speckled Dace are also limited to a few (three known) populations (Moyle et al. 2015), the potential threat(s) of climate change to Owens Pupfish may be similar. The predicted hotter and drier future climate, paired with an ever-increasing human demand for water resources in the Owens Basin, strongly indicates that aquatic habitats must be carefully protected if the Owens Pupfish is to persist. Given the area's history of water exportation and competing demands for remaining water supplies to meet agricultural, municipal, recreational, and ecological needs, future climate warming and increased variability and extremity of weather patterns will undoubtedly exacerbate existing challenges.

Stochasticity—With such small and isolated populations, Owens Pupfish are particularly susceptible to stochastic (random) threats, including demographic, genetic and environmental stochasticity or catastrophic events (Shaffer 1981 in USFWS 2009). Portions of the Owens Basin, (e.g., Long Valley in the northern part of the basin) are volcanically active and earthquakes could lead to disruption of subsurface flows that feed springs or contribute to other surface flows, potentially threatening Owens Pupfish refuge habitats. Likewise, shifts in geothermal activity and associated rerouting of subsurface flows could lead to inundation of Owens Pupfish habitats, rendering them lethal by increasing water temperatures or altering water chemistry outside of their physiological tolerances. Long Valley (site of the massive 10 x 20 mile Long Valley Caldera) is listed by the California Volcano Observatory as one of the top three sites in the state with the highest chance of an eruption (U.S. Geological Survey (USGS) California Volcano Observatory website). Furthermore, the Long Valley Caldera is a blast volcano, increasing the chances of catastrophic impacts to the local environment due to the explosive nature of this type of volcanic eruption (Worldatlas.com website). The United States Geological Survey rates the threat potential of Long Valley as "Very High" (USGS Volcano Hazards Program website).

B. Degree and Immediacy of Threats

Numerous threats exist that may negatively affect the future persistence of Owens Pupfish; however, historic introductions of non-native aquatic organisms and associated predation and competition, along with historically extensive aquatic habitat alteration and reduction, are the primary threats that have led to their greatly reduced abundance, severely restricted distribution, and endangered listing status. As indicated, ongoing threats include the following: potential introduction of non-native species into refuge habitats; climate change; increasing demand for municipal, agricultural, and other water supplies; isolation and associated impacts from genetic drift, differentiation, and bottlenecks; reliance of all populations on routine removal of emergent

vegetation in very small or artificial (or both) refuge habitats; and stochastic events that may reduce or eliminate small, isolated populations. However, the degree and immediacy of these threats is unknown. It is likely that introduction or ongoing presence of non-native fishes ranks highest among potential threats (N. Buckmaster, CDFW, pers. comm., 2019).

VI. MANAGEMENT AND RECOVERY

A. Impact of Existing Management Efforts

Owens Pupfish population establishment—Historic management of Owens Pupfish has included numerous habitat creation or restoration projects and resulted in 88 translocations since the species was rediscovered in 1964 (Appendix A, Appendix B). However, over 90% of these translocations failed (Appendix C), and no attempt has been made to establish new populations since 2007 (S. Parmenter, CDFW pers. comm. 2019).

Owens Pupfish population monitoring—Ongoing population monitoring is a key management element in evaluating Owens Pupfish status and trends. Currently, the Bishop Paiute Tribe, in coordination with Bureau of Land Management (BLM) and the Department, conduct weekly monitoring of BLM Spring (the largest extant habitat) to ensure no non-native predators are introduced into this habitat. In addition to BLM spring, the Department currently conducts State Wildlife Grant-funded surveys of the remaining Owens Pupfish populations quarterly. Single mark-recapture estimates of the Owens Pupfish population in Mule Spring, Well 368, BLM Ponds, and Marvin's Marsh will be completed in 2019 (N. Buckmaster, CDFW pers. comm. 2019). Ongoing monitoring efforts are described in Table 2 (below).

Table 2. Overview of ongoing Owens Pupfish population monitoring.

Location	Monitoring Method	Frequency	Responsible Party
BLM Spring	Visual and Snorkel Surveys	Weekly	Bishop Paiute Tribe, CDFW, BLM
Mule Spring	Visual Surveys	Monthly	CDFW, BLM
Letter Ponds	Visual and minnow trapping Surveys	Quarterly	CDFW
Marvin's Marsh	Visual and minnow trapping Surveys	Annually	CDFW
Well 368	Visual Surveys	Annually	LADWP, CDFW

Rehabilitation of the River Spring Lakes Ecological Reserve—Options to expand Owens Pupfish populations into new habitats in the Owens Basin are very limited. Most otherwise suitable habitats are occupied by non-native species or are located on LADWP or other private property (or both). One of the few options is the River Spring Lakes Ecological Reserve (Ecological Reserve; Figure 4), which was purchased by the State of California in 1980 and contains a 640-acre spring-wetland complex, known as a ciénega. The property was acquired for the purpose of creating a refuge for imperiled Owens native fishes and to preserve one of the few large spring-wetland complexes remaining in the Inyo/Mono Desert for fish and wildlife habitat needs. The Ecological Reserve contains Amargosa River Pupfish, which were stocked by Robert Rush Miller in 1940, along with Salt Creek Pupfish. It is possible these two species hybridized after stocking; however, no genetic studies have been performed to determine this (N. Buckmaster, CDFW pers. comm. 2019).

The Department secured funding in 2016 to rehabilitate the Ecological Reserve by eradicating the introduced Amargosa and Salt Creek pupfishes, with the intention of introducing Owens Pupfish. The rehabilitation was completed in 2019 (N. Buckmaster, CDFW pers. comm. 2019). Following short-term monitoring to ensure the successful removal of the existing pupfish population, the Ecological Reserve will be stocked with Owens Pupfish from existing refuges. This introduction will increase the area of occupied Owens Pupfish habitat by five orders of magnitude and, because of its large size, the Ecological Reserve will likely prevent additional loss of genetic variation and serve as a more climate change-resilient refuge than existing sites. Its remote location, in a little-traveled part of the state, should also serve as a buffer against intentional stocking of nonnative fishes, as has repeatedly occurred in other more accessible Owens Pupfish refuge sites.

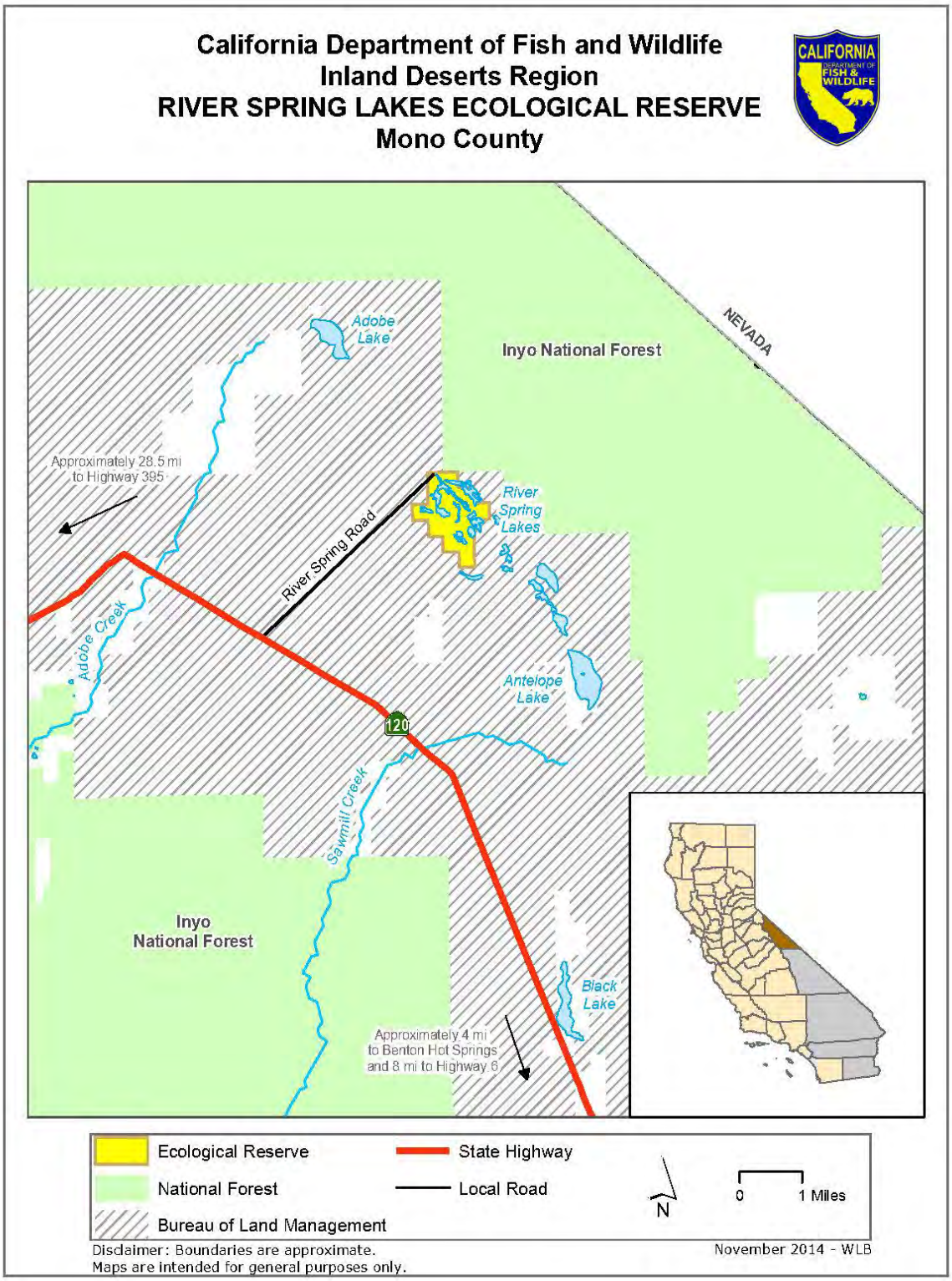


Figure 4. Vicinity map of River Spring Lakes Ecological Reserve, approximately 31 km (19 miles) east-southeast of Mono Lake in Mono County, CA.

B. Recommendations for Management Activities and Other Recommendations for Recovery of the Species

The Department recommends the following actions to ensure the long-term persistence of Owens Pupfish:

1. Continue maintenance of existing habitats and population monitoring:
   - Continue routine visual monitoring of occupied pupfish habitats and perform manual removal of emergent vegetation on an as-needed basis.
   - Continue population monitoring as prescribed in Table 2.
   - Continue visual surveys of BLM Spring to detect non-native fish introductions.

2. Expand existing distribution:
   - Reintroduce Owens Pupfish to the Owens Valley Native Fish Sanctuary and to Warm Spring (previous refuge habitats).
   - Prioritize and implement next steps in the Owens Pupfish introduction effort into the River Spring Lakes Ecological Reserve.

3. Develop and implement a genetic management plan to guide managed gene-flow between all populations:
   - Utilize a genetics management plan to inform Owens Pupfish translocations and for the purposes of potential future mixing of populations to ensure maximum genetic variation in all populations.
   - Integrate, where warranted and feasible, the findings and recommendations of Finger et al. (2013), including founding new populations composed of 30-50 founders from each of the extant populations and regularly translocating up to 10 migrants per generation among stable populations.

VII. RECOMMENDATION TO THE COMMISSION

Pursuant to Fish and Game Code section 2077, the Department has prepared this Five-Year Species Review based upon the best scientific information available to the Department to determine if conditions that led to the original listing are still present. Based on this Five-Year Species review, the Department submits the following recommendation to the Commission:

In completing this Five-Year Species Review for Owens Pupfish, the Department finds there is sufficient scientific information to indicate that the conditions that led to the listing of Owens Pupfish as endangered are still present, and recommends no change to the status of Owens Pupfish on the list of endangered species at this time.

VIII. Sources

A. Literature Cited

BARLOW, G. 1961. Social behavior of the desert pupfish, *Cyprinodon macularius*, in the field and in the aquarium. Am. Midland Nat. 65:339-359.

BRUNELL, S. 1970. The Desert Pupfish. California Tomorrow, Vol. 1:2-14.

CALIFORNIA DEPARTMENT OF FISH AND GAME. 1990. Five Year Status Report for the Owens Pupfish. Internal administrative report.

COLE, G.A. 1981. Habitats of North American desert fishes. Pages 477-492. In R.J. Naiman and D.L. Soltz (eds.). Fishes in North American Deserts. Wiley Interscience, New York.

DAVIDSON, J.W. 1859. Report of the results of an expedition to Owens Lake and River, with the topographical features of the country, climate, soil, timber, water, and also habit, arms, and means of subsistence, of the Indian Tribe seen from March, July and August, 1859. Pages 14-31. In, P.J. Wilke and H.W. Lawton (eds.). The expedition of Capt. J.W. Davidson from Fort Tejon to Owens Valley in 1859. Bellena Press Publications in Archaeology, Ethnology, and History No. 8.

FINGER, A., S. PARMENTER, AND B. MAY. 2013. Conservation of the Owens Pupfish: genetic effects of multiple translocations and extirpations. Transactions of the American Fisheries Society. 142:1430-1443.

FRANKHAM, R., J. D. BALLOU, AND D. A. BRISCOE. 2002. Introduction to conservation genetics. Cambridge University Press, Cambridge, UK.

INYO COUNTY WATER DEPARTMENT (website). https://www.inyowater.org/documents/reports/owens-valley-water-history-chronology/

KENNEDY, C.H. 1916. A possible enemy of the mosquito. California Fish and Game 2:179-182.

MILLER, R.R. 1948. The cyprinodont fishes of the Death Valley system of eastern California and southwestern Nevada. Miscellaneous Publications of the University of Michigan Museum of Zoology 68:1-155.

MILLER, R.R. 1969. Conservation of fishes of the Death Valley system in California and Nevada. Transactions of the California-Nevada section of the Wildlife Society 1969:107-122.

MILLER R.R., AND E.P. PISTER. 1971. Management of the Owens pupfish, Cyprinodon radiosus, in Mono County, California. Transactions of the American Fisheries Society 100:502-509.

MIRE, J.B. 1993. The behavioral ecology and conservation biology of the Owens pupfish, Cyprinodon radiosus. Unpublished Ph.D. Dissertation, University of California, Berkeley, CA. 221 pp.

MIRE, J.B. AND L. MILLETT. 1994. Size of mother does not determine size of eggs or fry in the Owens pupfish, Cyprinodon radiosus. Copeia 1994:100-107.

MOYLE, P.B. 2002. Inland Fishes of California. University of California Press, Oakland.

MOYLE, P.B., J.D. KIERNAN, P.K. CRAIN AND R.M. QUIÑONES. 2013. Climate change vulnerability of native and alien freshwater fishes of California: a systematic assessment approach. PLoS ONE 8(5): e63883. https://doi.org/10.1371/journal.pone.0063883

MOYLE, P.B., R. M. QUIÑONES, J. V. KATZ AND J. WEAVER. 2015. Fish Species of Special

Concern in California. Sacramento: California Department of Fish and Wildlife. www.wildlife.ca.gov

PINTER, N., AND E.A. KELLER. 1991. Hydrology of Fish Slough. Pages III-11 to III-13 in Ferren, Jr., and Davis editors. Biotic inventory and ecosystem characterization for Fish Slough Inyo and Mono Counties, California. University of California, Santa Barbara. Prepared for the Resources Agency, Department of Fish and Game, Award No. FG-83890.

QUATTRO, J., AND R. VRIJENHOEK. 2016. Fitness differences among remnant populations of the Sonoran topminnow, Poeciliopsis occidentalis. Science. 245. 976-978.

SADA, D.W. 1989. Status and distribution of speckled dace (*Rhinichthys osculus*) in the Owens

River system, Inyo and Mono Counties, California. Unpublished report to California Department of Fish and Game, Rancho Cordova, CA.

SADA, D.W. AND J.E. DEACON. 1994. Spatial and temporal variability of pupfish (genus Cyprinodon) habitat, populations, and microhabitat use at Salt Creek and Cottonball Marsh, Death Valley National Monument, California. Unpublished report to the U.S. National Park Service, Death Valley National Monument. 92 pp.

SNYDER, J.O. 1917. An account of some fishes from Owens River, California. Proceedings of the U.S. National Museum 54:201-205.

SOLTZ, D.L. AND R.J. NAIMAN. 1978. The natural history of native fishes in the Death Valley system. Natural History Museum of Los Angeles County Science Series 30:1-76.

STEWARD, J.H. 1933. Ethnology of the Owens Valley Paiute. University of California Publications in American Archaeology and Ethnology. 33 pp.

U.S. FISH AND WILDLIFE SERVICE. 1984. Recovery Plan for the Owens Pupfish, Cyprinodon radiosus. U.S. Fish and Wildlife Service, Portland, Oregon. 47 pp.

U.S. FISH AND WILDLIFE SERVICE. 1998. Owens Basin wetland and aquatic species recovery plan, Inyo and Mono Counties, California. Portland, Oregon. pp. 18-113.

U.S. FISH AND WILDLIFE SERVICE. 2009. Owens Pupfish 5-Year Review: Summary and Evaluation. Ventura Fish and Wildlife Office.

U.S. GEOLOGICAL SURVEY VOLCANO HAZARDS PROGRAM website. https://volcanoes.usgs.gov/volcanoes/long_valley/

U.S. GEOLOGICAL SURVEY CALIFORNIA VOLCANO OBSERVATORY website. https://volcanoes.usgs.gov/observatories/calvo/

WORLDATLAS.COM website. Https://www.worldatlas.com/articles/which-states-in-the-us-have-most-active-volcanoes.html

B. Personal Communication

E-mail message from Bjorn (Peter) Erickson (USFWS) on July 22, 2019, indicating the Owens Pupfish federal 5-year review will not be initiated until their FY 2021.

Multiple e-mail messages with Nick Buckmaster (CDFW, Bishop Field Office) from July-November, 2019.

C. Other

N/A

IX. LIST OF FIGURES

Figure 1. Map of Fish Slough Ecological Reserve……..…..……5
Figure 2. Representative Owens Pupfish Habitat (BLM Spring, Fish Slough)……..……...7
Figure 3. Map of historic range and current distribution of Owens Pupfish.……..……8
Figure 4. Location of River Spring Lakes Ecological Reserve ..……...16

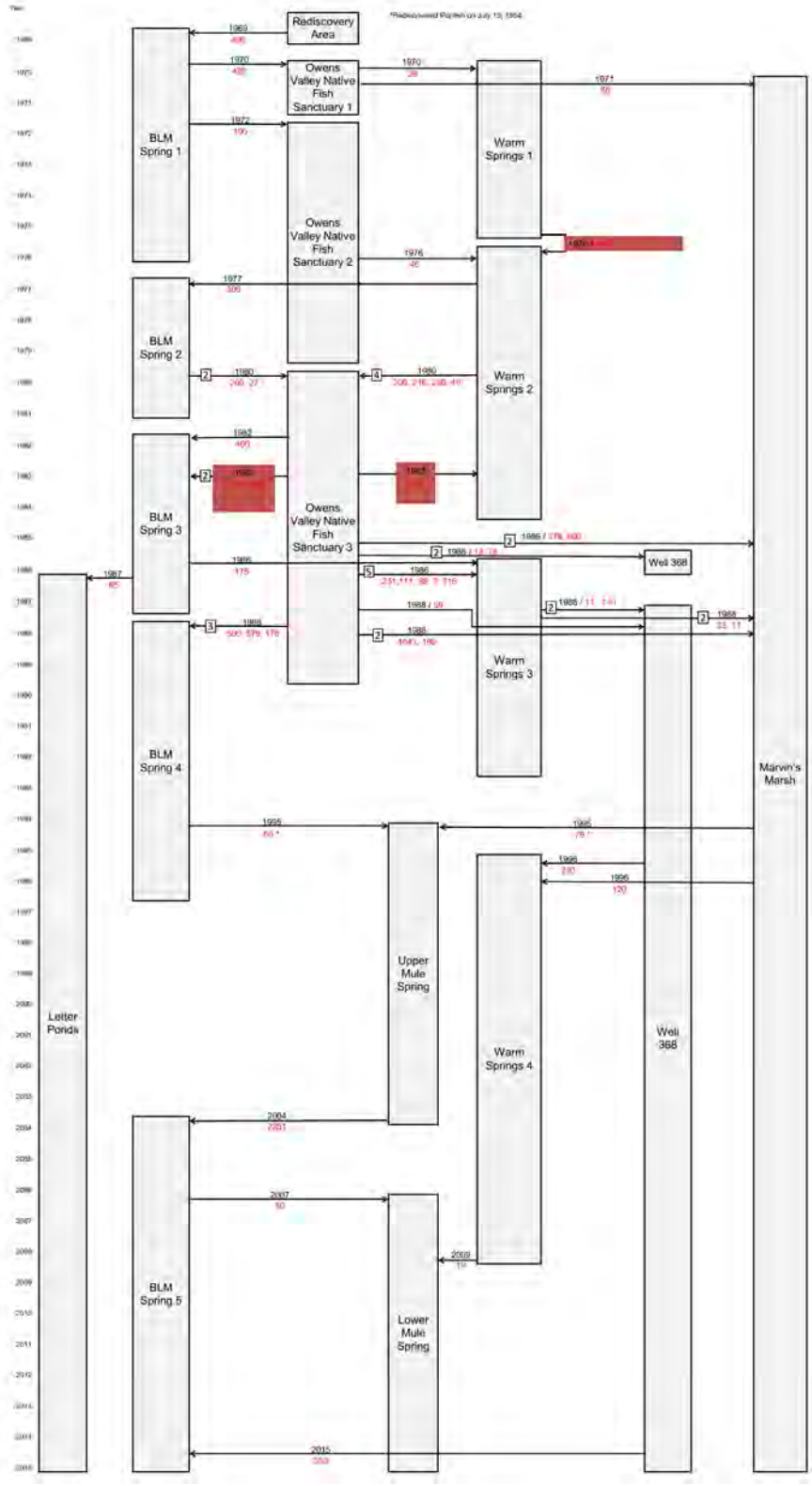
X. LIST OF TABLES

Table 1. Descriptions of refuge sites and populations of Owens Pupfish ..….……..9
Table 2. Overview of ongoing Owens Pupfish population monitoring ...……..14

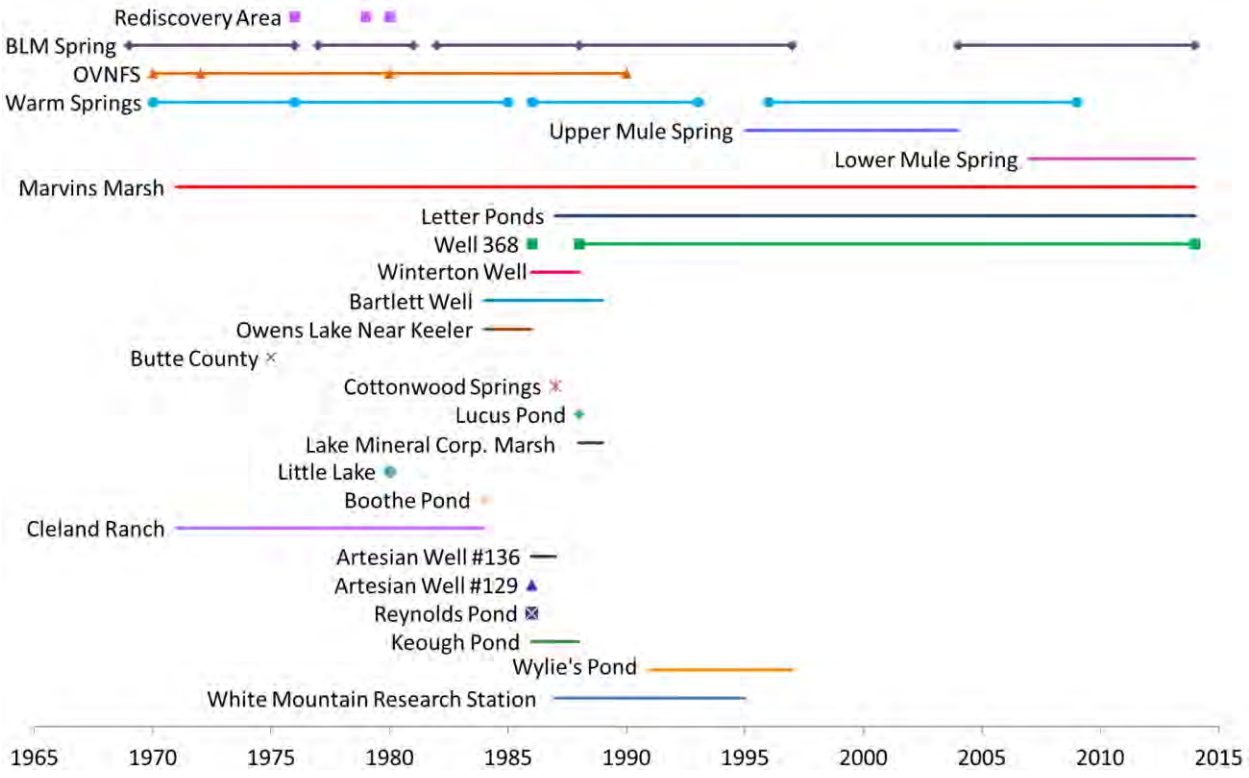
XI. LIST OF APPENDICES

Appendix A. Owens Pupfish translocation graphical diagram.……..…….21
Appendix B. Presence of Owens Pupfish in various transplant locations ……22
Appendix C. Causes of Owens Pupfish translocation failures…….....23
Appendix D. Historical (1913) map of a portion of the Owens Basin..……..24

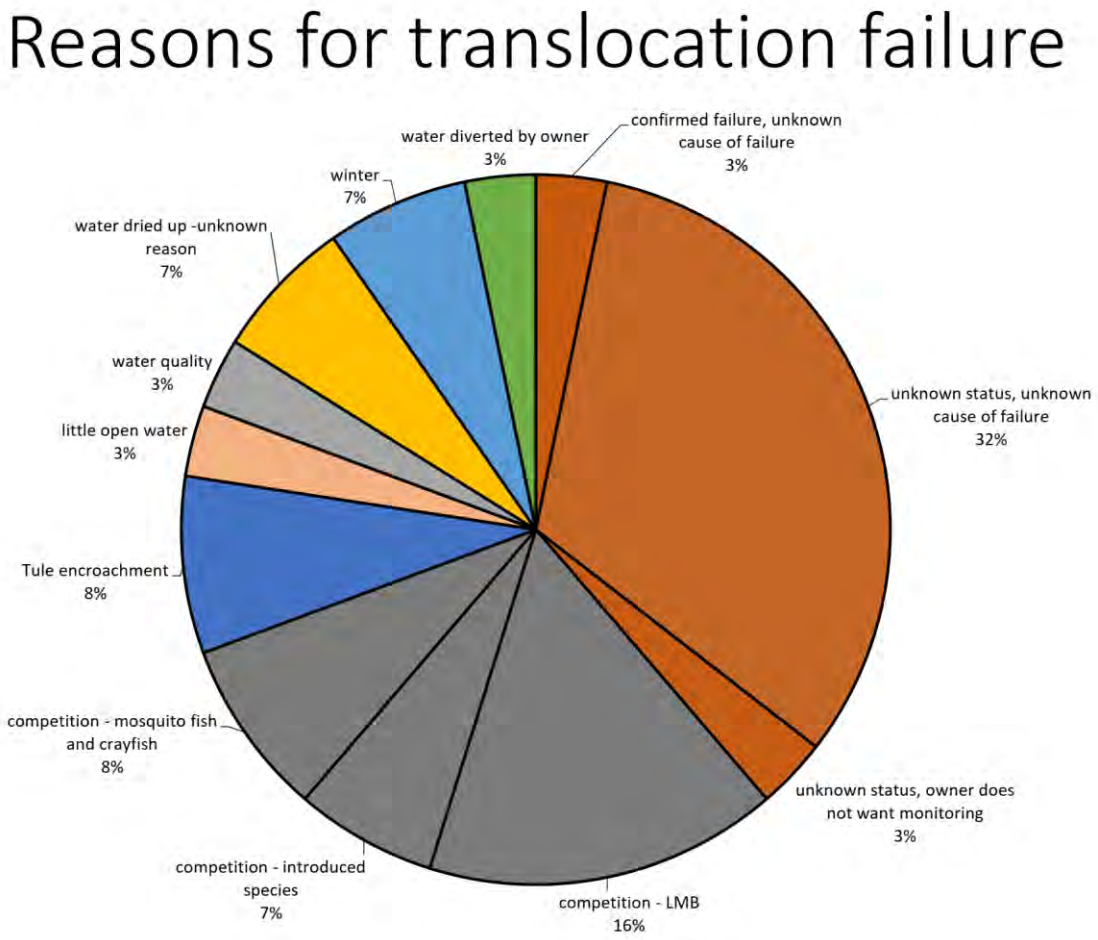
Appendix A. Owens Pupfish translocations from 1969-2015. (Source: S. Parmenter, CDFW 2019).



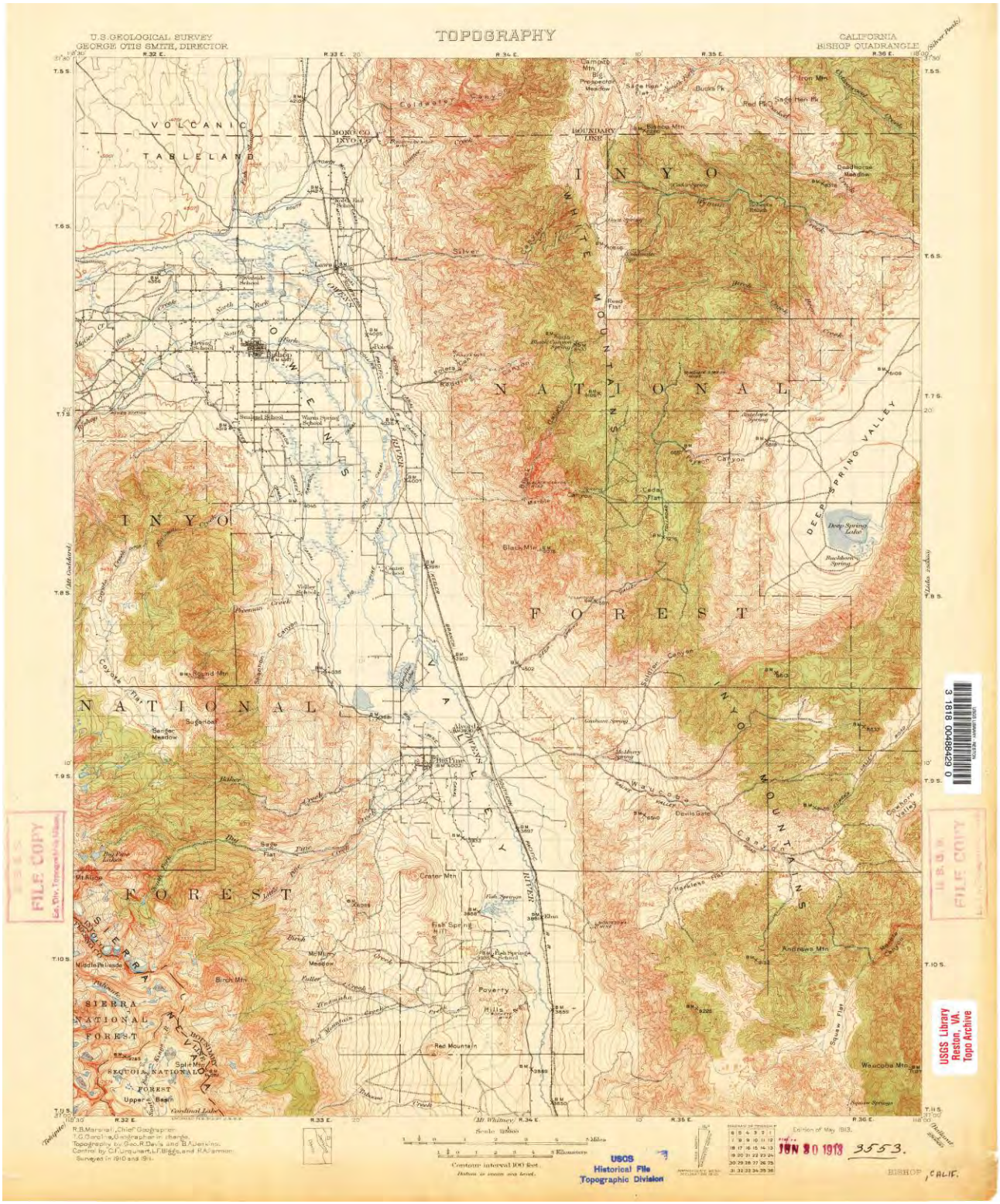
Appendix B. Presence of Owens Pupfish in various transplant locations 1969-2018 (Source: S. Parmenter, CDFW 2019).



Appendix C. Causes of Owens Pupfish translocation failures (Source: S. Parmenter, CDFW 2019).



Appendix D. Historical (1913) map of a portion of the Owens Basin, featuring extensive wetland complexes associated with the Owens River and representing likely Owens Pupfish historic habitats.



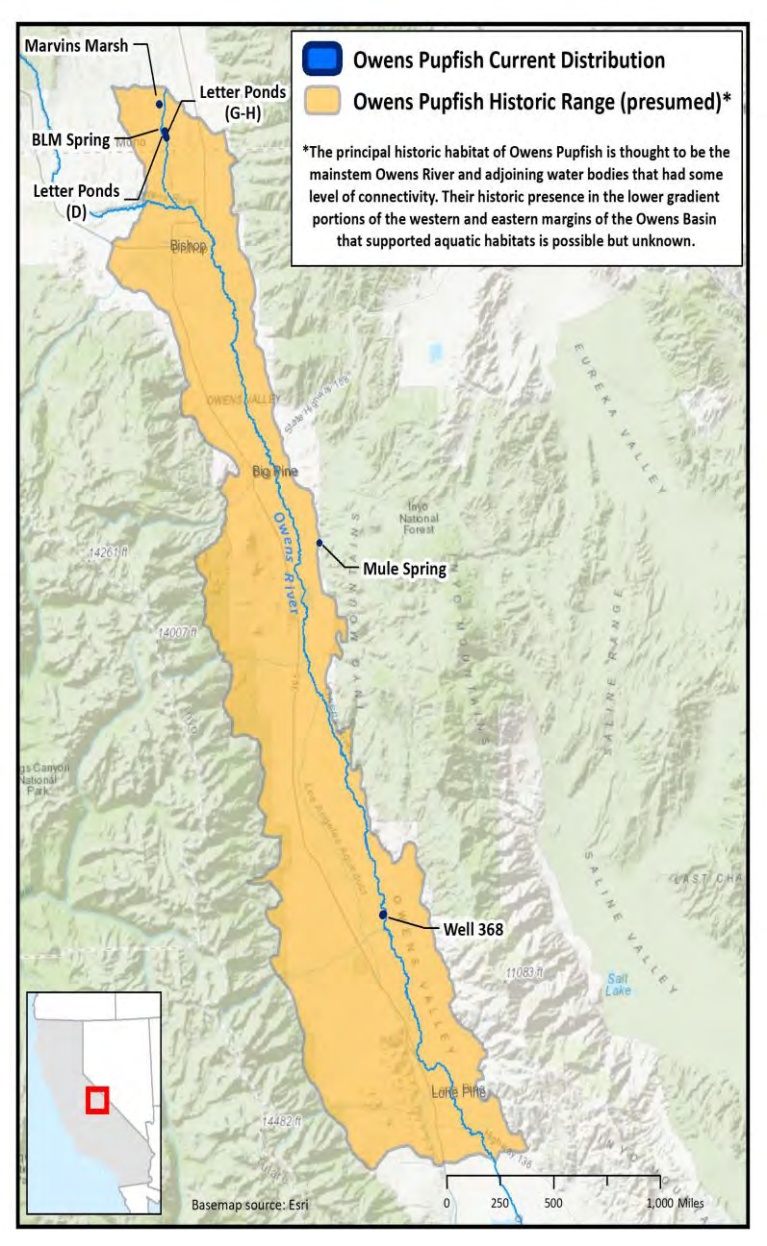
5-Year Species Review: Owens Pupfish *(Cyprinodon radiosus)*

Fish and Game Commission Meeting

August 2020

Jeff Weaver
Fisheries Branch

Owens Pupfish



- CESA-listed endangered
- Five isolated populations remain
- Inyo and Mono counties
- Current habitats heavily managed

Population Trends

Site	Size (acres)	Introduction year	Estimated population size	Population trend
BLM Spring	0.17	1969	1,000-10,000	increasing/stable
BLM Ponds	0.01	1982	100	stable
Marvin's Marsh	0.07	1986	100-1,000	decreasing
Mule Springs	0.01	1995	3,000 (+/-300)	stable
Well 368	0.05	1988	100-1,000	stable

Threats

- **Predation by non-native aquatic organisms**
- Historic/ongoing loss of suitable habitats
- Genetic factors (bottleneck, drift)
- Water development
- Climate change*

Owens Pupfish
Findings and Recommendation

- The Department finds that the conditions that presumably led to the listing of Owens Pupfish are still present, and additional threats have emerged since listing.

- The Department recommends no change to the status of Owens Pupfish on the list of endangered species at this time.

Questions ◈ Thank You

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Received October 21, 2019.
Original date stamped copy on file.

BEFORE THE CALIFORNIA FISH AND GAME COMMISSION

A Petition to List the Western Joshua Tree (*Yucca brevifolia*) as Threatened under the California Endangered Species Act (CESA)

Center for Biological Diversity
October 15, 2019

Notice of Petition

For action pursuant to Section 670.1, Title 14, California Code of Regulations (CCR) and Division 3, Chapter 1.5, Article 2 of the California Fish and Game Code (Sections 2070 *et seq*.) relating to listing and delisting endangered and threatened species of plants and animals.

I. SPECIES BEING PETITIONED:

Species Name: Western Joshua tree (*Yucca brevifolia*) as either a full species, or as the subspecies *Yucca brevifolia brevifolia.*

II. RECOMMENDED ACTION: Listing as Threatened

The Center for Biological Diversity submits this petition to list the western Joshua tree (*Yucca brevifolia*) as Threatened pursuant to the California Endangered Species Act (California Fish and Game Code §§ 2050 et seq., "CESA"). The western Joshua tree (*Yucca brevifolia*), long recognized as a subspecies or variety (*Yucca brevifolia brevifolia*), has recently been recognized as a full species distinct from its close relative, the eastern Joshua tree (*Yucca jaegeriana*).

This petition demonstrates that the western Joshua tree is eligible for and warrants listing under CESA based on the factors specified in the statute and implementing regulations. Specifically, the western Joshua tree meets the definition of a "threatened species" since it is "a native species or subspecies of a … 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 . . . ." Cal. Fish & Game Code § 2067.

In the event the Commission determines that full-species taxonomy is not sufficiently established, petitioners request listing of the taxa as a subspecies/variety *Yucca brevifolia brevifolia*. Additionally, while petitioners believe that the western Joshua tree warrants protection under CESA throughout its range in California, in the event the Commission determines that it does not, the Commission must assess whether either of the two population clusters of the species (denoted as *Y. brevifolia* North [YUBR North] and *Y. brevifolia* South [YUBR South] in the petition) separately warrant listing as ecologically significant units (ESUs).

Cover photo of tallest (25 m) known *Yucca brevifolia* in western Antelope Valley in 1925 from Webber (1953). The tree was burned by vandals in 1930, generating outrage and sparking early desert protection efforts culminating in the 1936 creation of Joshua Tree National Monument.

III. AUTHOR OF PETITION:

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I hereby certify that, to the best of my knowledge, all statements made in this petition are true and complete.

Signature: _____ Date: ____10/15/19_____

Table of Contents

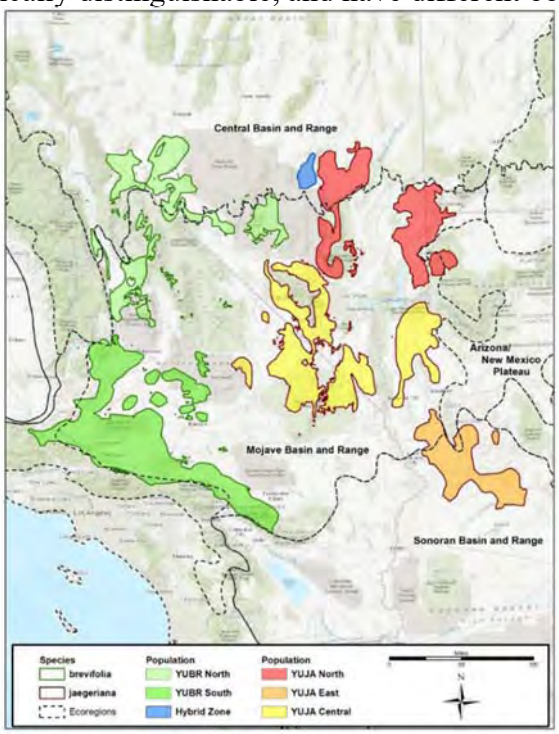
Executive Summary 1
1 Introduction 3
2 Life History 3
2.1 Taxonomy 3
2.2 Species Description 4
2.3 Reproduction and Growth 7
2.4 Habitat Requirements 14
3 Current and Historical Distribution 16
4 Abundance and Population Trends 19
5 Factors Affecting Ability to Survive and Reproduce 20
5.1 Predation 20
5.2 Invasive species 22
5.3 Wildfires 24
5.3.1 Joshua tree response to fire 24
5.3.2 Increasing wildfire frequency and intensity in the Mojave 27
5.4 Climate Change 32
5.4.1 Current and projected climate change in the range of *Y. brevifolia* 32
5.4.2 Climate change impacts on Joshua trees 34
5.5 Habitat Loss to Development 46
6 Degree and Immediacy of Threat 48
7 Inadequacy of Existing Regulatory Mechanisms 48
7.1 Regulatory Mechanisms for Greenhouse Emissions Reductions 48
7.2 Mechanisms to protect habitat from fire, development and other threats 50
7.2.1 Invasive species and fire 51
7.2.2 Habitat loss and degradation 52
8 USFWS's Flawed Endangered Species Act Determination. 58
9 The Western Joshua Tree Warrants Listing under CESA. 62
10 Recommended Management and Recovery Actions 64
11 Conclusion 66
12 References Cited 66

Executive Summary

The Center for Biological Diversity submits this petition to list the western Joshua tree (*Yucca brevifolia*) as Threatened pursuant to the California Endangered Species Act (CESA). This petition demonstrates that the western Joshua tree is eligible for and warrants listing under CESA based on the factors specified in the statute and implementing regulations.

Under CESA, a "threatened species" is "a native species or subspecies of a … 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…" A plant is an "endangered species" when it 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." While the western Joshua tree is not at imminent risk of extinction, it faces significant and growing threats, primarily from climate change, that ultimately threaten the viability of the species in all or a significant portion of its range in California; it consequently meets the definition of a "threatened species."

Long considered a single species with two subspecies or varieties, the Joshua tree has recently been recognized as comprised of two distinct species, the western Joshua tree (*Yucca brevifolia*) and the eastern Joshua tree (*Y. jaegeriana*). The two species are geographically separated, genetically and morphologically distinguishable, and have different obligate pollinators.



Both species occur in California, with the western Joshua tree having a boomerang-shaped range from Joshua Tree National Park, westward along the northern slopes of the San Bernardino and San Gabriel Mountains, through the Antelope Valley, northward along the eastern flanks of the southern Sierra Nevada and eastward to the edges of Death Valley National Park (green areas on

map). The eastern Joshua tree's range in California is centered in the Mojave National Preserve (yellow areas on map).

While both the western and eastern species of Joshua tree are of conservation concern, the fate of the western Joshua tree in California is particularly alarming, as recent studies indicate that the species' range is contracting at lower elevations, recruitment is limited, and mortality is increasing, all of which would likely reflect a population already starting to decline due to recent warming. Even greater changes are projected to occur over the coming decades.

Climate change represents an existential threat to western Joshua trees. Even in the absence of climate change, the convergence of factors necessary for recruitment results in successful establishment of new seedlings only a few times in a century. Such recruitment has already largely stopped at the drier, lower limits of the species' range. Prolonged droughts, which are projected to occur with greater frequency and intensity over the coming decades, will not only preclude recruitment across ever-greater areas of the species' range, but will lead to higher adult mortality, either directly due to temperature and moisture stress or indirectly due to increased herbivory from hungry rodents lacking alternative forage. Whether or not the species' pollinating moth will be able to keep pace with a changing climate is highly questionable. The Joshua tree's ability to colonize new habitat at higher elevations or latitudes is extremely limited and no such range expansion is yet occurring, even as the lower elevation and southern edge of its range is already contracting. And there is no safe refuge, as the higher elevation areas in which Joshua trees are projected to best be able to survive increasing temperatures and drying conditions are at great risk of fire due to the prevalence of invasive non-native grasses. Absent rapid and substantial reductions in GHG emissions *and* protection of habitat, the species will likely be extirpated from all or most of California by the end of the century.

In addition to climate change and fire, the western Joshua tree is threatened by habitat loss and degradation from other human activities. The portion of the species' range where management is most protective—Joshua Tree National Park— is also the area where the early impacts of climate change are already being felt most severely. Other areas of federal land that are home to the species are subject to poorly-regulated activities including off-road vehicle use, cattle grazing, power and pipeline rights-of-way and large-scale energy projects that consume or degrade habitat. And while much of the western Joshua tree's range is on public lands, approximately 40% of its range in California is on private land, of which only a tiny fraction is protected from development. Under current growth projections, virtually all of this habitat will be lost in the coming decades absent strengthened protection under the law.

The Joshua tree has long been the most iconic species of the Mojave Desert. Given the well-publicized threats facing the species in the face of climate change, it has recently become an emblem of our society's failure to address the climate crisis. But the Joshua tree is also uniquely situated to become an example of successful action to save a species threatened by climate change. Action taken in and by California to save the species can serve as a model for proactive climate adaptation efforts not just in California but around the world. Listing the species under CESA is not just a symbolically important act of California recognizing the threats the species faces from climate change, but also can serve as the impetus for meaningful management actions that can help ensure the species remains a living icon in perpetuity.

The Western Joshua Tree Warrants Listing as Threatened under the California Endangered Species Act (CESA)

1 Introduction

This petition summarizes the available scientific information regarding the taxonomy and natural history of the western Joshua tree (*Yucca brevifolia*), its distribution and abundance in California, population trends and threats, and discusses the limitations of existing management measures in protecting the species. As demonstrated below, western Joshua trees meet the criteria for protection as "threatened" under the California Endangered Species Act (CESA) and would benefit greatly from such protection.

2 Life History

2.1 Taxonomy

Joshua tree taxonomy has long been subject to some dispute and confusion. Often referenced as being within the Families Liliaceae or Agavaceae, under the molecular-based taxonomic system developed by the Angiosperm Phylogeny Group, the species is now considered as being within the Asparagaceae (AGP IV 2016; ITIS 2019).

The Joshua tree has until recently been treated by most authorities as a single species, *Yucca brevifolia* Engelm., comprised of two varieties or subspecies, *Yucca brevifolia brevifolia* (western Joshua tree) and *Yucca brevifolia jaegeriana* (eastern Joshua tree) (ITIS 2019).[1] The two forms are for the most part geographically separated, genetically and morphologically distinguishable, and have different obligate pollinators. The two forms may be the result of allopatric speciation, though some gene flow between them has been documented in a small area in Nevada (Yoder et al. 2013; Royer et al. 2016). Lenz (2007) believed the differences in flower and fruit morphology between *Y. b. brevifolia* and *Y. b. jaegeriana* as well as each having different obligate pollinators were sufficient to recognize *Y. b. jaegeriana* as a full species, *Y. jaegeriana*.

More recent studies focused on pollinator interactions have confirmed significant morphological differences in the stylar canals of the flowers of the two forms, which correspond to differences in ovipositor length in their respective pollinators (Godsoe et al. 2008; Starr et al. 2013; Yoder et al. 2013). Smith et al. (2008) used genetic markers to determine that western and eastern Joshua trees likely diverged over 5 million years ago, which corresponds to the time when the Bouse Embayment, an extension of estuarine waters of the Gulf of California, extended into the Mojave, separating western and eastern areas (Pellmyr and Segraves 2003). Starr et al. (2013) and Yoder et al. (2013) also found genetic differentiation between the two forms but declined to recognize them as separate species.[2] Royer et al. (2016) expanded on these studies

[1] Other previously described subspecies/varieties including *Y.b. herberti*, *Y.b. weberi* and *Y.b. wolfei* are considered synonyms of *Y. brevifolia* (ITIS 2019; Wallace 2017).

[2] Yoder et al. (2013) noted that whether *Y. b. brevifolia* and *Y. b. jaegeriana* represent full species "is heavily dependent on the species concept we use to make that judgment." Starr et al. (2013) noted that "[t]he validity of this

using molecular techniques and found "evidence for strong genome-wide patterns of divergence between the Joshua tree species" and noted their results "revealed extensive genetic differentiation between *Y. brevifolia* and *Y. jaegeriana*." Royer et al. (2016) followed Lenz (2007) and recognized *Y. brevifolia* and *Y. jaegeriana* as full species.

Most recently, in a broad review of the science regarding Joshua trees, the U.S. Fish and Wildlife Service treated *Y. brevifolia* and *Y. jaegeriana* as separate species for purposes of federal Endangered Species Act (ESA) consideration (Wallace 2017; USFWS 2018; USFWS 2019).[3] Petitioners follow Lenz (2007), Royer et al. (2016), Cole et al. (2017) and USFWS (2018) and treat *Y. brevifolia* and *Y. jaegeriana* as full species. However, since CESA provides for the protection of both species and subspecies, regardless of whether it is treated as a species (*Y. brevifolia*) or subspecies (*Y. b. brevifolia*), the western Joshua tree is eligible for and warrants listing under the statute.

2.2 Species Description[4]

The earliest known written description of the Joshua tree is an unflattering entry in the Fremont Report in which it was noted that "their stiff and ungraceful form makes them to the traveler the most repulsive tree in the vegetable kingdom . . .'' (Fremont 1845). Over time, Joshua trees became increasingly more appreciated, with Griffin (1930) referring to them as "one of the outstanding plants of the desert," Runyon (1930) characterizing them as "grotesque in the extreme…yet they are magnificent," Little (1950) somewhat undecidedly calling them "picturesque or grotesque," and Jaeger (1965) calling them "at once the most spectacular and most characteristic tree of the Mohave Desert."

More technically, the Jepson Flora describes Joshua trees as follows:

> *Habit*: Plant 1--15 m. *Stem*: erect, above ground, generally branched above, rosettes at tips, well above ground. *Leaf*: 15--35 cm, 0.7--1.5 cm wide, dark green, expanded base 2--4 cm, 4--5 cm wide, +- white, margins minute-serrate, yellow. *Inflorescence*: 3--5 dm, distal generally +- 1/2 exserted from rosettes. *Flower*: erect; perianth 4--7 cm, +- bell-shaped, parts lanceolate to oblong, +- fused at base, cream to +- green; filaments thick; pistil +- 3.5 cm. *Fruit*: capsule, spreading to erect in age, 6--8.5 cm, ellipsoid, dry, spongy, or leathery in youth. (Hess 2012).

Among the numerous natural history accounts of the Joshua tree, Gucker (2006), prepared for the U.S. Forest Service and readily available online,[5] is among the most comprehensive. The following is largely adapted from Gucker (2006).

---

designation [two species] is not yet certain, and here, we conservatively refer to the two morphotypes as subspecies."

[3] As discussed *infra*, while the taxonomic and other life history discussions in USFWS (2018) represent a comprehensive summary of the available science, the threats analysis in the document is highly problematic and shows some evidence of political interference driving its ultimate conclusions.

[4] Because the bulk the scientific literature cited in this petition treats Joshua trees as a single species without distinction between *Y. brevifolia* and *Y. jaegeriana*, this petition generally refers just to the "Joshua tree," highlighting difference between the two taxa where appropriate.

The Joshua tree is a 5 to 20 meters tall, evergreen, tree-like plant. Trees exceeding 10 meters are rare. Tree size and growth form vary with site and climate conditions, as well as between the two species. *Y. brevifolia* typically have one main stout stem or trunk that measures 0.3 to 1 meter in diameter and have an expanded base. *Y. jaegeriana* typically have multiple stems. Trunks are fibrous, and the bark or periderm is soft and cork like. Bark plates measure 7.5 to 15 cm long and 2.5 to 5 cm in thickness. (Gucker 2006).

Figure 1. Western Joshua tree (*Yucca brevifolia*) and Easter Joshua tree (*Yucca jaegeriana*).

Older plants generally have extensive branching. Young trees typically lack branches and are covered with persistent reflexed leaves. Trees normally reach 1 to 3 meters tall before branching. Branches are 2 to 5 meters and fork at 0.5 to 1-meter intervals. Inner branches are typically erect, and outer branches can be horizontal or drooping. (Gucker 2006).

Leaves are clustered in rosettes at the branch ends. Clusters are commonly 0.3 to1.5 meters long and 0.3 to 0.5 meters in diameter. Leaves are linear, needle shaped and measure 15 to 35 cm long by 0.7 to 1.5 cm wide, with enlarged bases attaching them to the branch. Leaf shape is slightly triangular and leaf margins are lined with small teeth. Spines measuring 7 to 12 mm occur at the leaf tips. Leaf clusters are longer (1-1.5 meters) on juvenile plants than on mature plants (0.3-1 meters). Outer leaf layers are thick and waxy to reduce water loss. Dead leaves are persistent and fold down, covering the branches and coating the trunks of young trees. (Gucker 2006).

Joshua tree flowers occur in dense, heavy panicles that measure 20 to 40 cm long. Individual flowers are round to egg shaped and measure 2.5 to 5 cm wide. Flowers have a musky scent, with the early botanist Trelease (1893) describing the smell as "so oppressive as to render

[5] https://www.fs.fed.us/database/feis/plants/tree/yucbre/all.html

the flowers intolerable in a room." Fruits are indehiscent capsules, which become spongy and dry with age. Egg-shaped capsules are 6 to 10 cm long and approximately 5 cm in diameter. Fruits develop at the base of the inflorescence while the upper portion is still in flower. Mature fruits contain 30 to 50 black seeds, which are flat to thickened with smooth to undulate surfaces. Seeds are 7 to 11 mm long. (Gucker 2006).

Figure 2. *Yucca brevifolia* fruit and seeds.

The two species of Joshua trees are morphologically distinguishable. *Y. jaegeriana* is sometimes referred to as dwarf Joshua tree as it is often smaller (3-6 meters tall), with shorter leaves (<22 cm) and shorter branches (0.7-1 meter) compared to *Y. brevifolia*. *Y. brevifolia* is less stocky, often 5 to 12 meters tall, with longer leaves (19-37 cm) and higher branches (2-3 meters above ground) compared to *Y. jaegeriana*. *Y. jaegeriana* displays true dichotomous branching while *Y. brevifolia* is not truly dichotomous. (Gucker 2006).

Lenz (2007) described the vegetative differences between the two species as follows:

> *Yucca brevifolia* s.s. is arborescent with a distinct trunk and, usually, stout branches; *Y. jaegeriana* is generally smaller and branched from near the base, the branches somewhat slender. The two possess dissimilar patterns of branching, *Y. brevifolia* having pseudodichotomous (monopodial) branching; *Y. jaegeriana,* until flowering, has true dichotomous branching. The species differ in leaf length; *Y. brevifolia* having leaves 15–35 cm long, those of *Y. jaegeriana* 10–20 cm. Leaf length is variable, depending at least in part on environmental conditions. (internal citations omitted)

Additionally, Lenz (2007) noted the differences in flower morphology between *Y. brevifolia* and *Y. jaegeriana*:

> Flowers of *Y. brevifolia* are nearly globular or depressed globular, the broadly ovate, fleshy, cream-colored perianth segments are strongly incurved, and the flowers never fully expand. Flowers of *Y. jaegeriana* are narrowly campanulate, conspicuously swollen at the base, somewhat constricted above, and the narrowly oblong perianth

segments are usually greenish, and recurved at their tips. The ovaries of *Y. brevifolia* are conical and taper from the base; those of *Y. jaegeriana* are lance-ovoid. Fruits of *Y. brevifolia* are ovoid to broadly ovoid; those of *Y. jaegeriana* are ellipsoid.

Figure 3: Flowers of *Y. brevifolia* (L) and *Y. jaegeriana* (R) above a 6" ruler. Source: Lenz 2007.

Studies on flower morphology in the context of pollination have concluded that the statistically greatest discernable difference between *Y. brevifolia* and *Y. jaegeriana* is in the length of the stylar canal—the path through which the female yucca moth inserts her ovipositor when laying eggs (Godsoe et al. 2008; Starr et al. 2013).

According to Warren et al. (2016), flower panicles grow primarily at the tips of branches that are oriented to the south, and when on branches that are not oriented in a southerly direction, the flower panicles themselves tend to bend or tilt toward the south. Such orientation may provide energetic and/or pollinator benefits (Warren et al. 2016).

2.3 Reproduction and Growth

Joshua trees reproduce both sexually and asexually, although patterns of sexual and clonal reproduction have not been thoroughly investigated (Sweet et al. 2019).

2.3.1 Asexual reproduction

Asexual reproduction is by rhizomes, branch sprouts, and/or basal sprouts. Rhizome production and clonal growth can be triggered by stem damage as well as certain environmental conditions. Dormant buds beneath the periderm may grow when older stems are bent or injured. Joshua trees with extensive rhizome growth and clonal form are typically shorter and have less branching than single-stemmed trees. In some cases, basal buds do not develop into distinct rhizomes, and stems grow adjacent to the main stem as sprouts. (Gucker 2006).

Some Joshua tree populations are largely if not entirely clonal, including in the Liebre Mountains and along the southern and western slopes of the Tehachapi Mountains. In these areas Joshua trees can occur in clumps nearly 30 feet (8 m) in diameter, with 30 to 40 trunk-like stems. A single clone in Gorman Creek was determined to occupy approximately one acre (0.4 ha) and was comprised of several hundred stems (Gucker 2006). Joshua trees with this growth form were previously classified as *Y. b.* var. *herbertii* (Webber 1953)(Figure 4) but are now known to be a clonal form of *Y. brevifolia* (ITIS 2019).

Figure 4: Type specimen of *Y. b.* var. *herbertii* in western Antelope Valley in 1946. Source: Webber (1953)

The extent of cloning apparently increases with increased elevation, with Joshua trees in low-elevation dry areas rarely forming more than 1 or 2 stems, but 2 to 3 stems are common, and some clumps are found, in higher, moister areas. A mix of temperature, high winds and abundant snowfall, as well as fire, may be the causal mechanisms of higher levels of Joshua tree cloning. (Gucker 2006). In a study following a large fire in Joshua Tree National Park in 1999, DeFalco et al. (2010) found that 33% of plants that were censused in burned areas sprouted from the root crown or stem after the fire compared with 15% in unburned areas. Recently, Harrower and Gilbert (2018) found enhanced clonality and lack of seedling recruitment on the lower elevation margins of the Joshua tree range in addition to the previously reported prevalence of cloning at higher elevation sites.

2.3.2 Sexual reproduction

Sexual reproduction of Joshua trees is by seed production. As described above, bisexual flowers occur in dense, heavy panicles that measure 20 to 40 cm long. Individual flowers are

round to egg shaped and measure 2.5 to 5 cm by 1to 2 cm wide.

Esque et al. (2015) noted that while flowering has been observed in Joshua trees as small as 1 meter in some areas, trees that were over 30-years old at their study site had yet to flower. Flowering is considered episodic and rare, generally occurring only in wetter years (Gucker 2006). Reports differ on timing of flowering, with, for instance, Hess (2012) indicating April and May, Waitman et al. (2012) stating February through March, and Harrower and Gilbert (2018) indicating between February and April. Recently, Cornett (2018) reported an apparently unprecedented flowering event in November, following heavy October rains and warmer than usual temperatures immediately thereafter.

Irrespective of timing, Joshua tree flowers require insect pollination to produce seeds.

Pollination and seed production

Joshua tree, as with almost all yuccas, have an obligate pollination mutualism with yucca moths (Lepidoptera, Prodoxidae). Female moths carry pollen to Joshua tree flowers in specialized mouthparts, inject eggs into the floral ovaries using a bladelike ovipositor, and then actively apply pollen to the stigmatic surface to fertilize the flower. As a Joshua tree flower develops into a fruit, the moth eggs hatch and the emerging larvae eat a portion of the developing seeds. The moths are the sole pollinators of Joshua trees, and in turn, the Joshua tree seeds are the only food source for the moths (Pellmyr and Segraves 2003; Yoder et al. 2013).

Joshua trees are now known to be pollinated by two species of moth, *Tegeticula synthetica* and *T. antithetica*, the latter only described in 2003 by Pellmyr and Seagraves. Outside of the narrow region in Nevada where *Y. brevifolia* and *Y. jaegeriana* are sympatric and hybridize, *T. synthetica* is the sole pollinator of *Y. brevifolia* and *T. antithetica* is the sole pollinator of *Y. jaegeriana*. While *T. synthetica* is about 30% larger than *T. antithetica*, the apparently more important difference in the two moths is the size of their ovipositors, with the difference in length of each matching the difference in the length of the stylar canal of their respective host plants, with the ovipositor of the western moth (*T. synthetica*) being about 50% larger than that of the eastern species (*T. antithetica*) (Pellmyr and Segraves 2003; Godsoe et al. 2008).[6]

The parallel differences between stylar canal length and ovipositor length between the two species of moths and two types of Joshua tree suggest that selection exerted by their pollinators is the best explanation for the morphological divergence of the trees. Since the female moth's ovipositor must be long enough to reach the ovules but not so long as to injure them, coevolution acting upon moth and tree should favor matching between the length of the moth's ovipositor and the flower's stylar canal (Godsoe et al. 2008; Yoder et al. 2013; Cole et al. 2017). Using molecular clock techniques, Pellmyr and Segraves (2003) concluded that the two moths diverged approximately 10 million years ago, while Smith et al. (2008) later determined that the split between the moth species likely occurred 1.14 million years ago.

[6] In addition to the pollinating *Tegeticula* moths, bogus yucca moths of the sister genus *Prodoxus* also lay their eggs in Joshua tree flowers. Adult Prodoxus lack the specialized mouthparts used for pollination and the larvae feed on plant tissues other than seeds (Althoff et al. 2004).

Studies in Tikaboo Valley in Nevada where both the two moth species and the two types of Joshua trees are sympatric demonstrate that *T. antithetica* can successfully fertilize *Y. brevifolia* and reproduce in their fruits, but *T. synthetica* do not successfully rear larvae on *Y. jaegeriana* (Smith et al. 2009; Starr et al. 2013; Yoder et al. 2013). Consequently, gene flow is largely unidirectional, with flow from *Y. jaegeriana* into *Y. brevifolia* but not from *Y. brevifolia* into *Y. jaegeriana* (Starr et al. 2013).

Once pollinated, fruits form in early summer and seeds are mature in mid-summer (Waitman et al. 2012). Fruits are indehiscent capsules, which become spongy and dry with age. Egg-shaped capsules are 6 to 10 cm long and approximately 5 cm in diameter. Fruits develop at the base of the inflorescence while the upper portion is still in flower. Mature fruits contain 30 to 50 black seeds, which are flat to thickened with smooth to undulate surfaces. Seeds are 7 to 11 mm long. (Gucker 2006).

Seed predation and dispersal

While *Tegeticula* moths are necessary for pollination, their larvae are the first predators that Joshua tree seeds experience. In one study, the range of larvae per fruit was 0 to 6, with an average of 1.4. These larvae consumed or damaged 7% of seeds (Keeley et al. 1985). Borchert and DeFalco (2016) found much higher levels of larvae predation, with 19.5% damaged in a year of widespread fruiting and 42.8% damaged in a subsequent year of reduced flowering and fruiting. Seed production was more than 100 times greater in the first year of the study, leading the authors to speculate that Joshua trees may be a masting species.

Just as a portion of a Joshua tree's seed production goes to its pollinator, a large percentage of its seed production goes to its primary dispersers, various scatter-hoarding rodents. Among the current consumers (and likely dispersers) of Joshua tree seeds in California are the white-tailed antelope squirrel (*Ammospermophilus leucurus*), Mojave ground squirrel (*Xerospermophilus mohavensis*) and California ground squirrel (*Otospermophilus beecheyi*), all of which are known to climb Joshua trees to remove the fruits for later consumption and/or to eat through the desiccated fruits in situ to reach the seeds (Lenz 2001). Once fruits are on the ground, numerous other species will dismantle the fruits and eat and/or cache the seeds, including the round-tailed ground squirrel (*Xerospermophilus tereticaudus*), rock squirrel (*Otospermophilus variegatus*), Merriam's kangaroo rats (*Dipodymus merriami*), canyon mice (*Peromyscus crinitus*) and woodrats (*Neotoma sp*.) (Lenz 2001; Vander Wall et al. 2006; Waitman et al. 2012; Borchert and DeFalco 2016). Among these species, the white-tailed antelope squirrel and Merriam's kangaroo rats have been identified as the most frequent agents of seed removal and caching (Waitman et al. 2012; Borchert and DeFalco 2016).

Studies by Vander Wall et al. (2006), Waitman et al. (2012) and Borchert and DeFalco (2016) have all highlighted the importance of seed dispersal by scatter-hoarding rodents. In the study by Vander Wall et al. (2006), more than 99% of tracked seeds were removed by rodents from placement below Joshua trees, with 84% found in rodent caches at a mean maximum distance of 30 meters. Subsequent surveys found 46% of caches intact, 51% of caches missing entirely, a handful of caches largely empty but with a few remnant seeds below ground and

numerous new secondary caches established. Over the subsequent months, rodents ate most of the cached seeds. Ultimately, well under 1% of cached seeds were documented as eventually germinating from identified caches the following spring. Nevertheless, Vander Wall et al. (2006) concluded that "the dismantling of yucca pods by rodents is very important because there is no other known mechanism for Joshua tree seeds to exit the indehiscent seed pods," and "that seeds that are not harvested by seed-caching rodents probably have no chance of establishing a seedling."

While a rodent eats the vast majority of the seeds it removes from a Joshua tree fruit, it also acts as the primary seed disperser, moving seeds upwards of 50 meters from the source tree (Vander Wall et al. 2006; Waitman et al. 2012; Borchert and DeFalco 2016). Waitman et al. (2012) concluded that rodents not only disperse seeds, but also, via the act of caching them, increase the likelihood of germination as seeds that have been buried in soil have a much greater chance of establishing seedlings than those left on the soil surface. Consequently, the Joshua tree's relationship with the predating rodent, which liberates its seeds from an otherwise inescapable pod, disperses them, and caches many where they have a higher chance of germination, may, as with the pollinating moth, be one of obligate mutualism (Vander Wall et al. 2006; Waitman et al. 2012).[7]

Waitman et al. (2012) also noted the limitations of the mutualistic relationship between Joshua trees and rodents, as it requires sufficient seed production such that the caching rodent collects more seeds than it can eat: "Small seed crop size along with an overabundance of rodents may shift this interaction from mutualism toward seed predation by rodents." Given seed production is apparently greatest in wetter years, in drought years virtually all seeds may be consumed by rodents, resulting in no seedlings being produced that year.

While almost all authors recognize the current importance of rodent seed dispersal, several have hypothesized that the large effort in fruit production by Joshua trees without a specialized dispersal agent may indicate that current fruit production is an evolutionarily relict designed to attract a now extinct megaherbivore dispersal agent, with Cole et al. (2011) identifying ground sloths and Lenz (2001) suggesting Columbian mammoths. Cole et al. (2011) note that evidence supports "the concept that the species' current mobility is constrained by the earlier extinction of the Shasta ground sloth and other possible seed vector(s)." However, Waitman et al. (2012) discount the role of the sloths in seed dispersal and conclude that "seed-caching rodents are responsible for seed dispersal today, and we suspect that they were an important, if not the sole, means of dispersal in the past."

Additionally, several authors have identified wind as an important seed dispersal agent (*e.g.* Lenz 2001, citing earlier accounts), with Gucker (2006) noting that as fruits become overmature, skins crack and moisture is released, making fruits lighter and more easily wind dispersed, and that finding clumps of 2 or more seedlings is likely evidence that the dried fruits

[7] However, unlike the Joshua tree's relationship with *Tegeticula* moths, where both tree and moth absolutely need each other to successfully reproduce, the tree's relationship with the rodent is more one-sided; the Joshua tree may be dependent upon the rodent to disperse its seeds, but the rodent – while certainly benefiting from the tree's seeds – can generally subsist on other food sources in its absence.

were wind dispersed. The largest known modern dispersal distances for Joshua trees of 151 meters in the Antelope Valley and 251 meters in Lanfair Valley were recorded by Lenz (2001) and ascribed to wind. However, Waitman et al. (2012), based upon wind tunnel tests of fruits and seeds, discount wind dispersal of seeds as playing a significant role for Joshua tree reproduction.

As further discussed *infra*, whether by wind or rodents, seed dispersal of Joshua trees is generally considered quite limited, likely constraining the ability of the species to extend it range in response to changing conditions (Lenz 2001; Cole et al. 2011).

Germination and growth

In laboratory conditions, Joshua tree seeds germinate readily and do not require any pretreatment (Gucker 2006). Waitman et al. (2012) had germination rates of 99% on freshly harvested seeds, while other experiments had germination rates of 98% and 72% after 6 months and 1.5 years of storage, respectively (Gucker 2006).

Longevity of viable seeds in the soil seed bank is limited. Waitman et al. (2012) reported that "a small fraction of seeds" emerged the year following their experiment, indicating that in some circumstances viability is at least two years. Reynolds et al. (2012) observed that seeds in the ground "rapidly lost germinability through time. Longevity of seeds in the soil declined by about 50% per year, which indicates that *Y. brevifolia* has little capacity for seed dormancy." Borchert and DeFalco (2016) noted that in most years when fruit production is enough to satiate predation by larvae and rodents, uneaten fruits may remain on the tree and "may function as a viable aerial seed bank well after fruit maturation," since seed germinability is likely longer in an intact fruit than in the soil.

Notwithstanding very high laboratory germination rates, seedling production in the field is extremely low. Of the 1000 seeds tracked by Vander Wall et al. (2006), 836 were cached by rodents, but only three of these were documented to ultimately produce seedlings. Of seeds planted in artificial caches in enclosures that precluded rodent harvest, only 14.8% germinated (Vander Wall et al. 2006). In another enclosure study, Waitman et al. (2012) reported only 3.2% of cached seeds produced seedlings in the field, while 36% of pots in an artificial growing chamber produced seedlings. Buried seeds, both in the field and laboratory, were most likely to produce emergent seedlings when 1 to 3 cm deep, depths similar to the caches rodents were observed making (Waitman et al. 2012). Both Vander Wall et al. (2006) and Waitman et al. (2012) reported higher seedling emergence rates from caches under shrub cover. However, both studies also found that rodents cache seeds without regard to shrub cover.

Reynolds et al. (2012) described the climate conditions supporting emergence and postulated that "there are fewer opportunities of emergence in the far western Mojave Desert, and under the current climate regime *Y. brevifolia* in that area may be most vulnerable to demographic change resulting from low and infrequent recruitment and may already have occurred." Subsequent studies (*e.g.* Sweet et al. 2019) have demonstrated that this demographic change due to low recruitment is already underway.

Once a seedling emerges, it faces a long, arduous path to adulthood, with high mortality

until it exceeds 25 cm in height (Esque et al. 2015). Survival of seedlings requires periods of cool temperatures, little to no herbivory, summer rain, and some amount of yearly precipitation over a period of several years (USFWS 2018).

Growth rates are dependent on factors ranging from age, precipitation, presence of nurse plants, temperature and (at least in labs) photoperiod (Gucker 2006). Over the years various studies have indicated differing rates of growth. In one study in Joshua Tree National Park, unbranched seedlings grew at an average rate of 7.6 cm/year for the first 10 years and an average of 3.8 cm/year thereafter, with other studies showing annual growth rates of was 5.9 cm/year and 11.7 cm/year (Gucker 2006). More recently, Esque et al. (2015) measured a long-term mean annual growth rate of 3.12 ± 1.96 cm over 22 years and noted that long-term growth rates in other contemporaneous studies elsewhere in the Mojave were comparable.

Lab studies suggest that cold periods are required for optimal seedling growth, as 3-year old seedlings kept at 4 °C for 2 months produced twice as many new leaves after the cold treatment as seedlings without the cold treatment. Other lab experiments suggest that day length affects the growth of seedlings, with seedlings exposed to 10 hours of daylight producing the longest and most leaves, while seedlings grown in 16 hours of daylight produced the shortest and fewest leaves (Gucker 2006).

Perhaps the most important factor in seedling survival and growth is the presence of nurse plants. Several studies have found successful seedling emergence tied to shrub cover (Bittingham and Walker 2000; Vander Wall et al. 2006; Waitman et al. 2012), with blackbrush (*Coleogyne ramississima*) generally noted as the most important nurse plant. The benefits of a shrub canopy for a young Joshua tree include increased soil moisture, decreased insolation, reduced soil temperatures, decreased evapotranspiration, increased nutrients, decreased herbivory, and/or lower wind desiccation (Bittingham and Walker 2000; Gucker 2006).

Figure 5: Young Joshua tree emerging from nurse plant.

Once established, a Joshua tree is relatively long-lived. However, aging a Joshua tree or determining maximum lifespan is difficult as the plants lack annual growth rings. While one early report of a 20-meter tall Joshua tree estimated the plant to be 1000 years old (Little 1950), most early studies postulated that large trees can be 300 years old with an average life span of 150 years (Gucker 2006). More recent studies based on growth rate and long-term monitoring have reached similar conclusions. Gilliland et al. (2006), based upon growth rates generated from a 14-year census of a Joshua tree woodland, estimated that the oldest tree was 321 years, with mean age of trees of 62.2 years. Estimates based on observed patterns of survivorship produced similar results, with a median life expectancy of 89 years, with 5% of the population projected to reach 383 years. Esque et al. (2015) estimated a generation time of 50-70 years based on data collected during a 22-year study.

Summing up reproduction and recruitment by Joshua trees, Esque et al. (2015) highlighted the challenges Joshua trees face:

> [R]ecruitment of *Y. brevifolia* requires a convergence of events, including fertilization by unique pollinators, seed dispersal and caching by rodents, and seedling emergence from a transient seed bank triggered by isolated late-summer rainfall. Alignment of these convergent events likely results in successful establishment of new seedlings only a few times in a century. (internal citations omitted)

As further discussed *infra*, the Joshua tree's recruitment challenges make the species particularly vulnerable to climate change.

2.4 Habitat Requirements

Joshua trees occur in desert grasslands and shrublands in hot, dry sites on flats, mesas, bajadas, and gentle slopes in the Mojave Desert (Gucker 2006). Soils in Joshua tree habitats are silts, loams, and/or sands and variously described as fine, loose, well drained, and/or gravelly, while the plants can reportedly tolerate alkaline and saline soils (Gucker 2006). Cole et al. (2011) characterizes populations as discontinuous and reaching their highest density on the well-drained sandy to gravelly alluvial fans adjacent to desert mountain ranges.

Lenz (2001) reports that plants tolerate temperatures of -25°C to 51°C and annual precipitation ranges of 98 to 268 mm. According to USFWS (2018), the temperature range for western Joshua trees ranges from a low of -8.1°C to a mean summer high of 37.2°C and the species occurs in areas averaging more than 82 mm of rainfall and less than 738 mm of rainfall per year. Went (1957), based on field observations and laboratory experiments, noted that non-juvenile Joshua trees required annual exposure to low temperatures for optimal growth. Turner (1982) postulated that such a need for cold winter temperatures may explain why Joshua trees are largely limited to the higher and cooler periphery of the Mojave.

Temperature and precipitation are likely the prime constraints on the species, with Cole et al. (2011) noting that "the northern portion of Joshua tree's range is spatially limited by extreme winter cold events, but at lower elevations it is limited by extreme high temperature events in

summer or winter. Mean precipitation patterns primarily limit the range from the east and west, as well as above and below its elevational range during various portions of the year. Low late-spring (April and May) precipitation seems to prevent Joshua tree from growing in lower elevation portions of the Mojave Desert." Temperature and precipitation requirements are further discussed *infra* with regard to climate impacts on the species.

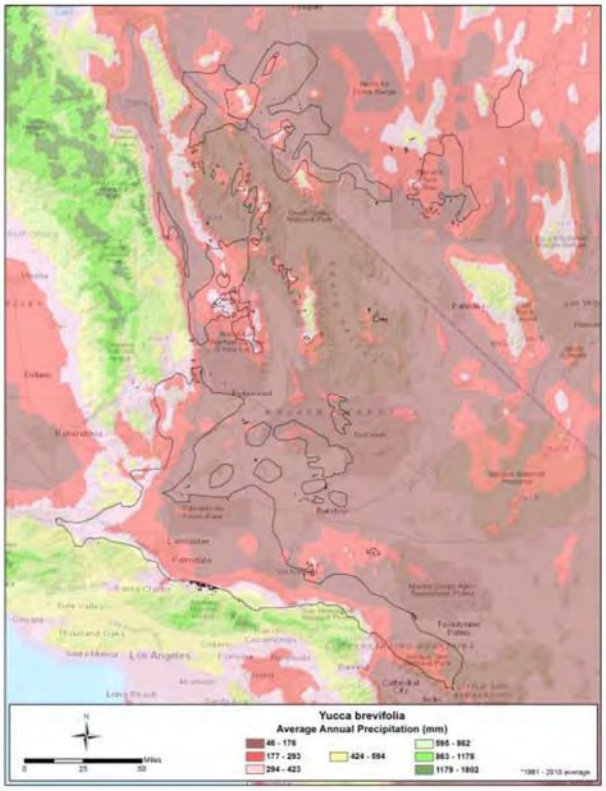


Figure 6. Average annual precipitation in range of *Y. brevifolia* (USFWS 2018).

The reported upper and lower elevation limits of Joshua trees vary significantly in the published literature (Gucker 2006). The recent Species Status Assessment by USFWS (2018) is based upon a comprehensive review of distribution records and describes the elevational range for *Y. brevifolia* as 750 meters (2461 ft) up to 2200 meters (7218 ft), and between 600 meters (1969 ft) and 2000 meters (6500 ft) for *Y. jaegeriana*.

Joshua trees are not restricted to any one desert scrub or xeric woodland community and can be found in many different plant alliances throughout their range (Turner 1982). For example, within Joshua Tree National Park, Harrower and Gilbert (2018) characterized their study area of Joshua trees as encompassing four broad eco-regional vegetation types: Sonoran–Colorado Desert scrub, Mojave–Sonoran creosote bush scrubland, Mojave mid-elevation desert, and pinyon–juniper woodland.

While Joshua tree habitat may not be limited by particular plant associations, as discussed *supra*, for successful reproduction and recruitment, Joshua trees require the presence of their obligate pollinator, rodents to disperse and cache seeds and nurse plants to shelter emerging seedlings.

3 Current and Historical Distribution

The current range of Joshua trees (both species)[8] extends from northwestern Arizona to southwestern Utah west to southern Nevada and southeastern California at elevations between 600 and 2200 meters of elevation and between 34° to 38° latitude (USFWS 2018). The current range of the Joshua tree is but a small fraction of its range during the late Pleistocene.

Plant material from Shasta ground sloth dung and packrat middens indicates that during the Pleistocene the Joshua tree had a much larger southern distribution extending well into the Sonoran Desert, where it range may have encompassed La Paz, Maricopa, Pinal, Yuma, and Pima counties in Arizona; Imperial and Riverside counties in California; mainland Mexico; and northern Baja California, Mexico (Cole et al. 2011) (Figure 7).

Figure 7: Current and Pleistocene range of the Joshua tree. Source: USFWS (2018), based on Cole et al. (2011).

The Joshua tree's historical range contracted northward along the southern edge of its range as climates warmed at the start of the Holocene. As noted by Cole et al. (2011), this contraction was not matched by northward expansion:

> Although the rapidly warming climate of the early Holocene would seem to have opened up vast new areas of potential range to the north, the fossil record does not record any significant northward expansion over the last 11,700 years.

[8] Because the split of Joshua trees into two species has only recently been recognized, much of the literature describing their past and present range does not explicitly distinguish between the two. The current range of *Y. brevifolia* is readily discernable from that of *Y. jaegeriana* and is described *infra*. However, while the historic range of Joshua trees is broadly known from subfossil records, the portion of that range that is ascribable to each species has yet to be determined.

Cole et al. (2011) ascribed the lack of northward expansion to the Joshua tree's extremely limited dispersal ability, potentially a result of the extinction of the Shasta ground sloth which may have been a primary seed disperser for the species.

Since the end of the Pleistocene, the Joshua tree's distribution has been remarkably stable throughout the Holocene into the present day (Cole et al. 2011; Holmgren et al. 2010).

There are currently five regional populations of Joshua trees distributed across the Mojave, southern Great Basin, and western Sonoran Deserts, with the vast majority of trees occurring within the Mojave.[9] Of the five populations, two are of *Y. brevifolia* and three of *Y. jaegeriana*, with a sixth small hybrid population in Tikaboo Valley, Nevada. One of the *Y. brevifolia* populations is entirely in California (YUBR South in Figure 8), while the other is shared with Nevada (YUBR North in Figure 8). Only one of the three *Y. jaegeriana* populations occurs in California (primarily in the Mojave National Preserve), and this population is shared with Nevada and Arizona (YUJA Central in Figure 8) (USFWS 2018).

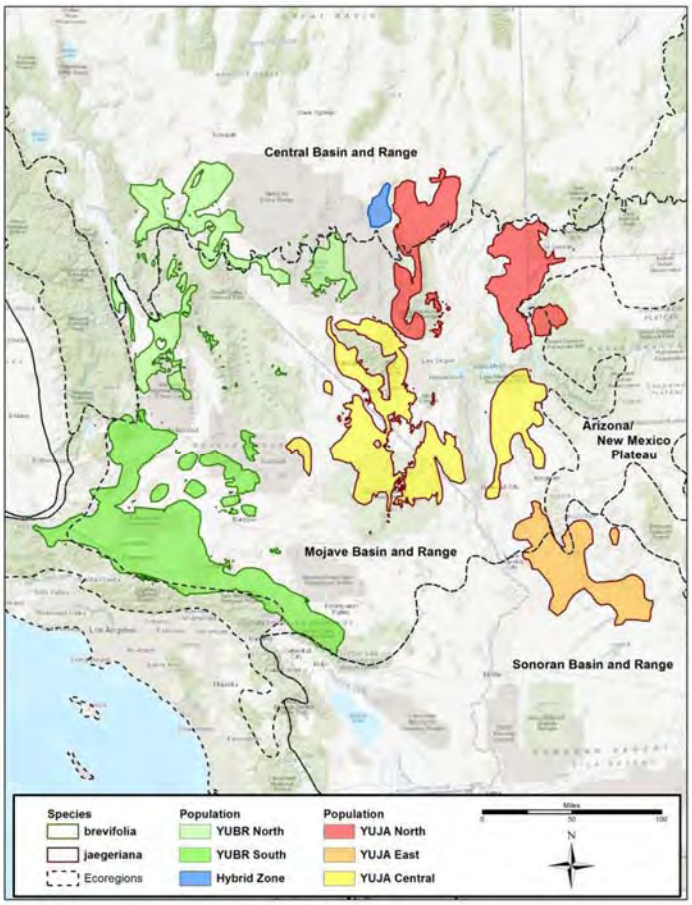


Figure 8. Current Joshua tree distribution. Source: USFWS 2018.

[9] While numerous published studies have characterized the range of Joshua trees, USFWS (2018) is the most complete synthesis of range data; consequently, petitioners cite primary to that document in this section.

Y. brevifolia occurs almost exclusively in the Mojave Desert in unevenly distributed populations. A small portion of its northern extent occurs within the Great Basin Desert (Figure 8). The primary distinguishing feature of these two desert regions is the presence of creosote bush in the Mojave Desert and Sagebrush steppe in the Great Basin. The southern extent of *Y. brevifolia's* range is in the Little San Bernardino Mountains of Joshua Tree National Park. The northern extent of its range is near Alkali, Nevada. The western extent is near the Hungry Valley State Vehicular Recreation Area near Gorman, California. The eastern extent of its range is in Tikaboo Valley, Nevada, where it co-occurs with *Y. jaegeriana* (USFWS 2018).

USFWS (2018), treats *Y. brevifolia* as comprised of two geographically separate populations, (YUBR) South and YUBR North.[10] YUBR South is entirely within California. This population occurs within the area stretching from Joshua Tree National Park, north to Ridgecrest and Red Mountain. This area is comprised of alluvial plains, fans, and bajadas of the major valleys lying between scattered mountain ranges. On the southern and western edge of the population boundary, *Y. brevifolia* occurs in transitional areas characterized by higher elevations and more rainfall with semi-desert montane chaparral to pinyon-California juniper woodlands. There is some variation in vegetation from north to south, but the basins typically are dominated by creosote bush (*Larrea tridentate*) and white bursage (*Ambrosia dumosa*) and the higher elevations are characterized by junipers and pinyons (USFWS 2018).

In the YUBR South range, average annual rainfall varies between 82.4 mm and 738.1 mm and minimum temperatures range from -5.7°C at the upper elevational limit (2200 meters) to 4.8°C at the lower elevational limit (750 meters). Mean summer high temperature are between 23.4–37.2°C. Less than 10 percent of annual precipitation occurs in summer in most areas occupied by *Yucca brevifolia* (USFWS 2018).

The geographic area in which YUBR South is situated is comprised of 3.7 million acres, with just over 50% in private ownership, 48% federally owned, and just under 2% state, county and local owned (USFWS 2018). USFWS (2018) estimates that 3,255,088 acres of this area was suitable for Joshua trees based on soils and other habitat factors.[11] However, Joshua tree do not occupy the entirety of this area, as they can have a patchy and disjunct distribution. Notably, the Bureau of Land Management's (BLM's) calculation of Joshua tree woodland on lands under its jurisdiction is substantially less than this larger area estimated by USFWS (2018). USFWS (2018) mapped 841,220 acres within the area of YUBR South as on BLM lands. BLM (2006) itself calculated that only 3275 acres of "Joshua tree woodland" occur on its lands in the West Mojave Plan (WEMO) area, which includes all of YUBR South. While this extreme difference between the two estimates is partly attributable to Joshua trees occurring in other plant community types that occupy much larger areas (e.g. "blackbrush scrub" and "creosote bush scrub"), it does highlight that areas of dense concentrations of Joshua trees occupy a relatively small fraction of the larger mapped areas.

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[10] As discussed *infra*, each of these populations may constitute an evolutionarily significant unit (ESU).

[11] A peer reviewer of USFWS (2018) pointed out that "the potential distribution of Joshua tree under current climate conditions is vastly overestimated" (Smith 2018). This is discussed in greater detail in the section of the federal ESA listing decision, *infra*.

Additionally, the cities of Palmdale, Lancaster, Hesperia, Victorville, and Yucca Valley, as well as numerous smaller communities are within the mapped YUBR South area. While *Y. brevifolia* currently persists in the less-developed areas of these communities, it is absent from the more developed areas as well as the agricultural lands in the region. The Antelope Valley, where the largest of these cities are situated, is the area where the greatest habitat loss of *Y. brevifolia* has already occurred.

The YUBR North population occurs in the area north of Inyokern, along the west and north margins of Death Valley, to Goldfield, Nevada, and east to the Nevada Test Site. In contrast to the mostly creosote bush shrubland of the lower elevations in YUBR South, the vegetation of this higher and cooler zone includes single-leaf pinyon, juniper, and sagebrush. The elevation range of the species in this population is between 1500 and 2200 meters. Average annual rainfall varies between 95.8 mm and 429 mm, minimum temperatures range from -8.1 to 3.6°C, mean summer temperatures range between 20.4 and 36.3°C, and summer precipitation comprises up to a quarter of the mean annual precipitation (USFWS 2018).

In contrast to the area of YUBR South, which is majority private land, the area of YUBR North is overwhelmingly (96%) federal land (USFWS 2018). The approximately 2 million acres comprising the YUBR North area is about evenly split between California and Nevada. USFWS (2018) estimates that almost all of this area (1,941,701 acres) is suitable for Joshua trees.

4 Abundance and Population Trends

Due to the species' patchy distribution within its range, highly variable population density (4 to 840 trees per acre) and lack of range-wide population surveys, a reliable estimate of Joshua tree population size is not available (USFWS 2018). Similarly, no range-wide population trends have been documented. However, recent studies carried out in portions of the species' range indicate that density is negatively correlated with increasing temperature, the species range is contracting at lower elevations, recruitment is limited, and mortality is increasing, all of which would likely reflect a population already starting to decline.

DeFalco et al. (2010), in a study in Joshua Tree National Park, found that recent drought and fire had resulted in significant mortality of *Y. brevifolia* in the park. Five years after a fire, 80% of burned trees in the study area had died, with smaller trees (<1 m tall) dying more rapidly. But perhaps more surprising, DeFalco et al. (2010) found that unburned trees also had high mortality rates during the same study period (1999-2004), with 26% of unburned trees also dying. As with post-fire mortality, smaller trees died in the initial years of the drought with mid-size and larger trees showing effects in later years. Mortality was ascribed both to water stress itself, as well as herbivory by pocket gophers (*Thomomys bottae*), which likely turned to Joshua tree stems, roots and periderm as alternative food sources due to reduced herbaceous cover during the drought (DeFalco et al. 2010).

In a recent study, Harrower and Gilbert (2018) investigated various life-history parameters of Joshua trees in Joshua Tree National Park and found the "ratio of dead to living trees was greater at the lower elevations where the sites are warmer and drier than sites at higher elevation." Their results "suggest that the range of Joshua trees is contracting at the lower

elevations where there was no seedling recruitment and high tree mortality." Harrower and Gilbert (2018) also note that Joshua trees "do not seem to be moving successfully into higher elevations," potentially due to limitations on numbers of pollinating moths at these higher elevations. This finding is consistent with that of St. Clair and Hoines (2018) who found Joshua tree stand density negatively correlated with increasing temperature.

A series of small-scale studies in Joshua Tree National Park summarized in Cornett (2014) documented a 93% decline in Joshua tree abundance between 1990 and 2013 at one site, a 16% decline in Joshua tree numbers between 1988 and 2008 at second site, and a 73% decrease from 1990 through 2013 at a third site. Fire contributed to the decline at the third site, but even that site had declined by 18% prior to the fire. Cornett (2014) noted that declines at these three sites, which "represent a broad geographical sampling" of Joshua trees in the Park, and along with the documented mortality of some of the largest (and presumably oldest) trees in Park, "would seem to indicate *Yucca brevifolia* numbers are declining throughout the Park."

Regardless of whether Joshua tree abundance is already declining, it is virtually certain that abundance will decline in the foreseeable future. The impacts of climate change, fire, habitat loss and other sources of mortality are discussed further below.

5 Factors Affecting Ability to Survive and Reproduce

As discussed in the Life History sections *supra*, Joshua tree survival and reproductive success is tied to multiple factors, many of which are influenced by climate. Importantly, survival varies greatly by size class, with relatively high survival among adults, but very high mortality rates for seedlings and smaller individuals (DeFalco et al. 2010; Esque et al. 2015). As noted by Esque et al. (2015), because *Y. brevifolia* "is long lived the current distribution of reproductive adults may mask the effects of recent changes in climate on recruitment and survival of seedlings and juveniles, which are more sensitive to the vagaries of desert conditions." Consequently, while some impacts such as reduced recruitment may already be observable, impacts such as adult mortality and consequent population declines and range reductions may have a lag time before their presence is felt on the landscape (Svenning and Sandel 2013).

Among the factors affecting *Y. brevifolia's* ability to survive and reproduce are predation, invasive species, wildfire, drought, climate change and habitat loss due to development. These factors are often related, synergistic, and collectively threaten the continued viability of the species.

5.1 Predation

Predation plays an important role in Joshua tree survival at every life stage. Before a seed even leaves a fruit, *Tegeticula* moth larvae eat a portion of the seeds, with Keeley et al. (1985) observing 7% of seeds in a fruit consumed or damaged (Keeley et al. 1985). Borchert and DeFalco (2016) found much higher levels of larvae predation, with 19.5% damaged in a year of widespread fruiting and 42.8% damaged in a subsequent year of reduced flowering and fruiting. Rodents then cache and ultimately consume the vast majority of seeds, with fewer than 1% of

seeds germinating (Vander Wall et al. 2006; Waitman et al. 2012; Borchert and DeFalco 2016). In drought years, virtually all seeds may be consumed by rodents, resulting in no seedlings being produced that year (Waitman et al. 2012).

Cattle have been documented grazing on the inflorescences of small Joshua trees. Lybbert and St. Clair (2017) documented floral herbivory by cows on *Yucca brevifolia* less than 2 m tall consumed 40% of inflorescences on their study plot. However, since the majority of Joshua trees flower above that 2 m threshold, only 6% of inflorescences overall were consumed by cattle. The fact that *Yucca brevifolia* evolved into a taller tree form than other yuccas might be a vestige of a growth-escape strategy to escape herbivory from a now extinct species, such as the Shasta ground sloth (Cole et al. 2011; Lybbert and St. Clair 2017).[12]

Drought years and fire also result in increased herbivory on seedlings and pre-reproductive Joshua trees (DeFalco et al. 2010; Esque et al. 2015), as the reduced availability of herbaceous forage forces small herbivores to use alternative food sources, including *Y. brevifolia* stems and leaves (DeFalco et al. 2010; Esque et al. 2015). DeFalco et al. (2010) found widespread evidence of tissue damage to Joshua trees in burned areas (28% of plants) from pocket gophers (*Thomomys bottae*), with lessor levels (16%) evident in unburned areas. Such damage occurred predominantly in lower elevation sites. In most areas Joshua tree survival rates dropped with evidence of rodent damage, with the effects most pronounced in burned areas.

In a separate study, Esque et al. (2015) found that herbivory by black-tailed jackrabbits (*L. californicus*) resulted in 55% mortality of pre-reproductive *Y. brevifolia* <25 cm tall on their study site in a single drought year. In addition to jackrabbits, Esque et al. (2015) documented damage to pre-reproductive plants from pocket gophers, white-tailed antelope squirrels (*Ammospermophilus leucurus*), and woodrats (*Neotoma sp*.).

While predation alone is likely not presently a threat to Joshua tree persistence, it can result in zero reproductive success in one or a sequence of dry years, as well as high mortality levels to seedlings and small plants (<25 cm tall), and even adults. This effect is magnified in areas that burn. Burned trees are likely physiologically more vulnerable to herbivore damage, while the lack of other herbaceous plants deprives young Joshua trees of nurse plants which shield them from herbivory. Moreover, jackrabbits, pocket gophers and other herbivores lack alternative food sources and turn to Joshua tree stems, roots and periderms for sustenance following such events (DeFalco et al. 2010; Esque et al. 2015). As discussed *infra*, both wildfire and droughts are predicted to increase in frequency and intensity in the coming decades, likely rendering the impacts of seed predation and herbivory on stressed and shrinking populations of Joshua trees more significant.

[12] Notably, cattle grazing can have significant impacts on other yuccas, with Lybbert and St. Clair (2017) documenting complete reproductive failure of *Y. baccata* and consequent apparent local extirpation of that species' pollinating moths on their study plot due to high levels of herbivory on the species' flowers by cows. *Y. baccata* is notably shorter than *Y. brevifolia* with its flowers within easy reach of cattle. The Joshua tree's evolutionary adaptation to survive sloth herbivory may have pre-adapted it to better survive cattle grazing.

5.2 Invasive species

Invasive plant species are widely established in the Mojave Desert throughout the range of *Yucca brevifolia*. And while invasive species represent a relatively small percentage of the flora, they represent a huge percentage of the biomass. Brooks and Berry (2006) found that in a high rainfall year (1995) nonnative annual species comprised 6% of the flora and 66% of the annual biomass, with those numbers increasing to 27% and 91% respectively in a low rainfall year (1999). The grasses red brome (*Bromus rubens*) and *Schismus* spp., along with the forb redstem fillaree/stork's bill (*Erodium cicutarium*) comprised 99% of the alien biomass. More recently, Sahara mustard (*Brassica tournefortii*) has spread into the Mojave, including into Joshua tree woodland (Frakes 2017; Brooks et al. 2018).

Figure 9: Carpet of desiccated invasive *Schismus* spp. between *Y. brevifolia.*

The abundance and diversity of alien species in the Mojave is positively correlated with disturbance, including livestock grazing, off-highway/off-road vehicle (OHV or ORV) use, fire, urbanization, roads, and agriculture. As summarized by Brooks and Berry (2006):

> Alien annuals had high density, biomass, or cover near roads, in an area of OHV use compared to an area where OHV use was lower, in an area where both OHV use and grazing were present compared to an area where both disturbances had been excluded for at least 10 years, in two grazed areas compared with ungrazed areas, and in areas near livestock watering sites…. These studies indicate that species richness and biomass of alien annual plants are positively correlated with disturbance (internal citations omitted).

Invasive species are also aided by nitrogen deposition as a result of air pollution (Brooks 2003). As noted by Allen et al. (2009), the "western Mojave Desert is affected by air pollution generated in the Los Angeles air basin that moves inland with the predominant westerly winds.

The pollution contains both oxidized and reduced forms of nitrogen (N), which are of concern because they are deposited on soil and plant surfaces and thus fertilize plants" (internal citations omitted). Fertilization disproportionally benefits nonnative species leading to increased abundance and biomass of invasive species such as *Bromus rubens* and *Schismus* spp. (Brooks 2003; Allen et al. 2009; Allen et al. 2011; Bytnerowicz et al. 2016).

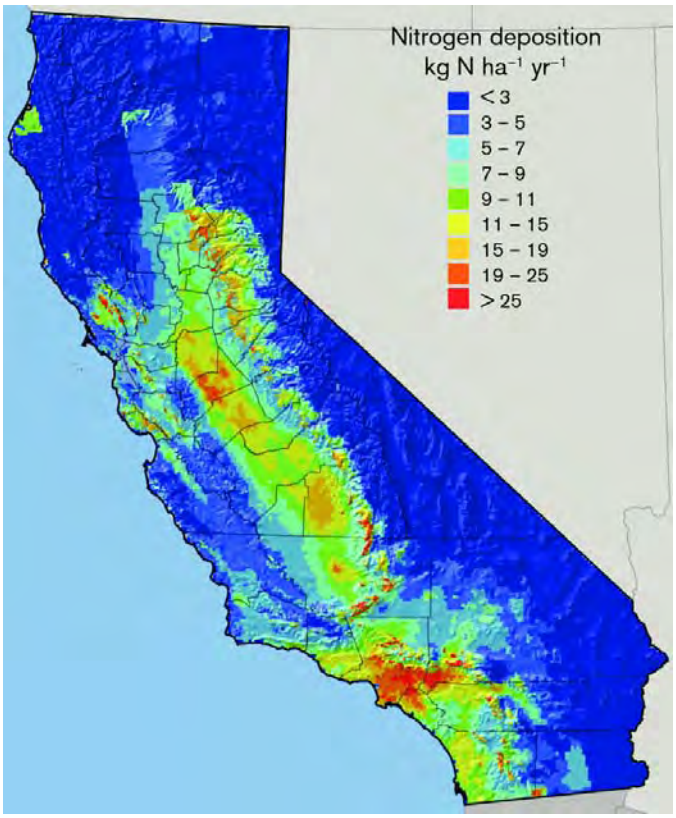

Figure 10: Map showing nitrogen deposition rates in California, with areas of high levels overlapping the range of YUBR South. Source: Bytnerowicz et al. 2016.

While the rapid spread of invasive species in the Mojave is resulting in competitive impacts on native annuals, and has also been demonstrated to have direct competitive impacts on native perennial species including creosote bush (*Larrea tridentata*) (DeFalco et al. 2007), direct competitive impacts of invasives on *Yucca brevifolia* have not been thoroughly studied. To the degree there is competition is would likely be most significant with emergent seedlings under nurse plants as this is the most vulnerable life stage of the Joshua tree (Reynolds et al. 2012).

The much bigger issue is that these invasive plants have altered fire dynamics, leading to larger and more frequent fires that are killing innumerable Joshua trees. As succinctly described by Barrows and Murphy-Mariscal (2012), "[m]ore frequent fires in the Mojave Desert are the result of the interaction of increased nitrogen deposition and the competitive advantage that nitrogen gives to invasive grasses such as red brome, *Bromus rubens*." Similarly, Pardo et al. (2011) highlighted the dire consequences for *Y. brevifolia*: "In Joshua Tree National Park in southern California, N deposition favors the production of sufficient invasive grass biomass to sustain fires that threaten the survival of the namesake species." As discussed below, the altered

fire regimes in the Mojave represent a significant threat to the Joshua tree at the individual and population level.

Figure 11: Fire-killed *Y. brevifolia* in a carpet of *Bromus rubens*.

5.3 Wildfires

Wildfire is one of the greatest threats to the persistence of *Yucca brevifolia*, particularly as the species' range contracts in the face of climate change and the frequency and severity of fire in the species' range increases (DeFalco et al. 2010; Holmgren et al. 2010; Vamstad and Rotenberry 2010; Cole et al. 2011; Barrows & Murphy-Mariscal 2012; Sweet et al. 2019).

5.3.1 Joshua tree response to fire

Some early researchers suggested that Joshua trees are well-adapted to fire due to the fact that damaged trees can resprout after fire (Webber 1953). Older adult trees are more fire resistant than younger trees as the apical meristems grow above the level of most ground fires while the flammable dead leaves on the main truck that can facilitate fire spread into the crown are largely shed as the tree matures (Gunter 2006). And even if top-killed or damaged by fire, a Joshua tree can sprout from the root crown, rhizomes, and/or branches. Similarly, previous studies also found that Joshua trees can at least partially repopulate some burned areas via such sprouting (Loik et al. 2000a).

However, several longer-term studies have subsequently demonstrated that Joshua trees have relatively low post-fire survival, are slow to repopulate burned areas, and successful recruitment from resprouting requires sufficient precipitation in the years following fire (DeFalco et al. 2010; Vamstad and Rotenberry 2010; Abella et al. 2009).

As summarized by Brooks et al. (2018), "Yucca species such as Joshua tree and Mojave yucca (*Yucca schidigera*) often survive burning, but Joshua trees typically die within the first few years after fire due to drought and herbivory stress." Moreover, Joshua trees are particularly vulnerable to fires as the "relatively small size and dense packing ratio of dead Joshua tree leaves compared with dead Mojave or banana yucca leaves increase the frequency at which they are completely burned and may explain why Joshua trees are more frequently killed by fire" (Brooks et al. 2018). It can take several decades before a Joshua tree sheds the dead leaves on its trunk, leaving the adult tree more fire resistant.

DeFalco et al. (2010) carried out a detailed study of Joshua tree survival in both burned and unburned areas of Joshua Tree National Park that paints a grim picture for species' future in the face of increasing fire.

> Five years after the Juniper Fire Complex of May 1999, approximately 80% of burned *Y. brevifolia* died compared with 26% in adjacent unburned sites. This high postfire mortality of *Y. brevifolia* is consistent with other studies including 90% mortality six years after a 1978 fire in Lower Covington Flat at Joshua Tree National Park and 64 – 95% mortality at sites censused 1 to 47yr after fires in Mojave and Sonoran deserts of California. Declining survival during the first year is attributed to immediate losses of small *Y. brevifolia* (< 1 m tall) whose active meristems close to the ground are vulnerable to extreme fire temperatures and flames that consume whole plants. As they age and grow taller, *Y. brevifolia* shed leaves from the trunk and are less likely to burn, unlike younger plants whose aging leaves are still attached and provide ladder fuel. Thus, taller plants likely sustained less proportional burn injury to the outer periderm tissue during the fire, and steep declines in this size class occurred only after the consecutive dry periods that began in the autumn months during 1999 and 2000 (internal citations omitted).[13]

Post-fire mortality in this study was likely the result of the interplay of drought and herbivory with fire. During the dry years subsequent to the fire, herbaceous plants were scarce, and pocket gophers (*Thomomys bottae*) gnawed the periderm and hollowed stems of *Y. brevifolia* causing many of them to topple. Pocket gopher damage reduced plant survivorship at low-elevation, unburned sites and diminished survival of burned plants in all but the driest site, which already had low survival (DeFalco et al. 2010).

> The loss of *Y. brevifolia* was not only amplified by the lack of precipitation following the wildfire but also by herbivores that damaged burned plants. Herbaceous annual plants were scarce during the growing season following the 1999 fire, and many perennials were dormant due to low autumn through spring precipitation that triggers germination and breaks leaf dormancy. Widespread incidence of tissue damage by *T. bottae* in burned areas implies that the roots and periderm of *Y. brevifolia* that did not die immediately in the fire offered an

[13] Noteworthy in the DeFalco et al. (2010) study is the fact that mortality of even unburned trees was high (26%) over the five years of their study. This was ascribed to a combination of drought stress and herbivory by pocket gophers. As discussed *infra*, such prolonged droughts are likely to be more frequent in a changing climate.

> alternative succulent food source in denuded areas where shrubs and grasses were incinerated (DeFalco et al. 2010) (internal citations omitted).

DeFalco et al. (2010) observed that 33% of censused Joshua trees in burned areas sprouted from the root crown or stem after the fire. These are in line with other studies that found 25% of Joshua trees sprouting from the root crown after a 1978 fire (but with only 10% surviving five years later) and 28% sprouting from the root crown (and 2% from the stem) one year after a 1995 fire (Loik et al. 2000a).

Postfire sprouting prolonged Joshua tree survival in the DeFalco et al. (2010) study, but only at the wetter, high-elevation sites. As noted by DeFalco et al. (2010), "sprouting can provide some advantage to survival only when precipitation is sufficient (e.g., at higher-elevation sites or during wet years). Thus, sprouting of *Y. brevifolia* in the Mojave Desert presents an uncertain recovery strategy in postfire landscapes, especially in the face of herbivory and recurring low-precipitation years."

One area where Joshua trees may be more adapted to fire is along the far western edge of their range. As observed by Brooks et al. (2018),

> Joshua tree populations along the extreme western edge of the desert bioregion near the Sierra Nevada and Transverse Ranges often resprout and survive more readily after fire than those further east. A cycle of relatively frequent fire and resprouting can result in short, dense clusters of Joshua tree clones, such as those found near Walker Pass, in the western end of the Antelope Valley, and in pinyon-juniper woodlands at ecotones with the Transverse Ranges such as Cajon Pass. High resprouting rates of Joshua trees in these areas may have evolved in local ecotypes that became adapted to shorter fire return intervals along the western desert ecotones than in other parts of the desert bioregion.[14]

Recruitment of new Joshua trees into burned areas is infrequent and slow. In one study no seedlings or saplings were observed in burned areas less than 10 years old, and fewer than 10 individuals per hectare were present on burned areas more than 40 years old in Joshua Tree National Park (Brooks et al. 2018). Another study found that Joshua trees were still rare on a site 65 years after a fire (Vamstad and Rotenberry 2010).

Among the factors inhibiting Joshua tree recolonization of burned sites are the lack of seeds due to mortality of seed-producing adults and the loss of suitable establishment sites due to the burning of nurse plants (DeFalco et al. 2010; Reynolds et al. 2012). Nurse plants in arid environments are known to moderate insolation, soil moisture, temperature, and humidity

[14] Notably, the distinguishable clonal form of Joshua trees in these areas was once recognized as its own subspecies or variety, *Y.b. herbertii*, which is now considered a synonym of *Y. brevifolia* (Wallace 2017). Regardless of taxonomy, Joshua trees in these areas warrant special monitoring and protection as they may hold adaptations that make them particularly resilient in the face of increasing fires and climate change.

beneath their canopies and improve conditions for seedling establishment (Reynolds et al. 2012). Nurse plants also shield seedlings from herbivory (Esque et al. 2015).

Blackbrush (*Coleogyne ramosissima*) is one of the most important nurse plants for Joshua tree seedlings (Brittingham and Walker 2000) but is also one of the most vulnerable shrubs to fire (Brooks et al. 2018). Blackbrush are highly flammable, and once ignited tend to completely combust and are killed. Blackbrush stands can take centuries to recover, with the fastest documented recovery being on the order of 50 to 75 years (Brooks et al. 2018). Because of their extreme flammability and slow recovery, the mid-elevation zone dominated by blackbrush and home to Joshua trees is likely the most susceptible area to type conversion via the grass/fire cycle as a result of the arrival of non-native grasses (Brooks et al. 2018).

In the Joshua Tree National Park fire studied by Loik et al. (2000a), blackbrush was eliminated from the burned area with no signs of recovery. Loik et al. (2000a) postulated that "the time required for Joshua trees to begin recruitment via seeds will be delayed until *C. ramosissima* becomes re-established."

As summarized by DeFalco et al. (2010), the "recruitment of *Y. brevifolia* is a slow process even without the impediments introduced by accelerated fire-return intervals." And with such accelerated return intervals it may be impossible: "The return of *Y. brevifolia* to prefire densities and demographic structure may take decades to centuries or be entirely unlikely, especially in light of potential changes to regional desert climate in combination with plant invasions and the potential for recurrence of subsequent fires" (Reynolds et al. 2012).

5.3.2 Increasing wildfire frequency and intensity in the Mojave

Large fires have been historically infrequent in Joshua tree woodlands, and the recent increase in fire size and frequency is partially due to invasion of exotic grasses, principally *Bromus* spp. and *Schismus* spp. (Brooks and Matchett, 2006; Vamstad and Rotenberry 2010; Klinger and Brooks 2017; Syphard et al. 2017; Brooks et al. 2018; Maloney et al. 2019).

Winters with relatively high amounts of precipitation produce an increase in biomass of native and especially non-native annual plants sufficient to carry fire in invaded habitats. The most dramatic changes have occurred in middle elevation shrublands dominated by creosote bush, blackbrush and Joshua trees. This zone is more susceptible than other areas of the Mojave Desert to increased fire size following years of high rainfall (Brooks and Matchett 2006).

The increase in fine, flashy fuel biomass from exotic plant species has increased the fire potential of these habitats sufficiently to allow for more frequent large fires than were carried by native vegetation alone (Brooks and Matchett 2006; Vamstad and Rotenberry 2010). The exotic grasses are of particular concern as they can form a continuous fuelbed for fire well into the hot, dry summer months and tend to not disarticulate as quickly as the native annual plants. While annuals, desiccated upright *Bromus* stems can be found on the landscape upwards of three years after senescence (Jurand and Abella 2013) and *Schismus* remnants can persist as fuel on the landscape for over a year (Brooks et al. 2018). Increased cover of invasive annual grass increases both the chance of a fire igniting and facilitates fire spread. This can both decrease the

time interval between the previous and subsequent fire as well as the extent of burning (Klinger and Brooks 2017).

Several recent reviews have documented fire frequency and extent in the Mojave over the past century (Tagestad et al. 2016; Syphard et al. 2017; Brooks et al. 2018). Each of these studies recognized that precipitation was a primary driver of fire frequency and extent, with wetter periods fostering the growth of invasive grasses which carry fire, and drier periods leading to fewer and smaller fires. Tagestad el al. (2016) summarized both short and long-term impacts of precipitation variation.

> Long-term drought or above-average precipitation periods can have landscape-scale effects on the health and distribution of perennial plant species and the frequency and size of fires. Short-term increases in winter and summer precipitation can have an even greater effect on the likelihood of fire. High winter precipitation creates ephemeral flushes of herbaceous biomass resulting in continuous fuelbeds that promote the spread of fire. High summer precipitation brings thunderstorms with accompanying lightning and high winds which contribute to the ignition and spread of fires. Cumulative years of higher than normal precipitation also appear to have an effect on the potential for fire. This is especially a concern in areas invaded by annual grasses which exhibit a profound response to increased cool-season precipitation (internal citations omitted).

Particularly worrisome is that a sequence of wet years can lead to enormous fires, such as happened throughout the Mojave, including in the range of *Y. brevifolia* in 2005:

> The 2005 Mojave Desert fire season, which burned an area equal to 132% of the total area that burned during the previous 25 years, was preceded by three extremely high precipitation years, suggesting that multiple years of high precipitation can have a cumulative effect on the accumulation of fuels (Tagestad el al. 2016).

According to Brooks et al. (2018), accounts by agency fire mangers of the 2005 fires "indicate that these fires exhibited extreme fire behavior not previously observed in the Mojave Desert," and they attributed this largely to continuous cover of taller than average red brome in the burn areas.

One consistent finding of recent California Desert fire studies is that fires are not evenly distributed by ecological zone or area, but that mid-elevation areas (the zone predominately occupied by Joshua trees) are particularly susceptible. Brooks et al. (2018) found, based upon fire data from 1972 to 2007, that "although fire occurrence across large parts of the warm deserts may be relatively low, they can be much higher and pose significant land management challenges in localized areas. The majority of fire area in the Mojave section of California occurred in the middle-elevation zone." Brooks et al. (2018) also noted that in "the middle elevations of the Mojave Desert there was also evidence of a significant increase in annual fire area."

Tagestad et al. (2016) similarly observed that between "1976 and 2010 there were 227 fires

in the Mojave Desert greater than 405 ha (1000 acres). These fires burned a total of 758,477 ha (1,874,230 acres) with most of the burned area occurring in the middle elevation zones receiving sufficient precipitation for growth of fuels." Notably, blackbrush, a critical nurse plant for Joshua tree seedlings, experienced exceptional rates of burning, as "areas identified as historical blackbrush communities have experienced more multiple fires than all the other communities combined."

Brooks et al. (2018) also found that fires in the California Desert "are clustered in regional hot spots where they are more frequent and burn more proportional area than desert-wide averages. These areas all occur in the Mojave ecological section, with one hot spot at the ecotone with the Colorado section in the vicinity of Joshua Tree National Park." A recent mapping effort by Syphard et al. (2017) clearly shows that a disproportionate number of fires, including large fires, occur in the western Mojave range of *Y. brevifolia* (Figure 12).

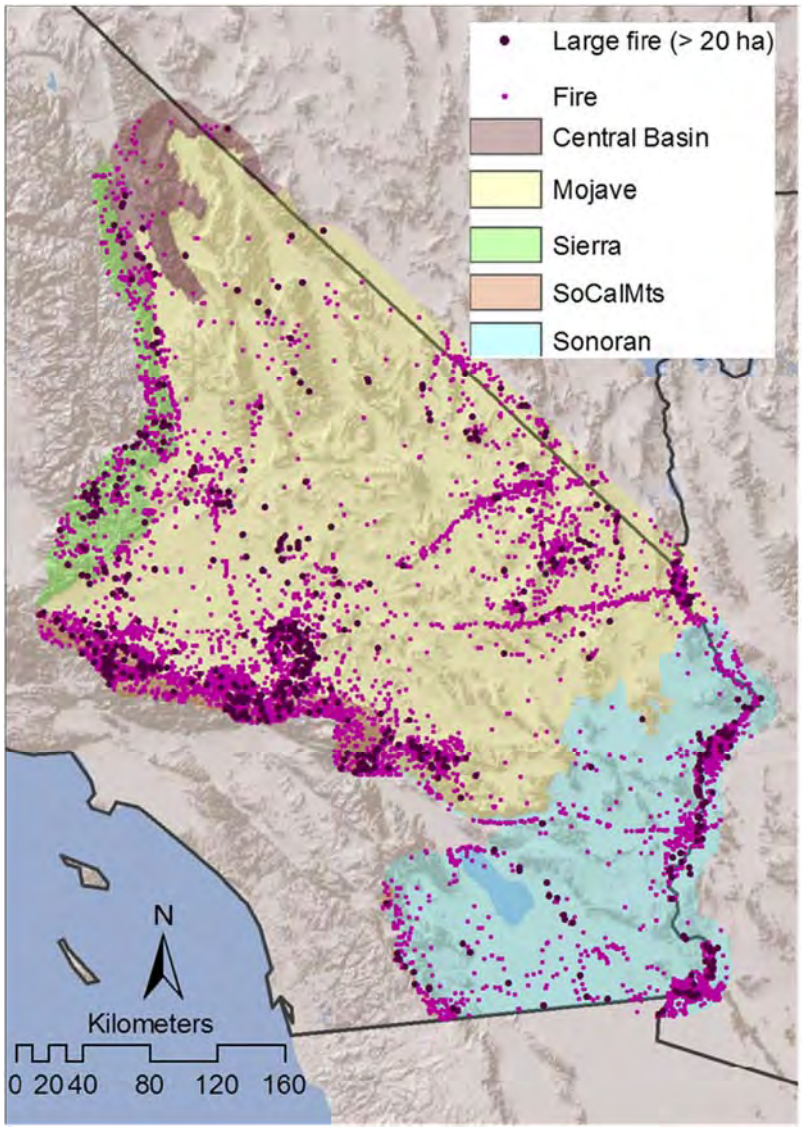

Figure 12. Fire occurrence between 1990-2010 in California Desert. Source: Syphard et al. (2019).

Fires in the Mojave are started by a mix of accidental and intentional human activities as well as lightening. Lightning frequency is higher in the desert than in any other California bioregion and is a significant source of fire (Brooks et al. 2018). Various studies have looked at the relationship of human caused versus lightening fires. One study found that the significant increase in fire frequency in the Mojave from 1980 to 1995 was associated with increased numbers of fires caused by humans, with the number of lightning-caused fires remaining constant. Although most human fires were small and started along roadsides, the less frequent large fires typically occurred in remote areas far from major roads and were started by lightning (Brooks et al. 2018). The influence of roads on fire ignitions is such that the outlines of Interstate Highways 5 and 40 can be discerned by the fire patterns reflected in the map in Figure 12.

Hopkins (2018), using data from Short (2017), tallied approximately 10,000 fires in the California desert from 1992 to 2015, and found that lighting accounted for only 10% of the fires, but 40% of the fires that burned more than 500 acres. Of the 90% that were human caused, equipment use was responsible for 22%, arson 8%, children 6%, smoking 5%, debris burning 5%, campfires 4%, and most of the remainder to unspecified miscellaneous causes.

A recent comprehensive analysis of fire records in the California Desert found that in "the Mojave, powerlines and other types of energy infrastructure (oil and gas wells, wind turbines, and power plants) were the most important anthropogenic land use contributors to large fires" (Syphard et al. 2017). The relationship between development and fire is also significant, with Syphard et al. (2019) warning that "[w]ith more fires occurring in close proximity to human infrastructure, there may also be devastating ecological impacts if development continues to grow farther into wildland vegetation."

Fire fueled by invasive grasses is already significantly affecting Joshua tree woodlands. As Holmgren et al. (2010) summarized regarding conditions in Joshua Tree National Park (JTNP),

> With each subsequent fire the native plants vanish but these invasive grasses thicken and expand, fuelling ever larger and more frequent wildfires, inducing what has been called the 'grass–fire cycle'. Prior to 1965, fire records at the park suggest that most lightning-caused fires, which happened in May through September, seldom spread more than a few tens of metres from the strike… [*B. rubens*] spread dramatically and began fuelling large fires in both the Mojave and Sonoran Deserts. At JTNP, fires measuring in the thousands of acres burned in 1979, 1995, 1999 and 2006. The increase in fire size and frequency could transform JTNP vegetation in a matter of decades.

The specific impacts of more frequent and intense fire on Joshua trees themselves are also significant. Esque et al. (2015) described these impacts:

> Recent increases in fire frequency caused by invasive species throughout the range of *Y. brevifolia* have also affected all life stages of the species, and survival from intense fires is low even among large individuals. The impact of fire on seedling and juvenile survival is particularly exacerbated because fires tend to track the same

heavy precipitation years that are most suitable for *Y. brevifolia* seedling emergence (internal citations omitted).

Perhaps most importantly, areas identified as potential late-century climate refugia for *Y. brevifolia* are particularly vulnerable to fire, with over a third of the area identified as refugia by Barrows and Murphy-Mariscal (2012) burned between 1967 and 2012, and half the refugia identified under a moderate warming scenario by Sweet et al. (2019) burned as of 2018 (Figure 13).

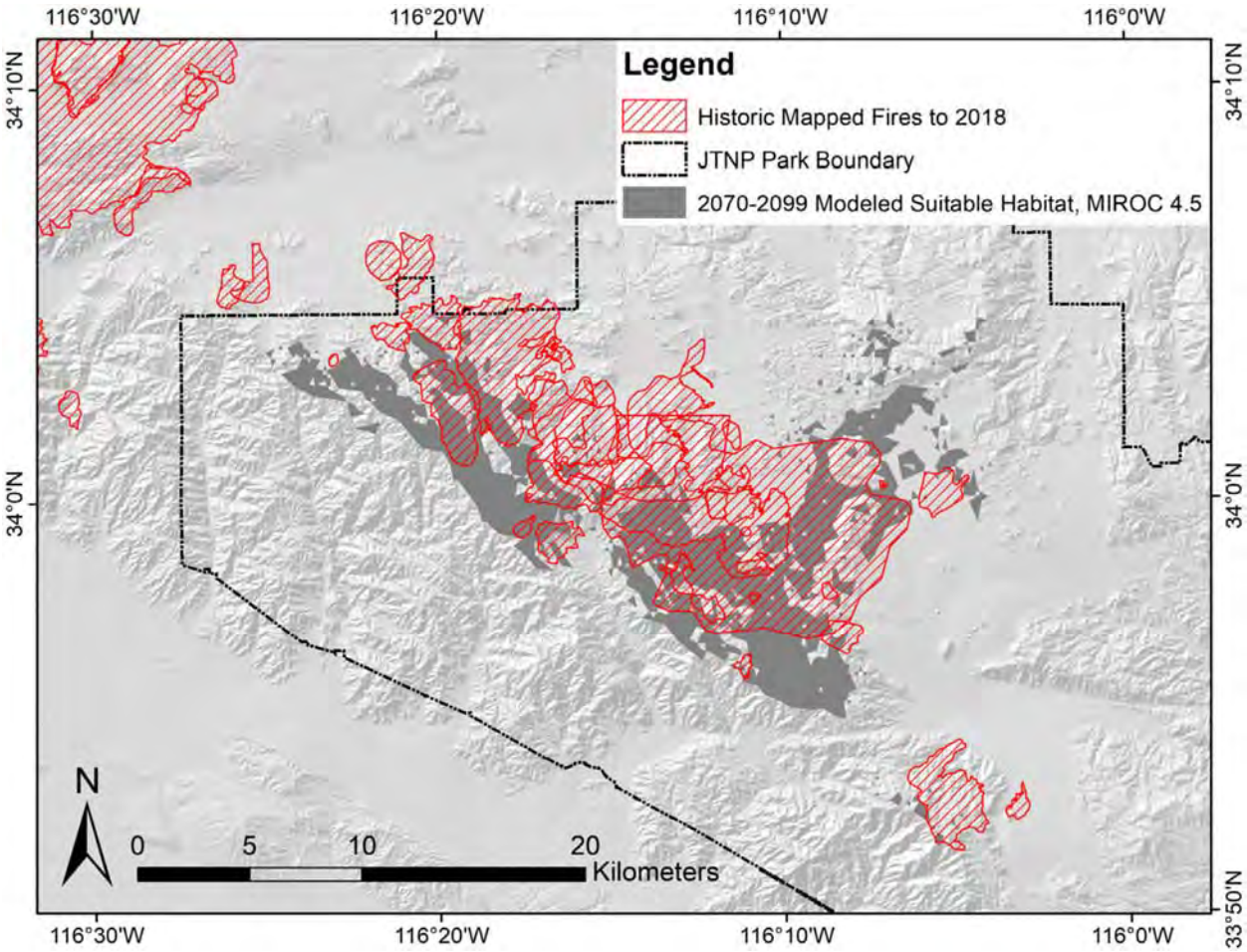

Figure 13. Historic fires in JTNP through 2018 in relation to modeled Joshua tree suitable habitat under a moderate warming scenario. Source: Sweet et al. (2019).

In sum, Joshua tree woodlands are generally not adapted to fire, and recover slowly, if at all (Abella et al. 2009; DeFalco et al. 2010; Vamstad and Rotenberry 2010; Brooks et al. 2018). Moreover, as noted by DeFalco et al. (2010), "the slower decline in survival for burned *Y. brevifolia* at the more mesic, high-elevation sites underscores the importance of postfire climate conditions on defining the demographic structure of recovering *Y. brevifolia* populations." As discussed *infra*, a rapidly changing climate with greater heat stress and more intense droughts will make postfire recovery increasing unlikely; and as fire increases in frequency and/or intensity, it will threaten the continued viability of ever-shrinking populations of *Y. brevifolia*.

5.4 Climate Change

Climate change represents the single greatest threat to the continued existence of *Yucca brevifoia*. Even under the most optimistic climate scenarios, western Joshua trees will be eliminated from significant portions of their range by the end of the century; under warming scenarios consistent with current domestic and global emissions trajectories, the species will likely be close to being functionally extinct in the wild in California by century's end (Dole et al. 2003; Cole et al. 2011; Sweet et al. 2019).

5.4.1 Current and projected climate change in the range of *Y. brevifolia*

A strong, international scientific consensus has established that human-caused climate change is causing widespread harms to human society and natural systems, and climate change threats are becoming increasingly dangerous. In a 2018 *Special Report on Global Warming of 1.5°C* from the Intergovernmental Panel on Climate Change (IPCC), the leading international scientific body for the assessment of climate change, describes the devastating harms that would occur at 2°C warming above pre-industrial levels, highlighting the necessity of limiting warming to 1.5°C to avoid catastrophic impacts to people and life on Earth (IPCC 2018). Average global temperature has already risen approximately 1°C (IPCC 2018).

In addition to warming, many other aspects of global climate are changing. Thousands of studies conducted by researchers around the world have documented changes in surface, atmospheric, and oceanic temperatures; melting glaciers; diminishing snow cover; shrinking sea ice; rising sea levels; ocean acidification; and increasing atmospheric water vapor (USGCRP 2017).

Climate change is increasing stress on species and ecosystems, causing changes in distribution, phenology, physiology, vital rates, genetics, ecosystem structure and processes, and increasing species extinction risk (Warren et al. 2011). A 2016 analysis found that climate-related local extinctions are already widespread and have occurred in hundreds of species, including almost half of the 976 species surveyed (Wiens 2016). A 2016 meta-analysis reported that climate change is already impacting 82% of key ecological processes that form the foundation of healthy ecosystems and on which humans depend for basic needs (Scheffers et al. 2016). The Mojave Desert in which the Joshua tree resides has already experienced many of these impacts, with, for example, bird occupancy and site-level species richness declining by about 50% over the past century (Iknayan and Beissinger 2018), and this decline linked to water stress related to increased cooling needs (Riddell et al. 2019).

Deserts have warmed and dried more rapidly over the last 50 years than other ecoregions, both globally and in the contiguous United States (USGCRP 2017). According to California's Fourth Climate Change Assessment: Inland Deserts Summary Report (Hopkins 2018), the California Desert has already experienced significant warming. Over the second half of the 20th century, daily maximum temperatures warmed by 0.4-0.7ºF [0.22-0.39ºC], comparing 1976-2005 with 1961-1990, and daily minimum temperatures warmed by 0.3-0.6 ºF [0.17-0.33ºC] over the same period.

Other studies have documented even greater warming in the range of the Joshua tree. The Washington Post, using NASA and NOAA county-level temperature datasets from 1895 to 2018, demonstrated that many areas of the United States have already had temperature increases well above the global average (Mufson et al. 2019).[15] The four California counties in which *Y. brevifolia* occurs — San Bernardino, Los Angeles, Kern and Inyo — have already experienced average annual temperature increases of 1.9, 2.3, 1.7 and 2.3ºC respectively.

Hopkins (2018) projects that daily maximum temperatures will increase by 5-6ºF [2.8-3.3ºC] for 2006-2039, by 6-10ºF [3.3-5.6ºC] for 2040-2069, and 8-14ºF [4.4-7.8ºC] for 2070-2100 on average for the region, with ranges depending on future greenhouse gas emissions (RCP 4.5 and RCP 8.5 scenarios). By the end of the century, the hottest day of the year is projected to rise by at least 6ºF [3.3ºC], and up to 9ºF [5ºC] on average. Extremely hot days, defined as temperatures >95ºF [35ºC], averaged 90 per year in the Mojave during the 1981-2000 period, and will increase to up to 141 days by the end of the century under RCP 8.5.

While temperature projections for the Mojave are unidirectional (it will be a lot hotter), precipitation projections are more complicated and divergent. For the suite of downscaled climate models used by Hopkins (2018), there is little projected change in average rainfall each year to the end of the century (<10%), even under different emissions scenarios. However, these projections show an increase in interannual variability, with reductions in minimum annual precipitation of up to 50% and increases in maximum annual precipitation of 40-65% by the end of the century, as well as an increase of winter precipitation (falling mainly in December, January, and February).

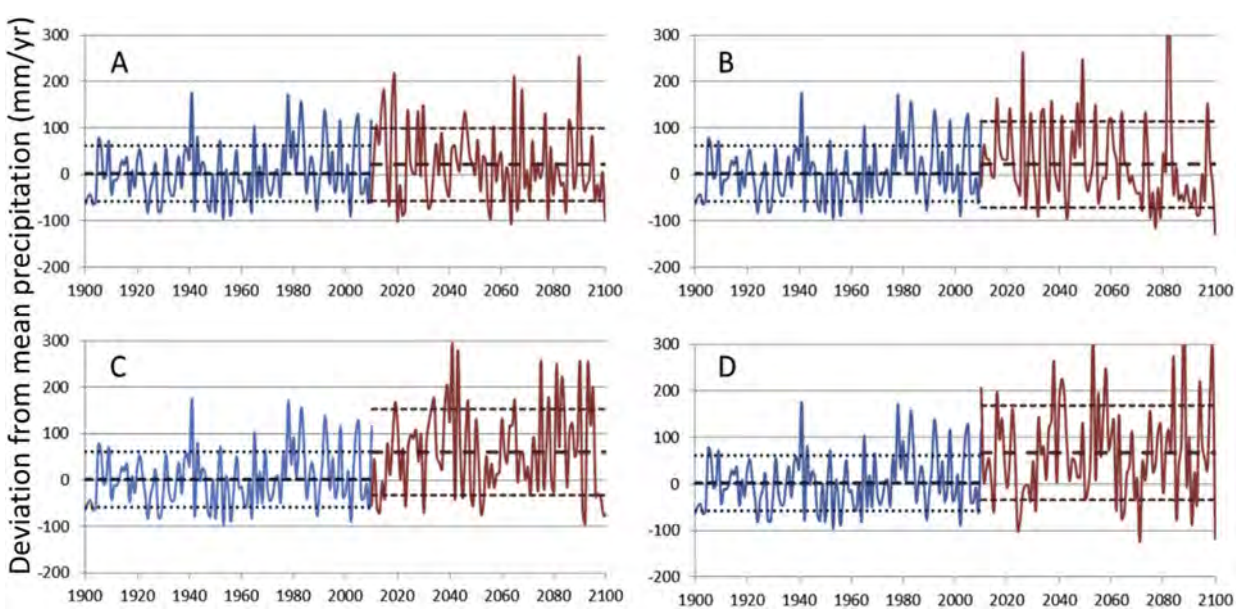

Figure 14: Plot of future modeled and historic precipitation in the Mojave Desert from global climate model/scenarios: A) GFDL/B1, B) GFDL/A2, C) IPSL/B1 and D) IPSL/A2. Source: Tagestad et al. (2016).

[15] Available at https://www.washingtonpost.com/graphics/2019/national/climate-environment/climate-change-america/

Tagestad et al. (2016) came to similar conclusions, noting that "recent analysis of regional climate models over southwest North America indicate increased winter precipitation in the future within the Mojave ecoregion." Tagestad et al. (2016), using climate models that best matched historic annual and seasonal precipitation records in the Mojave (GFDL_CM2.1 and IPSL_CM4), found that average annual precipitation is predicted to be higher than the historical average, although with greater annual and decadal variation, that there would be numerous, extended periods of high precipitation (Figure 14), and due to the invasive grass fueled link between winter precipitation and fire, concluded that "fire will be more prevalent in the Mojave Desert for many periods during the next century."

In sum, average annual temperatures in the range of *Y. brevifolia* have already increased well over 1.5°C (Mufson et al. 2019), and daily maximum temperatures over the remainder of the 21st century under current emissions trajectories will increase by over 7ºC (Hopkins 2018). Precipitation will increase in variability, with more extreme and prolonged droughts, while an overall increase in winter precipitation will foster more growth of invasive grasses, leading to more frequent and more intense fire (Hopkins 2018; Tagestad et al. 2016). Given Joshua trees are already suffering from the warming that has occurred to date, these additional changes pose a significant threat to the persistence of *Y. brevifolia* in California.

5.4.2 Climate change impacts on Joshua trees

Researchers have been raising the alarm about threats to the Joshua trees for decades. More than half a century ago, Webber (1953) stated of the species that "[r]egardless of the present wide distribution and large concentration of yuccas, its future appears very dim. This gloomy outlook is mainly due to the plant's failure to reproduce and its destruction by man." In 2000, Loik et al. (2000a) raised the specter of climate change, predicting that "[c]hanges in the local climate due to anthropogenic greenhouse gases may cause warming of the microclimate near the soil surface thereby precluding the future establishment of *Yucca brevifolia*." A year later, Lenz (2001) noted that "Joshua trees in many areas appear physically stressed in all probability due to less than optimum growing conditions," and speculated that "depending upon the intensity and duration of global warming its long-range survival may depend upon the availability of a refugium."

Over the past 20 years, modeling of Joshua tree future distribution in a warming climate has become more sophisticated, has used more accurate and comprehensive distribution data, has produced projections at ever-finer spatial scales and has increasingly used field data to validate model performance. And while model projections of potential range expansion have varied greatly and have not distinguished between *Y. brevifolia* and *Y. jaegeriana*, *every* published modeling effort has predicted range contractions along the western edge of the Joshua tree's range in California, which largely corresponds to the range of *Y. brevifolia* in the state. A review of these studies demonstrates that *Y. brevifolia* will face massive range contractions within the foreseeable future that threaten the continued viability of the species.

Thompson et al. (1998) published the first modeled projection of the future range of Joshua trees under changing climate conditions. Using data on temperatures and precipitation levels where the species is currently found, Thompson et al. (1998) calculated that Joshua tree potential

future habitat under doubled CO_2 conditions was almost 8-fold greater than present habitat, extending as far north as Washington state, south into Mexico and east into Texas. The modeling effort predicted retraction of range along its western edge in California. This study, which dealt with 16 different tree species, did not analyze other habitat variables or dispersal ability and used a model that poorly matched the current distribution of the species (e.g. the model predicted presence in the Coast Ranges under then current climate conditions).

Shafer et al. (2001) carried out a similar modeling effort looking at the future range of Joshua trees, finding that "[u]nder each of the future climate scenarios, its simulated potential range is fragmented and displaced northward and eastward." The Shafer et al. (2001) study addressed 15 different species of trees, used three climate variables (mean temperature of the coldest month, growing degree days, and a moisture index) and a 25-km grid scale.[16] Consequently, the results are course, but still roughly consistent with later modeling efforts (e.g. Cole et al. 2011), and most notably show almost complete extirpation of the species from California (Figure 15). The projected potential expanded range extending into northern Nevada and Utah as well as Washington state does not account for how the species might disperse into these new areas of potential habitat.

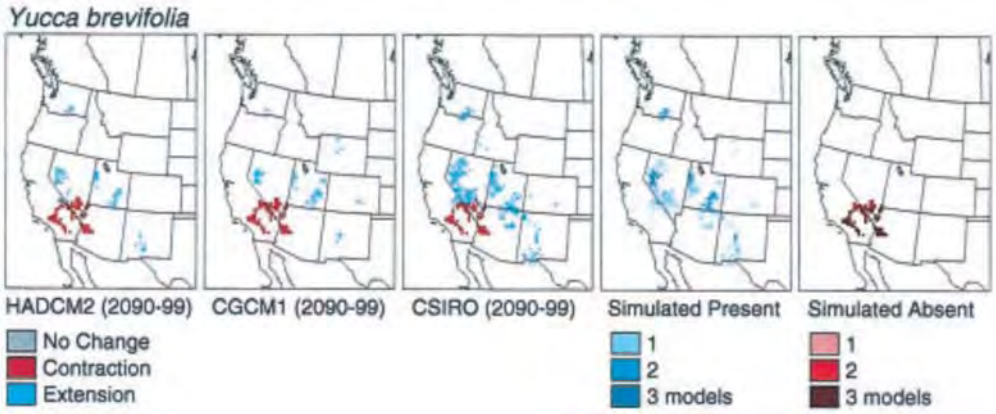

Figure 15: Modeled future range of Joshua Trees. Source: Shafer et al. (2001).

Dole et al. (2003) subsequently modeled future range for Joshua trees in a doubled CO_2 world, finding that "a considerable portion of the current range of *Y. brevifolia* will become climatically unfavorable for this species, but that significant amounts of new habitat may become available." While Dole et al. (2003) did not take dispersal into account in the modeling, they noted that it would be a factor in real-world application, and in "the worst-case scenario, *Y. brevifolia* will migrate too slowly to fill potential new habitat, while much of its current range will become climatically unfavorable."

Dole et al. (2003) also noted a further potential limitation in the model which assumed "the distribution of *Y. brevifolia* is in equilibrium with current climate." Significant subsequent research (e.g. Barrows and Murphy-Mariscal 2012; Harrower and Gilbert 2018; Sweet et al.

[16] The current distribution data used to develop the model in Shafer et al. (2001) is also questionable as the paper states "*Yucca brevifolia* (Joshua tree) is found in the deserts of the southwest US and northwest Mexico." The species has likely been absent from Mexico for thousands of years (Cole et al. 2011).

2019) has confirmed that at least in the southern part of its range, current climate conditions are already deleterious to Joshua tree survival and/or reproduction. Notwithstanding these model limitations, which almost certainly overestimate projected future habitat, modeled habitat loss is roughly congruent with the key results of Shafer et al. (2001) and Cole et al. (2011), with the species disappearing from 76% of its current range. Notably, much of the new area deemed climatically suitable for *Y. brevifolia* in California is developed agricultural land in the San Joaquin Valley and therefore highly unlikely to ever actually be occupied by the species.[17]

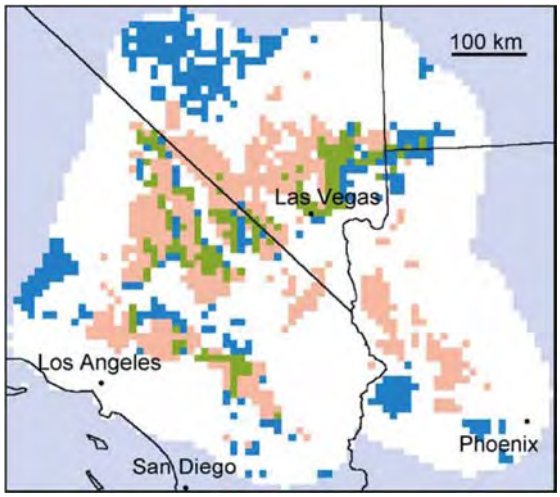

Figure 16: Modeled future range of Joshua Trees. Pink is lost range, green is maintained range and blue is expanded range. Source: Dole et al. (2003).

Cole et al. (2011) built a sophisticated species distribution model with climate and habitat variables derived from a comprehensive dataset of presence/absence data throughout the current range of the Joshua tree. Late Pleistocene and Holocene records were also compiled to generate a map of past distribution of the species. The study differed from previous models in its use of actual specific data points for presence and habitat variables for the species and the testing of the models to simulate the current range of the species.

> Construction of an independent test data set of Joshua tree current presence and absence allowed the evaluation of multiple suitable climate models for Joshua tree. Model concordance was found to increase with the inclusion of measures of monthly temperature variability (maximum and minimum rather than just mean), finer spatial scale (~1 km rather than ~4 km), and applying a 40-year mid-20th-century baseline (1930–1969) climate rather than a 30-year late-20th century baseline (1970–1999).[18]

[17] Dole et al. (2003) also modeled the impact of doubled CO_2 concentrations on the physiology of Joshua trees given there is some evidence that certain plant species are more resistant to freezing in high CO_2 conditions. Such modeling showed a 14% increase in projected new habitat and a slight increase (from 24% to 29%) of current habitat areas that would remain suitable. However, the authors recognized that the impacts of CO_2 induced warming were more significant than the physiological effects of CO_2 itself.

[18] Cole et al. (2011) selected 1930 to 1969 as their climatic baseline period "because evidence suggests that Joshua tree recruitment was greater during this interval than during the latter part of the 20th century. For instance, survey results show minimal to no recent Joshua tree recruitment within the southern Mojave Desert in recent years, and

The methodology of Cole et al. (2011) consequently address many of the shortcomings of climate niche models that have be raised by some (Pearson and Dawson 2003; Fitzpatrick and Hargrove 2009).

All of the individual climate models, as well as an ensemble of 22 global circulation models (GCMs) utilized by Cole et al. (2011), project a severe (~90%) decline in the area of suitable climates for Joshua trees by 2070 to 2099, as the southern parts of its range becomes climatically unsuitable.

Cole et al. (2011) also modeled areas where the species could potentially naturally expand its range in the future, as well as areas that might be suitable for relocation or assisted migration (Figure 17).

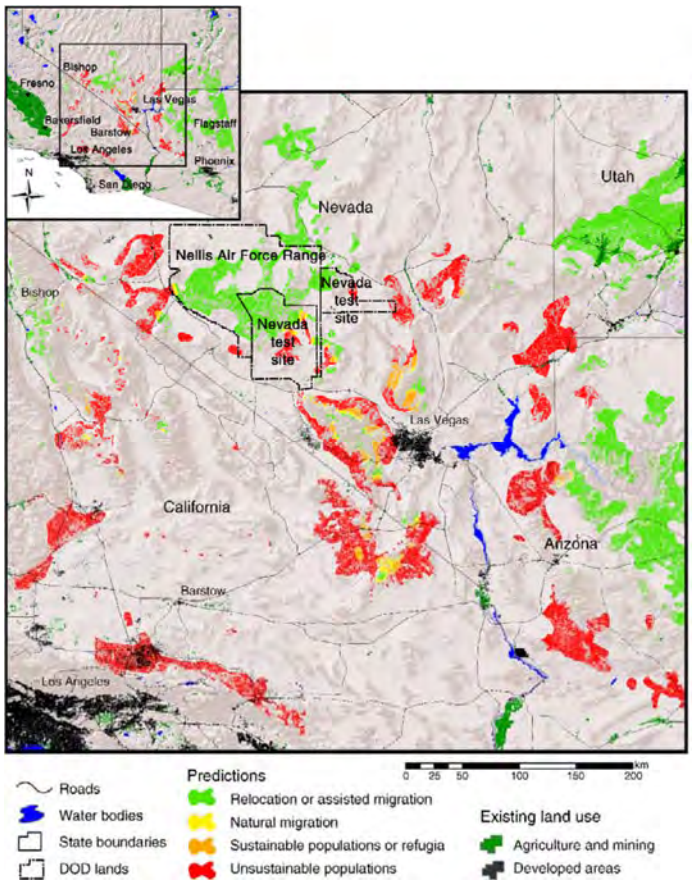

Figure 17. Areas with existing Joshua tree populations where a majority of the models used by Cole et al. (2011) predict future climates unsuitable for survival (red); current populations with future climates favorable for Joshua tree persistence (orange); areas within 2 km of current populations with future favorable climates and suitable substrates where natural migration could possibly occur (yellow); and protected areas with future favorable climates and suitable substrates where assisted migration might be possible (green). Source: Cole et al. (2011)

Joshua trees tall enough to be tallied in recent vegetation plots likely became established during this 1930–1969 interval or before."

In determining potential natural expansion areas, Cole et al. (2011) looked at rates of migration discernable from paleontological data as well as from modern studies of seed dispersal by rodents. Such data reveals minimal actual northward range shift over the Holocene, corresponding to a migration rate of 2 meters a year. Similar migration rates could be calculated based on studies of rodent seed caching activity and Joshua tree generation time. Cole et al. (2011) postulated that their results "suggest that the species migrational capacities have been ineffective following the extinction of Pleistocene megaherbivores that may have acted as seed vectors, especially the Shasta ground sloth." Given a 2-meters a year range expansion would total less than 200 meters by century's end and would be largely invisible in any mapping effort, Cole et al. (2011) used "a generous estimate of potential natural migration of 2 km over the next 60 to 90 years" to designate areas of potential natural migration. This suggests that the colonization of mapped areas of natural migration might in fact also require assisted migration to occur in a meaningful timeframe.

Cole et al. (2011) summed up the relationship between the Joshua tree's past, its present limited present dispersal abilities, and future projections to highlight the severe range contraction in will undergo in the coming decades.

> As climate rapidly warmed at the start of the Holocene, the widely dispersed range of Joshua tree severely contracted from the south, leaving only the populations near what had been its northernmost limit. The Holocene and recent history of Joshua tree suggests that its migrational capacity may be severely limited. Its ability to spread northward into new suitable habitats during the Holocene may have been inhibited by the somewhat earlier extinction of its primary megafaunal dispersers, especially the Shasta ground sloth. Because GCM models project a climate warming of a similar pace and magnitude to that of the early Holocene over the next 60 to 90 years, Joshua tree could undergo a similar decline in its southernmost populations to that of the early Holocene.

Cole et al. (2011) do not predict the complete extirpation of Joshua trees from their current range, noting that the "results predict the survival of some natural Joshua tree populations throughout the next century, but most will be greatly reduced in area." Importantly, because the authors modeled the Joshua tree present and future distribution as a single species, they did not distinguish between *Y. brevifolia* and *Y. jaegeriana*. From their mapping however, it appears that the majority of the areas for which Joshua trees are projected to persist are in the range of *Y. jaegeriana*. *Y. brevifolia* disappears almost entirely from its current range in California (Figure 17).[19]

[19] A subsequent study by Notaro et al. (2012) included Joshua trees among 170 tree and shrub species for which they modeled projected range shifts by the end of the century. They noted that the projected northward shift of the species and decline in its southern range in response to warming was consistent with that described by Cole et al. (2011). However, unlike Cole et al. (2011), they did not consider dispersal ability in projecting range expansion and consequently concluded that the species would experience a "robust range expansion" of 143%. Importantly, their analysis was limited to the "Southwest United States" which did not include California. Consequently, regardless of other limitations of their analysis that may render the results suspect, the results shed no light on the future status of *Y. brevifolia* in California.

While the Cole et al. (2011) study looked at the future of Joshua trees throughout their range, Barrows and Murphy-Mariscal (2012) examined the status and fate of *Y. brevifolia* in Joshua Tree National Park (JTNP). The approach Barrows and Murphy-Mariscal (2012) took was one of niche modeling:

> In lieu of local-scale predictions of how precipitation or temperature will shift, modeling the sensitivity of species to a gradient of climate change scenarios can provide insights as to potential effects of local-scale changes in temperature and precipitation. A useful tool in assessing species sensitivity to changing conditions is niche modeling which includes habitat variables, such as climate and terrain, in an attempt to assess the complex interaction of factors that constrain a species' distribution (internal citations omitted).

To assess the validity of the niche models, Barrows and Murphy-Mariscal (2012) used "citizen scientist" volunteers to collect Joshua tree recruitment data throughout their range in the park to determine whether modeled shifts in suitable habitat coupled with recent temperature increases approximate current demographic response patterns, specifically successful seedling recruitment. The key climate variable used was summer maximum temperature, which was changed incrementally by increasing mean maximum July temperature by 1ºC, 2ºC, and then 3ºC.

Since the niche models were developed based on data of existing adult Joshua trees, the model projects the distribution of suitable habitat for the species when those individuals were recruited into the population, conditions when summer temperatures may have been up to 1ºC cooler than current conditions. Shifting mean maximum summer temperatures upwards by 1ºC, 2ºC, and then 3ºC resulted in modeled reductions in the extent of suitable habitat for Joshua trees of 30-35%, 66-78% and 90-98% respectively, depending upon the precipitation variables used.

The niche model Barrows and Murphy-Mariscal (2012) developed for juvenile Joshua trees (individuals 30 cm or less in height) based on their current distribution, resulted in a total suitable habitat area about half of that for adult trees. The juvenile model was a near match for the boundaries of the +1ºC adult model. The match between the current juvenile model and the +1ºC adult model provides some level of model validation consistent with the hypothesis that early levels of climate change may have already had an impact on Joshua tree recruitment. Put another way, adult Joshua trees in JTNP were recruited into the population under climate conditions where summer maximum temperature was approximately 1ºC cooler than present; warming to date may not be fatal to established adult Joshua trees, but it has apparently already shrunk the area of suitable habitat for recruitment by half.[20]

Barrows and Murphy-Mariscal (2012) contrasted their results to those of Dole et al. (2003)

[20] Barrows and Murphy-Mariscal (2012) noted that "we searched for but did not find any areas of non-fire related mortality of Joshua trees within JTNP." This seems at odds with DeFalco et al. (2010) who reported 26% mortality of unburned Joshua trees following drought in their study area in JTNP. A subsequent study by Harrower and Gilbert (2018) also documented significant non-fire mortality in the park, indicating that the current climate, at least at lower elevations, is already deleterious to adult Joshua trees.

and Cole et al. (2011), both of which indicated that similar expected levels of climate change would result in no suitable habitat for Joshua trees within the central or southern portions of their current distribution. Barrows and Murphy-Mariscal (2012) ascribed the differences as being due to the scales of analyses rather than differences in models or model assumptions, since finer-scale analysis can incorporate local adaptations as well as topographic-climate complexities that may provide refugia.

Barrows and Murphy-Mariscal (2012) declared their analysis "represents a more optimistic scenario than previously published models of climate change impacts on Joshua trees." However, given their +3ºC model found that Joshua tree range in the park could be curtailed by 90 to 98% and noted that red brome fueled wildfires could burn any remaining refugia, it is somewhat difficult to share their optimism. Moreover, Barrows and Murphy-Mariscal (2012) used a +3ºC increase in summer maximum temperature as their "extreme" scenario, while Hopkins (2018) projects that summer maximum temperatures may hit that level before mid-century and may exceed +7ºC by century's end.

The most recent species distribution modeling effort for Joshua trees paints an even more concerning portrait of the species' future. Sweet et al. (2019) sought to identify the existence and extent of potential climate refugia for *Yucca brevifolia* within JTNP. Similar to Barrows and Murphy-Mariscal (2012), this study developed species distribution models (SDMs) validated with field data:

> By combining finer scale topographic and climate datasets, using more refined climate models and a more comprehensive set of Joshua tree location data, our objective was to construct SDMs to forecast this species' response to multiple future climate scenarios. Then, with the aid of volunteer community scientists, we collected Joshua tree demographic data across their range within the park. We aimed to identify the existence and extent of potential Joshua tree climate refugia and validate this prediction using empirical demographic data on Joshua tree recruitment along a gradient that falls within and outside modeled refugia.

Sweet et al. (2019) used the species distribution modeling platform Maxent to develop relationships between Joshua tree presence points and a database of nine environmental variables including minimum and maximum temperature, precipitation, climatic water deficit (CWD), topography, and soil characteristics. They used the end-of-century (2070–2099) CMIP5 MIROC RCP 4.5, 6.0, and 8.5 emissions scenarios, representing CO2 emissions under highly mitigated, moderately mitigated, and unmitigated scenarios, respectively. The results showed loss of the vast majority of *Y. brevifolia* suitable habitat under all scenarios. Under the RCP 4.5 and 6.0 scenarios, 18.6% and 13.9% of current occupied areas remained as refugia. However, under the RCP 8.5 scenario, which is closest to current emissions trajectories, suitable habitat was almost completely eliminated, with only 15 ha, or 0.02% remaining as refugia (Figure 18).

As with those identified by Barrows and Murphy-Mariscal (2012), the refugia identified by Sweet et al. (2019) are in areas of high fire risk, with the authors noting that the "areas mapped as Joshua tree refugia, which are found at higher elevation wetter areas, also tend to have the highest covers of invasive annual grasses." Approximately half of the refugia mapped under the

RCP 4.5 scenario have already experienced fire in recent decades. As discussed *supra*, fire fueled by invasive grasses is a significant source of Joshua tree mortality and creates conditions that delay or preclude recruitment, and therefore has the potential to diminish the effectiveness of any climate refugia for the species.

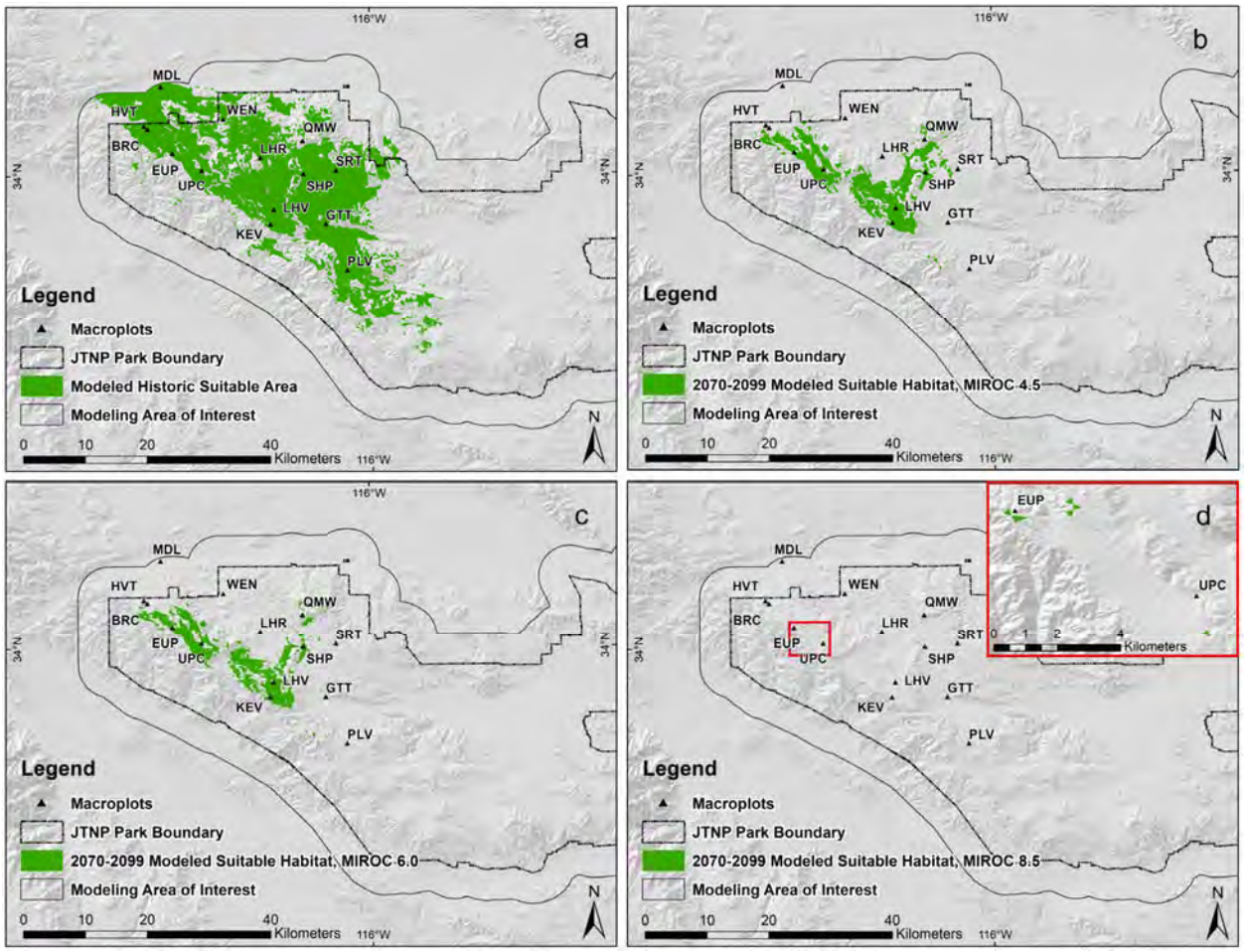

Figure 18: Map of historically suitable habitat (a) and end-of-century refugia for Joshua trees at JTNP. Modeled refugia are the area of overlap between current and future suitable habitat under 3 emission scenarios: RCP 4.5 (b), 6.0 (c), and 8.5 (d, with inset to display the modeled area). Source: Sweet et al. (2019).

The modeling results of Sweet et al. (2019) are similar to those of Barrows and Murphy-Mariscal (2012) in terms of overall trajectory and location of habitat loss in JTNP, but diverge in terms of how much area remains as refugia under their highest-warming scenarios. Barrows and Murphy-Mariscal (2012) projected between 2 and 10% of existing habitat would remain suitable in the park (916 to 4640 ha), while Sweet et al. (2019) projected only 0.02% would remain (15 ha). Sweet et al. (2019) ascribed the difference to finer scale habitat data, difference in climate scenarios used, and better and more dense information on Joshua tree presence. Put another way, the more detail we learn about the current status of Joshua trees, the bleaker their future appears.

Sweet et al. (2019) also used field data on distribution of juvenile trees (defined as smaller

than 60 cm) to validate their modeling results.[21] They explained their rationale as follows:

> Large, long-lived species, such as Joshua trees, have an advantage over short-lived species, as they can weather year-to-year variation and short-term droughts. Still, long-term persistence, especially over the time reflected in climate change estimates, depends on where and when species reproduce, recruit, and establish on a landscape. Other studies have found differences between the adult distribution and the distribution of juveniles or seedlings on the landscape. Since the establishment stage of trees and other perennial species is a vulnerable and important stage, the density of seedlings in a given area can provide early indications of future distribution shifts.
>
> In order to study the future distribution of Joshua trees at JTNP, therefore, a field-based assessment of current recruitment patterns may be foretelling of changes in the population of Joshua trees on the landscape. Joshua tree annual survivorship is age- and precipitation-dependent; low precipitation levels have an inordinate negative impact on survivorship of smaller plants. With the levels of increased aridity that this region has already experienced, it follows that demographic shifts in Joshua trees should be apparent. The occurrence of young, healthy Joshua trees can therefore provide an empirical validation for modeled predictions of where climate refugia have already started to become established today (internal citations omitted).

Sweet et al. (2019) categorized 14 nine-hectare macroplots throughout the park that contained Joshua trees as high or low-recruiting depending on whether the density of documented juveniles was above or below the mean. They found that high-recruiting macroplots had significantly higher annual precipitation, and marginally significantly lower climatic water deficit and maximum summer temperature. Importantly, high-recruiting macroplots were geographically differentiated from low-recruiting macroplots in that they were located either within or significantly closer to predicted future refugia than low-recruiting macroplots. Moreover, when temperature and precipitation for refugia areas were plotted together with macroplots, there was considerable correspondence between the high-recruiting macroplots and the refugia. This result, which validated modeled predictions, was "not surprising—the factors that allow for recruitment (lower CWD, higher precipitation), especially in a desert environment, also differentiated, on a landscape scale, the areas supporting Joshua trees within the park."

Studying the density of tree recruitment, Sweet et al. (2019) found early indications of a shift in Joshua tree recruitment and noted that "[i]f recruitment patterns portend the future distribution of adults on the landscape, this type of analysis allows a glimpse into changes that may occur even before those outlined in the modeled future scenarios."

The Sweet et al. (2019) analysis was designed "to inform management with the most robust available predictions, focusing on areas where the species occurs already." These "occupied climate refugia are most relevant to the conservation of the species for the next 50 yr, and perhaps longer." Proper management and protection of these areas is critical the persistence

[21] Barrows and Murphy-Mariscal (2012) also used juvenile distribution to validate their models but used a 30 cm rather than 60 cm cutoff to define "juveniles".

of *Y. brevifolia*: "Since these refugia are also subject to threats such as fire and invasive species, management efforts aimed at reducing these threats provide on-the-ground actions that increase the likelihood that these areas will sustain this iconic species." Management and recovery actions are further discussed *infra*.

The species distribution modeling studies discussed above individually and collectively lay out a compelling warning about the difficult future facing *Y. brevifolia* in California. Two of those studies also looked at field data and concluded that recruitment of Joshua trees was *already* being hampered by warming (Barrows and Murphy-Mariscal 2012; Sweet et al. 2019).

Additionally, multiple other field studies documenting the *current* impacts of warming, drought, invasive species, fire and other impacts on Joshua tree survival and recruitment reinforce the findings of these modeling efforts. The more recent of these studies have specifically looked at such impacts in the of context climate change (*e.g.* DeFalco et al. 2010 [fire, drought and herbivory]; Reynolds et al. 2012 [seed germination and recruitment]; Esque et al. 2015 [recruitment and juvenile growth]; Borchert and Defalco 2016 [reproduction, seed predation and dispersal]; Harrower and Gilbert 2018 [pollination]; St. Clair and Hoines 2018 [reproduction]). These studies and the documented impacts on *Y. brevifolia* are described in the sections on Reproduction, Abundance and Population Trends, and Factors Affecting Ability to Survive and Reproduce, *supra*.

Joshua tree persistence on the landscape is dependent not just on survival of Joshua trees themselves, but on successful recruitment, which is dependent upon their obligate pollinating moths, seed dispersing rodents and the presence of nurse plants. As summarized by Sweet et al. (2019), "[r]ecruitment, survival of populations, and certainly migration of the species will be affected by factors such as the availability of pollinators, dispersers, seed and seedling predators and other mutualisms on the landscape." Climate change threatens to disrupt these essential relationships.

While multiple species can serve as its nurse plants, and a variety of rodents can act as seed dispersers, only a single species, *Tegeticula synthetica*, pollinates *Yucca brevifolia* in its California range (Pellmyr and Segraves 2003; Godsoe et al. 2008). And while clonal reproduction can prolong survival in certain locations and circumstances (DeFalco et al. 2010), ultimately long-term survival as a species likely requires the genetic diversity that sexual reproduction fosters (Harrower and Gilbert 2018). Consequently, the long-term viability of *Y. brevifolia* depends on maintaining its obligate mutualism relationship with *T. synthetica*.

A recent study by Harrower and Gilbert (2018) in JTNP sheds significant insight into the apparent fragility of the relationship between *Y. brevifolia* and *T. synthetica*. The authors succinctly lay out the problem:

> Obligate mutualisms like the Joshua tree–yucca moth interaction are acutely sensitive to changes in climate. The interacting partners may respond differently, creating an asynchrony in species phenology that can lead to population decline and local extinction. Environmental changes that shift the outcome to fewer viable seeds or greater seed predation could be detrimental to both species. However, the climate

envelope within which this mutualism currently exists is narrow, and climate change effects in the Mojave Desert are expected to limit this envelope to only the highest elevations in Joshua Tree National Park (JTNP) within 90 yr, greatly reducing habitat with suitable climate and potentially extirpating the species from its namesake park (internal citations omitted).

Joshua trees are distributed across a 1200-m elevational range in JTNP from approximately 1000 m to 2200 m. Elevation gradients can serve as "natural experimental systems through systematic variation in abiotic and biotic factors," and average daily summer temperature per site in the Harrower and Gilbert (2018) study declined steadily along the elevation gradient with the warmest site at 30.2°C and the coolest at 19.9°C. Harrower and Gilbert (2018) examined how the abundance of *Y. brevifolia* and *T. synthetica* varies by elevation and quantified how the outcome of the Joshua tree–yucca moth interaction shifts depending on the context of where it occurs and the impacts that may have on Joshua tree fitness.

The authors found a sharp dichotomy between intermediate elevation sites versus the highest and lowest sites. Tree abundance was highest at intermediate elevations, with a "marked peak at around 1250 m where the trees were numerous and large and produced many flowers; this peak coincided with a high abundance of moths, as well as high production of pods, seeds, fertile seeds, and seedlings that grew from seeds." A positive relationship between moth abundance and successful sexual reproduction was found, with number of seedpods and fertile seeds per pod increasing with moth abundance. Moth abundance was significantly correlated with tree size, tree abundance, and number of flower panicles per tree, with larger trees having more panicles. These associations collectively indicate that reproductive success of both Joshua trees and yucca moths are greatest where the Joshua trees are abundant and vigorous, which currently is at intermediate elevations.

In stark contrast to intermediate elevation results, at the lowest and highest sites the number of dead Joshua trees peaked, while live trees were small and few and had few flowers, and no moths, seedpods, or seedlings were encountered. Reproduction was limited to clonal spread. Soil moisture was very low at the lower, warmer elevations and may have contributed to Joshua tree death. The authors noted that their observations were consistent with expectations from the models of Cole et al. (2011) and Barrows and Murphy-Mariscal (2012) and suggest that the range of Joshua trees is contracting at the lower elevations where there was no seedling recruitment and high tree mortality.

Harrower and Gilbert's (2018) finding that at elevation extremes Joshua tree reproduction is almost exclusively clonal is consistent with previous accounts finding that Joshua tree clonality increases with elevation, but the lack of seedling recruitment and enhanced clonality at low elevations had not been previously reported. Trees produced flowers at both of the extremes, but no moths, fruit development, or seed set were observed in these areas. Consequently, the lack of seedlings could be explained by the lack of pollinators.

The presence of only clonal populations at the low and high ends of *Y. brevifolia* distribution has several very significant potential repercussions:

> If trailing edge populations of (mostly clonal) Joshua trees are also those in the population that are best adapted to deal with the highest local temperatures, a lack of sexual outcrossing with populations at higher elevations could threaten overall species persistence due to reduced fitness of seedlings as the climate warms. Clones have reduced reproductive fitness, which could increase susceptibility to local extinction of the trees. The lack of pollinators, seed set, and seedlings at higher elevations suggests that Joshua trees are not currently expanding their range upslope (Harrower and Gilbert 2018) (internal citations omitted).

Harrower and Gilbert (2018) summarized the dilemma facing the *Y. brevifolia* and *T. synthetica* mutualism: "Joshua trees seem to be dying back at low elevations as predicted, but they do not seem to be moving successfully into higher elevations, where the mutualism is not successful." Moths are absent at these higher elevations and it "remains to be seen if Joshua tree performance can improve at higher elevations and if it will be able to attract enough moths to successfully reproduce, or if moths can migrate to and survive at those locations." Given "the survival of the species requires colonization of new habitats," the current lack of a functioning pollination mutualism at the high elevation margins of the Joshua tree's range raises serious doubts about the ability of the species to colonize new habitats, and ultimately to survive.[22]

In sum, climate change represents an existential threat to *Y. brevifolia* in its California range. Even in the absence of climate change, the convergence of biotic and abiotic factors necessary for recruitment "results in successful establishment of new seedlings only a few times in a century" (Esque et al. 2015). Such recruitment has already largely stopped at the drier, lower limits of the species' range (Barrows and Murphy-Mariscal 2012; Sweet et al. 2019). Prolonged droughts, which are projected to occur with greater frequency and intensity over the coming decades (Hopkins 2018), will not only preclude recruitment across ever-greater areas of the species' range, but will lead to higher adult mortality, either directly due to temperature and moisture stress or indirectly due to increased herbivory from hungry rodents lacking alternative forage (DeFalco et al. 2010; Harrower and Gilbert 2018). Whether or not the species' pollinating moth will be able to keep pace with a changing climate is highly-questionable (Harrower and Gilbert 2018). The Joshua tree's ability to colonize new habitat at higher elevations or latitudes is extremely limited and no such range expansion is yet occurring, even as the lower elevation and southern edge of its range is already contracting (Cole et al. 2011; Harrower and Gilbert 2018). And there is no safe refuge, as the higher elevation areas in which Joshua trees are projected to best be able to survive increasing temperatures and drying conditions are at great risk of fire due to the prevalence of invasive grasses (Barrows and Murphy-Mariscal 2012; Sweet et al. 2019). Absent rapid and substantial reductions in GHG emissions *and* protection of habitat, the species will likely be extirpated from all or most of California by the end of the century.

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[22] Interestingly, certain higher elevation areas (but not the highest elevations) had the highest density of trees in the study, but very low moth abundance. These higher elevation sites were dominated by trees reproducing asexually. It is not clear whether moths are unable to thrive at these higher elevations or if the low numbers of flowers meant that location was unable to attract or support the moths. Harrower and Gilbert (2018) postulated that this elevation range, from 1500 to 1600 m, "where trees thrive but moths do not, may be an important transition zone for future work on the details of the Joshua tree–yucca moth climate mismatch."

5.5 Habitat Loss to Development

While the overall outlook for *Y. brevifolia* is grim, the species has an advantage over many other climate-threatened species in that much of its habitat is at least nominally protected from other impacts. Its southernmost population is within the national park that bears its name, while some of its northernmost populations are in Death Valley National Park. As described in the Distribution section *supra*, YUBR North is 96% federal land, while, YUBR South is 48% federal land. Nevertheless, development presents a substantial threat to the species in a significant portion of its range.

Of the two *Y. brevifolia* populations, YUBR South has been the most impacted by human development and faces the greatest threats in its future. Over 50% of the land area comprising the habitat for this population is privately owned (USFWS 2018). The cities and towns of Apple Valley, Hesperia, Lancaster, Palmdale, Ridgecrest, Victorville, and Yucca Valley, along with many other smaller communities have been built in Joshua tree habitat in the YUBR South area. In recent decades these areas have grown rapidly, with the populations of Lancaster, Palmdale and Apple Valley all growing by approximately 36% between 2000 and 2018, Yucca Valley growing by 29.5% and Victorville by a staggering 93% during that same time period (SCAG 2019).

Human population growth in these areas and consequent loss of Joshua tree woodlands is expected to continue in the coming decades. The USFWS (2018), using the EPA's Integrated Climate and Land-Use Scenarios (ICLUS) modeling tool to predict future housing density growth in the range of the Joshua Tree, estimated that 41.6% of suitable habitat for *Y. brevifolia* in the YUBR South area would be lost to housing development by 2095 (Figure 19).[23] When combined with YUBR North, about a third of Joshua tree habitat would be lost for the species in California. Importantly, the ICLUS modeling done by USFWS only looks at housing density, not industrial, military or other development so likely represents an underestimate of development impacts.

In addition to urban growth, various other forms of development threaten Joshua tree habitat in California, including roads, highways, transmission lines, industrial facilities and large and small-scale renewable energy projects. While many of these impacts have been poorly quantified to date, according to USFWS (2018), renewable energy development has already resulted in the loss of 1.2% of mapped *Y. brevifolia* habitat, equating to about 68,000 acres. However, given USFWS included Nevada habitat in this calculation, while virtually all of the large-scale renewable energy development in the range of the species is in the YUBR South area, the actual total in California is likely closer to 2% of habitat lost to date. Under the Desert Renewable Energy Conservation Plan (DRECP) amendments to the California Desert Conservation Area (CDCA) Plan, of the 388,000 acres of development focus areas on BLM land subject to a streamlined review process to facilitate renewable energy development, approximately 50,000 acres fall within the mapped distribution for *Y. brevifolia* (USFWS 2018),

[23] In using the ICLUS model, USFWS (2018) ran development scenarios consistent with IPCC B1 and A2 climate scenarios. The 41.6% projection is from the A2 scenario which most closely matches current emissions trajectories. Under the lower-growth B1 scenario, 21.7% of YUBR South suitable habitat would be lost to housing development.

equating to more than 1% of additional habitat at risk from this type of development on federal lands and an unknown but potentially larger amount on private lands (Figure 19).[24]

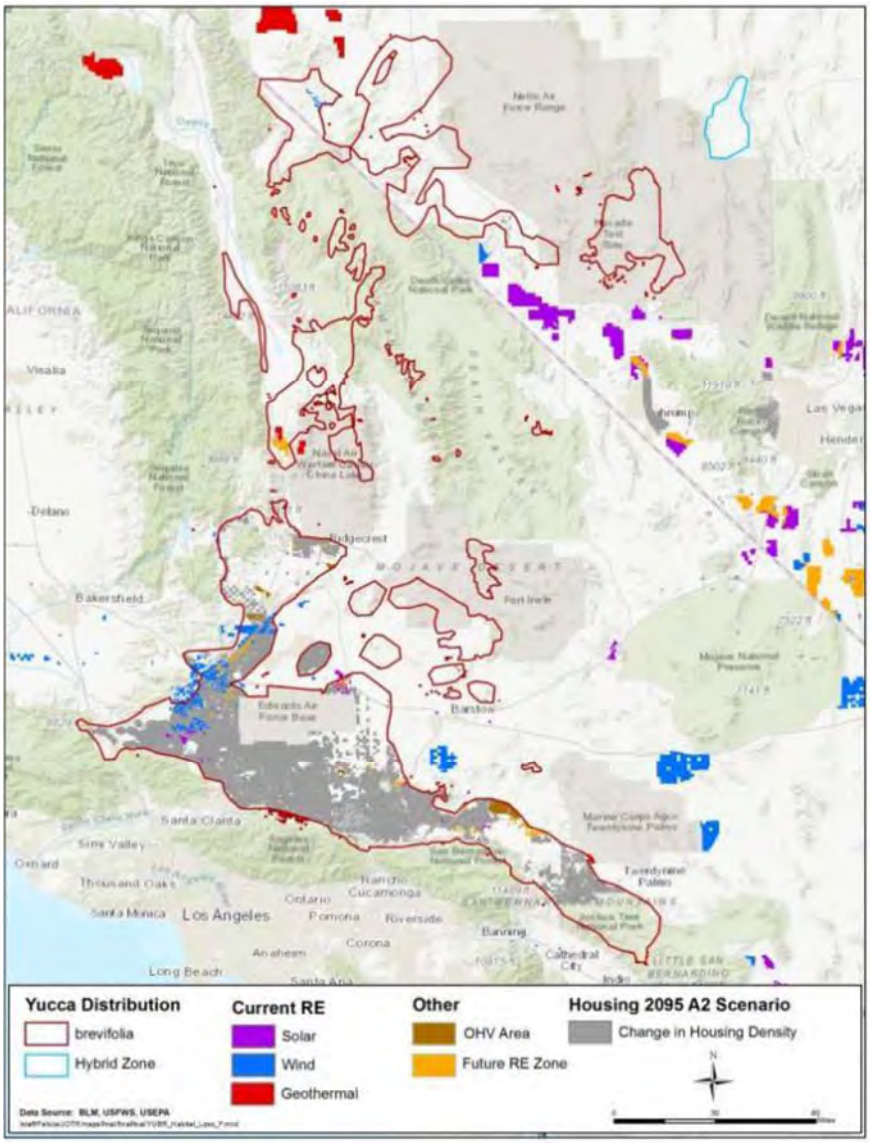

Figure 19: Map showing Joshua tree projected habitat loss due to urban grown, as well as current and projected habitat loss due to large-scale renewable energy projects. Source: USFWS (2018).

In sum, human development has already consumed hundreds of thousands of acres of habitat in the range of *Y. brevifolia*. Over the coming decades, over a million additional acres will be destroyed or degraded for housing, roads, energy projects and assorted other development (USFWS 2018). This large-scale loss or severe degradation of habitat is of conservation concern

[24] Notably, the Trump administration has initiated plans to roll back protections contained in the DRECP, which would likely subject additional areas of Joshua tree habitat to either renewable energy development or other forms of habitat degradation or destruction. https://www.blm.gov/california/BLM-to-consider-changes-desert-renewable-energy-conservation-plan.

for the species even absent the threats posed by climate change. However, given that *Y. brevifolia* in California will lose upwards of 90% of its range under likely climate scenarios, the added loss of habitat and the genetic resiliency and connectivity it provides will further push the species towards extirpation in California.

6 Degree and Immediacy of Threat

As demonstrated in the previous sections, the threats facing *Y. brevifolia* are severe and immediate. While extirpation is likely decades away, the species is already suffering the impacts of climate change, with recruitment failure and adult mortality at the hotter, lower elevation edges of its range (Barrows and Murphy-Mariscal 2012; Harrower and Gilbert 2018; Sweet et al. 2019). Moreover, the impacts of invasive grass fueled fire are already being felt, with approximately half of identified refugia areas in JTNP under moderate warming scenarios having burned in recent decades (Sweet et al. 2019). And perhaps most importantly, the impacts from current GHG emissions will continue to be felt for decades to come, with little time remaining to reduce such emissions before warming sufficient to drive *Y. brevifolia* to functional extinction becomes unavoidable. Consequently, while *Y. brevifolia* may not currently be "in serious danger of becoming extinct throughout all, or a significant portion, of its range," it is certainly likely to become so "in the foreseeable future." Cal. Fish & Game Code §§ 2062 & 2067.

7 Inadequacy of Existing Regulatory Mechanisms

No existing regulatory mechanism are currently in place at the international, national, state or local level that adequately address the threats facing *Y. brevifolia.*

7.1 Regulatory Mechanisms for Greenhouse Emissions Reductions

Given climate change is the greatest threat to the continued existence of the Joshua tree, ultimately the species cannot be saved absent global action to reduce such emissions. Unfortunately, such action is severely lacking in scale, speed and efficacy at all levels of government, both domestically and internationally.

The United States has contributed more to climate change than any other country. The U.S. is the world's biggest cumulative emitter of greenhouse gas pollution, responsible for 25 percent of cumulative global CO_2 emissions since 1850, and is currently the world's second highest emitter on an annual and per capita basis (Le Quéré et al. 2018). However, U.S. climate policy is wholly inadequate to meet the international Paris Agreement targets to avoid the worst dangers of climate change.

As summarized by the Fourth National Climate Assessment, efforts to mitigate greenhouse gas emissions do not approach the scale needed to avoid "substantial damages to the U.S. economy, environment, and human health and well-being over the coming decades":

> Climate-related risks will continue to grow without additional action. Decisions made today determine risk exposure for current and future generations and will either broaden or limit options to reduce the negative consequences of climate

> change. While Americans are responding in ways that can bolster resilience and improve livelihoods, neither global efforts to mitigate the causes of climate change nor regional efforts to adapt to the impacts currently approach the scales needed to avoid substantial damages to the U.S. economy, environment, and human health and well-being over the coming decades (USGCRP 2018).

In 2016, the U.S. committed to holding the long-term global average temperature to well below 2°C and "to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels" under the international Paris Agreement. Existing U.S. domestic laws including the Clean Air Act, Energy Policy and Conservation Act and others provide authority to executive branch agencies to require greenhouse gas emissions reductions from virtually all major sources in the U.S., sufficient to meet the Paris Agreement temperature commitment.

However, the Trump administration has focused on pushing through harmful rollbacks of federal climate policy, and federal agencies are either failing to implement or only partially implementing domestic law and policy mandating greenhouse gas reductions. Trump administration rollbacks of federal climate policy include rescinding the Climate Action Plan, repealing and replacing the Clean Power Plan, a plan to dramatically expand offshore oil drilling in all oceans along U.S. coast, an attempt to rescind the Obama-era withdrawal of offshore drilling in U.S. federal waters in most of the Arctic and parts of the Atlantic, lifting of the moratorium on new federal coal leases, weakening emissions standards for cars and light duty trucks, delaying the implementation of methane emissions standards for new and modified oil and gas facilities, and the intended withdrawal from the Paris Agreement.

As a result, current U.S. climate policy has been ranked as "critically insufficient" by an international team of climate policy experts and climate scientists who concluded in September 2019:

> The Trump Administration has continued with its campaign to systematically walk back US federal climate policy. If it successfully implements all the proposed actions, greenhouse gas emissions projections for the year 2030 could increase by up to 400 MtCO2e over what was projected when President Trump first took office. That's almost as much as the entire state of California emitted in 2016 (CAT 2019).

To meet the carbon budget for keeping temperature rise below 1.5°C, most U.S. and global fossil fuels must remain undeveloped and fossil fuel production must be phased out globally within the next several decades (Rogelj et al. 2015). However, the U.S. is now the world's largest oil and gas producer and third-largest coal producer (OCI 2019) due to U.S. policies that aggressively promote ever greater fossil fuel production. For example, in 2005, Congress exempted fracking from the Safe Drinking Water Act in legislation known as the "Halliburton Loophole." Thereafter, fracking spread rapidly and facilitated a dramatic increase in U.S. natural gas and crude oil production (USEIA 2016). After Congress lifted the 40-year old crude oil export ban in December 2015, crude oil exports have skyrocketed and now hover at nearly three million barrels per day—about a quarter of all U.S. production (DiChristopher 2019). U.S. subsidies are also spurring fossil fuel production. A recent study assessing the impact of major federal and state subsidies on oil production found that these subsidies push nearly half of new

oil investments into profitability, potentially increasing U.S. oil production by 17 billion barrels over the next few decades (Erikson et al. 2017). In short, U.S. policy is incentivizing rather than reducing fossil fuel production.

And while U.S. policy and emissions are going in the wrong direction under the Trump administration, the rest of the world is doing little better. As summarized by CAT (2019), current polices, if actually implemented by all nations, will still result in over 3°C of warming, and even if all pledges and targets make pursuant to the Paris Agreement were met, warming would still be on the order of 2.6 to 2.9°C (Figure 20). This level is far above the 1.5°C threshold the world needs to stay below to avoid the worst impacts of climate change.

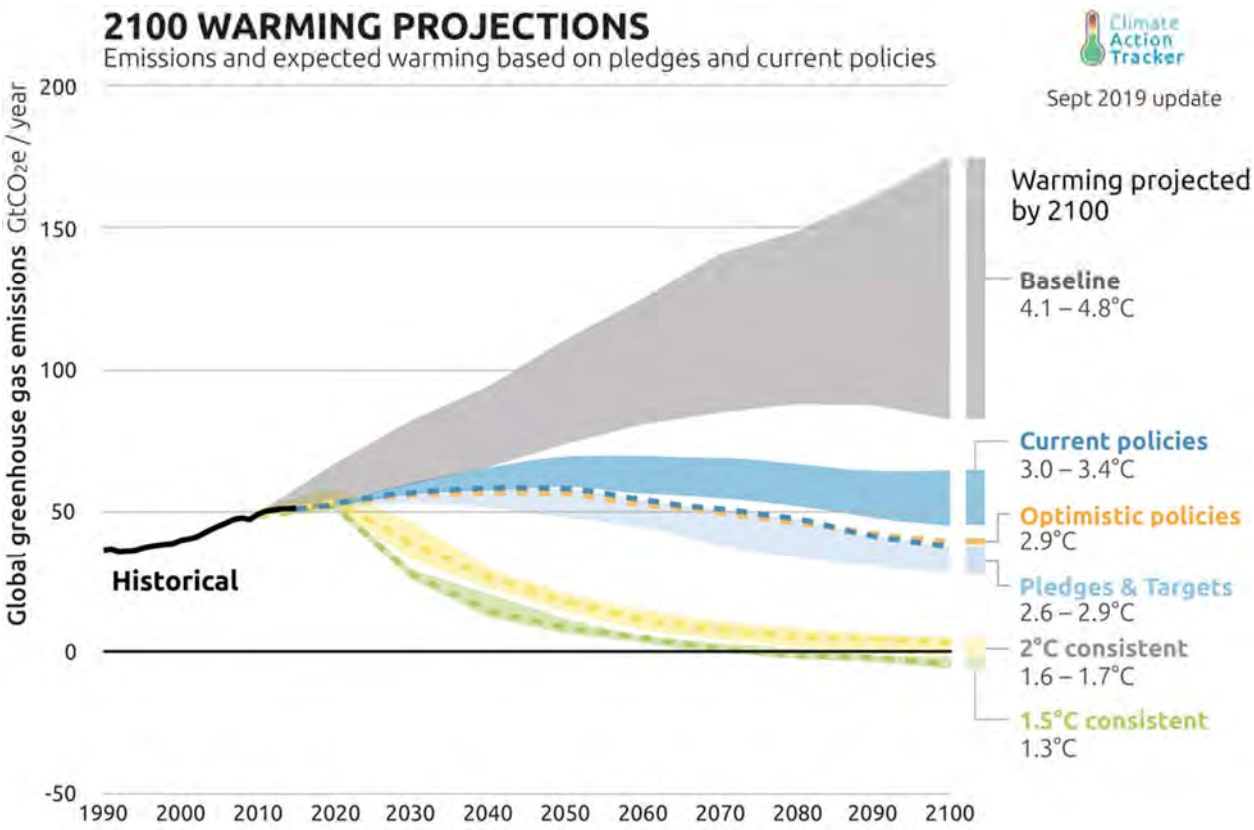

Figure 20: Graph showing mismatch between current emissions trajectories, international climate targets, and national policies and commitments. Source: CAT (2019).

In sum, both domestically and globally, government policies and commitments, not to mention actual actions, to avoid the worst impacts of climate change are woefully inadequate. These trends will lead to temperatures in the range of *Y. brevifolia* that are incompatible with reproduction and ultimately, survival of the species.

7.2 Mechanisms to protect habitat from fire, development and other threats

While the lack of effective regulatory mechanisms to address greenhouse pollution is largely determinative as to the question of whether *Y. brevifolia* qualifies for CESA protection,

mechanisms to protect the species from other threats are also insufficient.

7.2.1 Invasive species and fire

To date no legal, regulatory or management efforts have demonstrative effectiveness at addressing the severe threat that invasive species and consequent altered fire regimes pose to Joshua trees. While the National Park Service (NPS) has updated it fire management plans to address the increased threat of fire to the species, large fires continue to be a significant threat in JTNP (Sweet et al. 2019). Other areas in the species' range lack species-specific fire management plans. And while immediate suppression of fires in *Y. brevifolia* habitat can limit the spread of fires, protection of the species from fire ultimately requires invasive species management to reduce the fuel load. Given invasive species spread and abundance is linked to both disturbance (e.g. roads, ORVs, cows, urbanization) (Brooks and Berry 2006) and nitrogen deposition (Allen et al. 2009; Allen et al. 2011), each of these contributing factors will need to be addressed.

Disturbance is somewhat limited in the portions of the range of *Y. brevifolia* within national parks, but these areas harbor only approximately 10% of the species' current suitable range in California. The vast majority of the species' range in the state is on BLM, military and private lands that are not managed primarily for species protection and include activities such as ORV use, cattle grazing, military training, urban sprawl and activities that foster the spread of invasive species and/or the ignition of fires (USFWS 2018).

Notably, BLM recently (10/3/19) approved a Record of Decision for a vehicle route network in the West Mojave Planning Area, which encompasses the entire range of YUBR South and a portion of YUBR North. About a quarter of mapped Joshua tree habitat in YUBR South is on BLM land, while over half of YUBR North habitat is on BLM land. BLM approved an expansive ORV route network of 6000 miles of open vehicle routes in the plan area, ensuring that any public lands outside of wilderness will be highly fragmented, directly degrading habitat, exacerbating the spread of invasive species and increasing the number of human-caused ignitions (BLM 2019).

Nitrogen deposition impacts both disturbed and relatively undisturbed areas, with JTNP being one of the areas in the range of *Y. brevifolia* worst impacted by nitrogen deposition (Allen et al. 2011; Figure 10). As summarized by, Pardo et al. (2011), the threat is dire: "In Joshua Tree National Park in southern California, N deposition favors the production of sufficient invasive grass biomass to sustain fires that threaten the survival of the namesake species."

It is unlikely that nitrogen deposition will be adequately reduced throughout the range of *Y. brevifolia* for at least several decades, if ever. In the western areas of JTNP, nitrogen deposition is largely derived from nitric oxides (HNO_3) coming from automobile and powerplant pollution blown in from the greater Los Angeles area (Allen et al. 2009). In the eastern part of the park, deposition is largely from ammonia (NH_3) from local agricultural sources in the Coachella and Imperial Valleys (Allen et al. 2009). High rate of nitrogen deposition in the far western Mojave likely originate from a mix of smokestack and tailpipe pollution and agricultural sources in the San Joaquin Valley (Bytnerowicz et al. 2016). Even if California successfully decarbonizes its

vehicle fleet and power generation in the coming decades, nitrogen deposition from large-scale agriculture will likely continue to impact large areas of *Y. brevifolia* habitat for the foreseeable future.

Moreover, even if disturbance and nitrogen deposition are reduced and the further spread of invasive species can be curtailed, no fully-effective treatments currently exist to reduce or eliminate at a landscape scale the most pernicious invasive species (e.g. *Bromus* spp., *Schismus* spp., *Erodium cicutarium*), *Brassica tournefortii*) that have already become established in significant portions of the range of *Y. brevifolia* (Brooks et al. 2018).

7.2.2 Habitat loss and degradation

As discussed above, *Yucca brevifolia* stands to lose upwards of a third of its suitable habitat in California to development over the coming decades, including over 40% of its habitat in the YUBR South region. No existing state or federal regulatory mechanisms are currently operative in a manner that will meaningful reduce this threat.

<u>State and local mechanisms</u>

A relatively small portion of the range of *Yucca brevifolia* occurs within California State Parks, including Red Rock Canyon State Park and Eastern Kern County Onyx Ranch State Vehicular Recreation Area in Kern County and Saddleback Butte State Park, Arthur B. Ripley Desert Woodland State Park, and Antelope Valley California Poppy Reserve in Los Angeles County. Collectively these make up less than 1% of the species range in the state (USFWS 2018). While these areas are protected from urban development and are generally to be managed for the protection of park resources, they alone are unlikely to prevent the decline and eventual extirpation of Joshua trees from the region. Saddleback Butte and Arthur B. Ripley Desert Woodland State Parks are small and isolated islands of protected habitat, comprised of approximately 3000 and 500 acres respectively. Antelope Valley California Poppy Reserve is approximately 1800 acres but contains only a few isolated clusters of Joshua trees. Red Rock Canyon State Park at approximately 27,000 acres is much more substantial in size, but is faced with many management challenges similar to adjacent BLM lands, particularly a proposed increase in ORV use in the Park. Similarly, the newly-created Eastern Kern County Onyx Ranch State Vehicular Recreation Area contains some Joshua tree woodland but is managed primarily for ORV use.[25] In any event, even if all other threats to *Y. brevifolia* in these parks were effectively managed, climate change and fire still threatened to extirpate the species from these parks over the coming decades.

The California Desert Native Plants Act, Cal. Food & Agricultural Code §§ 80001 – 80201, was passed "to protect California desert native plants from unlawful harvesting on both public and privately owned lands." *Id*. at § 80002. Joshua trees are explicitly regulated under this provision. *Id*. at § 80073(a)("yuccas") & 80101(b)(1) (setting price for *Y. brevifolia* permits). The Act generally prohibits harvest of desert plants absent permits issued by the relevant county agricultural commissioner or sheriff. *Id*. at § 80073. Land clearing for agriculture and various

[25] Information on each of these parks is available at https://www.parks.ca.gov/.

other forms of development activities are generally exempted so long as the plants are not offered for sale and proper notice is given. *Id*. at § 80111. The statute also includes provisions designed to assure the survival and transplant of desert plants that are harvested pursuant to permits. *Id*. at § 80116. The Department of Fish and Wildlife is tasked with enforcing the statute. Cal. Fish & Game Code § 1925 ("The Department shall enforce the provisions of the California Desert Native Plants Act").[26]

Commercial collection was once seen as perhaps the greatest threat to the Joshua tree and other desert plants, As described in an early account about the threats commercial harvesters presented to the species in southern California, "As soon as they began to realize their beauty and unique character there began a wholesale foray into the desert to dig them up…At the present rate of destruction the cactus of the desert and the Joshua trees will be gone within two years" (Carr 1930). Various state and local laws and ordinances were ultimately passed to address this threat, including the California Desert Native Plants Act. While these measures have been largely effective at reducing the commercial harvest of Joshua trees, they have done little to slow the loss of habitat from agricultural conversation and development in the range of the species.

Among the local jurisdictions in the range of *Y. brevifolia* that currently have plant protection ordinances or other measures that nominally protect Joshua trees are Hesperia, Palmdale, Victorville, Yucca Valley, and Los Angeles and San Bernardino counties. While all of these provisions require consideration of Joshua tree retention in development plans, most exempt single-family homes and none act as an actual bar to tree removal, instead usually requiring transplantation, donation or making available for adoption trees removed from construction sites. *See, e.g*. Palmdale Municipal Code §§ 14.04.010 *et seq*. (requiring preservation of two Joshua trees per acre but allowing this metric to be met by donating removed trees to an offsite City-administered tree bank); Yucca Valley Ordinance 140 (allowing removal of Joshua trees for transplant if they interfere with "approved improvements or other ground disturbing activities" and "best efforts" are made to avoid the need to remove them).

The California Fish and Game Commission noted the inadequacy of these approaches when it adopted its California Policy for Native Plants in 2015:

> The State's policies and practices regarding native plants are in need of review and updating. More than 30 years ago state law focused on transplantation as a means of mitigating for listed plant species, however experience and numerous studies document that such practices are largely ineffectual over time and often damaging to species or population survival.[27]

In sum, the California Desert Native Plants Act and similar local ordinances are, as recognized by the Commission, "largely ineffectual" at protecting imperiled plant species from habitat loss. These provisions may result in the near-term preservation of individual adult Joshua

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[26] A similar statute, the Native Plant Protection Act provides comparable protections for "endangered or rare" native plants. Cal. Fish & Game Code §§ 1900-1913. The Joshua tree is not among the species regulated by this statute.
[27] Available at https://fgc.ca.gov/About/Policies/Miscellaneous.

trees in urban and suburban neighborhoods, but these areas are less likely to remain habitat long-term. Successful recruitment in such areas is likely constrained by lack of nurse plants and it remains highly uncertain whether pollinating moths will be able to persist with the resultant low Joshua tree densities (Harrower and Gilbert 2018)("Having robust, dense, flowering trees is important to support and attract enough moths for successful seed set"). Consequently, these measures are inadequate to prevent extensive loss of Joshua tree habitat in the near-term and for the foreseeable future.

Other state statutes also are inadequate to protect Joshua trees from habitat loss. The California Environmental Quality Act (CEQA) is California's landmark environmental law and establishes a state policy to prevent the "elimination of fish or wildlife species due to man's activities, ensure that fish and wildlife populations do not drop below self-perpetuating levels, and preserve for future generations representations of all plant and animal communities...." Cal. Pub. Res. Code § 21001(c). Towards this end, state and local agencies are required to analyze and disclose the impacts of any discretionary decision or activity. CEQA contains a substantive mandate that agencies should not approve projects as proposed if there are feasible alternatives or mitigation measures which would substantially lessen the significant environmental effects of such projects. Cal. Pub. Res. Code § 21002.

CEQA requires a "mandatory finding of significance" if a project may "substantially reduce the number or restrict the range of an endangered, rare or threatened species." Cal. Code Regs., tit. 14, § 15065(a)(1). CDFW has interpreted this provision to apply to species of special concern, which are species that are "experiencing, or formerly experienced, serious (noncyclical) population declines or range retractions (not reversed) that, if continued or resumed, could qualify it for State threatened or endangered status."[28] CDFW further provides that species of special concern "should be considered during the environmental review process." *Id.*; Cal. Code Regs., tit. 14, § 15380. Thus, a potentially substantial impact on a species of special concern, threatened species, or endangered species could be construed as "per se" significant under CEQA. *Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova* (2007) 40 Cal.4th 412, 449. And under CEQA, when an effect is "significant," the lead agency approving the project must make a finding that changes or alterations have been incorporated into the project to avoid or mitigate its significant impacts, or that such changes are within the responsibility of another agency, or that mitigation is infeasible. Cal. Pub. Res. Code § 21081(a). These provisions therefore provide some protections to species that are listed as species of special concern, threatened, or endangered.

However, Joshua trees are not listed as a species of special concern or as threatened or endangered, such that a project that has the potential to impact the species would not necessarily qualify as a "significant effect" under a lead agency's interpretation of CEQA. In such case, CEQA's substantive mandate to adopt all feasible alternatives or mitigation measures might not be triggered.

CEQA also requires a "mandatory finding of significance" if a project may "substantially

[28] California Department of Fish and Wildlife, *Species of Special Concern*, available at https://www.wildlife.ca.gov/Conservation/SSC.

reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community." Cal. Code Regs., tit. 14, § 15065. Moreover, CEQA's "Environmental Checklist" in Appendix G of the CEQA Guidelines characterizes a project's effects as "significant" if the project would "[c]onflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance."

While these provisions might theoretically offer some protection for Joshua trees, in practice they have not provided sufficient protection. Under CEQA, lead agencies have discretion to develop their own thresholds of significance. *East Sacramento Partnerships for a Livable City v. City of Sacramento* (2016) 5 Cal.App.5th 281, 300; Cal. Code Regs., tit. 14, § 15064(d). This allows local agencies—who are often under pressure from developers to approve projects—to make significance determinations that are inconsistent with independent scientific analysis, including CDFW's analysis.

Even when a lead agency acknowledges that an effect is "significant," CEQA allows a lead agency to adopt a "statement of overriding considerations" and approve a project if the agency finds that other factors outweigh the environmental costs of the project or that further mitigation is infeasible. Cal. Code Regs., tit. 14, § 15093(b); Cal. Pub. Res. Code § 21081. This means that even if a project may have a significant effect on a Joshua tree population, an agency could interpret CEQA as still allowing approval of the project. CEQA in practice is therefore inadequate to protect Joshua trees.

The Natural Community Conservation Planning Act is a voluntary conservation planning mechanism for proposed development projects within a planning area to avoid or minimize impacts to wildlife. Cal. Fish & Game Code §§ 2800-2835. The Act is designed to promote coordination among agencies and landowners to conserve unfragmented habitat areas and multihabitat management. Cal. Fish & Game Code § 2801(d).[29] The Act can also serve as a mechanism to authorize take of CESA listed species. *Id*. at § 2835.

There are no finalized Natural Community Conservation Plans (NCCPs) that cover the Joshua tree. One approved NCCP, the Coachella Valley MSHCP approaches the southern edge of the range of *Y. brevifolia* but does not include the species as a covered species. An NCCP that does overlap the range of the Joshua tree is the proposed Town of Apple Valley MSHCP.[30] This NCCP has been under development for several years with a planning agreement signed in 2017. However, *Y. brevifolia* is not on the proposed list of covered species for the NCCP. Previously, both the West Mojave Plan and the DRECP were intended to be joint plans covering both federal BLM lands and private lands subject to development, but each was ultimately implemented as a federal-only plan, neither of which treat the Joshua tree as a covered species. These plans are further discussed below. In sum, NCCPs may in the future provide some conservation benefit for Joshua trees, but have not done so to date and consequently cannot be considered as providing adequate protection in lieu of CESA listing.

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[29] The NCCP Act is described on CDFW's website at https://www.wildlife.ca.gov/conservation/planning/NCCP.
[30] Documents available at https://www.wildlife.ca.gov/Conservation/Planning/NCCP/Plans/Apple-Valley-MSHCP

Federal mechanisms

The primary federal regulatory mechanism with the potential to protect Joshua trees are management laws and plans governing federal lands. Almost all of the suitable habitat in YUBR north and half within YUBR South is on federal land. Consequently, management of these lands has an important role to play in determining the continued viability of Joshua trees in the state. As discussed above, approximately 10% of *Y. brevifolia* habitat is on NPS lands that are generally well-managed and should prevent significant habitat loss or degradation from activities such as ORV use, cattle grazing, road building or other forms of development. However, even within Death Valley National Park, the 86,400-acre Hunter Mountain Allotment is still active and overlaps with the range of *Y. brevifolia* in the park (NPS 2012). Nevertheless, these lands represent the best opportunities for active management measures to reduce the risk of fire and otherwise attempt to maintain *Y. brevifolia* on the landscape in the face of projected warming.

About 12 percent of the mapped distribution of the YUBR South population falls within military installations and a roughly comparable amount of the YUBR North population falls within such lands (USFWS 2018). The four bases in California with Joshua tree habitat - Edwards Air Force Base, Fort Irwin National Training Center, China Lake Naval Weapons Station and Twentynine Palms Marine Corps Air Ground Combat Center - have each developed Integrated Natural Resource Management Plans (INRMPs) pursuant to the Sikes Act, 6 U.S.C. §§ 670a-670o, that incorporate some avoidance and minimization measures that could reduce impacts to Joshua trees. These measures are summarized in USFWS (2018) and largely consist of avoidance where feasible and transplantation when conflicts are unavoidable. These measures largely mirror those required for private lands under state and local ordinances, which as discussed *supra*, are in the Commissions own words, "largely ineffectual."

The majority of Joshua tree habitat on federal lands is on BLM lands. These areas are governed by the agency's California Desert Conservation Area (CDCA) Plan as amended. The Northern and Eastern Mojave Plan (NEMO) area overlaps with most of the California range of the YUBR North populations and the West Mojave Plan (WEMO) area covers all of YUBR South and the southwestern portion on YUBR North. The 2016 Desert Renewable Energy Conservation Plan (DRECP) amendments cover the entirety of the species' range in California. None of these plans provide adequate protection for *Y. brevifolia*. area

BLM's NEMO plan does virtually nothing to specifically protect Joshua trees. The species is not mentioned in the Record of Decision (ROD) at all, and the only specific protection afforded to it is a prohibition on collecting downed trees for firewood (BLM 2002). Notably, Joshua tree protection is explicitly excluded from the plan's measure to limit surface disturbance below certain thresholds:

> It should be noted that some important plants, such as Joshua trees, which are important as an overstory plant but are not dominant, would not be a part of the evaluation trigger. Reestablishment of such plants could, of course, be a restoration requirement for a particular project, but they would not be used to trigger an evaluation for the purposes of reducing the cumulative disturbance total (BLM 2002).

In short, the NEMO plan was not designed with the intent of protecting Joshua trees, and the BLM apparently did not wish to have protection of the species act a barrier to any potential land-disturbing activities.

The WEMO plan is little better. As with NEMO, its ROD does not mention Joshua trees at all. The FEIS for the plan amendment was developed when the project was to also be a habitat conservation plan (HCP) covering private development in the plan area. In this context it discusses existing and proposed preservation of Joshua tree woodlands in the Antelope Valley by state and local entities, but the only specific conservation measure for Joshua trees that BLM itself takes is to prohibit harvesting of Joshua trees in designated conservation areas (BLM 2006). Given state law already prevents such harvest, this conservation measure is illusory. BLM approved the WEMO plan as a federal only plan with no HCP component. Under this alternative, BLM estimated that 54.1% of Joshua tree woodland habitat could be lost (BLM 2006).[31]

BLM recently completed an amendment to the WEMO plan dealing with vehicle routes (BLM 2019). Under this plan amendment, the route network is expanded to approximately 6000 miles of roads and trails open to ORVs. The ROD does not mention Joshua trees, the FSEIS does not meaningfully address impacts to Joshua trees, and the plan amendments do not add any specific measures to protect the species. Mentions of Joshua trees are cursory in the FSEIS, with for example, in a chart of subregions of the plan area, for one area BLM states that it "has an extensive Joshua Tree forest," and immediately thereafter notes that "Gently terrain and good soils make ideal provide ideal OHV touring opportunities" [typos in original].[32] In the ROD, BLM also reaffirms cattle grazing on all active allotments (BLM 2019). As discussed *supra*, invasive species and consequently fuel loads, and well as human-caused ignitions increase in areas subject to disturbance such as cattle grazing and ORV use (e.g. Brooks and Berry 2006). The recent plan amendment will both directly degrade Joshua tree habitat via increased vehicle use, while also indirectly exacerbating the conditions that lead to more frequent and more intense fires.

The more recent DRECP started as both a BLM plan and a state NCCP. Consequently, the environmental documents associated with it address the conservation of Joshua trees more directly than the overlapping BLM plans. However, the DRECP was ultimately adopted as a BLM-only plan, rendering much of the proposed broader conservation uncertain. Among the Joshua tree measures BLM adopted are an objective listed as "Conserve unique landscape features, important landforms, and rare or unique vegetation types identified within the BLM Decision Area, including…Areas of dense Joshua Tree woodland." To meet this objective, the DRECP requires that for new actions, Joshua tree impacts are to be assessed in planning

[31] As discussed in the Distribution section *supra*, "Joshua tree woodland" represents only a portion of the habitat types where the species occurs. However, it is the densest and highest quality habitat for the species.

[32] The only other "analysis" of impacts to Joshua trees in the FSEIS, is an assertion repeated verbatim multiple time in the document that attempts to minimize harm from vehicles: "In remote or mountainous areas, most travel is confined to roads, so that the woodland communities (Joshua tree woodland, scrub oak, pinyon pine woodland, juniper woodland) suffer relatively fewer direct vehicle impacts" (BLM 2019).

decisions and "impacts to Joshua tree woodlands will be avoided to the maximum extent practicable, except for minor incursions" (BLM 2016).[33] In addition to the specific measures for Joshua trees, their habitat would likely gain better protection from various land designations made under the DRECP. However, the benefits for the species derived from the DRECP amendments to the CDCA Plan are in doubt, as the BLM announced that is was planning to revisit the conservations measures of the plan. *See* Notice of Intent to Amend the California Desert Conservation Area, Bakersfield, and Bishop Resource Management Plans and Prepare Associated Environmental Impact Statements or Environmental Assessments, 83 Fed. Reg. 4921 (February 2, 2018). That amendment process is currently ongoing.

In sum, outside of national parks and areas of congressionally designated wilderness, federal land management plans in the range of *Y. brevifolia*, if they address the species at all, at best provide for avoidance of harm to the extent "practicable" or "feasible." Such protection is inadequate in the face of the difficulties the species will face in a rapidly changing climate.

8 USFWS's Flawed Endangered Species Act Determination.

The strongest federal regulatory mechanism that could protect *Y. brevifolia* is the federal Endangered Species Act (ESA). However, on August 15, 2019 the USFWS found that listing Joshua trees (*Y. brevifolia* and *Y. jaegeriana*) throughout their multistate range was not warranted. Endangered and Threatened Wildlife and Plants; 12-Month Findings on Petitions to List Eight Species as Endangered or Threatened Species, 84 Fed. Reg. 41694 (August 15, 2019) (USFWS 2019). The finding was made in response to a 2015 petition by WildEarth Guardians seeking such listing.

While the 2018 species status assessment prepared by USFWS and relied upon by the agency in its decision is informative as to many aspects of Joshua tree taxonomy, natural history, distribution and threats, its conclusions are not at all determinative to the question of whether *Y. brevifolia* warrants listing under CESA. Most importantly, USFWS (2018) assessed whether Joshua Trees in their four-state range were threatened or endangered. And to the degree that the agency considered *Y. brevifolia* separately from *Y. jaegeriana*, it never examined the species' status in just California, rather than California and Nevada combined. Under CESA, the only question is whether the species in imperiled in California. As both CDFW and the Commission have concluded—and appellate courts have upheld—the term "range" under CESA is construed to refer to the range of a species *within* California, not the worldwide range of the taxa. *California Forestry Assn. v. California Fish & Game Com.* (2007) 156 Cal.App.4th 1535, 1550-551.

Additionally, several of the analyses and conclusions contained in USFWS (2018) are flawed and served to downplay the threats and overstate the likely resilience of the species. For example, the agency used an upper "appropriate temperature range" for the species of 59ºC (138ºF). The same metric was used for all age classes, from seedlings to adults. This threshold

[33] DRECP documents are available at https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=95675

was based on a laboratory studies by Smith et al. (1983) in which detached leaves were placed in hot water for an hour and then examined for heat damage. The temperature at which a severed leaf demonstrates cell damage in a lab is a far different metric than the ambient temperature in which a Joshua tree can survive and successfully reproduce in the wild.[34] The temperature used by USFWS (2018) is higher than the hottest temperature (56.7°C; 134.1°F) ever measured on Earth. Notably, the highest lab air temperature that Smith et al. (1983) actually successfully reared Joshua trees was 45ºC (113ºF).[35]

USFWS (2018) also downplays the risks of fire to *Y. brevifolia*. Using modeling to estimate invasive grass cover and link high coverage ratios (15-45%) as a proxy for increased fire frequency and severity, the agency estimated that approximately 1.4 percent of the YUBR South and 8.8 percent of the YUBR North current mapped distribution would be at risk in the next several decades. In contrast, Sweet et al. (2019) documented that half of the area of Joshua tree habitat in JTNP identified as refugia for the species under an RCP 4.5 pathway had already burned in recent decades. The total recent burn area in the park represents well over 10% of the current range of the species in the park and such fires are likely to increase within JTNP and throughout the range of the species.

Another severe limitation of USFWS (2018) is the complete discounting of species distribution modeling, which currently represents the best available science on the future status of the western Joshua tree. The agency admits that it did not carry out any such modeling, claiming that having quantitative information is somehow at odds with its goals in carrying out a status assessment.

> We did not model future distribution based on predicted climate change scenarios. Instead, we used future scenarios to perform a qualitative evaluation of the impact of climate change on the current distribution. … Our goal was to present information related to future climate outcomes, not to evaluate quantitative assessments of climate change on future Joshua tree distribution, therefore we did not construct ecological niche models (e. g., species distribution models) (USFWS 2018).

What USFWS claims it did in lieu of deploying ecological niche modeling was scenario planning, citing to Star et al. (2016) for its rationale.

> Rather than focusing only on the most likely predictions, scenario planning identifies a range of possible future states. Scenarios are not predictions, and probabilities are not assigned to specific outcomes. By recognizing the limits of projections and acknowledging deep uncertainty, decision makers are not restricted to preparing for

[34] By way of comparison, according to industrial safety standards, a human can safely touch items as hot a 140°F without burning their hand, but prolonged exposure to air temperature of 140°F would lead to heat stress and ultimately be fatal.

[35] Among the various temperature ranges listed for the species in the wild, the highest is reported by Lenz (2001) as 51°C (124°F), which presumably corresponds to a one-time daily maximum temperature recorded somewhere in the species' range; this temperature is well above the average summer maximum of the hottest place in the United States, Furnace Creek in Death Valley (July average of 47°C (116°F)).

> only one outcome, and can still act in the face of climate change while retaining flexibility.

USFWS (2018) also cites two older studies in an attempt to undermine the utility of such studies as well as the feasibility of doing them with regard to Joshua trees.[36]

> Furthermore, ecological niche models are often criticized for inaccurate projections of future occurrence (Fitzpatrick and Hargrove 2009, p. 2256). This is especially true for species where current distribution data are not extensive across the species range or information about physiological thresholds is lacking, such as Joshua tree (Pearson and Dawson 2003, p. 362). Given the absence of information about the adaptive capacity of Joshua tree, in combination with gaps in the occurrence data across the species' range, the probability of spurious conclusions seemed high.

The problems with USFWS's approach are many. First, USFWS did not *itself* need to model future distribution of Joshua trees, as this has already been done my multiple researchers, with Cole et al. (2011), Barrows and Murphy-Mariscal (2012) and Sweet et al. (2019) employing the most sophisticated of such efforts. Nowhere in USFWS (2018) is there even an acknowledgement that such modeling efforts have been undertaken and reported in these studies.[37]

Second, while scenario planning may be useful in recovery planning or otherwise preparing for management responses to climate change, it has little utility in determining whether a species is "likely" to become endangered in the foreseeable future, as required by the ESA and CESA. 16 U.S.C. § 1532(20); Cal. Fish & Game Code § 2067 (ESA and CESA definitions of threatened species). In effect, USFWS (2018) is acknowledging that "[r]ather than focusing only on the most likely predictions" it instead applied a more nebulous framework that allowed it to "retain flexibility" and disregard not just the best available science, but also the plain language of the ESA.

Third, USFWS's reliance upon Pearson and Dawson (2003) and Fitzpatrick and Hargrove (2009) for it critique of ecological niche models is misplaced. The concerns raised by Pearson and Dawson (2003) and Fitzpatrick and Hargrove (2009) about the limitations of certain niche modeling efforts may be valid, but Cole et al. (2011), Barrows and Murphy-Mariscal (2012) and Sweet et al. (2019) all employed the measures raised by these earlier authors to improve the accuracy of their modeling, including, most importantly, validating their models against the current distribution of the species. Pearson and Dawson (2003) also note that information on dispersal abilities should also be included in modeling where possible, a factor clearly addressed in Cole et al. (2011).

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[36]Neither of these studies, nor Star et al. (2016), appear in the references section of USFWS (2018), indicating that they may have been added at the last-minute in an attempt to justify a legally and scientifically dubious conclusion.

[37]Elsewhere in the document, USFWS (2018) cites to Cole et al. (2011) and Barrows and Murphy-Mariscal (2012) for other aspects of Joshua tree natural history or range. Sweet et al. (2019) had not been published at the time of USFWS (2018) but was released prior to the actual listing decision being published and should have factored into the final decision.

Additionally, the primary concern of Fitzpatrick and Hargrove (2009) is that climate change and future conditions will create novel environments with new species interactions, including many invasive species. This makes predictions about future species distribution less reliable, unless they account for such factors. But these concerns are addressed by Cole et al. (2011), Barrows and Murphy-Mariscal (2012) and Sweet et al. (2019) who examined the current and past status of *Y. brevifolia* across environmental gradients (elevation and latitude) and used increasingly finer-scale species distribution and climate data to refine their model outputs. Moreover, unlike USFWS who discarded such modeling entirely, Pearson and Dawson (2003) explicitly acknowledged the utility of such models: "In many cases, bioclimate envelope models provide perhaps the best available guide for policy making at the current time." In the decade and half since this statement was published, such models have improved greatly and are even more useful for informing policy decisions.

Finally, USFWS's failure to rely upon the published species distribution models was strongly criticized by one of the peer-reviewers of the status assessment.

> [T]he assessment has not completed, and does not incorporate, a species distribution model, and thus draws invalid conclusions about future distributions under various climate change scenarios. Unfortunately, the problems are significant enough that the assessment's conclusions are not scientifically sound, and should not be used for making a decision regarding whether to list Joshua trees under the ESA (Smith 2018).

Smith (2018) noted that species distribution models are the "accepted standard" for assessing future distribution of a species, described the finding of the various modeling efforts to date, compared these to the conclusions of the status assessment, and concluded that "[g]iven that the USFW assessment has not followed the conventional standards in the field for predicting future distributions, and makes predictions that are starkly different than those drawn by other workers making comparable model assumptions, I consider the assessment's conclusions to be highly dubious." Smith (2018) concluded with the recommendation that "[f]irst and foremost, the assessment simply MUST include a formal species distribution model." (emphasis in original).

Smith (2018) also pointed out that the estimation of "suitable habitat" for Joshua trees was overstated in the status assessment.

> [T]he way that 'suitable habitat' has been defined ignores important recent work on demographic trends in Joshua trees, with the result that the potential distribution of Joshua tree under current climate conditions is vastly overestimated.

Specifically, Smith (2018) pointed out USFWS (2018) had not taken into account climate change that has already occurred when it delineated such habitat.

> In identifying the climate requirements for Joshua tree, the assessment uses the current distribution to determine suitable habitat.… There are two significant, interrelated problems with these assumptions. First, the current distribution of Joshua

> tree includes individuals who are hundreds of years old, and that became established during pre-industrial climate conditions when global average temperatures were a full degree cooler than they are today, and about 0.75 degrees cooler than the 30-year average. Indeed, it is well established that long-lived trees can persist as relict stands of moribund adults that exist outsides the range of suitable habitats required for long term population persistence.
>
> In the case of Joshua trees in particular, we have very compelling evidence that the current distribution of mature trees does not reflect the climate requirements for successful germination and seedling establishment. For example, extensive mapping studies in Joshua Tree National Park found that seedlings occur only in a fraction of the area occupied by adults, and that this area corresponds to the predicted distribution under a 2-degree warming scenario (Barrows and Murphy-Mariscal, 2012). That is, the suitable habitat for seedlings is much smaller, includes a narrower range of climates, than would be predicted based adult presence data. Although the Barrows and Murphy-Mariscal study considered only a small portion of the geographic range of Joshua trees, other workers have found similar patterns across the Joshua trees range.

Smith (2018) concluded that these errors rendered the conclusions of the assessment unreliable: "I consider the current assessment to not be based on the best available science, and its conclusion have no valid scientific basis." USFWS did not address either of the primary problems identified by Smith (2018) when it finalized the status assessment.

In sum, USFWS's determination to not protect Joshua trees under the ESA should not, and legally cannot, be a basis to fail to protect *Y. brevifolia* under CESA.

9 The Western Joshua Tree Warrants Listing under CESA.

As detailed above, in conformance with the requirements of Cal. Code Regs., tit. 14, § 670.1, this petition presents scientific information regarding the western Joshua tree's life history, population trend, range, distribution, abundance, kind of habitat necessary for survival, factors affecting the ability to survive and reproduce, degree and immediacy of threat, impact of existing management efforts, suggestions for future management, availability of sources and information, and detailed distribution maps.[38]

That information clearly demonstrates that the western Joshua tree (*Yucca brevifolia*) is eligible for and warrants listing under CESA based on the factors specified in the statute and implementing regulations. While *Y. brevifolia* is not at imminent risk of extinction, it still faces significant and growing threats, primarily from climate change, that ultimately threaten the viability of the species in all or a significant portion of its range in California in the foreseeable future; it consequently meets the definition of a "threatened species."

[38] Information on suggestions for future management and availability of sources and information are contained in the Management Recommendations and References sections *infra*.

Under CESA, a "threatened species" is "a native species or subspecies of a … 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 . . . ." Cal. Fish & Game Code § 2067. A plant is an "endangered species" when it 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." Cal. Fish & Game § 2062.

Moreover, CDFW has concluded—and appellate courts have upheld—that when determining whether a species is threatened or endangered under CESA, the term "range" is construed to refer to the range of a species or subspecies *within* California, not the worldwide range of the species or subspecies. *California Forestry Assn. v. California Fish & Game Com.* (2007) 156 Cal.App.4th 1535, 1550-551. This means that regardless of how *Y. brevifolia* may fair in Nevada, the Commission and CDFW can only consider the status and fate of the species in California.

Additionally, in determining the foreseeable future in the context of climate change, CDFW has treated the rest of the century as foreseeable.

> In considering what the 'foreseeable' future is for climate change effects, the Department relied on climate change projections to the end of the 21st century, as described by the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC 2007). The IPCC models and projections have been thoroughly vetted and validated in the series of Assessment Reports produced over the past 12 years. The Department considers the climate change projections to be the best available information on global climate change (Bonham 2013).

As discussed in the climate sections above, absent rapid and substantial reductions in greenhouse gas emissions, the best available science demonstrates that by the end of this century *Y. brevifolia* will be extirpated from, at a minimum, a significant portion of its range in California. Any places it remains will be in small, isolated refugia. These areas, if any, will likely be populated with low numbers of non-reproductive adult trees, themselves threatened by fire. At such point, if not already extirpated from the state, the species will certainly be "in serious danger of becoming extinct throughout all, or a significant portion, of its range" in California and be an "endangered species." Consequently, it is a "threatened species" today.

In the event the Commission determines that full-species taxonomy for the western Joshua tree is not sufficiently established, petitioners request listing of the taxa as a subspecies/variety *Yucca brevifolia brevifolia*. Additionally, while petitioners believe that the western Joshua tree warrants protection under CESA throughout its range in California, if the Commission determines that it does not warrant range-wide listing, the Commission must assess whether either of the two population clusters of the species, YUBR North and YUBR South separately warrant listing as ecologically significant units (ESUs).

The Commission and CDFW have long recognized that ESUs can be designated and listed under CESA, and this interpretation of CESA has been upheld by the courts. *See California*

Forestry Assn. v. California Fish & Game Com. (2007) 156 Cal.App.4th 1535, 1540 ("Consistent with the policy of the CESA, we will hold that the term 'species or subspecies' includes evolutionarily significant units"); *Central Coast Forest Assn. v. Fish & Game Com.* (2018) 18 Cal.App.5th 1191, 1197, fn. 4 [*"CCFA II"*] ("An ESU is included within the term 'species or subspecies' in sections 2062 and 2067."). While the ESU concept has primarily been applied to fish, the Commission recently listed an ESU of a mammal, the Pacific Fisher, as a "threatened species." *See* 14 C.C.R. 670.5(b)(6)(J) ("Fisher (*Pekania pennant*) Southern Sierra Nevada Evolutionarily Significant Unit"). Moreover, unlike the federal ESA, where listing of distinct populations segments (DPSs), of which ESUs are subcategory, is restricted to vertebrate species (16 U.S.C. § 1532(16) (definition of "species"), the ESU concept under CESA has no such limitation and applies to all listable taxa, including plants.

The populations currently delineated as YUBR North and YUBR South have been recognized for over 40 years and recently confirmed by USFWS (2018).

> Rowlands (1978, p. 72) subdivided the Joshua tree range into five regions based on differences in geographic distribution, varieties (i.e., species in this SSA), vegetation, and temperature and rainfall amounts. Based on these regions and more current distribution models (Cole *et al*. 2011, pp. 139–140), we delineated two populations of *Yucca brevifolia* [*Y. brevifolia* south (YUBR South) and *Y. brevifolia* north (YUBR North)], and three populations of *Y. jaegeriana* [*Y. jaegeriana* central (YUJA Central), *Y. jaegeriana* north (YUJA North), and *Y. jaegeriana* east (YUJA East)]. We added a sixth population, the Hybrid Zone in Tikaboo Valley, to distinguish the geographic area where both species, and their pollinators, come into contact between YUBR North and YUJA North.

The two *Y. brevifolia* populations are separated by a small gap in their range, with the northern edge of YUBR South reaching the southern parts of China Lake and the southern boundary of YUBR North reaching the northern edge of the base (Figure 8). USFWS (2018) characterizes YUBR North habitats as "somewhat drier and less diverse than YUBR South," with the lower elevations of YUBR South comprised of mostly creosote bush shrubland, while YUBR North associated vegetation including single-leaf pinyon, juniper, and sagebrush. At its simplest, YUBR South occurs mostly in the creosote dominated Western Mojave while YUBR North occurs in the area where the Northern Mojave transitions to the Great Basin and sagebrush becomes more dominant. This significant difference in habitat between the two population is sufficient to recognize them as ESUs for separate evaluation in the event full species listing is ultimately not deemed warranted by the Commission.

10 Recommended Management and Recovery Actions

For all species imperiled due to the impending loss of their suitable habitat as a result of climate change, the most important recovery actions are those that lead to rapid and steep greenhouse gas emissions reductions so as to minimize the additional warming that will occur in the climate system. However, given inertia in both the climate system and society, significant additional warming is unavoidable even under the most optimistic climate scenarios. Species that are already showing the effects of warming will continue to suffer and decline. For many

narrowly-endemic species with limited dispersal capabilities we will soon reach a point where little else can be done other than ex situ conservation in captivity and/or via assisted migration. It is hard to be optimistic about the fate of such species, as they will likely be lost from the wild even under more moderate warming scenarios.

While the threats facing *Y. brevifolia* in the coming decades are dire, unlike more narrowly-endemic species, the species has the benefit of being long-lived, with a relatively large current distribution spread across elevational and latitudinal gradients, much of which is in protected areas. Consequently, if the species and its habitat are protected early from other threats, and with active management to enhance recruitment and survival, and potentially dispersal, the western Joshua tree has a realistic chance of persisting in the wild. In this context, recommendations for the management and recovery of the western Joshua tree are as follows:

1. The governor declares a climate emergency and takes all necessary action to set California on a path to full decarbonization of our economy by no later than 2045 (e.g. banning the sale of new fossil fuel vehicles by 2030 and requiring the generation of all electricity from carbon-free sources by 2030).
2. CDFW prepares a recovery plan for *Y. brevifolia* pursuant to Cal. Fish & Game Code § 2079.1.
3. CDFW works with local jurisdictions within the range of *Y. brevifolia* to develop NCCPs that protect from development all high-density Joshua tree habitat remaining on private lands.
4. The California Department of Parks and Recreation develops and implements management plans (including fire management plans) focused on Joshua tree protection for state park units within the range of *Y. brevifolia* (Red Rock Canyon State Park and Eastern Kern County Onyx Ranch State Vehicular Recreation Area in Kern County and Saddleback Butte State Park, Arthur B. Ripley Desert Woodland State Park and Antelope Valley California Poppy Reserve in Los Angeles County).
5. The California Department of Parks and Recreation seeks to acquire habitat to expand and connect existing state parks for protection and restoration of Joshua tree habitat.
6. CDFW expands its cooperative work with relevant federal agencies (NPS, DoD, BLM, USFWS) to better protect Joshua trees on federal land.
7. CDFW works with the University of California, California Invasive Plants Council and other institutions and agencies to develop effective measures to control the spread of invasive grasses in *Y. brevifolia* habitat.
8. CDFW works with CAL-FIRE to develop protocols for fire suppression activities within the range of *Y. brevifolia* that maximize protection of the species, while minimizing ground disturbance that may foster the spread of non-native grasses and other invasive species.
9. CDFW works with relevant entities to establish and maintain a seed bank of *Y. brevifolia* collected throughout the range of the species to ensure protection of its genetic diversity.
10. CDFW works with relevant entities to identify potential sites for assisted migration and develop protocols for carrying out such activities.

11 Conclusion

The Joshua tree has long been the most iconic species of the Mojave Desert. Given the well-publicized threats facing the species in the face of climate change, it has recently become an emblem of our society's failure to address the climate crisis. But the Joshua tree is also uniquely situated to become an example of successful action to save a species threatened by climate change. Action taken in and by California to save the species can serve as a model for proactive climate adaptation efforts not just in California but around the world. Listing the species under CESA is not just a symbolically important act of California recognizing the threats the species faces from climate change, but also can serve as the impetus for meaningful management actions that can help ensure the species remains a living icon in perpetuity.

12 References Cited

Copies of references cited in the petition are either linked to websites below or included as files on a disk accompanying a hard copy of the petition sent to the Commission.

Abella, S.R., E.C. Engel, C.L. Lund, J.E. Spencer. 2009) Early post-fire plant establishment on a Mojave Desert burn. Madroño 57(3):137-148.

Allen, E B. and L.H. Geiser. 2011. North American deserts. In L.H. Pardo, M.J. Robin-Abbott and C T. Driscoll (Eds.), Assessment of Nitrogen Deposition Effects and Empirical Critical Loads of Nitrogen for Ecoregions of the United States (pp. 133-142): General Technical Report NRS-80.

Allen, E.B., L.E. Rao, R.J. Steers, A. Bytnerowicz, and M.E. Fenn. 2009. Impacts of atmospheric nitrogen deposition on vegetation and soils at Joshua Tree National Park. The Mojave Desert: Ecosystem Processes and Sustainability (pp. 78–100). Las Vegas, NV: University of Nevada Press.

Althoff, D.M., K.A. Segraves, and J.P. Sparks. 2004. Characterizing the interaction between the bogus yucca moths and yuccas: do bogus yucca moths impact yucca reproductive success? Oecologia 140:321–327.

[APG] Angiosperm Phylogeny Group. 2016. An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG IV. Botanical Journal of the Linnean Society, 181 (1): 1–20.

Barrows, C.W. and M.L. Murphy-Mariscal. 2012. Modeling impacts of climate change on Joshua trees at their southern boundary: How scale impacts predictions. Biological Conservation 152:29–36.

Bonham 2013. Report to The Fish and Game Commission Status Review of the American Pika (*Ochotona princeps*) in California.

Borchert, M.I. and L.A. DeFalco. 2016. *Yucca brevifolia* fruit production, predispersal seed predation, and fruit removal by rodents during two years of contrasting reproduction. American Journal of Botany 03(5):830–836.

Brittingham, S. and L.R. Walker. 2000. Facilitation of *Yucca brevifolia* recruitment by Mojave Desert shrubs. Western North American Naturalist 60(4):374–383.
Brooks, M.L. 2003. Effects of increased soil nitrogen on the dominance of annual plants in the Mojave Desert. Journal of Applied Ecology 40:344-353.

Brooks, M.L. and K.H. Berry. 2006. Dominance and environmental correlates of alien annual plants in the Mojave Desert, USA. Journal of Arid Environments 67:100–124

Brooks, M.L. and J.R. Matchett. 2006. Spatial and temporal patterns of wildfires in the Mojave Desert, 1980-2004. Journal of Arid Environments 67:148–164.

Brooks, M.L., Minnich, R.A., Matchett, J., 2018. Southeastern Deserts Bioregion. In Fire in California's Ecosystems 2nd Edition. University of California Press.

[BLM] Bureau of Land Management. 2002. Northern and Eastern Mojave Plan (NEMO). DOI-BLM-CA-D010-2002-0001-RMP-EIS (Northern and Eastern Mojave RMP Amendment). https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=renderDefaultPlanOrProjectSite&projectId=73191

[BLM] Bureau of Land Management. 2006. West Mojave Plan (WEMO). DOI-BLM-CA-D010-2003-0001-RMP-EIS (West Mojave RMP Amendment). https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=renderDefaultPlanOrProjectSite&projectId=72544

[BLM] Bureau of Land Management. 2016. Desert Renewable Energy Conservation Plan (DRECP). DOI-BLM-CA-D010-2014-0001-RMP-EIS (DRECP Amendment). https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=95675

[BLM] Bureau of Land Management. 2019. West Mojave Route Network Project (WMRNP). DOI-BLM-CA-D080-2018-0008-EIS (West Mojave Route Network Project SEIS) https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=139661

Bytnerowicz, A., Fenn, M.E., Allen, E.B., and Cisneros, R. 2016. Ecologically relevant atmospheric chemistry. In Ecosystems of California. Chapter 7. Edited by E. Zavaleta and H.A. Mooney. University of California Press, Berkeley, Calif. pp. 107–128.

Carr, H. 1930. The Lancer. Desert Magazine, July 1930. Pasadena, CA.

[CAT] Climate Action Tracker, USA. 2019. http://climateactiontracker.org/countries/usa. (updated version September 19, 2019).

Cole, K.L., K. Ironside, J. Eischeid, G. Garfin, P.B. Duffy, and C. Toney. 2011. Past and ongoing shifts in Joshua tree distribution support future modeled range contraction. Ecological Applications 21(1):137–149.

Cole, W.S., A.S. James, and C.I. Smith. 2017. First Recorded Observations of Pollination and Oviposition Behavior in *Tegeticula antithetica* (Lepidoptera: Prodoxidae) Suggest a Functional Basis for Coevolution with Joshua Tree (*Yucca*) Hosts. Annals of the Entomological Society of America 110(4):390–397.

Comanor, P.L. and W.H. Clark. 2000. Preliminary growth rates and a proposed age-form classification for the Joshua tree, *Yucca brevifolia* (Agavaceae). Haseltonia 7:37-45.

Cornett, J.W. 2014. Population dynamics of the Joshua tree (*Yucca brevifolia*): Twenty-three year analysis, Lost Horse Valley, Joshua Tree National Park. In R. E. Reynolds (Ed.), *Not a Drop Left to Drink* (pp. 71-73): California State University Desert Studies Center, 2014 Desert Symposium.

Cornett, J.W. 2018. Joshua trees are blooming early in the desert. It's not a good thing — you can thank climate change. DESERT magazine. Jan. 30, 2019

DiChristopher, T., *US crude oil exports hit a record last week at 3.6 million barrels a day*, CONSUMER NEWS AND BUSINESS CHANNEL, Feb. 21, 2019, *available at*: https://www.cnbc.com/2019/02/21/us-crude-oil-exports-hit-a-record-high-last-week.html.

DeFalco, L.A., T.C. Esque, S.J. Scoles-Sciulla, and J. Rodgers. 2010. Desert wildfire and severe drought diminish survivorship of the long-lived Joshua tree (*Yucca brevifolia*; Agavaceae). American Journal of Botany 97(2):243–250.

DeFalco, L.A., G.C.J. Fernandez, and R.S. Nowak. 2007. Variation in the establishment of a non-native annual grass influences competitive interactions with Mojave Desert perennials. Biological Invasions 9:293–307.

Dole, K.P., M.E. Loik, and L.C. Sloan. 2003. The relative importance of climate change and the physiological effects of CO2 on freezing tolerance for the future distribution of *Yucca brevifolia.* Global and Planetary Change 36:137–146.

Engelmann, G. 1871. *Yucca brevifolia*, p. 496. In C. King, Report No. 5, Geological exploration of the fortieth parallel. Government Printing Office, Washington.

Esque, T.C., P.A. Medica, D.F. Shrylock, L.A. DeFalco, R.H. Webb, and R.B. Hunter. 2015. Direct and indirect effects of environmental variability on growth and survivorship of pre-reproductive Joshua trees, *Yucca brevifolia* Engelm. (Agavaceae). American Journal of Botany. 102(1):85–91.

Erickson, P., A. Down, M. Lazarus, and D. Koplow. 2017. Effect of subsidies to fossil fuel companies on United States crude oil production. 2 Nature Energy 2:891-898.

Fitzpatrick, M.C. and W.W. Hargrove. 2009. The projection of species distribution models and the problem of non-analog climate. Biodiversity Conservation 18:2255–2261

Frakes, N. 2017. Invasive Plant Management at Joshua Tree National Park. Presentation at California Invasive Plant Council Symposium, October 2017.

Fremont, J.C. 1845. Report of the Exploring Expedition to the Rocky Mountains in the Year 1842, and to Oregon and North California in the years 1843-44. 28th Congress, 2d Session. Gales and Seaton, Washington, D.C.

Gilliland, K.D., N.J. Huntly, and J.E. Anderson. 2006. Age and population structure of Joshua trees (*Yucca brevifolia*) in the northwestern Mojave Desert. Western North American Naturalist 66:202–208.

Godsoe, W., E. Strand, C.I. Smith, J.B. Yoder, T.C. Esque, and O. Pellmyr. 2009. Divergence in an obligate mutualism is not explained by divergent climatic factors. New Phytologist 183:589–599.

Godsoe, W., J.B. Yoder, C.I. Smith, and O. Pellmyr. 2008. Coevolution and divergence in the Joshua tree/yucca moth mutualism. The American Naturalist 171(6):816–823.

Griffin, H.E. 1930. Preserving California Desert Scenery. Desert Magazine, February 1930. Pasadena, CA.

Gucker, C.L. 2006. *Yucca brevifolia*. In: Fire Effects Information System, U. S. Dept. of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/.

Harrower, J. and G. S. Gilbert. 2018. Context-dependent mutualisms in the Joshua tree–yucca moth system shift along a climate gradient. Ecosphere 9(9):e02439. 10.1002/ecs2.2439.

Hess, W.J. 2012. *Yucca brevifolia*. In Jepson Flora Project (eds.) Jepson eFlora, http://ucjeps.berkeley.edu/eflora/eflora_display.php?tid=48766 (accessed on October 13, 2019).

Holmgren, C.A., J.L. Betancourt, and K.A. Rylander. 2010. A long-term vegetation history of the Mojave-Colorado Desert ecotone at Joshua Tree National Park. Journal of Quarternary Science 25(2) 222–236.

Hopkins, F. (University of California, Riverside). 2018. Inland Deserts Summary Report. California's Fourth Climate Change Assessment. Publication number: SUM-CCCA4-2018-008.

Iknayan, K.J. and S.R. Beissinger. 2018. Collapse of a desert bird community over the past century driven by climate change. Proc. Natl. Acad. Sci. U.S.A. 115:8597–8602.

[ITIS] Integrated Taxonomic Information System. 2019. ITIS Database. [Online]. Available: http://www.itis.gov/index.html.

[IPCC] Intergovernmental Panel on Climate Change (IPCC). 2018. Global Warming of 1.5° C: An IPCC Special Report on the Impacts of Global Warming of 1.5° C Above Pre-industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty. Intergovernmental Panel on Climate Change. Available at: *http://www.ipcc.ch/report/sr15/*.

Jaeger, E. C. 1965. The California Desert. Stanford University Press. Stanford, California

Jurand, B.S. and S.R. Abella. 2013. Soil Seed Banks of the Exotic Annual Grass *Bromus rubens* on a Burned Desert Landscape. Rangeland Ecology and Management. 66:157–163.

Keeley, J.E. and A. Meyers. 1985. Effect of heat on seed germination of southwestern Yucca species. The Southwestern Naturalist. 30(2): 303-304.

Klinger, R. and M. Brooks. 2017. Alternative pathways to landscape transformation: invasive grasses, burn severity and fire frequency in arid ecosystems. Journal of Ecology. 105:1521–1533.

Lenz, L.W. 2001. Seed dispersal in *Yucca brevifolia* (Agavaceae) present and past, with consideration of the future of the species. Aliso 20:61–74.

Lenz, L.W. 2007. Reassessment of *Yucca brevifolia* and recognition of *Y. jaegeriana* as a distinct species. Aliso: A Journal of Systematic and Evolutionary Botany 24(1):97–104.

Le Quéré, C. et al. 2018. Global carbon budget 2018, 10 Earth Syst. Sci. Data 10:21412194.

Little, E. L. 1950. Southwestern trees: a guide to the native species of New Mexico and Arizona. Agricultural Handbook No. 9. Washington, DC: U.S. Department of Agriculture, Forest Service. 109 p.

Loik, M.E., C.D. St. Onge, and J. Rogers. 2000a. Post-fire recruitment of Yucca brevifolia and Yucca schidigera in Joshua Tree National Park, California. In J.E. Keeley, M. Baer-Keeley, and C.J. Fotheringham [eds.], Second interface between ecology and land development in California, 79 – 85. Open-File Report 00-62, U.S. Geological Survey, Sacramento, California, USA.

Loik, M.E., T.E. Huxman, E.P. Hamerlynck, and S.D. Smith. 2000b. Low temperature tolerance and cold acclimation for seedlings of three Mojave Desert Yucca species exposed to elevated CO2. Journal of Arid Environments, 46(1):43–56.

Lybbert, A.H. and S.B. St. Clair. 2017. Wildfire and floral herbivory alter reproduction and pollinator mutualisms of Yuccas and Yucca moths. Journal of Plant Ecology. 10(5):851-858

Maloney, K.A., E.L. Mudrak, A. Fuentes-Ramirez, H. Parag, M. Schat, and C. Holzapfel. 2019. Increased fire risk in Mojave and Sonoran shrublands due to exotic species and extreme rainfall events. 10(2):e02592.

Mufson, S., C. Mooney, J. Eilperin, and J. Muyskens. 2019. 2°C: Beyond the Limit: Extreme climate change has arrived in America. Washington Post. https://www.washingtonpost.com/graphics/2019/national/climate-environment/climate-change-america/

National Park Service (NPS). 2012. Death Valley National Park Wilderness and Backcountry Stewardship Plan and Environmental Assessment. https://parkplanning.nps.gov/showFile.cfm?projectID=23311&MIMEType=application%252Fpdf&filename=DEVA%5FWilderness%5F%5F%5FBackcountry%5FStewardship%5FPlan%2Epdf&sfid=139732

Notaro, M., A. Mauss, and J.W. Williams. 2012. Projected vegetation changes for the American Southwest: Combined dynamic modeling and bioclimatic-envelope approach. Ecological Applications 22(4):1365–1388.

[OCI] Oil Change International, Drilling Toward Disaster: Why U.S. Oil and Gas Expansion Is Incompatible with Climate Limits (January 2019), http://priceofoil.org/drilling-towards-disaster.

Pardo, L.H., M.E. Fenn, C.L. Goodale, L.H. Geiser, C.T. Driscoll, E.B. Allen, J.S. Baron, R. Bobbink, W.D. Bowman, C.M. Clark, B. Emmett, F.S. Gilliam, T.L. Greaver, S.J. Hall, E.A. Lilleskov, L. Liu, J.A. Lynch,1 K.J. Nadelhoffer, S. S. Perakis, M.J. Robin-Abbott, J.L. Stoddard, K.C. Weathers, and RL. Dennis. 2011. Effects of nitrogen deposition and empirical nitrogen critical loads for ecoregions of the United States. Ecological Applications 21(8):3049–3082.

Pearson, R.G. and T.P. Dawson. 2003. Predicting the impacts of climate change on the distribution of species: are bioclimate envelope models useful? Global Ecology & Biogeography 12:361–371

Pellmyr, O. 2003. Yuccas, yucca moths, and coevolution: A review. Annals of the Missouri Botanical Garden 90(1):35–55.

Pellmyr, O. and K.A. Segraves. 2003. Pollinator divergence within an obligate mutualism: Two yucca moth species (Lepidoptera; Prodoxidae: *Tegeticula*) on the Joshua tree (*Yucca brevifolia*; Agavaceae). Annals of the Entomological Society of America 96:716–722.

Reynolds, M.B.J., L.A. DeFalco, and T.C. Esque. 2012. Short seed longevity, variable germination conditions and infrequent establishment events provide a narrow window for *Yucca brevifolia* (Agavaceae) recruitment. American Journal of Botany 99(10):1647–1654.

Riddell, E.A., K.J. Iknayana, B.O. Wolfc, B.S., and Steven R. Beissinger. 2019. Cooling requirements fueled the collapse of a desert bird community from climate change. Proc. Natl. Acad. Sci. U.S.A. https://doi.org/10.1073/pnas.1908791116115, 8597–8602.

Rogelj, J., G. Luderer, R.C. Pietzker, E. Kriegler, M. Schaeffer, V. Krey, and K. Riahi. 2015. Energy system transformations for limiting end-of-century warming to below 1.5°C, 5 Nature Climate Change 519.

Royer, A.M., M.A. Streisfeld, and C.I. Smith. 2016. Population genomics of divergence within an obligate pollination mutualism: Selection maintains differences between Joshua tree species. American Journal of Botany 03(10):1730–1741.

Runyon, F.F. 1930. Our Natural Scenic Spots. Desert Magazine, July 1930. Pasadena, CA.

Sanford, M.P. and N. Huntly. 2009. Selective herbivory by the desert woodrat (*Neotoma lepida*) on Joshua trees (*Yucca brevifolia*). Western North American Naturalist 69:165–170.

Scheffers, B. R., L. De Meester, T.C.L. Bridge, A.A. Hoffmann, J.M. Pandolfi, R.T. Corlett, S.H.M. Butchart, P. Pearce-Kelly, K.M. Kovacs, D. Dudgeon, M. Pacifici, C. Rondinini, W.B. Foden, T. G. Martin, C. Mora, D. Bickford and J.E.M. Watson. 2016. The broad footprint of climate change from genes to biomes to people. Science 354:6313.

Short, K.C., 2017. Spatial wildfire occurrence data for the United States, 1992-2015 [FPA_FOD_20170508]. 4th Edition. Fort Collins, CO: Forest Service Research Data Archive. https://doi.org/10.2737/RDS-2013-0009.4.

Smith, C.I. 2018. Peer Review of USFWS Draft Species Status Assessment for Joshua Tree. Email comment, dated June 11, 2018.

Smith, C.I., C.S. Drummond, W. Godsoe, J.B. Yoder, and O. Pellmyr. 2009. Host specificity and reproductive success of yucca moths (*Tegeticula* spp. Lepidoptera: Prodoxidae) mirror patterns of gene flow between host plant varieties of the Joshua tree (*Yucca brevifolia*: Agavaceae). Molecular Ecology 18:5218–5229.

Smith C.I., O. Pellmyr, D.M. Althoff, M. Balcázar-Lara, J. Leebens-Mack, K.A. Segraves. 2008. Pattern and timing of diversification in Yucca (Agavaceae): specialized pollination does not escalate rates of diversification. Proceedings of the Royal Society of London, Series B: Biological Sciences 275:249–258.

Smith, C.I., S. Tank, W. Godsoe, J. Levenick, E. Strand, T.C. Esque. 2011. Comparative phylogeography of a coevolved community: Concerted population expansions in Joshua trees and four yucca moths. PLoS One 6(10):1–18.

Smith, C.I., W. Godsoe, S. Tank, J.B. Yoder, and O. Pellmyr. 2008. Distinguishing coevolution from covariance in an obligate pollination mutualism: Asynchronous divergence in Joshua tree and its pollinators. Evolution 62(10):2676–2687.

Smith, S.D., T.L. Hartsock, and P.S. Nobel. 1983. Ecophysiology of *Yucca brevifolia*, an arborescent monocot of the Mojave Desert. Oecologia 60:10–17.

Smith, S.D., T.E. Huxman, S.F. Zitzer, T.N. Charlet, D.C. Housman, and J.S. Coleman. 2000. Elevated CO2 increases productivity and invasive species success in an arid ecosystem. Nature 408:79–82.

[SCAG] Southern California Association of Governments. 2019. Local Profiles. http://www.scag.ca.gov/DataAndTools/Pages/LocalProfiles.aspx

St. Clair, S.B. and J. Hoines. 2018. Reproductive ecology and stand structure of Joshua tree forests across climate gradients of the Mojave Desert. PLoS ONE 13(2): e0193248.

Star, J., E.L. Rowland, M.E. Black, C.A.F. Enquist, G. Garfin, C.H. Hoffman, H. Hartmann, K.L. Jacobs, R.H. Moss and A.M. Waple. 2016. Supporting adaptation decisions through scenario planning: Enabling the effective use of multiple methods. Climate Risk Management. 13:88-94.

Starr, T.N., K.E. Gadek, J.B. Yoder, R. Flatz, and C.I. Smith. 2013. Asymmetric hybridization and gene flow between Joshua trees (Agavaceae: Yucca) reflect differences in pollinator host specificity. Molecular Ecology 22(2):437-49.

Svenning, J.-C. and B. Sandel. 2013. Disequilibrium Vegetation Dynamics Under Future Climate Change. American Journal of Botany 100(7):1266–1286.

Sweet, L.C., T. Green, J.G.C. Heintz, N. Frakes, N. Graver, J.S. Rangitsch, J.E. Rodgers, S. Heacox, and C.W. Barrows. 2019. Congruence between future distribution models and empirical data for an iconic species at Joshua Tree National Park. Ecosphere 10(6):e02763/ecs2.2763.

Syphard, A.D., J.E. Keeley, and J.T. Abatzoglou. 2017. Trends and drivers of fire activity vary across California aridland ecosystems. Journal of Arid Environments 144:110–122.

Syphard, A D., H. Rustigian-romsos, M. Mann, E. Conlisk, M.A. Moritz, and D. Ackerly. 2019. The relative influence of climate and housing development on current and projected future fire patterns and structure loss across three California landscapes. Global Environmental Change, 56:41–55.

Tagestad J., M. Brooks, V. Cullinan, J. Downs, and R. Mckinley. 2016. Precipitation Regime Classification for the Mojave Desert: Implications for fire occurrence. Journal of Arid Environments 124:388–397.

Thompson, R.S., S.W. Hostetler, P.J. Bartlein, and K.H. Anderson. 1998. A Strategy for Assessing Potential Future Changes in Climate, Hydrology, and Vegetation in the Western United States. U.S. Geological Survey Circular 1153. United States Government Printing Office, Washington.

Trelease, W. 1893. Further Studies of Yuccas and Their Pollination. Missouri Botanical Garden Annual Report, Vol. 1893, pp. 181-226.

Turner, R.M. 1982. Mohave desertscrub. In D. Brown (Ed.), *Biotic Communities: Southwestern United States and Northwestern Mexico*. Salt Lake City, UT: University of Utah Press.

United Nations Framework Convention on Climate Change, Conference of the Parties Nov. 30-Dec. 11, 2015, Adoption of the Paris Agreement Art. 2, U.N. Doc. FCCC/CP/2015/L.9 (Dec. 12, 2015) (Paris Agreement).

[USEIA] U.S. Energy Information Administration. 2016. Hydraulically fractured wells provide two-thirds of U.S. natural gas production (May 5, 2016). https://www.eia.gov/todayinenergy/detail.php?id=26112.

[USEIA] U.S. Energy Information Administration. 2016. Hydraulic fracturing accounts for about half of current U.S. crude oil production (March 15, 2016). https://www.eia.gov/todayinenergy/detail.php?id=25372.

[EPA] U.S. Environmental Protection Agency. 2009. Land-Use Scenarios: National-Scale Housing-Density Scenarios Consistent with Climate Change Storylines (Final Report). U.S. Environmental Protection Agency, Washington, DC; EPA/600/R-08/076F. Available from the National Technical Information Service, Springfield, VA, and online at http://www.epa.gov/ncea.

[USFWS] U.S. Fish and Wildlife Service. 2018. Joshua Tree Species Status Assessment. Dated July 20, 2018. 113 pp. + Appendices A–C.

[USFWS] U.S. Fish and Wildlife Service. 2019. Endangered and Threatened Wildlife and Plants; 12-Month Findings on Petitions to List Eight Species as Endangered or Threatened Species, 84 Fed. Reg. 41694 (August 15, 2019).

[USGCRP] U.S. Global Change Research Program. 2017. Climate Science Special Report, Fourth National Climate Assessment, Volume I. https://science2017.globalchange.gov/.

[USGCRP] U.S. Global Change Research Program. 2018. Impacts, Risks, and Adaptation in the United States, Fourth National Climate Assessment, Volume II. https://nca2018.globalchange.gov/.

Vander Wall, S.B., T. Esque, D. Haines, M. Garnett, and B. Waitman. 2006. Joshua tree (*Yucca brevifolia*) seeds are dispersed by seed-caching rodents. Ecoscience 13:539–543.

Vamstad, M.S. and J.T. Rotenberry. 2010. Effects of fire on vegetation and small mammal communities in a Mojave Desert Joshua tree woodland. J. Arid Environ. 74, 1309–1318.

Waitman, B.A., S.B. Vander Wall, and T.C. Esque. 2012. Seed dispersal and seed fate in Joshua tree (*Yucca brevifolia*). Journal of Arid Environments 81:1–8.

Wallace, G. 2017. WEG 2015 petition to list *Yucca brevifolia*. U.S. Fish and Wildlife Service White Paper, 6 p. Carlsbad, CA.

Warren, R., J. Price, A. Fischlin, S. de la Nava Santos, and G. Midgley. 2011. Increasing impacts of climate change upon ecosystems with increasing global mean temperature rise. Climatic Change 106(2):141–177.

Warren, S.D, L.S. Baggett, and H. Warren. 2016. Directional Floral Orientation in Joshua Trees (*Yucca brevifolia*). Western North American Naturalist 76(3):374–378.

Webber, J.M. 1953. Yuccas of the Southwest. Agriculture Monograph No. 17. Washington, DC: U.S. Department of Agriculture, Forest Service. 97 p.

[WEG] WildEarth Guardians. 2015. Petition to List the Joshua Tree (*Yucca brevifolia*) under the Endangered Species Act.

Went, F.W. 1948. Ecology of desert plants. I. Observations on germination in the Joshua Tree National Monument, California. Ecology 29(3):242–253.

Went, F.W. 1957. The experimental control of plant growth. Chronica Botanica Volume 17. Waltham, MA: Chronica Botanica.

Wentz, J. & M.D. Gerrard, Persistent Regulations: A Detailed Assessment of the Trump Administration's Efforts to Repeal Federal Climate Protections (2019), http://columbiaclimatelaw.com/files/2019/06/Wentz-and-Gerrard-2019-06-Persistent-Regulations.pdf.

Wiens, J. J. 2016. Climate-related local extinctions are already widespread among plant and animal species. PLoS Biology 14(12):1–18.

Yoder, J.B., C.I. Smith, D.J. Rowley, R. Flatz, W. Godsoe, C. Drummond, and O. Pellmyr. 2013. Effects of gene flow on phenotype matching between two varieties of Joshua tree (*Yucca brevifolia*, Agavaceae) and their pollinators. Journal of Evolutionary Biology 26:1220–1233.

State of California
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Original on file.
Received March 16, 2020

M e m o r a n d u m

Date: March 11, 2020

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

From: Charlton H. Bonham
Director

Subject: **Initial Evaluation of the Petition to List Western Joshua Tree (*Yucca brevifolia*) as Threatened under the California Endangered Species Act**

The Department of Fish and Wildlife (Department) has completed its initial evaluation of the Petition to list western Joshua tree (*Yucca brevifolia*) as a threatened species under the California Endangered Species Act, Fish and Game Code section 2050 et seq. The Fish and Game Commission (Commission) received the Petition from Brendan Cummings of the Center for Biological Diversity on October 21, 2019. Pursuant to Fish and Game Code section 2073, the Commission referred the Petition to the Department on November 1, 2019. On December 11, 2019, the Commission officially received the Petition and approved a Department request for a 30-day extension to further analyze the Petition and complete its evaluation report in accordance with Fish and Game Code section 2073.5, subdivision (b).

The Department completed the attached Petition evaluation report as required by Fish and Game Code section 2073.5. (See also Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1).) The Department's evaluation report delineates the categories of information required in a petition, evaluates the sufficiency of the available scientific information regarding each of the Petition components, and incorporates additional relevant information that the Department possessed or received during the review period. Based upon the information contained in the Petition and other relevant information in the Department's possession, the Department has determined that there is sufficient scientific information available at this time to indicate that the petitioned action may be warranted. The Department recommends that the Petition be accepted and considered.

If you have questions or need additional information, please contact Chad Dibble, Deputy Director, Ecosystem Conservation Division at (916) 653-6956 or by email at Chad.Dibble@wildlife.ca.gov.

Attachment

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State of California
Natural Resources Agency
Department of Fish and Wildlife

REPORT TO THE FISH AND GAME COMMISSION

EVALUATION OF A PETITION FROM THE CENTER FOR BIOLOGICAL DIVERSITY TO LIST WESTERN JOSHUA TREE (*YUCCA BREVIFOLIA*) AS THREATENED UNDER THE CALIFORNIA ENDANGERED SPECIES ACT

Photo of *Yucca brevifolia* by Jeb McKay Bjerke

Prepared by
California Department of Fish and Wildlife

February 2020

I. EXECUTIVE SUMMARY 2

II. INTRODUCTION 3

A. Candidacy Evaluation 3

B. Petition History 5

C. Overview of Western Joshua Tree Ecology 6

III. SUFFICIENCY OF SCIENTIFIC INFORMATION TO INDICATE THE PETITIONED ACTION FOR WESTERN JOSHUA TREE MAY BE WARRANTED 7

A. Population Trend 8

B. Geographic Range 9

C. Distribution 12

D. Abundance 13

E. Life History 14

F. Kind of Habitat Necessary for Survival 15

G. Factors Affecting the Ability to Survive and Reproduce 15

H. Degree and Immediacy of Threat 23

I. Impact of Existing Management Efforts 24

J. Suggestions for Future Management 27

K. Detailed Distribution Map 28

L. Sources and Availability of Information 28

IV. RECOMMENDATION TO THE COMMISSION 29

V. LITERATURE CITED 30

APPENDIX 1: INFORMATION SUBMITTED TO THE DEPARTMENT I

I. EXECUTIVE SUMMARY

The Center for Biological Diversity (Petitioner) submitted a petition (Petition) to the Fish and Game Commission (Commission) to list the western Joshua tree (*Yucca brevifolia*) as threatened under the California Endangered Species Act (CESA). The Commission referred the Petition to the Department of Fish and Wildlife (Department) and the Department prepared this evaluation report (Petition Evaluation) to assess the scientific information discussed and cited in the Petition in relation to other relevant and available scientific information possessed or received by the Department during the evaluation period.

Western Joshua trees are evergreen tree-like plants that occur on flats and slopes in the Mojave Desert. The Petition does not present an estimate of western Joshua tree population size, nor does it provide evidence of a range-wide population trend; nevertheless, the Petition does provide information showing that some populations of western Joshua tree are declining, particularly within Joshua Tree National Park. Although a reliable estimate of western Joshua tree population size is not available, information available to the Department indicates that western Joshua tree is currently relatively abundant. Western Joshua tree likely relies on particular temperature and precipitation ranges, which in turn restricts the range of the species, and the habitat suitable for its survival. The Petition provides a significant amount of scientific information on factors affecting the ability of western Joshua tree to survive and reproduce. The Petition states that climate change is the greatest threat to the continued existence of western Joshua tree, with wildfires, invasive species, habitat loss due to human development, and predation as additional contributing factors that collectively threaten the continued viability of the species. Information in the Petition suggests that western Joshua tree is already being affected by threats, and these threats are likely to intensify significantly by the end of the century. The Petition describes the limitations of existing regulatory mechanisms as they relate to the factors affecting the ability of western Joshua tree to survive and reproduce.

After reviewing the Petition and other relevant information, the Department determined that the Petition contains sufficient information on population trend, range, distribution, abundance, life history, kind of habitat necessary for survival, factors affecting the ability to survive and reproduce, degree and immediacy of threat, impact of existing management efforts, suggestions for future management, and availability and sources of information, and also includes a detailed distribution map.

In completing its Petition Evaluation, the Department has determined the Petition provides sufficient scientific information to indicate that the petitioned action may be warranted for western Joshua tree. Therefore, the Department recommends the Commission accept the Petition for further consideration under CESA.

II. INTRODUCTION

A. Candidacy Evaluation

The Commission has the authority to list certain "species" or "subspecies" as threatened or endangered under CESA. (Fish & G. Code, §§ 2062, 2067, and 2070.) The listing process is the same for species and subspecies. (Fish & G. Code, §§ 2070-2079.1.)

CESA sets forth a two-step process for listing a species as threatened or endangered. First, the Commission determines whether to designate a species as a candidate for listing by evaluating whether the petition provides "sufficient information to indicate that the petitioned action may be warranted." (Fish & G. Code, § 2074.2, subd. (e)(2).) If the petition is accepted for consideration, the second step requires the Department to produce, within 12 months of the Commission's acceptance of the petition, a peer reviewed report based upon the best scientific information available that indicates whether the petitioned action is warranted. (Fish & G. Code, § 2074.6.) Finally, the Commission, based on that report and other information in the administrative record, determines whether the petitioned action to list the species as threatened or endangered is warranted. (Fish & G. Code, § 2075.5.)

A petition to list a species under CESA must include "information regarding the population trend, range, distribution, abundance, and life history of a species, the factors affecting the ability of the population to survive and reproduce, the degree and immediacy of the threat, the impact of existing management efforts, suggestions for future management, and the availability and sources of information. The petition shall also include information regarding the kind of habitat necessary for species survival, a detailed distribution map, and any other factors that the petitioner deems relevant." (Fish & G. Code, § 2072.3; see also Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1).) The range of a species for the Department's petition evaluation and recommendation is the species' California range. (*Cal. Forestry Assn. v. Cal. Fish and Game Com.* (2007) 156 Cal.App.4th 1535, 1551.)

Within 10 days of receipt of a petition, the Commission must refer the petition to the Department for evaluation. (Fish & G. Code, § 2073.) The Commission must also publish notice of receipt of the petition in the California Regulatory Notice Register. (Fish & G. Code, § 2073.3.) Within 90 days of receipt of the petition (or 120 days if the Commission grants an extension), the Department must evaluate the petition on its face and in relation to other relevant information and submit to the Commission a written evaluation report with one of the following recommendations:

- Based upon the information contained in the petition, there is not sufficient information to indicate that the petitioned action may be warranted, and the petition should be rejected; or

- Based upon the information contained in the petition, there is sufficient information to indicate that the petitioned action may be warranted, and the petition should be accepted and considered.

(Fish & G. Code, § 2073.5, subds. (a)-(b).) The Department's candidacy recommendation to the Commission is based on an evaluation of whether the petition provides sufficient scientific information relevant to the petition components set forth in Fish and Game Code Section 2072.3 and the California Code of Regulations, Title 14, Section 670.1, subdivision (d)(1).

In *Center for Biological Diversity v. California Fish and Game Commission* (2008) 166 Cal.App.4th 597, the California Court of Appeals addressed the parameters of the Commission's determination of whether a petitioned action should be accepted for consideration pursuant to Fish and Game Code Section 2074.2, subdivision (e), resulting in the species being listed as a candidate species. The court began its discussion by describing the standard for accepting a petition for consideration previously set forth in *Natural Resources Defense Council v. California Fish and Game Commission* (1994) 28 Cal.App.4th 1104:

> As we explained in *Natural Resources Defense Council*, "the term 'sufficient information' in section 2074.2 means that amount of information, when considered with the Department's written report and the comments received, that would lead a reasonable person to conclude the petitioned action may be warranted." The phrase "may be warranted" "is appropriately characterized as a 'substantial possibility that listing could occur.'" "Substantial possibility," in turn, means something more than the one-sided "reasonable possibility" test for an environmental impact report but does not require that listing be more likely than not.

(*Center for Biological Diversity*, *supra*, 166 Cal.App.4th at pp. 609-10 [internal citations omitted].) The court acknowledged that "the Commission is the finder of fact in the first instance in evaluating the information in the record." (*Id.* at p. 611.) However, the court clarified:

> [T]he standard, at this threshold in the listing process, requires only that a substantial possibility of listing could be found by an objective, reasonable person. The Commission is not free to choose between conflicting inferences on subordinate issues and thereafter rely upon those choices in assessing how a reasonable person would view the listing decision. Its decision turns not on rationally based doubt about listing, but on the absence of any substantial possibility that the species could be listed after

> the requisite review of the status of the species by the Department under [Fish and Game Code] section 2074.6.

(*Ibid*.)

CESA defines the "species" eligible for listing to include "species or subspecies" (Fish and G. Code, §§ 2062, 2067, and 2068), and courts have held that the term "species or subspecies" includes "evolutionarily significant units." (*Central Coast Forest Assn. v. Fish & Game Com.* (2018) 18 Cal.App.5th 1191, 1236, *citing Cal. Forestry Assn.*, *supra*, 156 Cal.App.4th at pp. 1542 and 1549.)

B. Petition History

Recent studies separate Joshua tree into two groups: western Joshua tree (*Yucca brevifolia* or *Yucca brevifolia* var. *brevifolia*) and eastern Joshua tree (*Yucca jaegerana* or *Yucca brevifolia* var. *jaegerana*). Both western Joshua tree and eastern Joshua tree were considered for listing under the federal Endangered Species Act (ESA), but on August 15, 2019, the U.S. Fish and Wildlife Service (USFWS) found that listing of the Joshua tree as a threatened or endangered species was not warranted (USFWS 2019).

On October 21, 2019, the Commission received a Petition to list any of the following as threatened under CESA: (1) the western Joshua tree (*Yucca brevifolia*) throughout its California range; or, in the event the Commission determines that listing of *Yucca brevifolia* throughout its California range is not warranted, (2) the western Joshua tree population within the northern part of western Joshua tree's California range (YUBR North), or (3) the western Joshua tree population within the southern part of western Joshua tree's California range (YUBR South). On November 1, 2019, the Commission referred the Petition to the Department for evaluation. At its meeting on December 11, 2019, the Commission officially received the Petition and approved a request from the Department for a 30-day extension to further analyze the Petition and complete its Petition Evaluation pursuant to Fish and Game Code Section 2073.5, subdivision (b).

The Department evaluated the scientific information presented in the Petition as well as other relevant information the Department possessed at the time of review. The Department received information from two people during the petition evaluation period pursuant to Fish and Game Code Section 2073.4. This Petition Evaluation includes copies of this information as Appendix 1, pursuant to Fish and Game Code Section 2073.5, subdivision (c). Pursuant to Fish and Game Code Section 2072.3 and Section 670.1, subdivision (d)(1), of Title 14 of the California Code of Regulations, the Department evaluated whether the Petition included sufficient scientific information regarding each of the following petition components to indicate that the petitioned action may be warranted:

- Population trend;
- Range;
- Distribution;
- Abundance;
- Life history;
- Kind of habitat necessary for survival;
- Factors affecting the ability to survive and reproduce;
- Degree and immediacy of threat;
- Impact of existing management efforts;
- Suggestions for future management;
- Availability and sources of information; and
- A detailed distribution map.

C. Overview of Western Joshua Tree Ecology

Western Joshua trees are evergreen, tree-like plants that have recently been treated as members of the asparagus family (Asparagaceae) (APG 2016, ITIS 2019). Western Joshua trees typically have a 5 to 15 meter (m) (16 to 50 feet (ft)) main stem with extensive branching on older plants. The tallest known western Joshua tree was 25 m (82 ft) tall, although trees exceeding 10 m (33 ft) are rare (Gucker 2006, Cummings 2019). Western Joshua tree is found in many different plant communities occurring on flats and slopes in the Mojave Desert at elevations between 400 and 2200 m (1300 to 7200 ft) (Turner 1982, Hess 2012, USFWS 2018, CNPS 2019). Lenz (2001) reports that Joshua tree plants tolerate temperatures of -25°C to 51°C (-13°F to 124°F) and annual precipitation ranges of 98 to 268 mm (3.9 to 10.6 inches (in)).

Western Joshua trees are capable of both sexual reproduction, and asexual reproduction via growth of rhizomes, branch sprouts, and/or basal sprouts. Significant examples of western Joshua tree asexual reproduction have been observed, with some clumps of plants being entirely clonal (Gucker 2006, DeFalco et al. 2010, Harrower and Gilbert 2018).

Western Joshua trees can reproduce sexually resulting in seed production. Flowering of western Joshua trees is considered episodic and rare, generally only occurring in wetter years (Gucker 2006). Flowers of Joshua trees are exclusively pollinated by specialized yucca moths (Trelease 1893, Pellmyr 2003, Pellmyr and Segraves 2003, Godsoe et al. 2008). In California, western Joshua tree is pollinated by one species of moth, *Tegeticula synthetica*. Female moths transfer pollen between western Joshua tree flowers in specialized mouthparts, inject eggs into the floral ovaries using a bladelike ovipositor, and then actively apply pollen to the stigmatic surface to fertilize the flower (Trelease 1892, Pellmyr 2003). As a western Joshua tree flower develops into a fruit,

the moth eggs hatch and emerging larvae eat a portion of the developing seeds. These moths are the sole pollinators of western Joshua trees in California, and in turn, Joshua tree seeds are the only food source for these moths (Pellmyr and Segraves 2003, Yoder et al. 2013). This relationship represents an obligate mutualism, where each species relies on the other for survival of its own species. Western Joshua tree relies on the yucca moth for pollination, but in turn has to sacrifice some seeds to the developing moth larvae.

Once pollinated, fruits form in early summer and seeds are mature in mid-summer (Waitman et al. 2012). Mature fruits contain 30 to 50 black seeds, which are flat to thickened with a smooth to shallowly bumpy surface.

Western Joshua tree seeds germinate readily in laboratory conditions and do not require any pretreatment (Wallace and Romney 1972, Alexander et al. 2008, Reynolds et al. 2012, Waitman et al. 2012). Seeds do not appear to be long-lived in the soil and are therefore unlikely to form a soil seed bank (Reynolds et al. 2012). Joshua tree seeds are harvested by rodents directly from fruits in the tree canopy and gathered quickly from the ground, and these seeds have been found in caches up to 57 m (190 ft) away from the source plant (Vander Wall et al. 2006, Waitman et al. 2012). Seeds that have been buried in soil have a much greater chance of establishing seedlings than those left on the soil surface, but seed caches are also consumed and moved to different caches by rodents; therefore Joshua tree and dispersing rodents may form a mutualism (Vander Wall et al. 2006, Reynolds et al. 2012, Waitman et al. 2012). Western Joshua tree seedling emergence was most successful for seeds planted one centimeter (cm) (0.4 in) deep (Waitman et al. 2012), and the greatest seedling emergence occurs during spring and summer, when increased soil moisture is accompanied by warm soil temperatures (Reynolds et al. 2012).

It can take many years for western Joshua tree seedlings to reach reproductive maturity. Esque et al. (2015) monitored a cohort of 53 western Joshua tree seedlings beginning in May of 1989, and found that ten of them (19 percent) were still living after 22 years, with an average height of 100 cm (39 in), but these ten plants had yet to reproduce. Growth rates appear to be dependent on factors including age, precipitation, presence of nearby plants that help seedlings establish, temperature and (at least in the laboratory) photoperiod (Gucker 2006).

III. SUFFICIENCY OF SCIENTIFIC INFORMATION TO INDICATE THE PETITIONED ACTION FOR WESTERN JOSHUA TREE MAY BE WARRANTED

The Petition components are evaluated below, pursuant to Fish and Game Code Section 2072.3 and Section 670.1, subdivision (d)(1), of Title 14 of the California Code of Regulations.

A. Population Trend

1. Scientific Information in the Petition

The Petition discusses population trends for western Joshua tree on pages 19 and 20 under the heading “Abundance and Population Trends”.

The Petition acknowledges that a reliable estimate of western Joshua tree population size is not available and that no range-wide population trends have been documented. The Petition therefore relies on studies indicating that western Joshua tree density is negatively correlated with increasing temperature, the species range is contracting at lower elevations, recruitment is limited, and plant mortality is increasing.

The Petition cites a study by DeFalco et al. (2010) that examined the mortality of western Joshua tree across several study sites five years after a fire in Joshua Tree National Park burned nearly 5700 hectares (22 square miles (mi^2)) in May 1999. The study found that approximately 80 percent of western Joshua trees that were burned by the fire died by 2004, and approximately 26 percent of the unburned trees died as well, with drought a likely contributing factor.

The Petition cites a study by Harrower and Gilbert (2018) that found strong positive relationships between western Joshua tree abundance, size, abundance of its pollinating moth, and reproductive success at Joshua Tree National Park. The study found that peak performance of both western Joshua tree and its pollinating moth occurs at intermediate elevations of approximately 1200 to 1400 m (4,000 to 4,600 ft). The study also found that the proportion of infertile western Joshua tree seeds increased at the margins of its range in Joshua Tree National Park, with the observation that Joshua trees appear to be dying back at low elevations, but do not appear to be expanding their range into higher elevations.

The Petition cites a study by St. Clair and Hoines (2018) that found a positive relationship between temperature and greater production of western Joshua tree flowers and seeds, but a negative relationship between temperature and western Joshua tree stand density, which suggests that there may be constraints of warmer temperatures on western Joshua tree establishment success.

The Petition also cites studies summarized by Cornett (2014) that describe declining western Joshua tree populations at three study sites in Joshua Tree National Park over an approximately 20-year period.

2. Other Relevant Scientific Information

The Department received additional information on western Joshua tree population trend during the Petition Evaluation period pursuant to Fish and Game Code Section

2073.4. The Department received two reports on western Joshua tree populations at Edwards Air Force Base. One of these reports describes a geographic information system (GIS) based analysis that was conducted to determine population trends for western Joshua tree at Edwards Air Force Base between 1992 and 2015 (USAF 2017a). The report suggests that western Joshua tree populations on the base were stable to increasing; however, the report describes several issues that increase the uncertainty of the results. The second report describes a GIS analysis, literature review, and field survey conducted of a 1999 fire area on Edwards Air Force Base to evaluate western Joshua tree survivorship and/or regeneration (USAF 2017a). The report used aerial photography taken in 1992 to count all identifiable western Joshua trees present in two areas prior to the 1999 fire and compared this information with the results of a 2017 field survey that identified all western Joshua trees in these same two areas. This report concludes that Joshua tree populations were stable in the sampled areas of the fire area from 1992 to 2017.

3. Conclusion

The Petition does not present an estimate of western Joshua tree population size, nor does it provide evidence of a range-wide population trend; nevertheless, the Petition does provide information showing that some populations of western Joshua tree are declining, particularly within Joshua Tree National Park. The Petition provides sufficient information on the population trend of western Joshua tree for the Department to make the recommendation in Section IV of this Petition Evaluation.

B. Geographic Range

1. Scientific Information in the Petition

The Petition discusses the geographic range of western Joshua tree on pages 16 through 19, under the heading “Current and Historical Distribution”. The Petition extensively cites the range information summarized in the Joshua Tree Status Assessment prepared by the USFWS (2018).

As described in Section II(B) of this Petition Evaluation, recent studies separate Joshua tree into two groups: western Joshua tree (*Yucca brevifolia* or *Yucca brevifolia* var. *brevifolia*) and eastern Joshua tree (*Yucca jaegerana* or *Yucca brevifolia* var. *jaegerana*). Western Joshua tree and eastern Joshua tree are distinguished by genetic and morphological differences, and by different yucca moth pollinators. Considered collectively, the Petition describes the range of western Joshua tree and eastern Joshua tree as extending from northwestern Arizona to southwestern Utah, and west to southern Nevada and southeastern California at elevations between 600 and 2200 m (2000 to 7200 ft) and between 34° to 38° latitude. The ranges of both western Joshua tree, eastern Joshua tree, and populations of those two species are presented in the

Petition on page 17 as Figure 8. Western Joshua tree is described as comprising two geographically separate populations named YUBR South and YUBR North in the Petition, and the map showing these populations has been duplicated as Figure 1.

The Petition describes western Joshua tree as occurring almost exclusively in the Mojave Desert in unevenly distributed populations, with a small portion of its northern extent occurring within the Great Basin Desert. The southern extent of western Joshua tree's range is in the Little San Bernardino Mountains of Joshua Tree National Park, and the northern extent of its range is near Alkali, Nevada. The western extent is near the Hungry Valley State Vehicular Recreation Area near Gorman, California. The eastern extent of its range is in Tikaboo Valley, Nevada, where the species co-occurs with eastern Joshua tree (USFWS 2018).

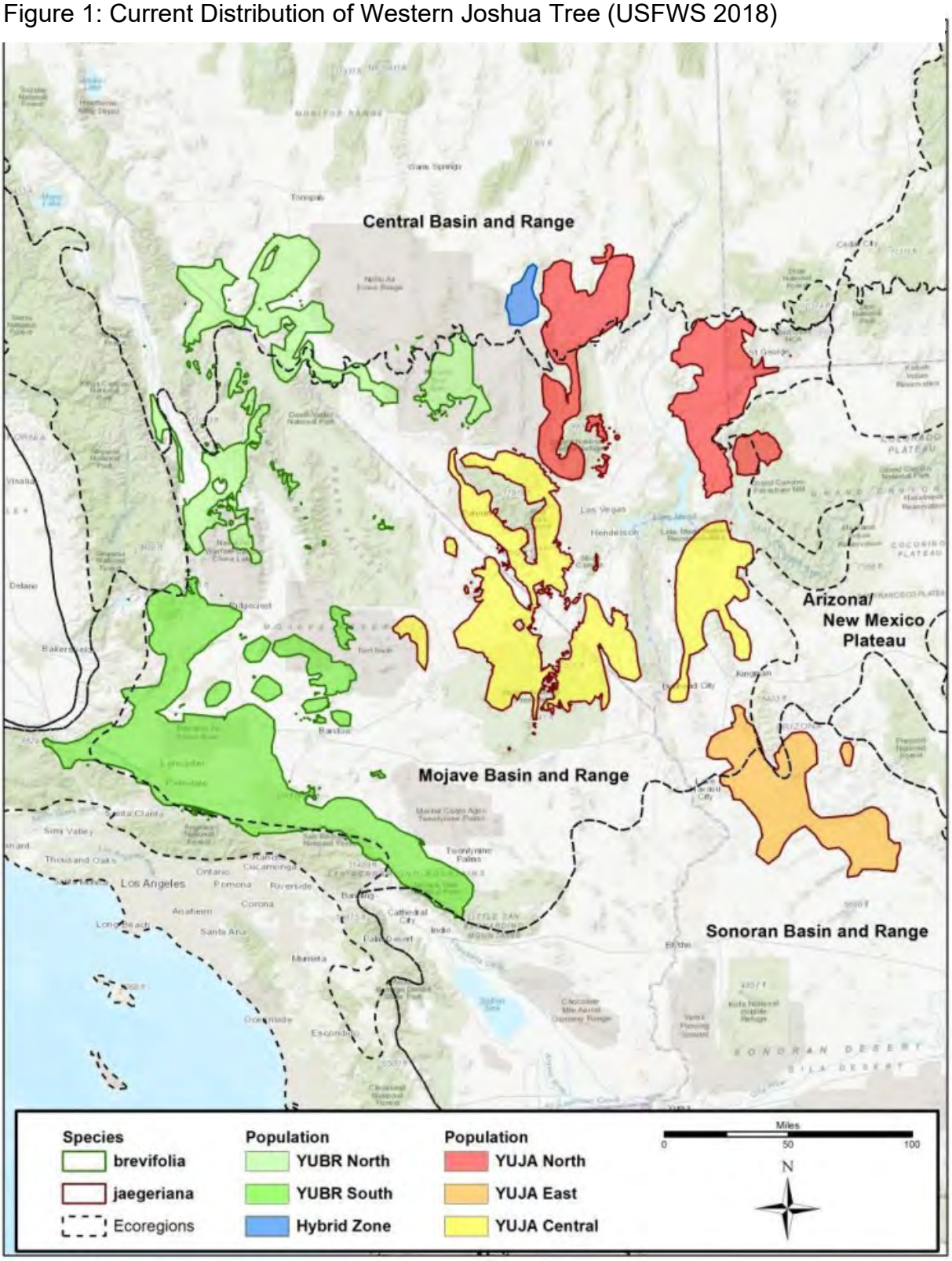
The Petition cites a study by Cole et al. (2011) that compiled locations and ages of late Pleistocene (22,000 to 13,000 years ago) Joshua trees from fossil packrat (*Neotoma* spp.) waste piles and Shasta ground sloth (*Nothrotheriops shastensis*) dung, and compared them with the current Joshua tree distribution. The study shows that as the climate rapidly warmed 11,700 years ago, the range of Joshua tree contracted, leaving only the populations near what had been its northernmost limit. Climate models for the next 60 to 90 years project a climate warming of a similar pace and magnitude to that which occurred in the early Holocene, approximately 11,700 years ago. The Cole et al. (2011) study includes models that project the future elimination of Joshua tree throughout most of the southern portions of its current range, with only a few populations within the current range predicted to be sustainable. Several models also project significant potential future expansion into new areas to the north and east of its current range and outside of California, but the species' historical and current rates of dispersal may conceivably prevent natural expansion into these new areas.

The Petition also cites a study by Holmgren et al. (2010) that examines the long-term vegetation history of Joshua Tree National Park via examination of fossil plants found in animal waste piles. Joshua tree is identified as a species that arrived fairly early in Joshua Tree National Park, about 13,880 years ago, and was stable in the Park throughout the Holocene (approximately 11,700 years ago to present).

2. Other Relevant Scientific Information

The Department possesses vegetation maps that cover a large portion of the California deserts where western Joshua tree generally occurs (Thomas 2002, Agri Chemical and Supply Inc. 2008, CDFW and USGS 2014, CDFW and Chico State University 2015, CDFW et al. 2017, CDFW and AIS 2019a, 2019b, and 2019c, CDFW 2019, NPS 2019). The *Yucca brevifolia* vegetation alliance is mapped with an approximate accuracy of 95

Figure 1: Current Distribution of Western Joshua Tree (USFWS 2018)



percent in the vegetation maps related to the Desert Renewable Energy Conservation Plan, and these maps also denote the cover of Joshua tree canopy in all vegetation polygons by cover class (0, >0-1%, >1-5%, and >5%) (VegCAMP 2013). Vegetation maps in the Department's possession may contribute to a relatively high-resolution western Joshua tree distribution map in many areas of California. These vegetation maps are likely to improve the current understanding of western Joshua tree's range.

3. Conclusion

The Petition provides sufficient information on the geographic range of western Joshua tree for the Department to make the recommendation in Section IV of this Petition Evaluation.

C. Distribution

1. Scientific Information in the Petition

The Petition discusses the distribution of western Joshua tree on pages 16 through 19, under the heading "Current and Historical Distribution". The Petition primarily relies on distribution information summarized in the Joshua Tree Status Assessment prepared by the USFWS (2018). The Petition describes western Joshua tree as comprising two geographically separate populations named YUBR South and YUBR North.

YUBR South is described as being entirely within California, and extending from Joshua Tree National Park, north to near Ridgecrest in Kern County. YUBR South is located on alluvial plains, fans, and bajadas of the major valleys lying between scattered mountain ranges. The elevation range of the YUBA South population is between 750 and 2200 m (2500 to 7200 ft), with creosote bush (*Larrea tridentata*) shrubland as the primary vegetation type. USFWS (2018) estimates that 3,255,088 acres within the YUBR South population distribution area are suitable for Joshua trees based on soils and other habitat factors; however, western Joshua trees have a patchy and disjunct distribution and do not occupy this entire area. Just over 50 percent of the YUBR South population is on private land, 48 percent is on federal land, and just under 2 percent is under state, county, or local ownership.

The YUBR North population occurs in the area north of Inyokern in Kern County, along the west and north margins of Death Valley, to Goldfield, Nevada, and east to the Nevada National Security Site (formerly the Nevada Test Site). The elevation range of western Joshua tree in the YUBR North population is between 1500 and 2200 m (4900 to 7200 ft), and the vegetation occurring nearby this higher and cooler population often includes singleleaf pinyon pine (*Pinus monophylla*), Utah juniper (*Juniperus osteosperma*), and big sagebrush (*Artemisia tridentata*) (USFWS 2018). The YUBR North population is about evenly split between California and Nevada. USFWS (2018)

estimates that approximately 1,941,701 acres of the distribution area of the YUBR North population is suitable for western Joshua tree, and approximately 96 percent of the YUBR North population is on federal land (USFWS 2018).

2. Other Relevant Scientific Information

As described in Section III(B)(2) of this Petition Evaluation, the Department possesses vegetation maps that cover a large portion of the California deserts where western Joshua tree occurs, and these maps may contribute to a relatively high-resolution western Joshua tree distribution map in many areas of California. These vegetation maps are likely to improve the current understanding of western Joshua tree's distribution.

3. Conclusion

The Petition provides sufficient information on the distribution of western Joshua tree for the Department to make the recommendation in Section IV of this Petition Evaluation.

D. Abundance

1. Scientific Information in the Petition

The Petition discusses the abundance of western Joshua tree on pages 19 and 20 under the heading "Abundance and Population Trends". The Petition states that western Joshua tree has a patchy distribution and a variable population density of 4 to 840 trees per acre (10 to 2,070 trees per hectare) and cites USFWS (2018). The discussion of western Joshua tree's "Current and Historical Distribution" on pages 16 through 19 of the Petition includes information demonstrating that western Joshua tree currently has a relatively widespread distribution in southern California. The Petition acknowledges that a reliable estimate of western Joshua tree population size is not available.

2. Other Relevant Scientific Information

As described in Section III(B)(2) of this Petition Evaluation, the Department possesses vegetation maps that cover a large portion of the California deserts where western Joshua tree occurs. It may be possible to use cover estimates from these maps as a rough proxy for western Joshua tree abundance; however, the Department does not possess this information for the entire western Joshua tree distribution in California. The range, distribution, and density information available to the Department indicates that the abundance of western Joshua tree is currently relatively high.

3. Conclusion

The Petition acknowledges that a reliable estimate of western Joshua tree population size is not available; however, information available to the Department indicates that the

abundance of western Joshua tree is currently relatively high. The Petition provides sufficient information on the abundance of western Joshua tree for the Department to make the recommendation in Section IV of this Petition Evaluation.

E. Life History

1. Scientific Information in the Petition

The Petition discusses the life history of western Joshua tree on pages 3 through 15 under the heading “Life History”. The Petition describes several aspects of western Joshua tree life history, including asexual reproduction, flowering, pollination, seed production, seed predation, seed dispersal, seed germination, and plant growth. In describing these aspects of western Joshua tree life history, the Petition cites several scientific studies and sources.

The Petition describes the ability of western Joshua tree to reproduce via asexual growth of rhizomes, branch sprouts, and/or basal sprouts. In discussing asexual reproduction, the Petition cites Webber (1953), Gucker (2006), DeFalco et al. (2010), and Harrower and Gilbert (2018).

The Petition describes the episodic and rare nature of western Joshua tree flowering events and the seasonal timing of flower production, and cites Gucker (2006), Hess (2012), Waitman et al. (2012), Esque et al. (2015), Cornett (2018), and Harrower and Gilbert (2018).

The Petition describes the obligate pollination mutualism between western Joshua tree and its specialized pollinating moth, *Tegeticula synthetica*, as well as the pollination mutualism between eastern Joshua tree and its pollinating moth, *Tegeticula antithetica*. The Petition also describes the narrow region in Nevada where western Joshua tree and eastern Joshua tree are sympatric and hybridize. The Petition describes the influence that two species of pollinating moth likely had on the morphological divergence of western Joshua tree and eastern Joshua tree. The Petition describes the formation and structure of western Joshua tree fruits. In discussing pollination and seed production, the Petition cites Pellmyr and Segraves (2003), Althoff et al. (2004), Gucker (2006), Godsoe et al. (2008), Smith et al. (2008a, 2008b), Smith et al. (2009), Waitman et al. (2012), Starr et al. (2013), Yoder et al. (2013), and Cole et al. (2017).

2. Conclusion

The Petition provides sufficient information on western Joshua tree life history for the Department to make the recommendation in Section IV of this Petition Evaluation.

F. Kind of Habitat Necessary for Survival

1. Scientific Information in the Petition

The Petition discusses the kind of habitat necessary for western Joshua tree survival on pages 14 and 15 under the heading “Habitat Requirements”.

The Petition describes Joshua trees as occurring in desert grasslands and shrublands in hot, dry sites on flats, mesas, bajadas, and gentle slopes in the Mojave Desert. Soils in Joshua tree habitats are described as silts, loams, and/or sands, variously described as fine, loose, well drained, and/or gravelly. The Petition describes temperature and precipitation ranges that have been reported for western Joshua tree, and states that these attributes are likely prime constraints on suitable habitat for the species and the species’ range. The Petition states that Joshua trees can be found in many different plant alliances throughout their range, and although they may not be limited by particular plant associations, Joshua trees require the presence of their obligate pollinator, rodents, to disperse and cache seeds, and nearby plants to shelter emerging seedlings for successful reproduction and recruitment.

In discussing the kind of habitat necessary for western Joshua tree survival, the Petition cites Went (1957), Turner (1982), Lenz (2001), Gucker (2006), Cole et al. (2011), Harrower and Gilbert (2018), and USFWS (2018).

2. Conclusion

The Petition provides sufficient information to support the conclusion that temperature and precipitation are likely critical for western Joshua tree survival and are likely prime constraints on suitable habitat for the species and the species’ range. The Petition provides sufficient information on the kind of habitat necessary for western Joshua tree survival for the Department to make the recommendation in Section IV of this Petition Evaluation.

G. Factors Affecting the Ability to Survive and Reproduce

1. Scientific Information in the Petition

The Petition discusses factors affecting the ability of western Joshua tree to survive and reproduce on pages 20 through 48 under the heading “Factors Affecting Ability to Survive and Reproduce”. The Petition identifies predation, invasive species, wildfires, climate change, and habitat loss to human development as the factors affecting the ability of western Joshua tree to survive and reproduce, stating that these factors are often related, synergistic, and collectively threaten the continued viability of the species. The information presented in the Petition for each of these factors is discussed separately below.

Predation

The Petition provides information on various impacts to western Joshua tree from predation and herbivory. Before dispersal, the larvae of the moth *Tegeticula synthetica* eat a portion of western Joshua tree's seeds. The Petition states that rodents cache and consume the vast majority of western Joshua tree seeds, with fewer than one percent of seeds germinating. Cattle have been observed grazing on the inflorescences of small western Joshua trees, and herbivory by black-tailed jackrabbits (*Lepus californicus*), pocket gophers (*Thomomys bottae*), white-tailed antelope squirrels (*Ammospermophilus leucurus*), and woodrats (*Neotoma* sp.) has been observed, which in some instances results in mortality of pre-reproductive plants. The Petition states that drought and fire result in increased herbivory on seedlings and pre-reproductive Joshua trees. The Petition acknowledges that predation alone is likely not presently a threat to western Joshua tree persistence, but the impact will be more significant as wildfire and drought frequency and intensity increase in the coming decades.

In discussing predation as a factor affecting the ability of western Joshua tree to survive and reproduce, the Petition cites Keeley et al. (1985), Vander Wall et al. (2006), DeFalco et al. (2010), Cole et al. (2011), Waitman et al. (2012), Borchert and DeFalco (2016), Esque et al. (2015), and Lybbert and St. Clair (2017).

Invasive Species

The Petition provides information on impacts to western Joshua tree from invasive species. Invasive plant species are widely established in the Mojave Desert throughout the range of western Joshua tree, and represent a large percentage of the biomass on the landscape. The abundance of invasive plant species in the Mojave Desert is positively correlated with disturbances such as livestock grazing, off-road vehicle use, fire, urbanization, roads, and agriculture. These invasive species are also aided by nitrogen deposition as a result of air pollution. Although it is possible that invasive plant species may compete with emergent western Joshua tree seedlings, the biggest impact to western Joshua tree from invasive plant species is through altered fire dynamics. Invasive plant species in the Mojave Desert have resulted in larger and more frequent fires that are killing a large number of western Joshua trees. The Petition describes this as a significant threat to western Joshua tree at the individual and population level.

In discussing invasive species as a factor affecting the ability of western Joshua tree to survive and reproduce, the Petition cites Brooks (2003), Brooks and Berry (2006), DeFalco et al. (2007), Allen et al. (2009), Allen and Geiser (2011), Pardo et al. (2011), Barrows and Murphy-Mariscal (2012), Reynolds et al. (2012), Bytnerowicz et al. (2016), Frakes (2017), and Brooks et al. (2018).

Wildfires

The Petition provides information on impacts to western Joshua tree from wildfire, and states that wildfire is one of the greatest threats to the persistence of the species, particularly as the species' range contracts in the face of climate change and as the frequency and severity of fire in the species' range increases.

Under the Wildfires section, the Petition first discusses western Joshua tree's response to fire. Although some early researchers suggested that western Joshua tree was well adapted to fire due to the ability of fire-damaged trees to resprout, longer-term studies have demonstrated that Joshua trees have relatively low post-fire survival rates, are slow to repopulate burned areas, and require sufficient precipitation in the years following fire for successful resprouting. Older and taller western Joshua trees are less affected by fire than younger, shorter trees. Post-fire mortality of western Joshua tree can be high due to drought and increased herbivory, particularly in areas that have been denuded of other vegetation that could serve as an herbivore food source. Post-fire sprouting of burned trees has been observed to prolong Joshua tree survival at high-elevation sites, when precipitation is sufficient. Joshua tree populations along the extreme western edge of the desert bioregion, near the Sierra Nevada and Transverse Ranges, appear to survive more readily after fire than those further east, resulting in dense unique clumps of clonal plants. Recruitment of new western Joshua trees into burned areas is infrequent and slow. The Petition states that blackbrush (*Coleogyne ramosissima*) is one of the most important plants for aiding western Joshua tree seedling establishment, but it is also one of the most vulnerable shrubs to fire and can take centuries to fully recover. The Petition states that due to western Joshua tree's inherently slow recruitment process, accelerated fire return intervals, and climate change, a return to pre-fire western Joshua tree density and abundance in burned areas may take centuries or may never occur.

In discussing western Joshua tree's response to fire as a factor affecting the ability of western Joshua tree to survive and reproduce, the Petition cites Webber (1953), Brittingham and Walker (2000), Loik et al. (2000), Gunter (2006), Abella et al. (2009), DeFalco et al. (2010), Vamstad and Rotenberry (2010), Reynolds et al. (2012), Esque et al. (2015), Wallace (2017), and Brooks et al. (2018).

Under the Wildfires section, the Petition also discusses the increasing wildfire frequency and intensity in the Mojave Desert. The Petition states that large fires have been historically infrequent in Joshua tree woodlands, and recent increases in fire size and frequency are partially due to invasion of non-native annual grasses. Winters with relatively high amounts of precipitation produce an increase in biomass of native and especially non-native annual plants that carry fire in invaded habitats, dramatically changing middle elevation shrublands dominated by creosote bush, blackbrush, and

western Joshua trees. Precipitation has been recognized as a primary driver of fire frequency and extent in the Mojave Desert, with wetter periods fostering the growth of invasive grasses which carry fire, and drier periods leading to fewer and smaller fires. Fires in the Mojave Desert are started by a mix of accidental and intentional human activities, as well as lightning. Most wildfires are human-caused and start along roadsides. Less frequent large fires typically start by lightning and occur in remote areas far from major roads. The Petition also notes the impact of fire on western Joshua tree seedling and juvenile survival is particularly exacerbated because fires tend to track the same heavy precipitation years that are most suitable for western Joshua tree seedling emergence.

In discussing the increasing wildfire frequency and intensity in the Mojave Desert as a factor affecting the ability of western Joshua tree to survive and reproduce, the Petition cites Brooks and Matchett (2006), Holmgren et al. (2010), Vamstad and Rotenberry (2010), Barrows and Murphy-Mariscal (2012), Jurand and Abella (2013), Esque et al. (2015), Tagestad et al. (2016), Klinger and Brooks (2017), Short (2017), Syphard et al. (2017), Brooks et al. (2018), Hopkins (2018), Maloney et al. (2019), Sweet et al. (2019), and Syphard et al. (2019).

Climate Change

The Petition provides information on impacts to western Joshua tree from climate change, and states that climate change represents the single greatest threat to the continued existence of the species. The Petition states that even under the most optimistic reduced-emission climate scenarios, western Joshua trees will be eliminated from significant portions of their range by the end of the century, and under warming scenarios consistent with current domestic and global emissions trajectories, the species will likely be close to being functionally extinct in the wild in California by the century's end.

Under the Climate Change section, the Petition has a subsection that discusses current and projected climate change in the range of western Joshua tree. A strong, international scientific consensus has established that human-caused climate change is causing widespread harm to human society and natural systems, and climate change threats are becoming increasingly dangerous. Climate change is causing increasing stress on species and ecosystems, and deserts have warmed and dried more rapidly over the last 50 years than other ecoregions, both globally and in the contiguous United States. Since 1895, the counties supporting western Joshua tree have already experienced annual temperature increases of 1.7 - 2.3°C (3.1 - 4.1°F). In addition, the Mojave Desert has experienced impacts to species and ecosystems, with bird occupancy and site-level species richness declining by about fifty percent over the past century, with this decline linked to increased cooling needs, necessitating more water

intake for survival. While all temperature projections predict that the Mojave Desert will become much hotter in the future, projections for future precipitation are less clear. Average annual rainfall is expected to be about the same, but interannual precipitation variability is expected to increase, as is the amount of winter precipitation.

In discussing current and projected climate change in the range of western Joshua tree as a factor affecting the ability of western Joshua tree to survive and reproduce, the Petition cites Warren et al. (2011), Scheffers et al. (2016), Tagestad et al. (2016), Wiens (2016), USGCRP (2017), Hopkins (2018), Iknayan and Beissinger (2018), IPCC (2018), Mufson et al. (2019), and Riddell et al. (2019).

Under the Climate Change section, the Petition has an additional subsection that discusses climate change impacts on western Joshua trees. Under this subsection, the Petition discusses six published models of future Joshua tree distribution: Thompson et al. (1998), Shafer et al. (2001), Dole et al. (2003), Cole et al. (2011), Barrows and Murphy-Mariscal (2012), and Sweet et al. (2019). Each of these models predict contractions of western Joshua tree at the western edge of its range. These six models are discussed separately in the following paragraphs.

Thompson et al. (1998) used temperature and precipitation data from the existing range of western and eastern Joshua tree to calculate potential future habitat under doubled carbon dioxide conditions. The Thompson et al. (1998) model predicted a retraction of Joshua tree range along its western edge in California, and predicted significant expansion of possible Joshua tree habitat extending as far north as Washington state, south into Mexico, and east into Texas; however this modeled projection of the future range of Joshua trees under changing climate conditions did not analyze other habitat variables or dispersal ability and used a model that poorly matched the current distribution of Joshua tree.

Shafer et al. (2001) carried out a similar modeling effort using three climate variables (mean temperature of the coldest month, a temperature index called growing degree days, and a moisture index) and a course grid scale. The results of this study were roughly consistent with the Thompson et al. (1998) model, but notably show an almost complete extirpation of western Joshua tree from California by 2090-2099 under several future climate scenarios.

Dole et al. (2003) also modeled the future range for Joshua trees under doubled carbon dioxide conditions, finding similarly to Thompson et al. (1998) models that a considerable portion of the current range of western Joshua tree will become climatically unfavorable for the species, although significant amounts of new habitat may become available. Like previous models, Dole et al. (2003) did not take dispersal ability into consideration and only focused on suitable habitat variables. This study also

noted that current climate conditions may already be detrimental to Joshua tree survival and/or reproduction, which was later confirmed by other subsequent research in the southern part of western Joshua tree's range.

Cole et al. (2011) built a sophisticated species distribution model with climate and habitat variables derived from a comprehensive dataset of presence/absence data throughout the current range of western and eastern Joshua tree. Late Pleistocene and Holocene (22,000 to years ago to present) records were also compiled to generate a map of past Joshua tree distribution. The study differed from previous models in its use of specific data points for presence and habitat variables for the species and the testing of models to simulate the current range of the species. All of the individual climate models, as well as an ensemble of 22 global circulation models (GCMs) utilized by Cole et al. (2011), project a severe (~90%) decline in the area of suitable climates for Joshua trees by 2070 to 2099, as the southern parts of its range become climatically unsuitable. Cole et al. (2011) also modeled areas where the species could potentially expand its range naturally in the future, as well as areas that might be suitable for relocation or assisted migration. The Cole et al. (2011) study considered the ability of Joshua tree to colonize new areas of potentially suitable habitat, which appears to be very limited.

Barrows and Murphy-Mariscal (2012) constructed a finer-scale model of western Joshua tree's current distribution within and surrounding Joshua Tree National Park, and then assessed the sensitivity of western Joshua tree to a gradient of climate change scenarios. Under the most severe climate scenario modeled (3°C increase in mean July maximum temperature), there was a 90 percent reduction in the current distribution of western Joshua tree in Joshua Tree National Park, but refugium of suitable western Joshua tree habitat still remained. A niche model for juvenile Joshua trees also provides support for the hypothesis that climate change has already had an impact on western Joshua tree recruitment within Joshua Tree National Park.

Similar to Barrows and Murphy-Mariscal (2012), Sweet et al. (2019) sought to identify the existence and extent of potential climate refugia for western Joshua tree within Joshua Tree National Park via species distribution models validated with field data. Sweet et al. (2019) used Joshua tree presence points, a database of nine environmental variables, and end-of-century (2070–2099) greenhouse gas emissions under highly mitigated, moderately mitigated, and unmitigated scenarios. Under highly mitigated and moderately mitigated greenhouse gas emissions scenarios, 18.6 percent and 13.9 percent, respectively, of current occupied western Joshua tree habitat remained as refugia. However, under the unmitigated greenhouse gas emissions scenario, which is closest to current emissions trajectories, suitable habitat for western Joshua tree was almost completely eliminated from Joshua Tree National Park, with only 15 hectares (37 acres), or 0.02 percent of western Joshua tree habitat remaining as refugia. Sweet et al. (2019) also used field data on distribution of juvenile western

Joshua trees (defined as smaller than 60 cm tall) to validate their modeling results as the current recruitment patterns may be foretelling of future changes in the population of western Joshua trees on the landscape.

In addition to the findings of the modeling efforts described above, the Petition presents information from other field studies that document the current impacts of warming, drought, invasive species, fire and other impacts on western Joshua tree survival and recruitment. The convergence of biotic and abiotic factors necessary for western Joshua tree recruitment results in successful establishment of new seedlings just a few times in a century, and the Petition reports that such recruitment has already largely stopped at the drier, lower elevational limits of western Joshua tree's range. Prolonged droughts are projected to occur with greater frequency and intensity over the coming decades and are likely to preclude recruitment across large areas of western Joshua tree's range. The droughts will also likely lead to higher adult mortality, either directly due to temperature and moisture stress or indirectly due to increased herbivory from rodents lacking alternative forage. Western Joshua trees also do not appear to be moving successfully into higher elevations. Where yucca moth population density is low, plants appear to only be reproducing via clonal growth. The areas where western Joshua trees are projected to be most likely to survive increasing temperatures and drying conditions are also at great risk of fire due to the prevalence of invasive grasses that increase the size and severity of fires. The Petition claims that absent protection of habitat and rapid and substantial reductions in greenhouse gas emissions, western Joshua tree will likely be extirpated from all or most of California within 80 years.

In discussing climate change impacts on western Joshua tree as a factor affecting the ability of western Joshua tree to survive and reproduce, the Petition cites Webber (1953), Thompson et al. (1998), Loik et al. (2000), Lenz (2001), Shafer et al. (2001), Pearson and Dawson (2003), Pellmyr and Segraves (2003), Cole et al. (2011), Dole et al. (2003), Godsoe et al. (2008), Fitzpatrick and Hargrove (2009), DeFalco et al. (2010), Barrows and Murphy-Mariscal (2012), Notaro et al. (2012), Reynolds et al. (2012), Esque et al. (2015), Borchert and Defalco (2016), Harrower and Gilbert (2018), Hopkins (2018), St. Clair and Hoines (2018), Sweet et al. (2019).

Habitat Loss to Development

The Petition provides information on impacts to western Joshua tree from habitat loss due to human development, and states that development presents a substantial threat to the species in a significant portion of its range.

The Petition acknowledges that much of western Joshua tree's distribution is on federal land and is therefore protected to some degree from development impacts. 96 percent of the geographic area in which the YUBR North population is located is federal land. 48

percent of the YUBR South population is located on federal land, but over 50 percent of the YUBR South population is on private land (see Figure 1). Western Joshua trees on private land have been the most impacted by human development and face the greatest threats from human development in the future. The cities and towns of Apple Valley, Hesperia, Lancaster, Palmdale, Ridgecrest, Victorville, and Yucca Valley, along with many other smaller communities have been built in western Joshua tree habitat in the YUBR South area, and these areas have grown rapidly in the past decades. Human population growth in these areas and consequent loss of Joshua tree woodlands is expected to continue in the coming decades.

In addition to urban growth, the Petition states that various other forms of human development threaten western Joshua tree habitat in California, including roads, highways, transmission lines, industrial facilities and large and small-scale renewable energy projects, and these developments have resulted in significant western Joshua tree habitat loss.

A possible scenario for western Joshua tree habitat loss due to human development by the year 2095 is presented in the Petition on page 47 as Figure 19. The Petition states that human development has already consumed hundreds of thousands of acres of habitat in the range of western Joshua tree, and that over the coming decades, more than a million additional acres will be destroyed or degraded for housing, roads, energy projects and assorted other development projects. Combined with threats to western Joshua tree under likely climate scenarios, the Petition states that the added loss of habitat and the genetic resiliency and connectivity that habitat provides will further push the species towards extirpation in California.

In discussing habitat loss due to human development and its effects on western Joshua tree survival and reproduction, the Petition cites USFWS (2018) and SCAG (2019).

2. Other Relevant Scientific Information

The Department received additional information on wildfires as a factor affecting the ability of western Joshua tree to survive and reproduce during the Petition Evaluation period pursuant to Fish and Game Code Section 2073.4. The Department received a report that describes a GIS analysis, literature review, and field survey of a 1999 fire area on Edwards Air Force Base to evaluate western Joshua tree survivorship and/or regeneration (USAF 2017a). The report used aerial photography taken in 1992 to count all identifiable western Joshua trees present in two areas prior to the 1999 fire and compared this information with the results of a 2017 field survey that identified all western Joshua trees in these same two areas. This report concludes that Joshua tree populations were stable in the sampled areas of the fire area from 1992 to 2017.

3. Conclusion

The Petition provides a significant amount of scientific information on factors affecting the ability of western Joshua tree to survive and reproduce. The Petition states that climate change is the greatest threat to the continued existence of western Joshua tree, with wildfires, invasive species, habitat loss from human development, and predation as additional contributing factors that collectively threaten the continued viability of the species. The Petition provides sufficient information on factors affecting the ability of western Joshua tree to survive and reproduce for the Department to make the recommendation in Section IV of this Petition Evaluation.

H. Degree and Immediacy of Threat

1. Scientific Information in the Petition

The Petition discusses the degree and immediacy of threats to western Joshua tree on page 48, under the heading “Degree and Immediacy of Threat”. The Petition states that while extirpation is likely decades away, the species is already suffering the impacts of climate change, with recruitment failure and adult mortality at the hotter, lower elevation edges of its range. The Petition states that invasive grass-fueled fires are already impacting populations of western Joshua tree, and half of the habitat refugia area in Joshua Tree National Park (modeled under a moderate global warming scenario) have already burned in recent decades. The Petition claims that impacts from current greenhouse gas emissions will continue for decades to come, with little time remaining to reduce emissions before climate warming drives western Joshua tree to unavoidable functional extinction.

In discussing the degree and immediacy of threats to western Joshua tree, the Petition cites Barrows and Murphy-Mariscal (2012), Harrower and Gilbert (2018), and Sweet et al. (2019). The Petition also references the preceding section of the Petition on pages 20 through 48 under the heading “Factors Affecting Ability to Survive and Reproduce”.

2. Conclusion

Information provided in the Petition suggests that western Joshua tree is already being affected by threats described in the Petition, and these threats are likely to intensify significantly by the end of the century. The Petition provides sufficient information on the degree and immediacy of threat to western Joshua tree for the Department to make the recommendation in Section IV of this Petition Evaluation.

I. Impact of Existing Management Efforts

1. Scientific Information in the Petition

The Petition discusses the impact of existing management efforts for western Joshua tree on pages 48 through 58, under the heading “Inadequacy of Existing Regulatory Mechanisms”, and also discusses the USFWS decision to not list Joshua tree under the federal Endangered Species Act on pages 58 through 62 under the heading “USFWS’s Flawed Endangered Species Act Determination”. The discussion of existing management efforts in the Petition is focused on regulatory mechanisms of government agencies. The Petition states that no existing regulatory mechanisms are currently in place at the international, national, state or local level that adequately address the threats facing western Joshua tree. The Petition goes on to discuss (1) regulatory mechanisms for greenhouse emissions reductions, (2) regulatory mechanisms to protect habitat from invasive species and fire, (3) state and local mechanisms to protect habitat from loss and degradation, and (4) federal mechanisms to protect habitat from loss and degradation. Information presented in the Petition for each of these will be discussed separately below.

Regulatory Mechanisms for Greenhouse Emissions Reductions

The Petition states that climate change is the greatest threat to the continued existence of western Joshua tree, and that the species cannot be saved absent global action to reduce greenhouse gas emissions. The Petition states that the United States has contributed more to climate change than any other country, and highlights recent rollbacks of federal climate policy. The Petition states that both domestically and globally, government policies, commitments and actions to avoid the worst impacts of climate change are inadequate, and that trends will lead to temperatures that are incompatible with reproduction and survival of western Joshua tree in its current range.

In discussing regulatory mechanisms for greenhouse emissions reductions, the Petition cites Rogelj et al. (2015), USEIA (2016a, 2016b), Erikson et al. (2017), Le Quéré et al. (2018), USGCRP (2018), CAT (2019), DiChristopher (2019), and OCI (2019).

Regulatory Mechanisms to Protect Habitat from Invasive Species and Fire

The Petition states that, to date, no legal, regulatory or management efforts have demonstrated effectiveness at addressing the severe threat that invasive plant species and consequent altered fire regimes pose to western Joshua trees. Immediate suppression of fires in western Joshua tree habitat can limit the spread of fires, but protection of the species from fire ultimately requires invasive plant species management to reduce fuel load. The Petition states that the spread and abundance of

invasive plant species are linked to both disturbance (e.g. roads, off road vehicles, cows, and urbanization) and nitrogen deposition, and therefore each of these contributing factors needs to be addressed. Although disturbance is limited in national parks, U.S. Bureau of Land Management (BLM), military, and private lands that compose the majority of western Joshua tree's range are often disturbed by projects and activities. It is also unlikely that nitrogen deposition will be adequately reduced throughout the range of western Joshua tree for at least several decades, if ever. The Petition states that even if disturbance and nitrogen deposition are reduced and the further spread of invasive species can be curtailed, no fully-effective treatments currently exist to reduce or eliminate the most harmful invasive plant species (e.g. *Bromus* spp., *Schismus* spp., *Erodium cicutarium*, *Brassica tournefortii*) that have already become established at a landscape scale in the range of western Joshua tree.

In discussing regulatory mechanisms to protect habitat from invasive species and fire, the Petition cites Brooks and Berry (2006), Allen et al. (2009), Allen et al. (2011), Pardo et al. (2011), Bytnerowicz et al. (2016), Brooks et al. (2018), USFWS (2018), BLM (2019), Sweet et al. (2019).

State and Local Mechanisms to Protect Habitat from Loss and Degradation

The Petition states that western Joshua tree stands to lose more than a third of its suitable habitat in California due to development over the coming decades, including over 40 percent of its habitat in the YUBR South region. Lands owned by the State of California make up less than one percent of western Joshua tree's range in the state, and the Petition states that protection of these lands alone is unlikely to prevent the decline and eventual extirpation of western Joshua tree.

The Petition discusses provisions of the California Desert Native Plants Act, which regulates commercial harvest of western Joshua tree. Commercial harvest was once considered a great threat to western Joshua tree and other desert plants. The Petition states that the California Desert Native Plants Act and various local laws and ordinances were ultimately passed to address this threat. These measures have been largely effective at reducing the commercial harvest of western Joshua tree, but have done little to slow the loss of western Joshua tree habitat from agricultural conversation and other human development. The Petition cites the California Fish and Game Commission's 2015 California Policy for Native Plants.

The Petition discusses the California Environmental Quality Act (CEQA). The Petition states that western Joshua tree is not a species of special concern or a candidate, threatened, or endangered species under CEQA, and therefore a project that has the potential to impact the species would not necessarily qualify as having a "significant

effect" under a lead agency's interpretation of CEQA. The Petition identifies other limitations in the ability of CEQA to protect western Joshua tree habitat from loss and degradation and concludes that CEQA, in practice, is inadequate to protect western Joshua tree.

The Petition discusses the Natural Community Conservation Planning Act but states that there are no finalized Natural Community Conservation Plans (NCCPs) that cover western Joshua tree. The Petition states that NCCPs may in the future provide some conservation benefit for western Joshua tree, but have not done so to date and consequently cannot be considered as providing adequate protection in lieu of CESA listing.

In discussing state and local mechanisms to protect western Joshua tree habitat from loss and degradation, the Petition cites Harrower and Gilbert 2018, USFWS 2018, and several state and local laws and regulations.

Federal Mechanisms to Protect Habitat from Loss and Degradation

The Petition states that management laws and plans governing federal lands are the primary federal regulatory mechanism with the potential to protect western Joshua trees. Almost all suitable habitat for YUBR North and about half of suitable habitat for YUBR South is on federal land. Consequently, management of these lands has an important role in determining the continued viability of western Joshua trees in California.

The Petition states that approximately ten percent of western Joshua tree habitat is on National Park Service lands that are generally well-managed, which should prevent significant habitat loss or degradation from activities such as off-road vehicle use, cattle grazing, road building or other forms of development. Approximately 12 percent of the mapped distribution of the YUBR South population falls within military installations and a roughly comparable amount of the YUBR North population falls within such lands. The Petition states that Integrated Natural Resource Management Plans for military installations incorporate some avoidance and minimization measures that could reduce impacts to western Joshua tree, but these measures largely consist of avoidance where feasible and transplantation when conflicts are unavoidable.

The majority of western Joshua tree habitat on federal lands is on BLM land, which is governed by BLM's California Desert Conservation Area (CDCA) Plan. The Northern and Eastern Mojave Plan and West Mojave Plan are amendments to the CDCA Plan that cover the California range of western Joshua tree. The 2016 Desert Renewable Energy Conservation Plan (DRECP) amendments also cover the entirety of western Joshua tree's range in California. The Petition states that these plans do not provide adequate protection for western Joshua tree because the species is not addressed in

the plans, the plans include weak or nonexistent avoidance and conservation measures, and/or the plans include activities that will actively degrade western Joshua tree habitat.

In discussing federal mechanisms to protect western Joshua tree habitat from loss and degradation the Petition cites BLM (2002, 2006, 2016, 2019), NPS (2012), USFWS (2018), and additional federal laws, regulations, and reports.

2. Conclusion

The Petition describes the limitations of existing regulatory mechanisms as they relate to the factors affecting the ability of western Joshua tree to survive and reproduce. The Petition provides sufficient information on the impact of existing management efforts on western Joshua tree for the Department to make the recommendation in Section IV of this Petition Evaluation.

J. Suggestions for Future Management

1. Scientific Information in the Petition

The Petition provides suggestions for future management of western Joshua tree on pages 64 through 65, under the heading “Recommended Management and Recovery Actions”. The Petition states that the most important recovery actions for western Joshua tree are those that lead to rapid and steep greenhouse gas emission reductions to minimize the additional warming that will occur in the climate system. The Petition also provides a list of ten additional recommendations for management and recovery of western Joshua tree. These additional recommendations include (1) declaration of a climate emergency and full decarbonization of California’s economy by 2045, (2) preparation of a state recovery plan for the species, (3) development of NCCPs, (4) management plans for western Joshua tree on California Department of Parks and Recreation land, (5) expansion and connection of existing state parks for protection and restoration of Joshua tree habitat, (6) expansion of cooperative work with federal agencies, (7) development of effective measures to control the spread of invasive grasses, (8) development of protocols for fire suppression activities that minimize ground disturbance and spread of invasive species, (9) establishment and maintenance of a western Joshua tree seed bank, and (10) assisted migration activities.

2. Conclusion

The Petition provides several suggestions for future management of western Joshua tree, although some of the suggestions are not within the Department’s jurisdiction. The Petition provides sufficient suggestions for future management of western Joshua tree for the Department to make the recommendation in Section IV of this Petition Evaluation.

K. Detailed Distribution Map

1. Scientific Information in the Petition

A distribution map is provided as Figure 8 on page 17 of the Petition. This distribution map was prepared by USFWS (2018) and includes a representation of the distribution of both western Joshua tree and eastern Joshua tree. This map has been duplicated as Figure 1 in this Petition Evaluation.

2. Other Relevant Scientific Information

As described in Section III(B)(2) of this Petition Evaluation, the Department possesses vegetation maps that cover a large portion of the California deserts where western Joshua tree occurs, and these maps may contribute to a relatively high-resolution western Joshua tree distribution map in many areas of California. These vegetation maps are likely to improve the current understanding of western Joshua tree's distribution.

3. Conclusion

The Petition provides a western Joshua tree distribution map that is sufficient for the Department to make the recommendation in Section IV of this Petition Evaluation.

L. Sources and Availability of Information

1. Scientific Information in the Petition

The Petition cites 114 scientific and administrative documents on pages 66 through 75, under the heading "References Cited". The Petitioner provided digital copies of these documents to the Commission, and they have been made available to the Department.

2. Other Relevant Scientific Information

The Department used additional sources of scientific information cited in this Petition Evaluation. The Department also received additional comments and information on the petitioned action from Mr. Robert R. Brown, Jr. and Mr. Larry Zimmerman, and these additional comments and information have been included as Attachment 1 to this Petition Evaluation.

3. Conclusion

The Petition provides sufficient information on the sources and availability of information used in the Petition for the Department to make the recommendation in Section IV of

this Petition Evaluation.

IV. RECOMMENDATION TO THE COMMISSION

Pursuant to Section 2073.5 of the Fish and Game Code, the Department has evaluated the Petition on its face and in relation to other relevant information the Department possesses or received. In completing its Petition Evaluation, the Department has determined there is sufficient scientific information to indicate that the petitioned action for western Joshua tree may be warranted. Therefore, the Department recommends the Commission accept the Petition for further consideration under CESA.

V. LITERATURE CITED

The sources provided below were used during preparation of this Petition Evaluation and/or cited in the Petition.

Abella, S.R., E.C. Engel, C.L. Lund, and J.E. Spencer. 2009. Early post-fire plant establishment on a Mojave Desert burn. Madroño 56:137–148.

Agri Chemical and Supply, Inc. 2008. Vegetation of Twentynine Palms, CA. Received from California Department of Fish and Wildlife (VegCAMP) on November 25, 2019.

Alexander, R.R, F.W. Pond, and J.E. Rodgers. 2008. *Yucca* L. In Bonner, F.T. and R.P. Karrfalt, (Eds.), The Woody Plant Seed Manual. Agric. Handbook No. 727. Washington, DC. U.S. Department of Agriculture, Forest Service. 1223 pp.

Allen, E B. and L.H. Geiser. 2011. North American deserts. In L.H. Pardo, M.J. Robin-Abbott, and C T. Driscoll (Eds.). Assessment of Nitrogen Deposition Effects and Empirical Critical Loads of Nitrogen for Ecoregions of the United States (pp. 133–142): General Technical Report NRS-80.

Allen, E.B., L.E. Rao, R.J. Steers, A. Bytnerowicz, and M.E. Fenn. 2009. Impacts of atmospheric nitrogen deposition on vegetation and soils at Joshua Tree National Park. In R.H. Webb, L.F. Fenstermaker, J.S. Heaton, D.L. Hughson, E.V. McDonald, and D.M. Miller (eds.). The Mojave Desert: Ecosystem Processes and Sustainability (pp. 78–100). Las Vegas, NV: University of Nevada Press.

Althoff, D.M., K.A. Segraves, and J.P. Sparks. 2004. Characterizing the interaction between the bogus yucca moths and yuccas: do bogus yucca moths impact yucca reproductive success? Oecologia 140:321–327.

[APG] Angiosperm Phylogeny Group. 2016. An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG IV. Botanical Journal of the Linnean Society 181:1–20.

Barrows, C.W. and M.L. Murphy-Mariscal. 2012. Modeling impacts of climate change on Joshua trees at their southern boundary: How scale impacts predictions. Biological Conservation 152:29–36.

[BLM] Bureau of Land Management. 2002. Northern and Eastern Mojave Plan (NEMO). DOIBLM-CA-D010-2002-0001-RMP-EIS (Northern and Eastern Mojave RMP Amendment). https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=renderDefaultPlanOrProjectSite&projectId=73191 [Accessed December 18, 2019].

[BLM] Bureau of Land Management. 2006. West Mojave Plan (WEMO). DOI-BLM-CA-D010- 2003-0001-RMP-EIS (West Mojave RMP Amendment). https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=renderDefaultPlanOrProjectSite&projectId=72544 [Accessed December 18, 2019].

[BLM] Bureau of Land Management. 2016. Desert Renewable Energy Conservation Plan (DRECP). DOI-BLM-CA-D010-2014-0001-RMP-EIS (DRECP Amendment). https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=95675 [Accessed December 18, 2019]

[BLM] Bureau of Land Management. 2019. West Mojave Route Network Project (WMRNP). DOI-BLM-CA-D080-2018-0008-EIS (West Mojave Route Network Project SEIS) https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=renderDefaultPlanOrProjectSite&projectId=93521 [Accessed December 18, 2019]

Borchert, M.I. and L.A. DeFalco. 2016. *Yucca brevifolia* fruit production, predispersal seed predation, and fruit removal by rodents during two years of contrasting reproduction. American Journal of Botany 103:830–836.

Brittingham, S. and L.R. Walker. 2000. Facilitation of *Yucca brevifolia* recruitment by Mojave Desert shrubs. Western North American Naturalist 60:374–383.

Brooks, M.L. 2003. Effects of increased soil nitrogen on the dominance of annual plants in the Mojave Desert. Journal of Applied Ecology 40:344–353.

Brooks, M.L. and K.H. Berry. 2006. Dominance and environmental correlates of alien annual plants in the Mojave Desert, USA. Journal of Arid Environments 67:100–124.

Brooks, M.L. and J.R. Matchett. 2006. Spatial and temporal patterns of wildfires in the Mojave Desert, 1980-2004. Journal of Arid Environments 67:148–164.

Brooks, M.L., R.A. Minnich, J. Matchett. 2018. Southeastern Deserts Bioregion. In N.G. Sugihara, J. van Wagtendonk, K.E. Shaffer, J. Fites-Kaufman, A.E. Thode (eds.). Fire in California's Ecosystems 2nd Edition. University of California Press.

Bytnerowicz, A., Fenn, M.E., Allen, E.B., and Cisneros, R. 2016. Ecologically relevant atmospheric chemistry. In E. Zavaleta and H.A. Mooney (eds.). Ecosystems of California. Chapter 7. Edited by University of California Press, Berkeley, Calif. pp. 107–128.

California Fish and Game Commission. 2015. California Policy for Native Plants. Adopted June 11, 2015. https://fgc.ca.gov/About/Policies/Miscellaneous#NativePlants [Accessed December 18, 2019]

[CAT] Climate Action Tracker, USA. 2019. http://climateactiontracker.org/countries/usa. (updated version September 19, 2019). [Accessed December 18, 2019].

[CDFW] California Department of Fish and Wildlife, Vegetation Classification and Mapping Program; [AIS] Aerial Information Systems. 2013 California Desert Vegetation Map and Accuracy Assessment in Support of the Desert Renewable Energy Conservation Plan. California Department of Fish and Wildlife Vegetation Classification and Mapping Program; 3/27/2013. [Cited 2019 December 5]. Available from: http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=62825

[CDFW] California Department of Fish and Wildlife, Vegetation Classification and Mapping Program; [USGS] U.S. Geological Survey. 2014. Vegetation Map - Johnson Valley [ds1019]. Retrieved from http://bios.dfg.ca.gov on November 25, 2019.

[CDFW] California Department of Fish and Wildlife, Vegetation Classification and Mapping Program; and Chico State University, Geographic Information Center. 2015. Vegetation - Proposed Tehachapi Pass High Speed Rail Corridor [ds1328]. Retrieved from http://bios.dfg.ca.gov on November 25, 2019.

[CDFW] California Department of Fish and Wildlife; Aerial Information Systems, Inc., and University of California Riverside Center for Conservation Biology. 2017. Vegetation - Mojave Desert for DRECP [ds735] Retrieved from http://bios.dfg.ca.gov on December 12, 2019.

[CDFW] California Department of Fish and Wildlife. 2019. Vegetation Survey Points [ds1020]. Received from California Department of Fish and Wildlife (VegCAMP) on December 5, 2019.

[CDFW] California Department of Fish and Wildlife; [AIS] Aerial Information Systems. 2019a. Jawbone North for AA. Unpublished data. Received from California Department of Fish and Wildlife (VegCAMP) on November 25, 2019.

[CDFW] California Department of Fish and Wildlife; [AIS] Aerial Information Systems. 2019b. Owens Valley for AA. Unpublished data. Received from California Department of Fish and Wildlife (VegCAMP) on November 25, 2019.

[CDFW] California Department of Fish and Wildlife; [AIS] Aerial Information Systems. 2019c. Jawbone South for AA. Unpublished data. Received from California Department of Fish and Wildlife (VegCAMP) on November 25, 2019.

[CNPS] California Native Plant Society. 2019. A Manual of California Vegetation, Online Edition. http://www.cnps.org/cnps/vegetation/. California Native Plant Society, Sacramento, CA. [Accessed December 18, 2019]

Cole, K.L., K. Ironside, J. Eischeid, G. Garfin, P.B. Duffy, and C. Toney. 2011. Past and ongoing shifts in Joshua tree distribution support future modeled range contraction. Ecological Applications 21:137–149.

Cole, W.S., A.S. James, and C.I. Smith. 2017. First Recorded Observations of Pollination and Oviposition Behavior in *Tegeticula antithetica* (Lepidoptera: Prodoxidae) Suggest a Functional Basis for Coevolution with Joshua Tree (*Yucca*) Hosts. Annals of the Entomological Society of America 110:390–397.

Cornett, J.W. 2014. Population dynamics of the Joshua tree (*Yucca brevifolia*): Twenty-three year analysis, Lost Horse Valley, Joshua Tree National Park. In R. E. Reynolds (Ed.), Not a Drop Left to Drink (pp. 71–73): California State University Desert Studies Center, 2014 Desert Symposium.

Cornett, J.W. 2018. Joshua trees are blooming early in the desert. It's not a good thing — you can thank climate change. DESERT magazine. Jan. 30, 2019

Cummings, B. 2019. A petition to list the western Joshua tree (*Yucca brevifolia*) as threatened under the California Endangered Species Act (CESA). Center for Biological Diversity

DiChristopher, T., 2019. US crude oil exports hit a record last week at 3.6 million barrels a day. Feb. 21, 2019. https://www.cnbc.com/2019/02/21/us-crude-oil-exports-hit-a-record-high-last-week.html. [Accessed December 18, 2019].

DeFalco, L.A., T.C. Esque, S.J. Scoles-Sciulla, and J. Rodgers. 2010. Desert wildfire and severe drought diminish survivorship of the long-lived Joshua tree (*Yucca brevifolia*; Agavaceae). American Journal of Botany 97:243–250.

DeFalco, L.A., G.C.J. Fernandez, and R.S. Nowak. 2007. Variation in the establishment of a non-native annual grass influences competitive interactions with Mojave Desert perennials. Biological Invasions 9:293–307.

Dole, K.P., M.E. Loik, and L.C. Sloan. 2003. The relative importance of climate change and the physiological effects of CO^2 on freezing tolerance for the future distribution of *Yucca brevifolia*. Global and Planetary Change 36:137–146.

[EPA] U.S. Environmental Protection Agency. 2009. Land-Use Scenarios: National-Scale Housing-Density Scenarios Consistent with Climate Change Storylines (Final Report). U.S. Environmental Protection Agency, Washington, DC; EPA/600/R-08/076F. Available from the National Technical Information Service, Springfield, VA, and online at http://www.epa.gov/ncea.

Erickson, P., A. Down, M. Lazarus, and D. Koplow. 2017. Effect of subsidies to fossil fuel companies on United States crude oil production. Nature Energy 2:891-898

Esque, T.C., P.A. Medica, D.F. Shrylock, L.A. DeFalco, R.H. Webb, and R.B. Hunter. 2015. Direct and indirect effects of environmental variability on growth and survivorship of prereproductive Joshua trees, *Yucca brevifolia* Engelm. (Agavaceae). American Journal of Botany. 102:85–91.

Fitzpatrick, M.C. and W.W. Hargrove. 2009. The projection of species distribution models and the problem of non-analog climate. Biodiversity Conservation 18:2255–2261.

Frakes, N. 2017. Invasive Plant Management at Joshua Tree National Park. Presentation at California Invasive Plant Council Symposium, October 2017.

Godsoe, W., J.B. Yoder, C.I. Smith, and O. Pellmyr. 2008. Coevolution and divergence in the Joshua tree/yucca moth mutualism. The American Naturalist 171:816–823.

Gucker, C.L. 2006. *Yucca brevifolia*. In: Fire Effects Information System, U. S. Dept. of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). https://www.fs.fed.us/database/feis/plants/tree/yucbre/all.html. [Accessed December 18, 2019].

Harrower, J. and G. S. Gilbert. 2018. Context-dependent mutualisms in the Joshua tree–yucca moth system shift along a climate gradient. Ecosphere 9(9):e02439. https://esajournals.onlinelibrary.wiley.com/doi/abs/10.1002/ecs2.2439. [Accessed December 18, 2019].

Hess, W.J. 2012. *Yucca brevifolia*. In Jepson Flora Project (eds.) Jepson eFlora, http://ucjeps.berkeley.edu/eflora/eflora_display.php?tid=48766 [Accessed December 18, 2019].

Holmgren, C.A., J.L. Betancourt, and K.A. Rylander. 2010. A long-term vegetation history of the Mojave-Colorado Desert ecotone at Joshua Tree National Park. Journal of Quarternary Science 25:222–236.

Hopkins, F. 2018. Inland Deserts Summary Report. California's Fourth Climate Change Assessment. Publication number: SUM-CCCA4-2018-008. https://www.energy.ca.gov/sites/default/files/2019-07/Reg%20Report-%20SUM-CCCA4-2018-008%20InlandDeserts.pdf. [Accessed December 18, 2019].

Iknayan, K.J. and S.R. Beissinger. 2018. Collapse of a desert bird community over the past century driven by climate change. Proc. Natl. Acad. Sci. U.S.A. 115:8597–8602.

[IPCC] Intergovernmental Panel on Climate Change (IPCC). 2018. Global Warming of 1.5° C: An IPCC Special Report on the Impacts of Global Warming of 1.5° C Above Pre-industrial Levels and Related Global Greenhouse Gas Emission Pathways, in the Context of Strengthening the Global Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty. Intergovernmental Panel on Climate Change. Available at: http://www.ipcc.ch/report/sr15/. [Accessed December 18, 2019].

[ITIS] Integrated Taxonomic Information System. 2019. ITIS Database. [Online]. Available: http://www.itis.gov/index.html. [Accessed December 18, 2019].

Jurand, B.S. and S.R. Abella. 2013. Soil seed banks of the exotic annual grass *Bromus rubens* on a burned desert landscape. Rangeland Ecology and Management. 66:157–163.

Keeley, J.E. and A. Meyers. 1985. Effect of heat on seed germination of southwestern Yucca species. The Southwestern Naturalist. 30: 303–304.

Klinger, R. and M. Brooks. 2017. Alternative pathways to landscape transformation: invasive grasses, burn severity and fire frequency in arid ecosystems. Journal of Ecology. 105:1521–1533.

Lenz, L.W. 2001. Seed dispersal in *Yucca brevifolia* (Agavaceae) present and past, with consideration of the future of the species. Aliso 20:61–74.

Le Quéré, C. et al. 2018. Global carbon budget 2018, 10 Earth Syst. Sci. Data 10:2141–2194.

Loik, M.E., C.D. St. Onge, and J. Rogers. 2000. Post-fire recruitment of *Yucca brevifolia* and *Yucca schidigera* in Joshua Tree National Park, California. In J.E. Keeley, M. Baer-Keeley, and C.J. Fotheringham (eds.). Second interface between ecology and land development in California, pp. 79–85. Open-File Report 00-62, U.S. Geological Survey, Sacramento, California, USA.

Lybbert, A.H. and S.B. St. Clair. 2017. Wildfire and floral herbivory alter reproduction and pollinator mutualisms of Yuccas and Yucca moths. Journal of Plant Ecology. 10:851-858.

Maloney, K.A., E.L. Mudrak, A. Fuentes-Ramirez, H. Parag, M. Schat, and C. Holzapfel. 2019. Increased fire risk in Mojave and Sonoran shrublands due to exotic species and extreme rainfall events. Ecosphere 10:e02592.

Mufson, S., C. Mooney, J. Eilperin, and J. Muyskens. 2019. 2°C: Beyond the Limit: Extreme climate change has arrived in America. Washington Post. https://www.washingtonpost.com/graphics/2019/national/climate-environment/climate-change-america/. [Accessed December 18, 2019].

Notaro, M., A. Mauss, and J.W. Williams. 2012. Projected vegetation changes for the American Southwest: Combined dynamic modeling and bioclimatic-envelope approach. Ecological Applications 22:1365–1388.

[NPS] National Park Service. 2012. Death Valley National Park Wilderness and Backcountry Stewardship Plan and Environmental Assessment. https://parkplanning.nps.gov/showFile.cfm?projectID=23311&MIMEType=application%252Fpdf&filename=DEVA%5FWilderness%5F%5F%5FBackcountry%5FStewardship%5FPlan%2Epdf&sfid=139732. [Accessed December 18, 2019].

[NPS] National Park Service. 2010. Geospatial data for the Vegetation Mapping Inventory Project of Joshua Tree National Park. https://www.nps.gov/im/vmi-jotr.htm on [Accessed December 6, 2019].

[OCI] Oil Change International, Drilling Toward Disaster: Why U.S. Oil and Gas Expansion Is Incompatible with Climate Limits (January 2019), http://priceofoil.org/drilling-towards-disaster. [Accessed December 18, 2019].

Pardo, L.H., M.E. Fenn, C.L. Goodale, L.H. Geiser, C.T. Driscoll, E.B. Allen, J.S. Baron, R. Bobbink, W.D. Bowman, C.M. Clark, B. Emmett, F.S. Gilliam, T.L. Greaver, S.J. Hall, E.A. Lilleskov, L. Liu, J.A. Lynch, K.J. Nadelhoffer, S.S. Perakis, M.J. Robin-Abbott, J.L. Stoddard, K.C. Weathers, and R.L. Dennis. 2011. Effects of nitrogen deposition and empirical nitrogen critical loads for ecoregions of the United States. Ecological Applications 21:3049–3082.

Pearson, R.G. and T.P. Dawson. 2003. Predicting the impacts of climate change on the distribution of species: are bioclimate envelope models useful? Global Ecology & Biogeography 12:361–371.

Pellmyr, O. 2003. Yuccas, yucca moths, and coevolution: A review. Annals of the Missouri Botanical Garden 90:35–55.

Pellmyr, O. and K.A. Segraves. 2003. Pollinator divergence within an obligate mutualism: Two yucca moth species (Lepidoptera; Prodoxidae: *Tegeticula*) on the Joshua tree (*Yucca brevifolia*; Agavaceae). Annals of the Entomological Society of America 96:716–722.

Reynolds, M.B.J., L.A. DeFalco, and T.C. Esque. 2012. Short seed longevity, variable germination conditions and infrequent establishment events provide a narrow window for *Yucca brevifolia* (Agavaceae) recruitment. American Journal of Botany 99:1647–1654.

Riddell, E.A., K.J. Iknayana, B.O. Wolf, B.S. Sinervo, and S.R. Beissinger. 2019. Cooling requirements fueled the collapse of a desert bird community from climate change. Proc. Natl. Acad. Sci. 116:21609-21615.

Rogelj, J., G. Luderer, R.C. Pietzker, E. Kriegler, M. Schaeffer, V. Krey, and K. Riahi. 2015. Energy system transformations for limiting end-of-century warming to below 1.5°C, Nature Climate Change 5:519-527.

Scheffers, B.R., L. De Meester, T.C.L. Bridge, A.A. Hoffmann, J.M. Pandolfi, R.T. Corlett, S.H.M. Butchart, P. Pearce-Kelly, K.M. Kovacs, D. Dudgeon, M. Pacifici, C. Rondinini, W.B. Foden, T. G. Martin, C. Mora, D. Bickford, and J.E.M. Watson. 2016. The broad footprint of climate change from genes to biomes to people. Science 354(6313).

Shafer, S.L., P.J. Bartlein, and R.S. Thompson. 2001. Potential changes in the distributions of western North America tree and shrub taxa under future climate scenarios. Ecosystems 4:200–215.

Short, K.C. 2017. Spatial wildfire occurrence data for the United States, 1992-2015 [FPA_FOD_20170508]. 4th Edition. Fort Collins, CO: Forest Service Research Data Archive. https://doi.org/10.2737/RDS-2013-0009.4. [Accessed December 18, 2019].

Smith C.I., O. Pellmyr, D.M. Althoff, M. Balcázar-Lara, J. Leebens-Mack, K.A. Segraves. 2008a. Pattern and timing of diversification in *Yucca* (Agavaceae): specialized pollination does not escalate rates of diversification. Proceedings of the Royal Society of London, Series B: Biological Sciences 275:249–258.

Smith, C.I., W. Godsoe, S. Tank, J.B. Yoder, and O. Pellmyr. 2008b. Distinguishing coevolution from covariance in an obligate pollination mutualism: Asynchronous divergence in Joshua tree and its pollinators. Evolution 62:2676–2687.

Smith, C.I., C.S. Drummond, W. Godsoe, J.B. Yoder, and O. Pellmyr. 2009. Host specificity and reproductive success of yucca moths (*Tegeticula* spp. Lepidoptera: Prodoxidae) mirror patterns of gene flow between host plant varieties of the Joshua tree (*Yucca brevifolia*: Agavaceae). Molecular Ecology 18:5218–5229.

[SCAG] Southern California Association of Governments. 2019. Local Profiles. http://www.scag.ca.gov/DataAndTools/Pages/LocalProfiles.aspx. [Accessed December 18, 2019].

St. Clair, S.B. and J. Hoines. 2018. Reproductive ecology and stand structure of Joshua tree forests across climate gradients of the Mojave Desert. PLoS ONE 13:e0193248. https://doi.org/10.1371/journal.pone.0193248. [Accessed December 18, 2019].

Starr, T.N., K.E. Gadek, J.B. Yoder, R. Flatz, and C.I. Smith. 2013. Asymmetric hybridization and gene flow between Joshua trees (Agavaceae: Yucca) reflect differences in pollinator host specificity. Molecular Ecology 22:437-49.

Sweet, L.C., T. Green, J.G.C. Heintz, N. Frakes, N. Graver, J.S. Rangitsch, J.E. Rodgers, S. Heacox, and C.W. Barrows. 2019. Congruence between future distribution models and empirical data for an iconic species at Joshua Tree National Park. Ecosphere 10:e02763. https://doi.org/10.1002/ecs2.2763. [Accessed December 18, 2019].

Syphard, A.D., J.E. Keeley, and J.T. Abatzoglou. 2017. Trends and drivers of fire activity vary across California aridland ecosystems. Journal of Arid Environments 144:110–122.

Syphard, A D., H. Rustigian-romsos, M. Mann, E. Conlisk, M.A. Moritz, and D. Ackerly. 2019. The relative influence of climate and housing development on current and projected future fire patterns and structure loss across three California landscapes. Global Environmental Change. 56:41–55.

Tagestad J., M. Brooks, V. Cullinan, J. Downs, and R. Mckinley. 2016. Precipitation Regime Classification for the Mojave Desert: Implications for fire occurrence. Journal of Arid Environments 124:388–397.

Thomas, K. 2002. Vegetation - Central Mojave Desert [ds166]. US Geological Survey. Retrieved from http://bios.dfg.ca.gov on December 12, 2019.

Thompson, R.S., S.W. Hostetler, P.J. Bartlein, and K.H. Anderson. 1998. A Strategy for Assessing Potential Future Changes in Climate, Hydrology, and Vegetation in the Western United States. U.S. Geological Survey Circular 1153. United States Government Printing Office, Washington.

Trelease, W. 1892. Detail illustrations of *Yucca*. Mo. Bot. Gard. Annu. Rep. 15:9–166.

Trelease, W. 1893. Further Studies of Yuccas and Their Pollination. Missouri Botanical Garden Annual Report, Vol. 1893, pp. 181-226.

Turner, R.M. 1982. Mohave desert scrub. In D. Brown (ed.), Biotic Communities: Southwestern United States and Northwestern Mexico. Salt Lake City, UT: University of Utah Press.

[USAF] U.S. Air Force. 2017a. Joshua Tree Historical Status on Edwards AFB. 412th Civil Engineering Group. Environmental Management Division. Edwards Air Force Base.

[USAF] U.S. Air Force. 2017b. Joshua Tree Survivorship and/or Regeneration in Fire Area on Edwards Air Force Base. 412th Civil Engineering Group. Environmental Management Division. Edwards Air Force Base.

[USEIA] U.S. Energy Information Administration. 2016a. Hydraulically fractured wells provide two-thirds of U.S. natural gas production (May 5, 2016). https://www.eia.gov/todayinenergy/detail.php?id=26112. [Accessed December 18, 2019]

[USEIA] U.S. Energy Information Administration. 2016b. Hydraulic fracturing accounts for about half of current U.S. crude oil production (March 15, 2016). https://www.eia.gov/todayinenergy/detail.php?id=25372. [Accessed December 18, 2019].

[USFWS] U.S. Fish and Wildlife Service. 2018. Joshua Tree Species Status Assessment. Dated July 20, 2018. 113 pp. + Appendices A–C.

[USFWS] U.S. Fish and Wildlife Service. 2019. Endangered and Threatened Wildlife and Plants; 12-Month Findings on Petitions to List Eight Species as Endangered or Threatened Species, 84 Fed. Reg. 41694 (August 15, 2019).

[USGCRP] U.S. Global Change Research Program. 2017. Climate Science Special Report, Fourth National Climate Assessment, Volume I. https://science2017.globalchange.gov/. [Accessed December 18, 2019].

[USGCRP] U.S. Global Change Research Program. 2018. Impacts, Risks, and Adaptation in the United States, Fourth National Climate Assessment, Volume II. https://nca2018.globalchange.gov/. [Accessed December 18, 2019].

Vander Wall, S.B., T. Esque, D. Haines, M. Garnett, and B. Waitman. 2006. Joshua tree (*Yucca brevifolia*) seeds are dispersed by seed-caching rodents. Ecoscience 13:539–543.

Vamstad, M.S. and J.T. Rotenberry. 2010. Effects of fire on vegetation and small mammal communities in a Mojave Desert Joshua tree woodland. Journal of Arid Environments. 74:1309–1318.

Waitman, B.A., S.B. Vander Wall, and T.C. Esque. 2012. Seed dispersal and seed fate in Joshua tree (*Yucca brevifolia*). Journal of Arid Environments 81:1–8.

Wallace, A. and E.M. Romney. 1972. Radioecology and ecophysiology of desert plants at the Nevada Test Site. Rep. TID25954. Washington, DC. U.S. Atomic Energy Commission, Office of Information Services. 439 pp.

Wallace, G. 2017. WEG 2015 petition to list *Yucca brevifolia*. U.S. Fish and Wildlife Service White Paper, 6 pp. Carlsbad, CA.

Warren, R., J. Price, A. Fischlin, S. de la Nava Santos, and G. Midgley. 2011. Increasing impacts of climate change upon ecosystems with increasing global mean temperature rise. Climatic Change 106:141–177.

Webber, J.M. 1953. Yuccas of the Southwest. Agriculture Monograph No. 17. Washington, DC: U.S. Department of Agriculture, Forest Service. 97 pp.

Went, F.W. 1957. The experimental control of plant growth. Chronica Botanica Volume 17. Waltham, MA: Chronica Botanica.

Wiens, J. J. 2016. Climate-related local extinctions are already widespread among plant and animal species. PLoS Biology 14(12):1–18.

Yoder, J.B., C.I. Smith, D.J. Rowley, R. Flatz, W. Godsoe, C. Drummond, and O. Pellmyr. 2013. Effects of gene flow on phenotype matching between two varieties of Joshua tree (*Yucca brevifolia*, Agavaceae) and their pollinators. Journal of Evolutionary Biology 26:1220–1233.

APPENDIX 1: INFORMATION SUBMITTED TO THE DEPARTMENT

Western Joshua Tree

(***Yucca brevifolia***)

Fish and Game Commission Meeting
August 19-20, 2020
Jeb McKay Bjerke
Native Plant Program

1

Presentation Overview

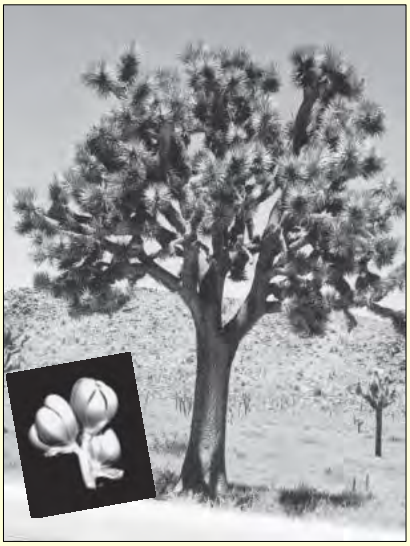
Purpose: Summarize Western Joshua Tree Petition Evaluation Report

1. Brief Species Overview
2. Information in the Petition and in the Department's Possession
3. Department Recommendation

2

2

Western Joshua Tree
Yucca brevifolia or
Yucca brevifolia var. *brevifolia*



Eastern Joshua Tree
Yucca jaegerana or
Yucca brevifolia var. *jaegerana*

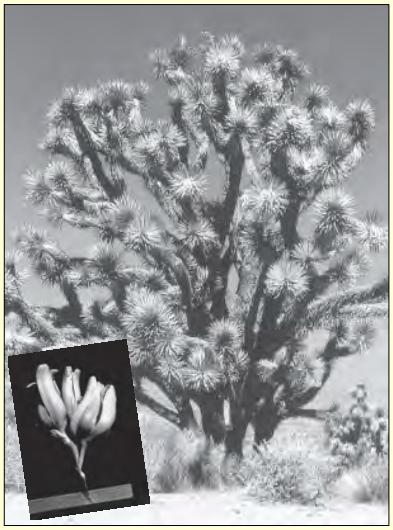


Photo Source: Lenz, L.W. 2007. Reassessment of *Yucca brevifolia* and recognition of *Y. jaegeriana* as a distinct species. Aliso: A Journal of Systematic and Evolutionary Botany 24(1):97–104. (cited in petition)

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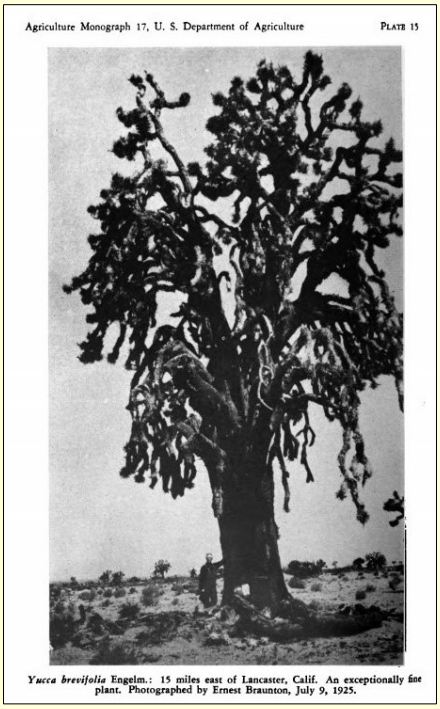
Agriculture Monograph 17, U. S. Department of Agriculture
PLATE 15
Yucca brevifolia Engelm.: 15 miles east of Lancaster, Calif. An exceptionally fine plant. Photographed by Ernest Braunton, July 9, 1925.

5

5

Photo: NPS/Stacy Manson

6

6

Information In Petition

- ✓ Population Trend
- ✓ Geographic Range
- ✓ Distribution
- ✓ Abundance
- ✓ Life History
- ✓ Habitat Necessary for Survival
- ✓ Factors Affecting Survival & Reproduction
- ✓ Degree and Immediacy of Threat
- ✓ Impact of Existing Management Efforts
- ✓ Suggestions for Future Management
- ✓ Detailed Distribution Map
- ✓ Sources & Availability of Information

7

7

Other Relevant Information the Department Possessed or Received

Vegetation maps possessed by the Department

Reports from Edwards Air Force Base:

- population trend from 1992-2015
- survivorship and/or regeneration within a fire area

Comments and information from a landowner

8

8

Abundance and Population Trend

(Information from Petition)

- No population size estimates
- No evidence of a range-wide population trend
- Some populations declining, particularly within Joshua Tree National Park

9

9

Abundance and Population Trend

(Additional Information in Department Possession)

- Currently relatively abundant
- Populations at Edwards Air Force Base appeared stable to increasing from 1992 to 2015

Source: U.S. Air Force. 2017. Joshua Tree Historical Status on Edwards AFB. 412th Civil Engineering Group. Environmental Management Division. Edwards Air Force Base

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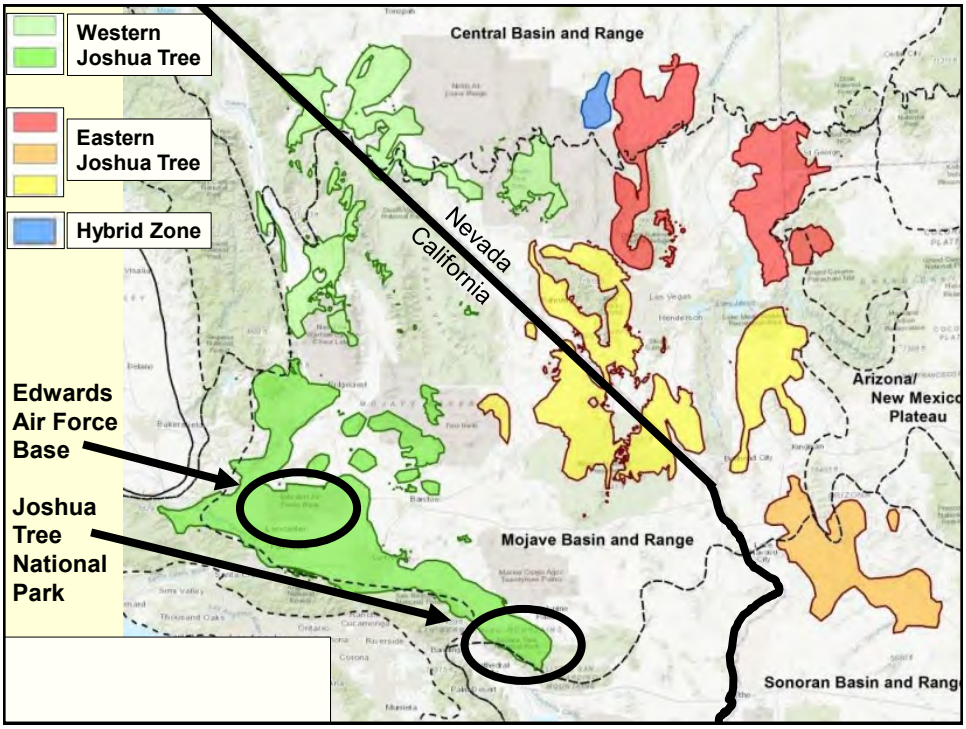


11

Life History

(Information from Petition)

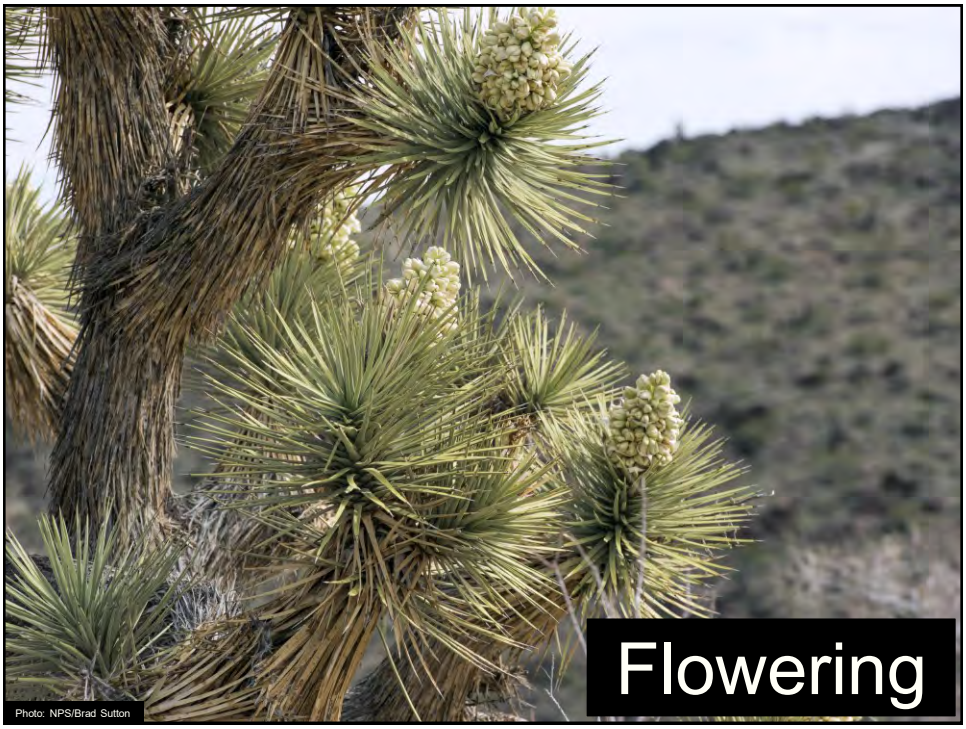
- Sexual or asexual reproduction
- Episodic and rare flowering
- Obligate pollination mutualism
- Seed production
- Germination and growth

12

12

Asexual Reproduction
Photo: Jeb Bjerke

13


Flowering
Photo: NPS/Brad Sutton

14

Photo: NPS/Robb Hannawacker

15

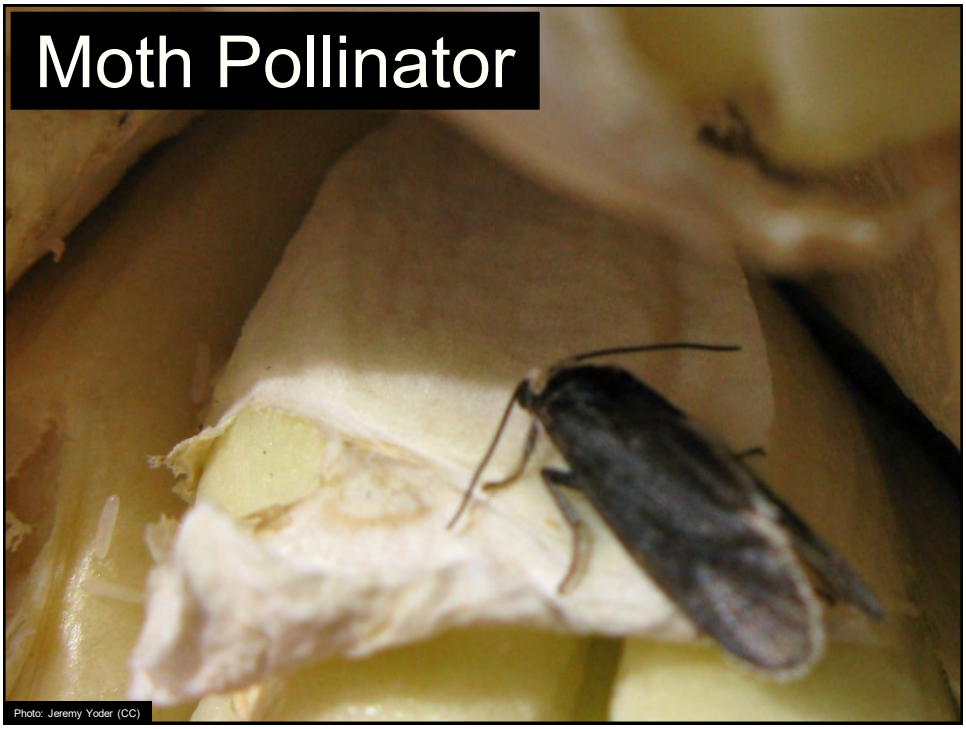
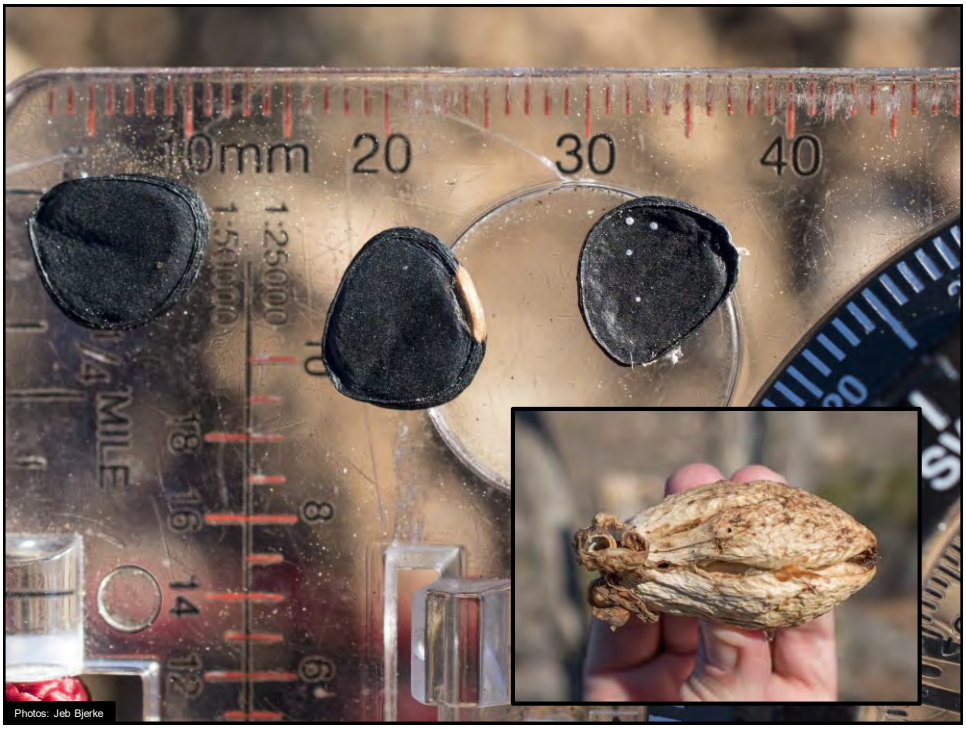


Photo: Jeremy Yoder (CC)

16



Photos: Jeb Bjerke

17

Photo: NPS/Brad Sutton

18

Habitat

(Information from Petition)

- Hot, dry sites on flats, mesas, bajadas, and gentle slopes
- Various soils
- Temperature and precipitation important
- Needs obligate pollinators, rodents, and plants to shelter emerging seedlings

19

19

20

Factors Affecting Survival & Reproduction

(Information from Petition)

- climate change
- habitat loss to human development
- invasive species
- wildfires
- predation

21

21

Factors Affecting Survival & Reproduction

(Information from Petition)

- Climate change represents the single greatest threat
- Six published models predict contractions at the western edge of its range
- Climate change contributes to other threats.

22

Models of Future Joshua Tree Distribution

Author (year)	Modeled Area	Data/Methods	Scenario	Results
Thompson et al. (1998)	Rangewide	15 km grid, temperature & precipitation, Little (1971,1976) range map	Doubled CO_2	**8-fold increase in range to north and east, range retraction in California**
Shafer et al. (2001)	Rangewide	25 km grid, 3 climate variables, Little (1971,1976) range map	2090-2099	**Increase in range to north and east, severe range retraction in California**
Dole et al. (2003)	Rangewide	10 km grid, temperature & precipitation data, Benson and Darrow (1981) range map	Doubled CO_2	**Increase in range to north and east, both contraction and expansion of range in California**
Cole et al. (2011)	Rangewide	Sophisticated model using presence/absence points from several sources, with statistical testing of the model, migration rates included, range retraction ~11,700 years ago examined	2070-2099	**Increase in range to north and east, very severe range retraction in California**
Barrows and Murphy-Mariscal (2012)	Joshua Tree National Park	Sophisticated fine-scale model using adult and juvenile presence points, adults and juveniles mapped separately to check for warming that has already occurred	+1°, +2° and +3° C warming	**Decrease but not elimination from Joshua Tree National Park (<10% remains under +3° C warming). Juvenile range already reduced ~75% from adult range**
Sweet et al. (2019)	Joshua Tree National Park	Sophisticated fine-scale model, Maxent, expanded presence point data from Barrows and Murphy-Mariscal (2012), field verification of model results at 14 macroplots	2070-2099	**Very severe range retraction in Joshua Tree National Park: almost complete elimination under current CO_2 trajectory**

23

Development

24

24

Invasive Grasses
Photo: NPS/Robb Hannawacker

25

Fire
Photo: NPS

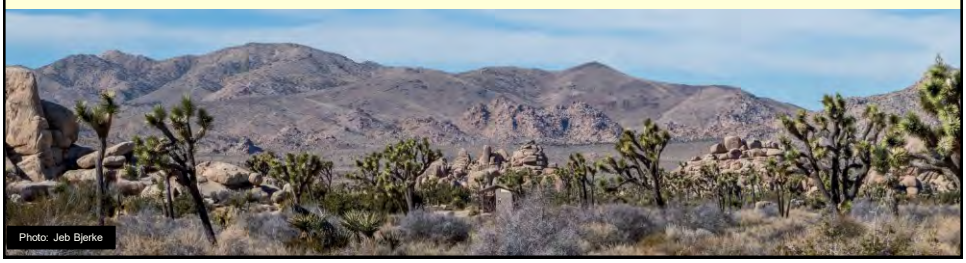
26

27

Impact of Existing Management

(Information from Petition)

- Inadequate regulatory mechanisms for:
  - CO_2 emissions
  - invasive species and fire
  - habitat loss and degradation



28

Sources & Availability of Information

(Information from Petition)

100+ scientific papers and other sources

Photo: NPS/Brad Sutton

29

29

Information In Petition

- ✓ Population Trend
- ✓ Geographic Range
- ✓ Distribution
- ✓ Abundance
- ✓ Life History
- ✓ Habitat Necessary for Survival
- ✓ Factors Affecting Survival & Reproduction
- ✓ Degree and Immediacy of Threat
- ✓ Impact of Existing Management Efforts
- ✓ Suggestions for Future Management
- ✓ Detailed Distribution Map
- ✓ Sources & Availability of Information

Other Relevant Information the Department Possessed or Received

30

30

Department Recommendation

The Department recommends that the Commission find there is sufficient information to indicate that the petitioned action may be warranted, and the petition should be accepted and considered.

31

31

SUMMARY

- Information from Petition and other sources
- Climate change listed as greatest threat: 6 models project California range reduction
- Human development, invasive species and altered fire regime are additional threats
- Petition states existing regulatory mechanisms are inadequate
- Recommendation: there is sufficient information to indicate that the petitioned action may be warranted

32

32

Questions ◈ Thank You

Jeb McKay Bjerke
Senior Environmental Scientist (Specialist)
(916) 651-6594
Jeb.Bjerke@wildlife.ca.gov

33

33

Congress of the United States
Washington, DC 20515

Original on file,
received June 10, 2020

June 10, 2020

Mr. Eric Sklar
President
California Fish and Game Commission
P.O. Box 944209
Sacramento, CA 94244-2090

Re: Petition to List the Western Joshua Tree

Dear President Sklar,

We write in strong opposition to the petition, submitted by the Center for Biological Diversity, to list the western Joshua tree as a threatened species under the California Endangered Species Act (CESA). Approving this petition would create an unprecedented expansion of CESA by using subjective models of hypothetical future circumstances, instead of objective evidence of declines in habitat and population, to justify listing of a species. Additionally, it would place unworkable burdens on private landowners and local governments.

The petition submitted by the Center for Biological Diversity fails to provide scientific evidence to substantiate a decline of the western Joshua tree population. Instead they seek threatened status for the western Joshua tree based on their prediction of a future decline due to global climate change. Such a justification is unprecedented and would open a Pandora's box to allow nearly any species of flora or fauna in California to be listed via CESA.

The petition itself acknowledges the western Joshua Tree is "not at imminent risk of extinction."[1] Yet, the petition cites California Fish & Game Code § 2067, which defines a "threatened" species as "a native species … although not presently threatened with extinction, [that] is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts." In fact, the Joshua tree has benefited from extensive conservation efforts and widely expanded habitat protections, many recent, which obviate the need for threatened status.

The overwhelming majority of Joshua tree habitat is located on federal lands, with millions of acres designated for various conservation purposes. Outside federal lands, the Joshua tree is protected under state law through the California Desert Native Plants Act, which requires permitting for removal. With these robust existing protections and population numbers

[1] Center for Biological Diversity, "Petition to List the Western Joshua Tree (Yucca brevifolia) as Threatened under the California Endangered Species Act (CESA)", exec. summary, p. 1, Oct. 15, 2019, *available at* https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=175218&inline.

unchanged, the US Department of the Interior last year rejected a nearly identical petition to list the Joshua tree as a threatened species.

Accepting this petition would be disastrous for housing needs and undermine California's own energy diversification goals, all while shuttering aggregate materials sites necessary to rebuild our civil infrastructure efficiently and responsibly.

We urge you to consider the dangerous new precedent that would be set should this petition succeed and ask respectfully that you deny this petition.

Thank you,

Paul Cook
Member of Congress

Kevin McCarthy
House Republican Leader

Tom McClintock
Member of Congress

Doug LaMalfa
Member of Congress

Ken Calvert
Member of Congress

Devin Nunes
Member of Congress

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California State Senate

SENATOR
SCOTT WILK
TWENTY-FIRST SENATE DISTRICT

COMMITTEES
AGRICULTURE
VICE CHAIR
EDUCATION
VICE CHAIR
GOVERNMENTAL ORGANIZATION
VICE CHAIR
RULES
VICE CHAIR
BUSINESS, PROFESSIONS & ECONOMIC DEVELOPMENT
VETERANS AFFAIRS

May 12, 2020

Original on file,
received May 12, 2020

Mr. Eric Sklar, President
California Fish and Game Commission
P.O. Box 944209
Sacramento, CA 94244-2090

Dear Commissioners,

I understand the Commission is considering listing the Western Joshua Tree under the California Endangered Species Act. My district covers much of the high desert ecosystem where the Western Joshua Tree is found, it is important to our community identity, our ecosystem and the natural beauty of our desert. However, it is not necessary or prudent to list the Western Joshua Tree under the Act.

The Joshua tree is well protected in its natural habitat in California. There are millions of acres set aside to preserve the Western Joshua Tree including the Mojave National Preserve, the Joshua Tree National Park, the Mojave Trails National Monument, the Sand to Snow National Monument, Castle Mountains National Monument and other protected areas at the local, state and federal levels.

By comparison, the areas of the high desert in Los Angeles and San Bernardino County are vital to the state's commitment to develop more housing and in areas that would not impact current and future efforts to continue to protect the Western Joshua Tree. This action would jeopardize housing commitments unnecessarily.

Not long ago, the federal government wisely rejected this proposal, and the Commission will be doing the right thing reject it as well.

Sincerely,

Scott Wilk

SCOTT WILK
Senator, 21st District

SW: dm

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Assembly
California Legislature

VINCE FONG
ASSEMBLYMEMBER, THIRTY-FOURTH DISTRICT

COMMITTEES
VICE CHAIR: TRANSPORTATION
APPROPRIATIONS
BUDGET
BUSINESS AND PROFESSIONS
PUBLIC EMPLOYMENT AND RETIREMENT

SUBCOMMITTEES
BUDGET SUBCOMMITTEE NO. 3 ON RESOURCES AND TRANSPORTATION
BUDGET SUBCOMMITTEE NO. 6 ON BUDGET PROCESS OVERSITE AND PROGRAM EVALUATION

June 11, 2020

Original on file, received June 11, 2020

Mr. Eric Sklar
President
California Fish and Wildlife Commission
P.O. Box 944209
Sacramento, CA 94244-2090

Re: Petition to List the Western Joshua Tree

Dear President Sklar,

I write in strong opposition to the petition submitted by the Center for Biological Diversity to list the western Joshua tree as a threatened species under the California Endangered Species Act (CESA). The Joshua tree currently receives protections at the federal, state, and local levels. Listing the tree under CESA would add redundant protections that place a significant financial burden on private land owners while doing little to address the long term threat to the species.

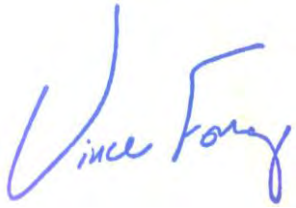
The California desert is comprised of rural, underserved communities that face economic challenges unlike other areas throughout our state. Listing the Joshua tree would effectively halt future development of these communities at a time when they are grappling with housing shortages, rising homelessness, and widespread unemployment.

Though it is important to protect our native species, the petition submitted by the Center for Biological Diversity fails to provide scientific evidence to demonstrate a decline of the Joshua tree population. The proposed listing is nothing more than a solution in search of a problem. Much of the western Joshua tree population resides on federally protected lands and state preserves, giving them the highest level of protection. Outside those jurisdictions, they are protected under state law through the California Desert Native Plants Act, which requires permitting for removal.

Furthermore, western Joshua trees are scattered throughout eastern Kern County near the Naval Air Weapons Station at China Lake. Listing the tree could potentially impede the ability of this military installation to carry out its intended purpose in helping ensure the military readiness and national protection of the United States. Restricting our national defense for a petition based upon unproven assertions is not only misguided, it’s dangerous.

I urge you to consider the significant impacts this will have on the development of rural desert communities and our national defense. I respectfully ask that you deny this petition.

Thank you,



Vince Fong
California State Assemblyman
34th District

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Assembly
California Legislature

TOM LACKEY
ASSEMBLYMAN, THIRTY-SIXTH DISTRICT

COMMITTEES
VICE CHAIR: LOCAL GOVERNMENT
VICE CHAIR: PUBLIC SAFETY
ACCOUNTABILITY AND ADMINISTRATIVE REVIEW
AGING AND LONG-TERM CARE
BUDGET
GOVERNMENTAL ORGANIZATION
JOINT LEGISLATIVE COMMITTEE ON EMERGENCY MANAGEMENT

Original on file,
received June 10, 2020

June 10, 2020

The Honorable Eric Sklar, President
California Fish and Game Commission
P.O. Box 944209
Sacramento, CA 94244-2090

Re: Petition to List the Western Joshua Tree

Dear President Sklar,

As an elected official representing the Antelope Valley, I write in strong opposition to the Petition submitted by the Center for Biological Diversity (Petition) to list the western Joshua tree as a threatened species under the California Endangered Species Act (CESA) and appreciate the opportunity to provide public comment. The western Joshua tree presently receives extensive protections at the federal, state, and local levels. Listing the tree would add redundant protections that place a significant financial burden on private land owners while doing little to address the alleged long term threat to the species upon which the Petition is based.

The Petition fails to provide scientific evidence to substantiate a decline of the western Joshua tree population. Instead, the Petition predicts a future decline due to global climate change. It is worth noting that a substantial portion of the western Joshua tree population resides on federal, state, and locally protected lands across multiple jurisdictions in the south western United States, giving them the highest level of protection. Outside those jurisdictions, they are protected under state law through the California Desert Native Plants Act, which requires permitting for removal. Counties and municipalities within the desert areas have also imposed development regulations to protect the species.

In August of 2019 the United States Department of Fish and Wildlife rejected a substantially similar petition to list both species of the Joshua tree on the federal Endangered Species Act. Citing the best available scientific evidence, their work resulted in the following statement:

> Adapted to harsh desert conditions, the trees can tolerate extreme temperatures, ranging from 4 to 120 degrees Fahrenheit and elevations between 1,900 to 7,200 feet….
>
> …The Service reviewed the status of both species and assessed the potential impact on their populations of stressors such as wildfire, drought, plant-eating animals, and climate change. The Service's analysis determined that neither taxa currently requires protection under the ESA. Most habitat occupied by the two species is federally-managed by agencies including the National Park Service, Bureau of Land Management, U.S. Forest Service and Department of Defense. A much smaller portion of habitat is managed by state or local governments or is privately owned. Species distribution mapping shows there has been no major reduction or contraction in Joshua tree populations during the last 40 years. Additionally, several federal agencies, the states of

1) https://www.fws.gov/carlsbad/NR/JTree_12M_Finding_NR_final_20190814.pdf

California and Arizona and several local jurisdictions have adopted and implemented policies that provide some protections to Joshua trees from harvesting and removal. (1)

Adding CESA protections will make it nearly impossible to construct vital public infrastructure projects and will increase the cost of housing in an economically depressed region. For example, between the cities of Palmdale and Lancaster there are at least 24 projects that would be affected due to this classification. These projects include mixed use development with apartments, townhomes, a hotel, commercial/retail, and almost a dozen tentative tract map (TTM) developments. If the western Joshua tree receives CESA protections, these projects will be significantly delayed or prohibited.

To make matters worse, CESA protections take effect immediately if the western Joshua tree is listed as a candidate species. This process leaves local governments without adequate time to plan contingencies for infrastructure projects that are under construction or close to breaking ground. The specific impacts this potential listing may have on state-mandated projects and affordable housing development remain largely unknown, and I therefore request additional time to realize the full impact this study will have on our communities. Due to the immediate and significant impacts this decision will have and the communication challenges faced, particularly due to the complications resulting from the COVID-19 pandemic and related public health State of Emergency, I respectfully ask that the Commission delay consideration of this matter to a meeting date after June 25, 2020. I acknowledge the Commission's currently posted agenda and staff's recommendation to continue the hearing to August 19-20, 2020, and strongly encourage the Commission to approve this continuance.

The western Joshua tree is an iconic species that defines the Antelope Valley community, and I and my predecessors have worked diligently to ensure that existing federal, state, and local protections for this plant species are observed at all times. I would welcome the opportunity to discuss local protection measures with the petitioners if they deem them insufficient. I oppose this Petition request because it creates new, sweeping state protections across immense geographical locations of our state that do not address the specifically alleged long-term threat to the species. Rather, these CESA protections will impose significant challenges to critical infrastructure development and drastically increase the cost of living in an already disadvantaged region. I remain committed to working with stakeholders on a strategic, targeted solution that balances conservation and preservation of this species with sustainable economic prosperity.

Thank you,

Tom Lackey
California State Assemblyman
36th District

1) https://www.fws.gov/carlsbad/NR/JTree_12M_Finding_NR_final_20190814.pdf

Assembly
California Legislature

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CHAD MAYES
ASSEMBLYMEMBER, FORTY-SECOND DISTRICT

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June 10, 2020

**Original on file,
received June 10, 2020**

The Honorable Eric Sklar, President
California Fish and Game Commission
P.O. Box 944209
Sacramento, CA 94244-2090

Re: Petition to List the Western Joshua Tree

Dear President Sklar,

As elected officials representing the Morongo Basin, we write in strong opposition to the Petition submitted by the Center for Biological Diversity (Petition) to list the western Joshua tree as a threatened species under the California Endangered Species Act (CESA) and appreciate the opportunity to provide public comment. The western Joshua tree presently receives extensive protections at the federal, state, and local levels. Listing the tree would add redundant protections that place a significant financial burden on private land owners while doing little to address the alleged long term threat to the species upon which the Petition is based.

The Petition fails to provide scientific evidence to substantiate a decline of the western Joshua tree population. Instead, the Petition predicts a future decline due to global climate change. It is worth noting that a substantial portion of the western Joshua tree population resides on federal, state, and locally protected lands across multiple jurisdictions in the south western United States, giving them the highest level of protection. Outside those jurisdictions, they are protected under state law through the California Desert Native Plants Act, which requires permitting for removal. Counties and municipalities within the desert areas have also imposed development regulations to protect the species.

In August of 2019 the United States Department of Fish and Wildlife rejected a substantially similar petition to list both species of the Joshua tree on the federal Endangered Species Act. Citing the best available scientific evidence, their work resulted in the following statement:

> Adapted to harsh desert conditions, the trees can tolerate extreme temperatures, ranging from 4 to 120 degrees Fahrenheit and elevations between 1,900 to 7,200 feet….
>
> …The Service reviewed the status of both species and assessed the potential impact on their populations of stressors such as wildfire, drought, plant-eating animals, and climate change. The Service's analysis determined that neither taxa currently requires protection under the ESA. Most habitat occupied by the two species is federally-managed by agencies including the National Park Service, Bureau of Land Management, U.S. Forest Service and Department of Defense. A much smaller portion of habitat is managed by state or local governments or is privately owned. Species distribution mapping shows there has been no major reduction or contraction in Joshua tree populations during the last 40 years. Additionally, several federal agencies, the states of California and Arizona and several local jurisdictions have adopted and implemented policies that provide some protections to Joshua trees from harvesting and removal. (1)

(1) https://www.fws.gov/carlsbad/NR/JTree_12M_Finding_NR_final_20190814.pdf

Adding CESA protections will make it nearly impossible to construct vital public infrastructure projects and will increase the cost of housing in an economically depressed region. For example, the Town of Yucca Valley (Town) is currently in the first stage of a wastewater reclamation project, which is a state-mandated phased project to connect the entire town to a newly constructed treatment facility. To finance the project, 4,500 properties were assessed $18,000 each, but there are still 3,000 connections remaining to be completed. If the western Joshua tree receives CESA protections, these remaining connections will be significantly delayed or prohibited, and the original assessment amount will not cover connection costs.

To make matters worse, CESA protections take effect immediately if the western Joshua tree is listed as a candidate species. This process leaves local governments without adequate time to plan contingencies for infrastructure projects that are under construction or close to breaking ground. We very much appreciate the multiple conversations we have had with yourself, Fish and Game Commission (Commission) staff, and officials from the California Department of Fish and Wildlife (Department). The specific impacts this potential listing may have on state-mandated projects and affordable housing development remain largely unknown, and we therefore request additional time to realize the full impact this study will have on our communities. Due to the immediate and significant impacts this decision will have and the communication challenges we faced, particularly due to the complications resulting from the COVID-19 pandemic and related public health State of Emergency, we respectfully ask that the Commission delay consideration of this matter to a meeting date after June 25, 2020. We acknowledge the Commission's currently posted agenda and staff's recommendation to continue the hearing to August 19-20, 2020, and strongly encourage the Commission to approve this continuance.

The western Joshua tree is an iconic species that defines our Morongo Basin community, and we and our respective predecessors have worked diligently to ensure that existing federal, state, and local protections for this plant species are observed at all times. We would welcome the opportunity to discuss our local protection measures with the petitioners if they deem them insufficient. We oppose this Petition request because it creates new, sweeping state protections across immense geographical locations of our state that do not address the specifically alleged long-term threat to the species. Rather, these CESA protections will impose significant challenges to critical infrastructure development and drastically increase the cost of living in an already disadvantaged region. We remain committed to working with stakeholders on a strategic, targeted solution that balances conservation and preservation of this species with sustainable economic prosperity.

Thank you,

Chad Mayes
California State Assemblyman
42nd District

Dawn Rowe
Third District Supervisor
County of San Bernardino

Dawn ROWE
THIRD DISTRICT SUPERVISOR

Original on file,
received June 16, 2020

BOARD OF SUPERVISORS
COUNTY OF KERN

SUPERVISORS

MICK GLEASON	District 1
ZACK SCRIVNER	District 2
MIKE MAGGARD	District 3
DAVID COUCH	District 4
LETICIA PEREZ	District 5

KATHLEEN KRAUSE
CLERK OF THE BOARD OF SUPERVISORS
Kern County Administrative Center
1115 Truxtun Avenue, 5th Floor
Bakersfield, CA 93301
Telephone (661) 868-3585
TTY (800) 735-2929

June 16, 2020

California Fish and Game Commission
Mr. Eric Sklar, President
P.O. Box 944209
Sacramento, CA 94244-2090

Emailed - fqc@fqc.ca.gov

RE: Opposition to Listing of Western Joshua Tree Item
June 24-25 California Fish and Game Commission

Dear President Sklar and Members of the Commission,

The Joshua Tree is well known in Kern County throughout our eastern Kern desert areas which contain the Mojave Air and Space Port, the cities of California City and Ridgecrest and thousands of acres of wind and solar projects. It occurs on both Bureau of Land Management (BLM) lands as well as private lands. In addition, there are protected areas within Red Rock State Park and on federal lands such as wilderness designations and BLM Areas of Critical Environmental Concern (ACEC) within Kern County. The Kern County Board of Supervisors believes that listing the Western Joshua Tree as a candidate for threatened status is unnecessary and will impede the implementation of climate goals that the State has created.

Through our Environmental Impact Report preparation on thousands of MWs of wind and solar as well as battery storage, the staff of our Planning and Natural Resources Department has carefully evaluated and protected the Western Joshua Tree when it occurs on projects. Since 2004, a policy of the Kern County General Plan has required Joshua Tree Woodlands be preserved onsite from development proposals or compensation land be provided. Extensive stands of Joshua Tree woodlands have been preserved in Kern's Tehachapi Wind area in between the turbine placement and will not be developed over the next 30-40 years of the wind farm operation. Repowering of those projects at the end of that 40 years will have a smaller footprint and those woodlands will still be there. In the cases where woodland must be disturbed our Board, on the recommendation of staff, has required that mitigation cover the loss of those important natural community through payment to the City of Lancaster for additions to their Prime Desert Woodland Preserve at 35th Street West in Lancaster which includes extensive Joshua Tree Woodlands.

The representations of the petition that Joshua Trees on private lands are threatened due to development is not applicable to Kern County. The majority of trees removed were done in the 1970s and 1980s for farming and cannot be reestablished. The current private lands with Joshua Trees are in the Antelope Valley adjudicated water basin and other water limited areas where residential and commercial development will not occur. While the petition you reviewed asserts that energy projects are a threat, in fact, commercial scale solar developers avoid properties with Joshua Trees whenever possible. If a significant older Joshua Tree occurs on the site, since they can live from 150 to 300 years, they have been avoided in the project design and in one case smaller trees were relocated to create desert landscaping along the outside of the project. Those relocated trees are thriving and continuing their slow growth. We note that if climate change is a threat to Joshua Trees it is a threat to all species and humans and increasing the burden of environmental regulation on this desert plant will only interfere with the ability of solar and wind projects to be financed and built. These are the exact projects the environmental groups claim is needed to address their climate change concerns and the State is encouraging for energy for our population. In addition, Kern County is a center of oil development in our valley portion and groups, as well as the State of California wants diversification of energy. Kern County has significant desert areas and transmission that will continue to be appropriate, and already disturbed for commercial scale solar and wind including the new over 3000 MW of battery storage planned. All projects in Kern County require an Environmental Impact Report and appropriate siting and evaluation of the impacts on Joshua Trees and Joshua Tree Woodlands are done. Listing could and will add a complicated layer of regulation that will delay and even prevent such projects with the related loss of jobs, tax revenue and progress on energy diversification that is so important to achieving the State goals. Kern County already provides over 15,900 MW of renewable energy for cities, counties and utilities in the State and this one listing could stop that progress.

The Kern County Board of Supervisors requests you vote no on designating the Western Joshua Tree as a candidate species for listing as inconsistent with the important goals of green energy job creation and encourage the department staff to continue their good work on reviewing projects to implement best practices for supporting the survival and expansion of the Western Joshua Tree.

Sincerely,

Leticia Perez, Chairman
Kern County Board of Supervisors

Cc: San Bernardino County Board
Senator Grove
Senator Hurtado
Assemblyman Salas
Assemblyman Fong

RECEIVED
CALIFORNIA
FISH AND GAME
COMMISSION

2020 MAY 22 PM 1:23

May 19, 2020

Mr. Eric Sklar, President
California Fish and Wildlife Commission
P.O. Box 944209
Sacramento, CA 94244-2090

RE: PETITION TO LIST THE WESTERN JOSHUA TREE

Dear President Sklar:

Victor Valley Transit Authority values our desert environment, of which the native Joshua Tree is an important element.

After careful consideration however, the Victor Valley Transit Authority Board of Directors is in ***strong opposition*** to the petition submitted by the Center for Biological Diversity to list the western Joshua tree as a threatened species under the California Endangered Species Act.

As noted in the Petition, the Western Joshua tree is not presently threatened with extinction. As such, the petition predicts a future decline due to global climate change. The proposed listing is based upon theory and modeling efforts, not current scientific facts as they exist today.

It is well known that much of the Western Joshua tree population resides on federally protected lands and state preserves, giving them the highest level of protection. Outside those jurisdictions, they are protected under state law through the California Desert Native Plants Act, which requires permitting for removal. In addition, the state of California has the opportunity to collaborate with the federal government on conservation efforts designed to protect the western Joshua tree and its surrounding habitat. To place the conservation requirements onto private property owners prior to governmental agencies attempting to collaborate and cooperate in implementing effective conservation efforts is neither good public policy nor good governance. Placing significant financial burdens on private landowners will not address the hypothetical decline in the species as outlined in the Petition.

The California desert is comprised of rural, underserved communities that face economic challenges unlike other areas of our state.

It is incongruous that the state of California on the one hand acknowledges the significant state-wide housing shortage, the lack of affordable housing, and the homeless population crisis, which all exist at the current time, yet on the other is prepared to impose some of the most stringent impediments to construction of housing by implementing this the State Endangered Species Act. Conflicting public policies need to be addressed prior to imposing additional constraints and costs upon private property owners and upon the delivery of

critical public infrastructure which is so lacking in the Victor Valley and indeed the entire desert area.

Imposition of the State Endangered Species Act will create unnecessary impediments, as well as greatly increased costs, to the delivery of these much-needed infrastructure systems throughout the Victor Valley. In many cases, these limitations upon infrastructure development will prevent local agencies from delivering much needed housing development, transportation network capacity enhancements and job creation through commercial development opportunities. Placing significant constrains and financial burdens on infrastructure development in this region's desert communities will not address the theoretical decline in the species as outlined in the Petition.

While we appreciate the Commission's role in administering the California Endangered Species Act, it is equally important to recognize when conflicting state public policies create an untenable framework within which federally funded public agencies such as the VVTA must navigate. VVTA urges you to consider the significant impacts your decision will have on our beautiful desert communities, and respectfully ask that you deny this petition.

Thank you for your time and consideration.

Curt Emick
Board Chair, Board of Directors
Victor Valley Transit Authority

Cc: Board of Directors

May 19, 2020

RECEIVED
CALIFORNIA
FISH AND GAME
COMMISSION

2020 MAY 26 PM 1:23

Mr. Eric Sklar, President
California Fish and Wildlife Commission
P.O. Box 944209
Sacramento, CA 94244-2090

RE: PETITION TO LIST THE WESTERN JOSHUA TREE

Dear President Sklar,

The Town of Yucca Valley, possibly more than any other community in the state, values the integration of the desert environment, including the Joshua Tree and other unique desert plants, into our continued development as a community. As evidenced by our Town logo, as well as our General Plan Vision and Values, the desert environment is woven into the fabric of this community.

After careful consideration however, the Yucca Valley Town Council is in ***strong opposition*** to the petition submitted by the Center for Biological Diversity to list the western Joshua tree as a threatened species under the California Endangered Species Act.

As noted in the Petition, the western Joshua tree is not presently threatened with extinction. As such, the petition predicts a future decline due to global climate change. The proposed listing is based upon theory and modeling efforts, not current scientific facts as they exist today.

The Petition clearly identifies that significant western Joshua tree habitat is located on federal lands. As such, the state of California has the opportunity to collaborate with the federal government on conservation efforts designed to protect the western Joshua tree and its surrounding habitat. To place the conservation requirements onto private property owners prior to governmental agencies attempting to collaborate and cooperate in implementing effective conservation efforts is neither good public policy nor good governance. Placing significant financial burdens on private landowners will not address the theoretical decline in the species as outlined in the Petition.

The California desert is comprised of rural, underserved communities that face economic challenges unlike other areas of our state. While the Petition identifies significant growth rates in several communities, the details in the Petition are misleading. For example, over the Town of Yucca Valley's 28 years of incorporation, the growth rate in housing units is less than one (1%) percent annually. Since 2010, a total of 194 single family residential construction permits have been issued. Growth in Yucca Valley has been anything but substantial or significant over the past 28 years.

The Town of Yucca Valley
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Simultaneously, the state of California acknowledges the significant state-wide housing shortage, the lack of affordable housing, and the homeless population crisis, which all exist at the current time. But the state of California is prepared to impose some of the most stringent impediments to construction of housing through implementation of the State Endangered Species Act. Conflicting public policies need to be addressed prior to imposing additional constraints and costs upon private property owners and upon the delivery of critical public infrastructure which is so lacking in Yucca Valley and the surrounding Morongo Basin.

The Town of Yucca Valley, through The Hi-Desert Water District, and as ordered by the California Regional Water Quality Control Board, is implementing wastewater collection and treatment infrastructure. Property owners in Phase I of the project agreed to tax themselves approximately $19,000 per single family residential unit to deliver this critical infrastructure to the community. Phase I was completed in approximately December 2019. Preliminary estimates for Phase II of the wastewater project place single family residential units' costs at approximately $28,000. For numerous property owners, it will not be possible to connect to the State mandated wastewater collection system without removal of Joshua trees. Therefore, policies created by two separate State agencies have created the inability of property owners to comply with both State regulations. Again, conflicting public policies need to be addressed prior to imposing additional constraints and costs upon private property owners.

The Town of Yucca Valley is part of the Morongo Basin. The Morongo Basin, including the Town of Yucca Valley, the City of 29 Palms, and the surrounding unincorporated San Bernardino County areas of Morongo Valley, Joshua Tree, as well as other small communities, is infrastructure deficient. These deficiencies cover the transportation network, including State Routes 62 and 247, flood control systems, as well as water and wastewater systems.

Imposition of the State Endangered Species Act will create unnecessary impediments, as well as greatly increased costs, to the delivery of these much-needed infrastructure systems throughout the Morongo Basin. In many cases, these limitations upon infrastructure development will prevent the agencies from delivering much needed housing development, transportation network capacity enhancements and job creation through commercial development opportunities. Placing significant constrains and financial burdens on infrastructure development in the Morongo Basin will not address the theoretical decline in the species as outlined in the Petition.

While we appreciate the Commission's role in administering the California Endangered Species Act, it is equally important to recognize when conflicting state public policies create an untenable framework within which the Town must navigate. I urge you to consider the significant impacts this will have on rural desert communities including the Town of Yucca Valley, and respectfully ask that you deny this petition.

Thank you for your time and consideration.

TOWN OF YUCCA VALLEY
Jeff Drozd
Mayor

385 North Arrowhead Avenue, 5th Floor, San Bernardino, CA 92415-0120 | Phone: 909.387.4821 Fax: 909.387.5430
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SAN BERNARDINO COUNTY

County Administrative Office
Governmental & Legislative Affairs

Josh Candelaria
Director

Original on file,
received August 6, 2020

August 6, 2020

Erick Sklar
President, California Fish and Game Commission
P.O. 944209
Sacramento, CA 94244-2090

RE: Item No. 25 – Western Joshua Tree

Dear President Sklar:

On behalf of the County of San Bernardino, thank you for taking into consideration our concerns regarding listing the western Joshua tree as a threatened species under the California Endangered Species Act (CESA). We appreciate the efforts the Commission and the California Department of Fish and Wildlife have taken to listen to our unique issues. Due to measures we have adopted on the local level to protect the Western Joshua tree and the clear absence of sufficient evidence to justify the petitioner's request, we are opposed to listing the Western Joshua tree under CESA.

With more than 80% of the county in federal ownership, public land is a major asset in San Bernardino County. Our diverse public lands support a range of environmental, economic, and quality of life benefits. The County is committed to balancing conservation with continuing public access for sustainable multiple uses.

As a regional conveyor, the County has worked with multiple stakeholders, including conservation organizations, outdoor recreationists, ranchers, industry officials, tribal leaders, and state and local officials, to ensure our natural resources are managed appropriately.

With the recent designation of three national monuments, numerous military installations located throughout the County, and 81% of the 20,000 square miles outside of local government's jurisdictions, listing the Joshua tree as a threatened species has the potential to adversely impact the limited development that can occur in rural parts of the County.

It is also important to note, communities take pride in the Joshua tree and have enacted additional protective measures through local ordinances. Moreover, the tree is considered an iconic species that generally adds property value. In fact, many builders go out of their way to plan developments around existing trees. Listing the Joshua tree

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Lorem Ipsum

on the CESA list will put unnecessary financial burdens on land owners, adversely impact local economies, and do little to address the alleged long-term threat to the species suggested by the petition.

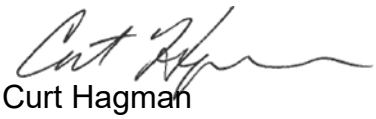
Much of the western Joshua tree population resides on federally protected lands and state preserves, giving them the highest level of protection. Outside those jurisdictions, they are protected under state law through the California Desert Native Plants Act, as well as through local governments regulations, which requires permitting for removal.

Furthermore, as explained in the County's legal and technical comments concurrently submitted with this letter, the County is concerned by the clear absence of sufficient information in the Petition, as prescribed in Fish and Game Code section 2072.3, regarding the "abundance" and population trend of the western Joshua tree to indicate that listing the species may be warranted. Should the Commission determine that the petition action may be warranted, a precedent may be set for future petitioners to disregard the requirement to include sufficient scientific evidence for justification of the request.

The County is supportive of additional measures on the local level, such as regional planning efforts to further enhance both population data and protections for the Joshua tree, in lieu of the petition.

For the above reasons, the County of San Bernardino respectfully requests you deny the petitioner's request. If you have any questions regarding the County's position, please do not hesitate to contact Josh Candelaria, Director of Governmental and Legislative Affairs at (909) 387-4821 or jcandelaria@sbcounty.gov.

Sincerely,



Curt Hagman
Board of Supervisors Chairman
Fourth District Supervisor
County of San Bernardino

Dawn Rowe
Board of Supervisors
Third District Supervisors
County of San Bernardino

High Desert Corridor
Joint Powers Authority

E-220 HIGH DESERT CORRIDOR

Original on file,
received August 6, 2020

August 6, 2020

Erick Sklar
President, California Fish and Game Commission
P.O. 944209
Sacramento, CA 94244-2090

RE: Item No. 25 – Western Joshua Tree

Dear President Sklar:

On behalf of the High Desert Corridor (HDC) Joint Powers Authority, I am writing you to express our opposition to the petition to list the Western Joshua tree as a threatened species under the California Endangered Species Act (CESA).

The purpose of the HDC is to improve east-west mobility within the High Desert region of Southern California by addressing present and future travel demands and mobility needs. The HDC also aims to improve travel safety and reliability, while connecting residential, commercial and industrial areas in the Antelope and Victor Valleys, including the cities of Palmdale, Lancaster, Adelanto, Victorville and the Town of Apple Valley.

Many of our communities take pride in the Joshua tree and have enacted additional protective measures through local ordinances. Moreover, the tree is considered an iconic species that generally adds property value. In fact, many builders go out of their way to plan developments around existing trees. Listing the Joshua tree as a threatened species has the potential to adversely impact the limited development that can occur in rural parts of San Bernardino and Los Angeles Counties. Critical public infrastructure projects, including road, sewer, and water would require additional environmental review, potentially increasing the cost of projects and delaying completion.

For the above reasons, I respectfully request you deny the petitioner's request. If you have any questions, please do not hesitate to contact Josh Candelaria, staff coordinator for the HDC, at (909) 387-4821 or jcandelaria@sbcounty.gov.

Sincerely,

ROBERT A. LOVINGOOD
Chairman, High Desert Corridor Joint Powers Authority

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Refer To File # 501803-0004

VIA EMAIL

Original on file,
received June 10, 2020

June 10, 2020

Erik Sklar, President
California Fish and Game Commission
1416 9th Street, Suite 1320
Sacramento, CA 95814
fgc@fgc.ca.gov

Re: Petition to list the western Joshua tree as threatened or endangered under the California Endangered Species Act

Dear President Sklar:

This letter is prepared and submitted on behalf of QuadState Local Governments Authority ("QuadState").[1] We are writing to oppose a petition ("Petition") submitted by the Center for Biological Diversity ("Petitioner") to list the western Joshua tree (*Yucca brevifolia*)[2] as threatened as either a full species or as the subspecies (*Yucca brevifolia brevifolia*) under the California Endangered Species Act ("CESA"), Fish & G. Code ("Code"), § 2050 *et seq*. We understand that at its June 24-25, 2020 meeting, the California Fish and Game Commission ("Commission") will consider whether listing the western Joshua tree under CESA, as requested by the Petition, may be warranted. We request the Commission reject the Petition.

While QuadState is confident that CESA and its implementing regulations require rejection of the Petition, QuadState supports the Commission deferring any decision until the next Commission meeting in order to provide our County members and their constituents with a meaningful ~~opportunity to participate in t~~he listing process. We understand that Commission staff have also recommended the decision be deferred until the August 19-20, 2020 Commission meeting.[3] As you

[1] QuadState is a joint exercise of powers authority established between eight counties and one city in four Western states. QuadState membership includes three desert counties in California—Imperial County, Inyo County, and San Bernadino County—in which the western Joshua tree may be found.

[2] Due to the species' treatment in the majority of existing scientific literature, the Petition primarily refers to Joshua tree as a single species rather than distinguishing between *Y. brevifolia* (the western Joshua tree) and *Y. jaegeriana* (the eastern Joshua tree); however, the Petition adopts the recent view that *Y. brevifolia* is distinct from *Y. jaegeriana* and requests listing of only *Y. brevifolia*. *See* Petition at 1, 4. In this letter, QuadState refers to the petitioned species as the western Joshua tree.

[3] *See* June 24-25, 2020 Commission Agenda *available* at:

https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=180395&inline.

57498505.v1

are well aware, governments and their citizens are facing a raft of challenges at this moment in time largely as a consequence of the COVID-19 pandemic and its devastating societal impacts. These circumstances have made it difficult for our members to give the Petition and the Department of Fish and Wildlife's ("Department") March 11, 2020 Initial Evaluation of the Petition ("Department Evaluation") appropriate attention.

Deferral will also allow the County members and their constituents with an opportunity to confer with Commission staff and Department personnel regarding the potential to adopt a 2084 regulation in the event that the Commission determines, over our objections, that listing the western Joshua tree under CESA may be warranted. As we are in the midst of a recession of uncertain depth and length, and because all agree that the threat to the species is not by any stretch a near-term threat, a 2084 regulation could be invaluable as a tool to limit the economic consequences of candidacy while ensuring adequate protection for the species, should the Commission pursue that route.

As set forth in greater detail below, QuadState does not believe that the Petition demonstrates that the western Joshua tree meets the definition of a threatened species under CESA. Rather, the Petition relies substantially on effects to the species that may be caused by climate change that Petitioner admits may not be evident for 50 or more years into the future. Such a request is unprecedented. Neither CESA nor its implementing regulations contemplate listing species where the data do not indicate existing and demonstrable threats. To date, the Commission has not listed a species primarily on the basis of potential, future adverse effects of climate change and doing so would establish a precedent not rooted in principles of sound science.

QuadState urges the Commission not to simply accept Petitioner's assertions regarding threats to the western Joshua tree and its habitats; rather, QuadState requests the Commission fulfill its legal obligation to evaluate the information in the Petition and other available information and determine whether the Petition's claims are credible and provide a lawful basis for a candidacy determination.

1. LEGAL BACKGROUND

Section 2070 of the Code provides that the Commission "shall establish a list of endangered species and a list of threatened species." CESA defines a threatened species 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.

Fish & G. Code § 2067. The statute defines endangered species as a species:

> 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.

Id. at § 2062.

A. Petition requirements

Any person can submit a petition to list a species under CESA. In order for a petition to be accepted by the Commission, the Code requires the petition include sufficient scientific information that the petitioned action may be warranted. Fish & G. Code, § 2072.3. Specifically, the CESA requires that a petition include information regarding the "population trend, range, distribution, abundance, and life history of a species, the factors affecting the ability of the population to survive and reproduce, the degree and immediacy of the threat, the impact of existing management efforts, suggestions for future management, and the availability and sources of information," as well as the "kind of habitat necessary for species survival, a detailed distribution map, and any other factors that the petitioner deems relevant." *Id*.

Caselaw clarifies that a species does not qualify as a candidate for "endangered" or "threatened" classification if the petition does not provide sufficient information that would lead a reasonable person to conclude the petitioned action may be warranted. *Natural Resources Defense Council v. Fish & Game Com*., 28 Cal. App. 4th 1104, 1119 (1994) (citing Fish & G. Code, § 2074.2).

B. Obligations of California Department of Fish and Wildlife in evaluating petitions

Pursuant to section 2073.5 of the Code and Title 14 of the California Code of Regulations, the Department must address each of the following petition components when evaluating whether the petitioned action (here, listing the western Joshua tree as threatened) may be warranted:

1. Population trend;
2. Range;
3. Distribution;
4. Abundance;
5. Life history;
6. Kind of habitat necessary for survival;
7. Factors affecting the ability to survive and reproduce;
8. Degree and immediacy of threat;
9. Impact of existing management efforts;
10. Suggestions for future management;
11. Availability and sources of information; and
12. A detailed distribution map.

Cal. Code Regs., tit. 14, § 670.1(d)(1). As set forth below, QuadState believes neither the information presented by the Petition nor the information contained in the Department Evaluation are sufficient to indicate that listing the western Joshua tree may, in fact, be warranted.

2. NEITHER THE PETITION NOR THE DEPARTMENT EVALUATION ESTABLISH SUBSTANTIAL POSSIBILITY THAT LISTING THE WESTERN JOSHUA TREE MAY BE WARRANTED

As noted above, a threatened species under CESA is one that is not presently threatened with extinction, but 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." Fish & G. Code § 2067. The Petition requests the western Joshua tree be listed as threatened under CESA. Thus, the question for the Commission is whether the species is likely to become in danger of extinction in the *foreseeable future* without *special protection and management* afforded by the Code. Below, we provide information establishing that the western Joshua tree does not meet the criteria for listing under the Code.

A. Western Joshua tree unlikely to become an endangered species in the foreseeable future

The Petition is clear that the western Joshua tree is not faced with "imminent risk of extinction," and, admits that "extirpation [of the species] is likely decades away[.]" Petition at 1, 48. While the Petition predicts that western Joshua trees will be "close to being functionally extinct" in California by "century's end" (that is, 80 years from now), the Petition also explains that "researchers have been raising the alarm about threats to Joshua trees for decades." *Id*. at 32. For example, a study cited by Petitioner from 1953 stated that "regardless of the present wide distribution and large concentration of yuccas, [the Joshua tree's] future appears very dim." *Id*. at 34. And yet, more than 70 years after that grim assessment, there has been no observable downward trend in the population of the Joshua tree, as stated in the Petition and reiterated in the Department Evaluation. *See* Petition at 19 ("no range-wide population trends have been documented"), at 20 ("Regardless of whether Joshua tree abundance is already declining, it is virtually certain that abundance will decline in the foreseeable future"), and at 9 ("The Petition does not present an estimate of western Joshua tree population size, nor does it provide evidence of a range-wide population trend…"); *see also* Department Evaluation at 2 ("Although a reliable estimate of western Joshua tree population size is not available, information available to the Department indicates that the Joshua tree is currently relatively abundant"). Indeed, the Petition itself notes that "while the threats facing *Y. brevifolia* in the coming decades are dire, unlike more narrowly-endemic species, the species has the benefit of being long-lived, with a relatively large current distribution, spread across the elevational and latitudinal gradients, much of which is in protected areas." Petition at 65.

Neither CESA nor its implementing regulations provide guidance on how the Commission should apply the "foreseeable future." Nevertheless, the Petition cites to a 2013 memorandum from the Director of the Department to the Executive Director of the Commission ("2013 Memorandum") concerning a petition to list the American pika on the basis of climate change-induced threats as precedent for the theory that the end of the 21st century may be an appropriate measure. Petition at 63; Memorandum from Charlton H. Bonham, Director of California Dep't of Fish and Wildlife to Sonke Mastrup, Exec. Director of Fish and Game Comm'n, (May 5, 2013) at 1 (emphasis added).

Petitioners fail to mention, however, that the Department ultimately recommended in the 2013 Memorandum that the Commission not list the American pika as a result of the potential threat of climate change. Instead, the Department noted in the 2013 Memorandum that "the best scientific information currently available indicates [the American pika] is not in serious danger in the ***next few decades*** of becoming extinct throughout all or a significant portion of the species' range in the state, nor by the end of the century should the existing climate change models and predicted trajectory of suitable pika habitat come to fruition." 2013 Memorandum at 1 (emphasis added).

Given that supposed extirpation of the Joshua tree is likely "decades" in the future and that there currently is no demonstrable downward trend in the species' abundance or range, QuadState fails to see how the Petition provides the best scientific evidence that the species is in danger of extinction in the foreseeable future.

B. Climate change modeling and relevant studies diverge on the effects of climate change on the Joshua tree

The Petition relies heavily on certain select studies to support the contention that extirpation of the western Joshua tree in California is a foregone conclusion due to the predicted effects of climate change. But multiple studies predict growth and expansion of the range of the tree as a result of a warming climate, while others predict a modest contraction of the tree's range, and still others predict total extirpation. This range of outcomes indicates uncertainty that increases as one looks further into the future.

For example, and as mentioned by Petitioners in a footnote, Notaro et al. (2012) predicted a "robust range expansion" of the species of nearly 150 percent as a result of climate change. Petition at 38, n. 38. Petitioners discount Notaro et al. because that study did not examine the species' response to climate change in California, but fail to mention other studies that also predict potential expansion of the species' range in California.

Archer et al. (2008) notes that "limited available data suggest increases in atmospheric [carbon dioxide] concentrations could promote Joshua Tree seedling survival, and could result in an increase of this native species' range." Steven R. Archer and Katharine I. Predick, *Climate Change and Ecosystems of the Southwestern United States*, Rangelands 30(3): 23-38 (June 2008). The same study further provides that:

> Although the deserts of southwestern North America have been the sites of many important ecological studies, there have been relatively few long-term monitoring studies that provide the opportunity to observe changes in ecosystem structure and function in response to climate change per se… Current observation systems are inadequate to separate the effects of changes in climate from the effects of other drivers…
>
> …

> In climate simulations for the Intergovernmental Panel on Climate Change emission scenarios, novel climates arise by 2100 AD. These future novel climates (warmer than any present climates, with spatially variable shifts in precipitation) increase the likelihood of species reshuffling into novel communities and other ecological surprises… Most ecological models are based upon modern observations, and so might fail to accurately predict ecological responses to future climates occurring in conjunction with elevated atmospheric CO2, nitrogen deposition, and nonnative species introductions.

Id. at 27-28.

Likewise, a study published in 2012 demonstrated that where there was a 3 degree Celsius increase in mean July maximum temperature, Joshua tree distribution within the Joshua Tree National Park ("JTNP") declined by a predicted 90 percent, but a suitable Joshua tree refugium remained in the park. Cameron W. Barrows, Michelle L. Murphy-Mariscal, *Modeling impacts of climate change on Joshua trees at their southern boundary: How scale impacts predictions*, Biological Conservation 152: 29-36 (2012). The study's authors noted that statistical analyses used in previous larger-scale climate modeling homogenized different local conditions and adaptations and, as a result, failed to accurately characterize "the unique niches of statistical outliers, individual populations at the periphery of a species' distribution." *Id*. at 30. To better understand Joshua trees' response to changing climactic conditions, the study's authors employed niche modeling, which considers habitat variables (e.g., climate and terrain) to assess the "complex interaction of factors" constraining species distribution. *Id*. Using this niche modeling, Barrows and Murphy-Mariscal explained that their results contrasted with those of two studies cited heavily by Petitioner: Dole e al. (2003) and Cole et al. (2011) (collectively "Dole and Cole"). While Dole and Cole constructed models wherein similar levels of climate change resulted in no suitable habitat for Joshua trees within the central or southern portions of their current distribution, Barrows and Murphy-Mariscal's results indicated suitable habitat would, indeed, remain. *Id*. at 34. Barrow and Murphy-Mariscal opined that the differences were due to scales of analyses used by Cole and Dole rather than differences in modeling or model assumptions. *Id*. Put simply, Barrows and Murphy-Marsical "were able to incorporate local adaptations as well as topographic-climate complexities, a perspective that would almost certainly be lost with the homogenizing of climate adaptations and landscape features inherent with larger scale analyses." *Id*. (citing Pennington et al. 2010). Importantly, and unlike Cole et al. (2011), Barrows and Murphy-Mariscal found no evidence of Joshua tree mortality within JTNP that was unrelated to fires, despite specifically searching for such causes. *Id*.

Finally, QuadState wishes to bring to the Commission's attention a paper presented at the 2018 Desert Symposium demonstrating that young *Y. jaegeriana* within the Cima Dome in the Mojave National Preserve (located in San Bernadino County, California) appear to survive and grow even through periods of long-term drought. *See* James W. Cornett, *Eastern Joshua tree (Yucca jaegeriana) growth rates and survivability on Cima Dome, Mojave National Preserve*, 2018 Desert Symposium (2018) ("The… study indicates young Joshua trees established near the species' elevational limit have the capacity to survive and continue to grow despite the long-term drought experienced during the… study"). While this paper was written based on a study of *Y. jaegeriana*,

one could reasonably postulate that *Y. brevifolia* occurring at similar elevations elsewhere in California would respond in much the same fashion in response to climate change-induced drought and temperature increases as their eastern counterpart. At a minimum, this paper provides further support for QuadState's position that the potential impacts to Joshua tree as a result of climate change do not form a reasonable basis on which to list the Joshua tree or place the species on the list of CESA candidates.

The varying results of studies and models demonstrate that specific effects of climate change on the western Joshua tree are uncertain, and, therefore, the Commission should decline to find the species may warrant listing under CESA at this time.

C. Special protection and management unlikely to address primary alleged threat of climate change

Even assuming that the species is, in fact, in danger of extinction in the foreseeable future, the Petition still fails to meet the test for listing the western Joshua tree as threatened under CESA. As is described in greater detail below, because the primary threat identified by the Petition is that of climate change, there would not appear to be relevant special protection or management efforts that the Commission could put into place that would reverse the supposed trajectory of the species.

The Petition acknowledges its position that "[c]limate change represents the single greatest threat to the continued existence of the *Yucca brevifolia*." Petition at 31. Indeed, the Petition states that "***[e]ven under the most optimistic climate scenarios, western Joshua trees will be eliminated from significant portions of their range by the end of the century***…" *Id*. (emphasis added).

Consequently, the Petition explains that the "lack of effective regulatory mechanisms to address greenhouse pollution is largely determinative as to the question of whether *Y. brevifolia* qualifies for CESA protection." Petition at 50-51. And the first remedy suggested in the Petition for ameliorating threats to the species and to manage and recover the species is for the governor of the State of California to declare a "climate emergency and take[] all necessary action to set California on a path to full decarbonization of [the state's] economy by no later than 2045 (e.g., banning the sale of new fossil fuel vehicles by 2030 and requiring the generation of all electricity from carbon-free sources 2030)." *Id*. at 65. The Department Evaluation also acknowledges that the most important recovery actions for the species are those leading to rapid and steep greenhouse gas emission reductions to minimize climate change. Department Evaluation at 27.

QuadState notes that the Petition neither explains nor substantiates how state-level action to address climate change would lead to a reduction in greenhouse gas emissions at a level necessary to ameliorate threats of climate change on western Joshua trees located in the State of California. Moreover, the Code explicitly states that the relevant management actions and protections must be available under Chapter 1.5 of the Code itself.[4] Fish & G. Code at § 2067. These provisions relate

[4] As noted above, the definition of a "threatened" species under CESA is a "native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that…is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts required by [Chapter 1.5 of the Code]." Fish & G. Code

to regulation of "take" of CESA-listed species and not to broad orders by the governor regulating GHG emissions.

Other protective or special management measures recommended by Petitioner include preparation of recovery plans, development of Natural Community Conservation Plans, acquisition of habitat to expand and connect existing state parks to protect Joshua trees, and development of fire protocols within the species range, among others. While these measures may be beneficial to the Joshua tree, the Petition states – and the Department Evaluation recognized – that threats to the Joshua tree due to habitat destruction, fire, and invasive species merely exacerbate the larger threat caused by climate change. *See* Department Evaluation at 2. As such, the measures recommended by Petitioner would not, without a reversal of the climate change trajectory, provide sufficient benefit to counter the purported threat to the species. If the climate change predictions espoused by the Petition prove true, the presence or absence of any protective measures would make no difference to the species' status. As noted above, the Petition admits that even under the best climate change scenario, the species will become close to functionally extinct. Petition at 32.

D. Joshua tree is adequately protected in the State of California

QuadState notes that the western Joshua tree already benefits from substantial on-the-ground conservation pursuant to federal, state, and local law, regulation, and policy, and believes that the Petition's claim that the western Joshua Tree is inadequately protected is wholly without merit. Petition at 48, 58.

For example, under the California Desert Protection Act of 1994 ("CDPA"), Congress expanded environmental protections to millions of acres of desert "wilderness" by establishing the Death Valley and Joshua Tree National Parks, and the Mojave National Preserve. Pub. L. No. 103-433, 108 Stat. 4471 (1994). Through the CDPA, Congress declared its policy that public lands in the California desert be included in the national park and national wilderness preservation systems in order to perpetuate the diverse ecosystems of the California desert in its natural state. *Id*. The CDPA withdrew designated areas from "all forms of entry, appropriation, or disposal under the public land laws" and effectively functions to preserve and protect the very habitat necessary for the Joshua tree's survival. *Id.;* 16 U.S.C. §§ 410aaa–42, 410aaa–47.

The Petition acknowledges that 96 percent of the western Joshua Tree population in the northern part of its range occurs on federal lands protected under the CDPA and other mechanisms and that ten percent of the species occurring in the northern part of its range occurs on National Park Service land which is "generally well-managed and should prevent significant habitat loss or degradation from activities such as [off-road vehicle] use, cattle grazing, road building, or other forms of development." Petition at 55. Nevertheless, Petitioners attempt to minimize the significance of this protection by noting without additional commentary the existence of a single grazing allotment (the 86,400-acre Hunter Mountain Allotment) within Death Valley National Park that supposedly

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§ 2067. The term "special protection and management efforts" is not further defined by the Code. Chapter 1.5 of the Code does not set forth any required special protection and management obligations relating to state-listed species outside of the application of prohibitions on import, export, and take established in § 2080 and activities relating thereto.

overlaps with the "range of *Y. breviolia*". *Id*. Petitioners cite the National Park Service's Death Valley National Park Wilderness and Backcountry Stewardship Plan and Environmental Assessment (2012) ("Park Service EA"). The Park Service EA, however, does not address whether the western Joshua tree occurs within the Hunter Mountain Allotment, and the Petition does not explore whether the current grazing allotment (which permits grazing of no more than 150 head of cattle between November 20 to June 30 of each year), in fact, negatively affects the species. *See* Park Service EA at 122.

At the state and local level, numerous laws and ordinances serve to provide significant additional protection for the western Joshua tree. For example, under the California Desert Native Plants Act, the western Joshua tree may not be harvested without a permit in Imperial, Inyo, Kern, Los Angeles, Mono, Riverside, San Bernardino, and San Diego Counties. Food & Agr. Code, §§ 80073(a), 80003. Local jurisdictions have adopted measures similar to those set forth in the California Desert Native Plants Act, including specific prohibitions on harvesting or removing Joshua trees. *See* San Bernadino County Code 88.01.060(c)(4). Chapter 14 of the City of Palmdale Municipal Code declares as its policy that "appropriate action must be taken in order to protect and preserve desert vegetation, ***and particularly Joshua trees***, so as to retain the unique natural desert aesthetics on some areas of this City[.]" Palmdale, Cal., Ordinance Ch. 14.04, § 14.04.010 (1992) (emphasis added).

QuadState fails to see how preservation and protection of such significant portions of a species' current habitat in addition to strong state and local laws and ordinances prohibiting removal of the species could lead a reasonable person to conclude such species is inadequately protected under existing regulatory mechanisms.

3. DEPARTMENT EVALUATION FAILS TO NOTE THE FACT THAT THE PETITION IS INCOMPLETE

QuadState notes that the Department appears to have completely ignored the requirement of the California Code of Regulations that a petition to list a species under CESA provide information concerning the species population trends and abundance. Despite acknowledging that the "Petition does not present an estimate of western Joshua tree population size, nor does it provide evidence of a rangewide population trend," the Department nevertheless found that the Petition presented sufficient information on population trend and range. Department Evaluation at 2, 9.

Indeed, the Petition explicitly states that "[d]ue to the [Joshua tree's] patchy distribution within its range, highly variable population density…and lack of range-wide population surveys, a reliable estimate of Joshua tree population size is not available." Petition at 19. Moreover, the Petition notes that "impacts such as adult mortality and consequent population declines and range reductions may have a lag time before the presence is felt on the landscape." *Id*. at 20.

QuadState fails to understand how a Petition's provision of no data can result in a Department finding that sufficient data was provided.

4. STANDARD FOR LISTING UNDER CESA CANNOT BE BASED ON FUTURE DECLINE ALONE

The Petition includes dire warnings concerning the threat climate change poses to the western Joshua tree; however, the Petition also acknowledges that "[s]ince the end of the Pleistocene, the Joshua tree's distribution has been remarkably stable throughout the Holocene into the present day." Petition at 16-17. Despite the continued persistence of the species for tens of thousands of years, the Petition nevertheless predicts that the species will be extirpated at least from the JTNP by 2071 to 2099. *Id*. at 37. Among the studies relied upon by the Petition for this prediction is Cole et al. 2011. *Id.* at 68. However, it is notable that Cole et al. 2011 explains that the warming climate that occurred at the end of the Pleistocene and marking the beginning of the Holocene was the "most recent warming event of similar magnitude to that predicted for the near future." Cole et al. 2011 at 139. While that study indicated the species did not migrate as one might have expected, the species nevertheless has continued to persist, demonstrating its remarkable resilience.

Common logic would tell us that a species should not be listed on the sole basis that it may experience a future decline in range or distribution, particularly where no studies have demonstrated a downward population trend or reduction in abundance at a population level. Indeed, to date, the Commission has declined to list any species solely (or primarily) on the basis of future threats due to climate change. Doing so would open Pandora's box, allowing for the listing of innumerable plants and animal species that are not currently in danger of extinction nor likely to become so in the coming decades. QuadState believes a listing – or even a placement of a species – based on supposed future threats would be inconsistent with the Code.

QuadState suggests that the approach the Department adopted with respect to the American pika, mentioned briefly above and cited by the Petition, was precisely right. There, the Department did not recommend listing the species under CESA on the basis of future threats caused by climate change. Instead, the Department noted its belief that continued study and monitoring of the American pika would be "imperative" for the agency over the "next few decades" in order to "better assess the foreseeable future and the need for protections under CESA." 2013 Memorandum at 2.

This wait and watch closely approach suggested by the Department in connection with the status of the American pika under state law was prudent, thoughtful, and warranted. The Commission should decline to find the Petition warranted at this time and should, instead, adopt an approach wherein the species' trends and trajectory are closely monitored. The Commission may elect to initiate the CESA listing process at a later date due to the provision of new information and, of course, interested persons may submit new petitions to list at any time, which would trigger the petition review process.

5. CONCLUSION

In light of the foregoing, QuadState urges the Commission not to simply accept Petitioner's assertions regarding threats to the western Joshua tree and its habitats; rather, QuadState requests the Commission fulfill its legal obligation to evaluate the information in the Petition and other available information and determine whether the Petition's claims are accurate and credible.

Natural Resources Defense Council v. Fish & Game Com., 28 Cal. App. 4th 1104, 1119, 1125. The "may be warranted" finding described in Fish & Game Code § 2074.2 requires a determination that there is a "substantial possibility" that the petitioned action is warranted. *Id*. Based on the information provided in the Petition, there can be no rational determination of a substantial possibility that listing the western Joshua tree would be warranted at this time.

Very truly yours,

Paul S. Weiland
Nossaman LLP

cc: Charlton Bonham, Director, California Department of Fish and Wildlife
Gerald Hillier, Executive Director, QuadState Local Governments Authority

From: Deanna Hernandez <dhernandez@mdaqmd.ca.gov>
Sent: Tuesday, June 23, 2020 2:28 PM
To: FGC <FGC@fgc.ca.gov>
Cc: Brad Poiriez <bradp@mdaqmd.ca.gov>
Subject: Public Comment - Fish & Game Commission Meeting June 24-25, 2020

Dear Commissioners,

The attached is being presented as public comment for Agenda Item #27, Western Joshua Tree by the Mojave Desert Air Quality Management District's Governing Board and the Executive Director, Air Pollution Control Officer. The District location is 14306 Park Avenue, Victorville, CA 92392, 760.245.1661.

Please feel free to contact me if you have any questions.

Sincerely,

Deanna Hernandez
Senior Executive Analyst - Confidential
760.245.1661, ext. 6244 *Office*
760.241.3942 *Fax*
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MINUTES OF THE GOVERNING BOARD
OF THE MOJAVE DESERT AIR QUALITY MANAGEMENT DISTRICT
VICTORVILLE, CALIFORNIA

AGENDA ITEM #13

DATE: June 22, 2020

RECOMMENDATION: Adopt a Resolution to oppose a petition to the California Fish and Game Commission to list the Joshua Tree as threatened under the California Endangered Species Act and direct staff action.

SUMMARY: This action adopts a resolution urging against listing the Joshua Tree as threatened under the California Endangered Species Act.

BACKGROUND: The California Fish and Game Commission will consider a petition to list the western Joshua Tree as threatened under the California Endangered Species Act. Such an action has the potential to harm the opportunities to advance renewable energy projects. Renewable energy projects are important contributors to reducing carbon-based fuel emissions, and improving air quality throughout the Mojave Desert Air Basin and Palo Verde Valley. The Resolution seeks to avoid a permanent prohibition on alternative energy projects from sources such as solar and wind.

REASON FOR RECOMMENDATION: Governing Board is required to adopt resolutions.

REVIEW BY OTHERS: This item was reviewed by Karen Nowak, District Counsel as to legal form and by Brad Poiriez, Executive Director on or about June 9, 2020.

FINANCIAL DATA: No increase in appropriation is anticipated.

PRESENTER: Robert Lovingood, Governing Board Member.

ACTION OF THE GOVERNING BOARD

APPROVED

Upon Motion by **ROBERT LOVINGOOD,** seconded by **BARBARA RIORDAN,** as approved by the following roll call vote:

Ayes:	*11*	**ABEL, BENNINGTON, COX, DECONINCK, HERNANDEZ, LEON, LOVINGOOD, MINTZ, PEREZ, RIORDAN, ROWE**
Noes:		
Absent:	*2*	**CAMARGO, WILLIAMS**
Abstain:		

DEANNA HERNANDEZ, SENIOR EXECUTIVE ANALYST
BY *Deanna Hernandez*
Dated: June 22, 2020

Ref. Resolution 20-11, "A RESOLUTION OF THE GOVERNING BOARD OF THE MOJAVE DESERT AIR QUALITY MANAGEMENT DISTRICT (MDAQMD) OPPOSING A PETITION TO THE CALIFORNIA FISH AND GAME COMMISSION TO LIST THE JOSHUA TREE AS THREATENED UNDER THE CALIFORNIA ENDANGERED SPECIES ACT."

RESOLUTION 20-11

A RESOLUTION OF THE GOVERNING BOARD OF THE MOJAVE DESERT AIR QUALITY MANAGEMENT DISTRICT (MDAQMD) OPPOSING A PETITION TO THE CALIFORNIA FISH AND GAME COMMISSION TO LIST THE JOSHUA TREE AS THREATENED UNDER THE CALIFORNIA ENDANGERED SPECIES ACT.

On June 22, 2020, on motion by Member **ROBERT LOVINGOOD** seconded by Member **BARBARA RIORDAN**, and carried, the following resolution is adopted:

WHEREAS, the California Fish and Game Commission will consider a petition to list the western Joshua tree as Threatened under the California Endangered Species Act; and

WHEREAS, the jurisdiction of the MDAQMD is home to dense stands of Joshua trees, with only five percent of the land area dedicated to housing, industrial, utilities, agriculture, transportation and parks; and

WHEREAS, the MDAQMD's jurisdiction, including the Joshua trees, is impacted by air pollution from tradition electricity generation; and

WHEREAS, renewable energy projects are important contributors to reducing carbon-based fuel emissions and improving air quality throughout the jurisdiction of the MDAQMD; and

WHEREAS, the MDAQMD seeks to avoid prohibitions on opportunities for alternative energy projects from sources; and

WHEREAS, a candidate listing would run counter to the State's housing and renewable energy goals; and

WHEREAS, a candidate listing would reduce well-paying jobs for local workers and harm the continued work of the local mining industry, which supplies vital materials to the housing, renewable energy, high-tech and many other industries; and

WHEREAS, the Joshua tree is already well protected through the 1.5 million-acre Mojave National Preserve, the 800,000-acre Joshua Tree National Park, the Mojave Trails National Monument, the Sand to Snow National Monument, Castle Mountains National Monument and other protected areas.

NOW, THEREFORE BE IT RESOLVED, that the MDAQMD Board respectfully urges the California Fish and Game Commission to decline the petition to list the western

Joshua tree as Threatened under the California Endangered Species Act.

BE IT FURTHER RESOLVED, that this Resolution shall take effect immediately upon adoption.

PASSED, APPROVED AND ADOPTED by the Governing Board of the Mojave Desert Air Quality Management District by the following vote:

AYES:	11	MEMBER: ABEL, BENNINGTON, COX, DECONINCK, HERNANDEZ, LEON, LOVINGOOD, MINTZ, PEREZ, RIORDAN, ROWE
NOES:		MEMBER:
ABSENT:	2	MEMBER: CAMARGO, WILLIAMS
ABSTAIN:		MEMBER:

STATE OF CALIFORNIA)
)
) ss:
COUNTY OF SAN BERNARDINO)

I, Deanna Hernandez, Senior Executive Analyst – Confidential, of the Mojave Desert Air Quality Management District, hereby certify the foregoing to be a full, true and correct copy of the record of the action as the same appears in the Official Minutes of said Governing Board at its meeting of June 22, 2020.

Deanna Hernandez,
Senior Executive Analyst – Confidential
Mojave Desert Air Quality Management District.

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August 6, 2020

Christopher J. Carr
TEL: 415.291.6208
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VIA E-MAIL: fgc@fgc.ca.gov

California Fish and Game Commission
P. O. Box 944209
Sacramento, CA 94244-2090

Re: Renewables Comments on August 20, 2020 Meeting Agenda's Item 25 re Petition of Center for Biological Diversity to List the Western Joshua Tree as a Threatened Species

Dear President, Vice President and Members of the Commission:

I submit these comments on behalf of the Solar Energy Industries Association (SEIA), the Large-scale Solar Association (LSA), the California Wind Energy Association (CalWEA) and the American Wind Energy Association California (AWEA-CA). As explained more fully below, these solar and wind energy industry associations urge the Commission to deny the Petition of the Center for Biological Diversity (CBD) to list the Western Joshua Tree (Joshua Tree) as a threatened species under the California Endangered Species Act (CESA) at this time.

The Petition should be denied for three principal reasons:

1. Insufficient population data for the Joshua Tree exists to support advancing it to candidacy at this time.[1]
2. Federal, state, and local regulations currently provide protections for the Joshua Tree covering over 76 percent of its range. See TetraTech Report submitted with this letter. Much of this area has been placed entirely off-limits to renewable energy development.
3. Finally, the solar and wind energy associations and their members will be participating in a regional conservation planning effort for Joshua Tree that will include enhancing both Joshua Tree population data and conservation measures required by local governments.

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[1] The letter submitted to the Commission by the California Building Industry Association et al. ably explains the lack of Joshua Tree population data.

> That process should be given an opportunity to succeed, because only through such planning can the threats to the Joshua Tree be effectively addressed.

Under current protections, solar and wind projects are developed without any significant impact on the Joshua Tree population. Moreover, accepting the Petition would impede development of wind and solar projects currently under development, and frustrate the achievement of California's goals to entirely eliminate greenhouse gases from its electricity supply. California's success in weaning itself from fossil fuels is the only way to effectively address the threat that climate change poses to the Joshua Tree -- the concern that is at the heart of CBD's Petition.

These issues are addressed below.

The Data-Deficient Petition Underscores the Need for a More Thorough Review
CBD's Petition as well as the Department's Evaluation Report lack basic population abundance and trend data that is needed before the Commission can make an informed decision as to whether to advance the Joshua Tree to candidacy. Additionally, the institutional and personal constraints imposed by the COVID-19 crisis have resulted in a process for considering the Petition that has provided insufficient time for stakeholder engagement including, critically, assessing the current state of the Joshua tree based on data. Apart from the process fairness (and quality of decision-making) concerns this presents, it will result in significant obstacles on Day 1 should the Joshua Tree be advanced to candidacy. It would seem to be difficult for CDFW to develop and implement 2081/ITPs without such data to inform the requirements of the permit, to say nothing of doing so in a timely manner. Advancing the Joshua Tree to candidacy without this information could effectively place a moratorium on development of any property containing a Joshua Tree. Given that Joshua Trees are not immediately threatened (as conceded by the Petition) there is no reason that more time should not be taken to acquire the necessary data to support a decision to advance the Joshua Tree to candidacy.

Existing Joshua Tree Protections are Widespread
A review of federal, state, and local regulations that protect the Joshua Tree was commissioned by the solar and wind energy associations. See TetraTech Report.[2] The review shows that there are many layers of existing protections that must be analyzed for any decision on candidacy to be properly informed. The area and proportion of the species range protected by a given policy were quantified specific to its jurisdiction using GIS spatial analyses. In total, the review found that 76.3 percent of the Joshua Tree range in California is subject to protective regulations. The review also found that many feasible mitigation measures are currently available or required under the California Environmental Quality Act (CEQA) to protect the Joshua Tree, and that compensatory mitigation for unavoidable habitat impacts at a 1:1 ratio is typical.

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[2] This review represents a high-level survey and summary that was necessarily limited by budget and time constraints.

Impacts on California Renewables and Climate Change Mandates
As the Commission is aware, the renewables industry has long been at the tip of the spear in California's nation-leading battle to address climate change. The contributions of solar and wind energy to meeting California's clean energy mandates, and the impacts on those efforts of advancing the Joshua Tree to candidacy, are detailed in my letter to the Commission of June 11, 2020 (which is attached hereto for the convenience of the Commission and incorporated herein by reference).

While CBD's Petition "states that climate change is the greatest threat to the continued existence of western Joshua tree" (Evaluation Report at 23), advancing the Joshua Tree to candidacy would hamper renewables development at precisely the moment renewables must start to scale dramatically if California is to meet SB 100's mandates of 60% renewable electricity by 2030 and a fully decarbonized grid by 2045.

Land use in California is often a zero-sum proposition, and with California in need of at least 100 gigawatts (GW) of new renewable energy in the next two decades, considerable thought must be given to where new renewable energy projects can be located in relation to the myriad other land needs, including conservation, agriculture, housing, recreation and the like. Renewable energy already faces a dearth of land on which to construct solar and wind projects. See Figure 1 at the end of this letter. It is not as a matter of choice that solar and wind projects are geographically concentrated.

As part of the state-federal Desert Renewable Energy Conservation Plan (DRECP), the Bureau of Land Management (BLM) adopted a Land Use Plan Amendment (LUPA) covering approximately 10 million acres of land. Of this area, the LUPA set aside 4,926,000 acres for permanent conservation while identifying just 388,000 acres for potential renewable energy development in Development Focus Areas (DFAs).[3] As shown in Figure 1, below, the LUPA, in combination with other protected federal land and military lands, leaves a tiny fraction of federal land available to renewable energy development. Of this area, much is unsuitable for renewable energy development.

With regard to wind energy, approximately 96 percent of the high-quality wind resources previously available for development on BLM land were permanently put off limits to development as a result of the new land designations made for conservation. With regard to solar energy, some 384 Conservation and Management Actions required under the LUPA when developing projects in DFAs have proven too onerous to enable development. As a result, approximately a dozen wind project applications were abandoned during the DRECP process and no new applications have been filed. Solar applications have also declined under the DRECP.

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[3] In addition, 3.6 million acres (about 36% of BLM DRECP land) was designated for recreational activities – of which approximately 1.5 million acres are accessible to off-highway vehicles. Solar and wind development is precluded in these areas, as well as in conservation areas.

As a result of these federal land restrictions, solar and wind projects must be sited primarily on private lands. These areas have also been severely restricted for development. For example, Los Angeles County adopted a Renewable Energy Ordinance in 2016 that prohibits ground-mounted utility-scale solar facilities in a large portion of the County and utility-scale wind facilities are prohibited in all zones and areas within the unincorporated County.[4] Similarly, San Bernardino County, in 2017, adopted the Renewable Energy and Conservation Element of its General Plan that prohibits utility-scale renewable energy development in a large percentage of the county.[5]

As a consequence of these federal and local restrictions, the majority of solar and wind development in Southern California is now concentrated in areas of Los Angeles and Kern Counties, as shown in Figure 2 at the end of this letter. See also TetraTech Report. These areas are within the Joshua Tree distribution range where renewable energy is not prohibited, but where protective local regulations exist, as described in the TetraTech Report. According the Joshua Tree protected species status under CESA would, as a practical matter, further restrict, and potentially make these areas unavailable for, renewable energy development. Southern California is particularly important to achieving California's clean-energy goals due to the greater quality and/or quantity of solar and wind resources, compared to Northern California, as well as transmission constraints limiting access to Northern California resources from which to supply Southern California electricity load. Therefore, it is no exaggeration to state that further limitations on the ability to develop solar and wind projects in the southern region will risk the achievement of California's climate change goals.

As explained above, according the Joshua Tree protected species status under CESA would, as a practical matter, only make more land unavailable to renewables development. Standing up the regional planning effort described below will involve the active participation of CDFW and provide the Department much needed runway to develop a consistent process and requirements for issuing 2081/Incidental Take Permits for Joshua Tree, should the species ultimately be advanced to candidacy.

Advancing the Joshua Tree to Candidacy Will Jeopardize Clean Energy Projects

A number of renewable energy projects are already contracted for 2021 and 2022 commercial operations dates (CODs). These projects have already prepared or are preparing Environmental Impact Reports in compliance with CEQA that address Joshua Trees among other biological resources. They also must conform to other relevant local and state laws and regulations that protect sensitive biological species. In order to achieve their contracted dates, projects with 2021 CODs must begin construction in mid- to late-2020, and projects with 2022 CODs must begin construction in mid- to late-2021. If the Joshua Tree advances to candidacy and a 2084 Rule is

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[4] See http://planning.lacounty.gov/energy.

[5] See http://www.sbcounty.gov/uploads/LUS/Renewable/2019_WEBSITE/REC%20Element.pdf and http://www.sbcounty.gov/uploads/LUS/Renewable/2019_WEBSITE/MIN-LUS-2-28-19-RECE_SIGNED.pdf. In 2019, amendments were made that allow some flexibility to the blanket prohibition of utility-scale projects in rural areas on an individual-project basis, subject to approval by the Board of Supervisors.

not established (as discussed below), the resulting need for 2081/Incidental Take Permits would delay the construction start dates of these projects and potentially make their CODs unachievable. In those cases, the developers would need to revisit the viability of their projects in consideration of liquidated damages and other penalties, and the off-takers would potentially be out of compliance for their renewable energy sourcing or reliability requirements. In addition, the much-needed jobs that come with those projects would be delayed or potentially lost altogether.

The Regional Planning Effort for Joshua Tree Should Be Given a Chance

Kern and San Bernardino Counties, along with renewable energy and other regulated industries, have committed themselves to initiate in short order a regional planning effort to address the long-term threats to the Joshua Tree. That planning effort, which was called for by CDFW Director Bonham in his statement to the Commission at its June 25 meeting, will build on the long-standing efforts of local governments to regulate and limit destruction of Joshua Trees through their local planning and permitting processes. See TetraTech Report (cataloguing actions taken by local governments). This planning effort will endeavor to enhance both Joshua Tree population data and the conservation actions of local governments to protect Joshua Trees. The Counties and project developers anticipate that CDFW will provide technical assistance in the planning effort, and will concurrently take steps to implement (and assist in the implementation of) most all of the management actions called for by CBD in the Petition. Advancing the Joshua Tree to candidacy on top of this would only complicate and divert resources from this planning effort.

2084 Rule

If the Commission decides to accept the Petition and makes the Joshua Tree a candidate species, the renewables industry respectfully requests that the Commission immediately thereafter adopt a regulation pursuant to its authority under Section 2084 of the Fish and Game Code to provide incidental take authorization during the Joshua Tree's candidacy. The solar and wind industries are aware of the Commission's desire to ensure its compliance with CEQA in adopting a 2084 Rule. For that reason, they will work closely with the Commission and CDFW to craft a regulation that authorizes incidental take for those projects subjected to appropriate CEQA review for impacts to the Joshua Tree. Both the solar and wind industries believe a 2084 Rule will be needed if the Joshua Tree is advanced to candidacy, because of the time it would take to secure 2081/Incidental Take Permit authorization of incidental take for projects that cannot be delayed if developers are to meet their commercial obligations.

Conclusion

Given California's urgent climate imperatives, and the extent to which California relies on both solar and wind projects to meet grid needs and climate targets, the solar and wind industries cannot emphasize strongly enough the negative impact that advancing the Joshua Tree to candidacy will have on clean energy development in California. Rejecting CBD's Petition at this time would afford local governments and these industries an opportunity to develop the necessary (and currently lacking) Joshua Tree population data while allowing Counties and project developers -- working closely with CDFW -- an opportunity to stand up a regional planning effort to responsibly and effectively address the long-term threats to the Joshua Tree.

Respectfully,

Christopher J. Carr

cc: Charlton Bonham
Director, California Department of Fish and Wildlife

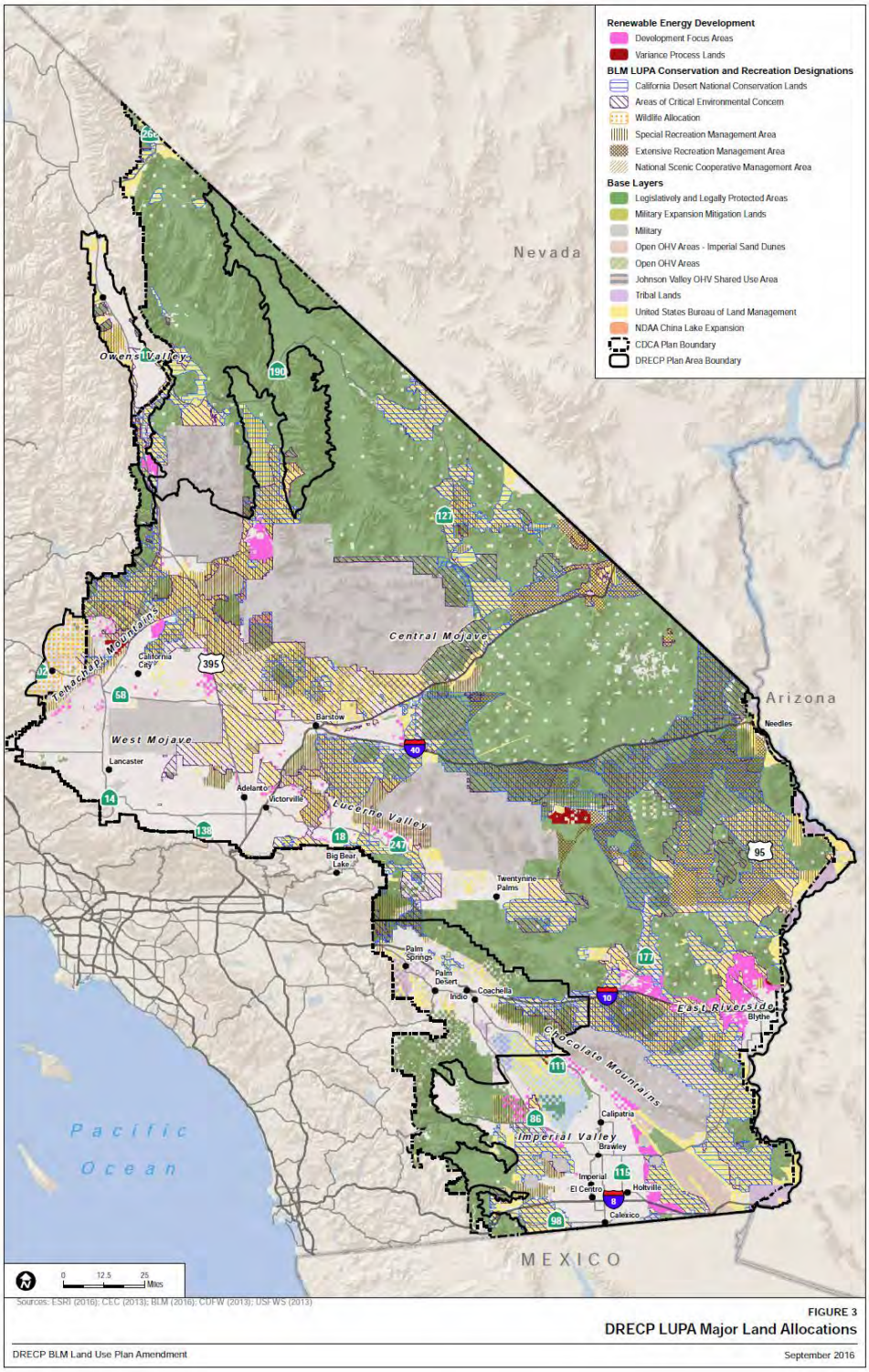
Shannon Eddy
Executive Director, LSA

Rick Umoff
Senior Director & Counsel, California, SEIA

Nancy Rader
Executive Director, CalWEA

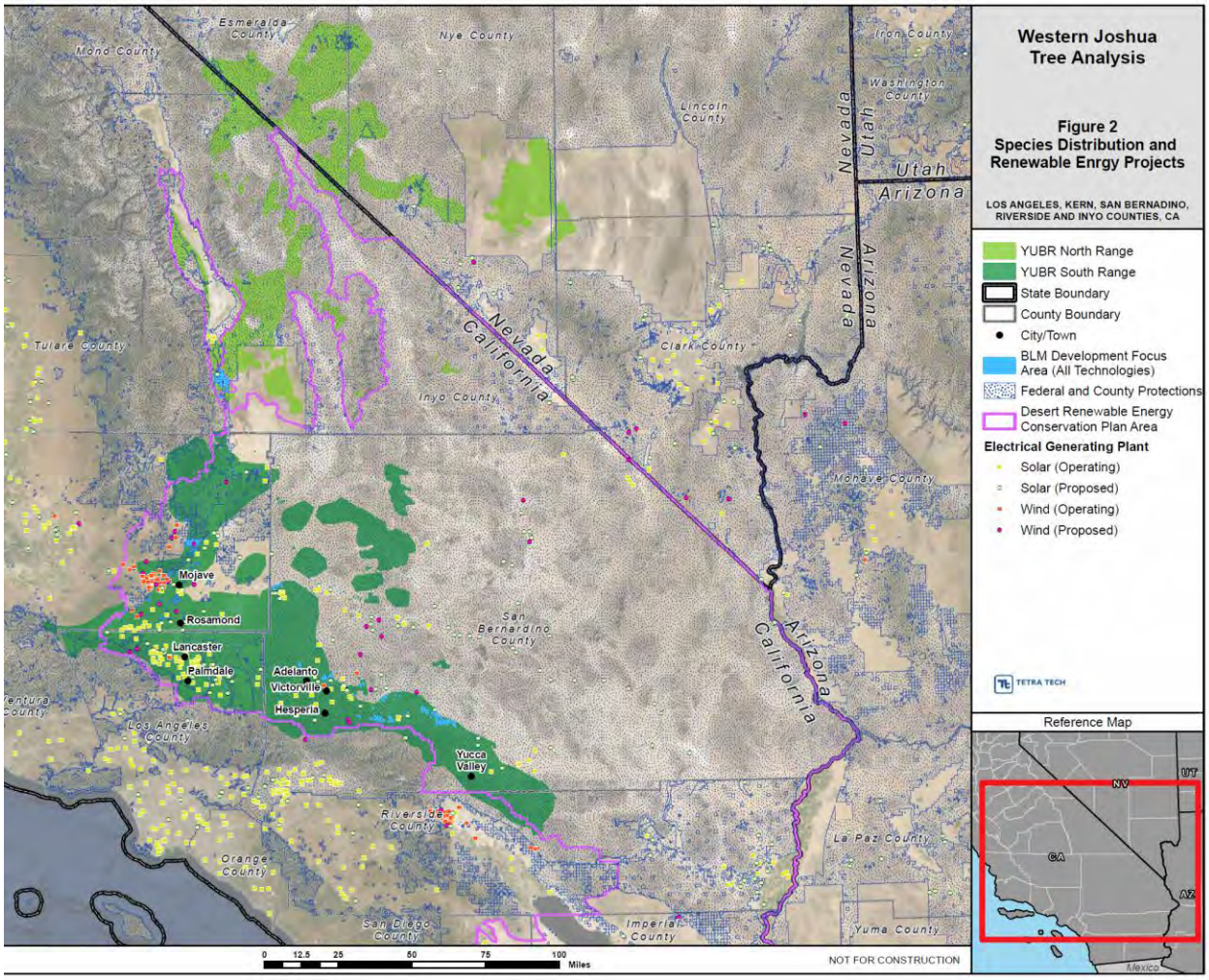
Danielle Mills
Director, AWEA-CA

Figure 1. Federal Land Wind and Solar Energy Development Areas and Exclusion Areas



Source: DataBasin

Figure 2. Joshua Tree Distribution and Solar and Wind Energy Projects



Source: TetraTech Report

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California Fish and Game Commission
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Sacramento, CA 94244-2090

Re: Solar Energy Industries Association and Large-scale Solar Association Comments on June 24-25, 2020 Meeting Agenda's Item 27 re Petition of Center for Biological Diversity to List the Joshua Tree as a Threatened Species

Dear President, Vice President and Members of the Commission:

These comments are submitted on behalf of the Solar Energy Industries Association ("SEIA") and the Large-scale Solar Association ("LSA"), to express their members' concerns about the potential implications of CBD's Petition to List the Joshua Tree as a threatened species under the California Endangered Species Act ("CESA").

The current agenda ("Agenda") for the Commission's June 24-25, 2020 meeting includes, as Item 27, consideration of whether listing the Joshua Tree "may be warranted." An affirmative determination by the Commission will result in "candidate" status for the Joshua Tree while the Commission considers whether listing the species as threatened "is warranted." Agenda at page 7. The Agenda includes a note explaining that: "Staff will recommend this item be continued to the August 19-20, 2020 meeting based on conversations with the petitioner, other stakeholders, and the Department." Id. SEIA and LSA urge the Commission to follow this staff recommendation. The Commission's continuing the item to its August meeting will allow workers, businesses, local governments and other interested parties that would be adversely impacted if the Joshua Tree is advanced to candidacy more time to analyze those impacts and present them to the Commission. It would also allow more time to gather information regarding the significant Joshua Tree protections already in place under existing laws. Moreover, the continuance would allow interested parties the time needed to work with the Commission and CDFW to develop a reasonable 2084 Rule under CESA to authorize incidental take of the Joshua Tree, so that one could be quickly promulgated by the Commission if the species is advanced to candidacy. California Fish and Game Code section 2084. SEIA's and LSA's members are such parties.

SEIA's and LSA's members include companies leading the nation in developing solar energy generation to address climate change and help states meet their ambitious goals for obtaining electricity from renewable sources. Collectively, the solar industry has developed some 12 GW of utility scale solar generation capacity in California, playing a critical, indeed indispensable, role in helping the State meet and exceed its RPS targets. A substantial percentage of the State's solar generating capacity is located within the area CBD's Petition identifies as the range of the Joshua Tree. In this area there are many more solar projects that have been permitted (and will soon commence construction), are in the permitting process, or are being planned. Simply put, by adding significant uncertainty, risk and delay to solar projects in the various planning, permitting and pre-construction stages, the listing of the Joshua Tree as a threatened species under CESA could hamper California's ability to meet its RPS requirement of 60% by 2030. It could also drive the development of solar projects to neighboring states, undermining economic and employment benefits that would otherwise accrue to Californians.

The solar industry has long been committed to conserving the earth's resources and protecting its biodiversity; fighting climate change is at the core of that commitment. In fact, the rasion d'tre of those companies is the development of renewable energy sources to combat climate change. CBD's Petition identifies climate change as a threat to the Joshua Tree. Nowhere is the nexus between climate action and conservation more complex than in the California desert – home to both rare desert habitat and species, and to some of the highest solar radiance in the world. What is most unique about this region is its proximity to major load centers – making it the ideal area for siting solar projects. California electricity planners project that the State must *at least* double its utility-scale solar capacity by 2020 in order to meet our climate targets – this is in addition to increasing rooftop solar installations. Smart siting of these projects in the desert must be part of this crucial effort if we are to succeed in meeting our goals.

Given California's urgent climate imperatives, we ask the Commission to expand its immediate species perspective to consider the myriad ways advancing the Joshua Tree to candidacy could undermine the State's efforts to address climate change. Slowing and substantially increasing the costs of solar development in California – which is what advancing the species to candidacy would do (even if only while the Commission considers whether listing in warranted) – would not help address, let alone arrest, any threat that climate change may pose to the Joshua Tree. Even the risk that the species will be advanced to candidacy will make financing and developing solar projects in California more difficult and expensive. Fortunately, it need not come to a choice between climate change solutions and the Joshua Tree. In fact, existing management efforts, some of which are identified below, are robust and sufficient to address the potential threats to the species asserted in the Petition.

In addition to being indispensable to advancing California's climate initiatives and meeting its renewable generation goals, the solar industry has been declared "essential critical infrastructure" under Governor Newsom's "Shelter-in-Place Order" in response to COVID-19. Executive Order N-33-20 (Mar. 19, 2020). What is more, not only does the industry employ essential workers developing critical energy infrastructure, but the construction jobs provided by solar project development are high-paying jobs that workers in the construction sector need now more than ever, given the impacts of the State and County shelter-in-place restrictions on the availability of

work and the associated economic slowdown. It is estimated that utility scale solar contributes tens of thousands of jobs to California. Similarly, with the drop in local government tax revenues resulting from the economic slowdown, the sales tax revenues that solar development projects have long provided to counties and cities (which developers have taken pains to designate the points of sale for solar panels) are needed now more than ever by those local governments.

These combined adverse impacts on the solar industry, workers, and local governments can be responsibly avoided. Contrary to the dire claims of CBD's Petition, existing management efforts are more than adequate to protect the Joshua Tree from any risk of becoming, in the foreseeable future, "in serious danger of becoming extinct throughout all, or a significant portion, of its range." Cal. Fish and Game Code sections 2062 and 2067. A great deal of Joshua Tree habitat is protected in federal and California parks, on State lands, and on other public lands where use is restricted (e.g., BLM lands subject to the DRECP). Many of the Counties where the Joshua Tree is present have their own ordinances and programs that conserve sensitive biological resources. A number of cities also have ordinances that help conserve the Joshua Tree. In addition, solar projects are subject to specific discretionary land use permit restrictions, with impacts to Joshua Trees mitigated as specified in the permit and associated environmental analysis. The California Desert Native Plants Act – California Food and Agriculture Code sections 80001 et seq. – already places restrictions on the removal of Joshua Trees, which the California Department of Fish and Wildlife is charged with enforcing. Fish and Game Code section 1925.

SEIA and LSA cannot emphasize strongly enough the negative impact that advancing the Joshua Tree to candidacy will have on solar development in California. Solar projects scheduled to receive permits, permitted projects expected to start construction later this year, as well as those already being built, will be brought to a standstill. These are projects that have already completed or soon will be completing CEQA, have mitigated or will be mitigating their environmental impacts, and have obtained or soon will obtain all necessary local, state, and federal permits and authorizations to comply with environmental laws and regulations. Even further consideration of the Petition to list the Joshua Tree will introduce uncertainty in the financing of upcoming solar projects. Any delays in these projects will put them at risk in their entireties because they often have both Investment Tax Credit deadlines as well as power purchase agreement (PPA) guaranteed in-service dates. The loss of jobs and impacts on local economies as a result of this listing effort are real and tangible; they cannot be overstated. Local tax revenues will take another hit, on top of the loss of revenues caused by the economic slowdown. And California's progress on advancing its climate initiatives and meeting its renewable sourcing goals will be unnecessarily hampered. California has been the nation's leader in addressing climate change – that role should not be undermined, particularly when there are many existing and successful programs in place to protect the Joshua Tree in California.

Continuing the Joshua Tree agenda item to the Commission's August meeting will allow SEIA and LSA to address in detail the threats to the Joshua Tree asserted in CBD's Petition, and enable them to update and provide additional information on the impacts that advancing the species candidacy would have on the solar industry in California. We understand the many complex

issues the Commission must weigh in this process, and respectfully request that you continue the Joshua Tree agenda item to the Commission's August 2020 meeting.

Respectfully,

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cc: Charlton Bonham
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Western Joshua Tree State Listing Petition Analysis

Prepared for:

American Wind Energy Association California

California Wind Energy Association

Large-scale Solar Association

Solar Energy Industries Association

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Portland, Oregon 97201

August 2020

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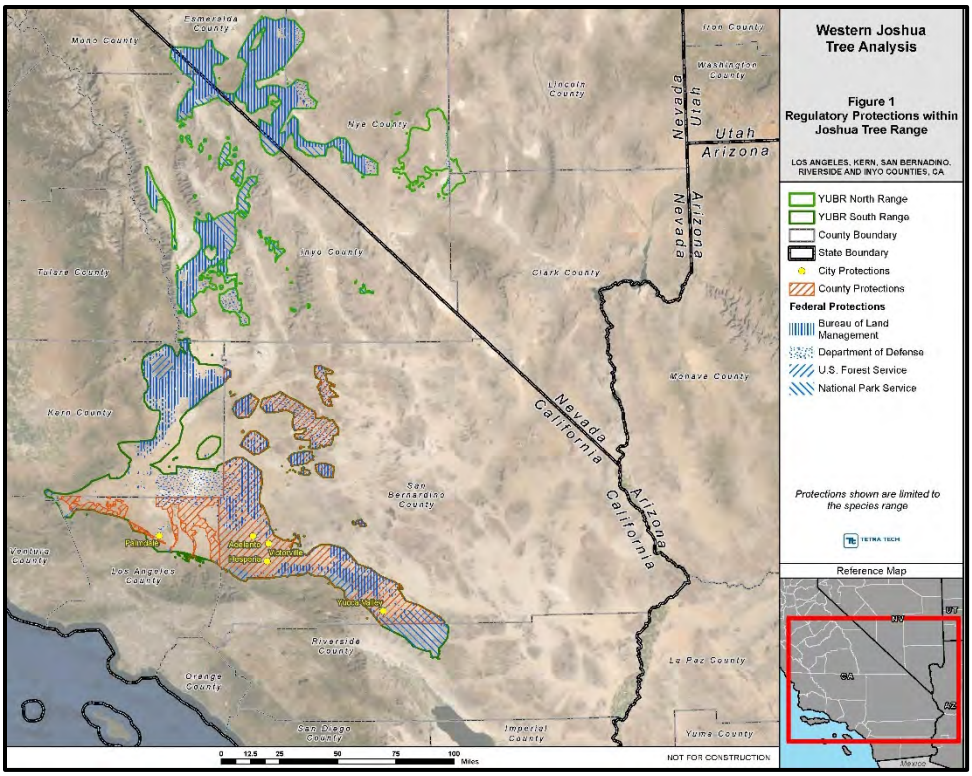
Executive Summary

The Center for Biological Diversity submitted a petition to the California Fish and Game Commission to list the Western Joshua Tree (*Yucca brevifolia*) as threatened under the California Endangered Species Act (CESA). Several renewable energy trade associations contracted Tetra Tech to review and summarize existing land protections and protective policies within the current distribution of the Western Joshua Tree (Figure 1). An evaluation prepared by the California Department of Fish and Wildlife (Department) found the species to be warranted for listing, but did not provide sufficient detail in its evaluation regarding protections for the species and its habitat, as written.

Tetra Tech reviewed publicly available data to identify protections of the Western Joshua Tree at the federal, state, and local level. Given the expanse of the Western Joshua Tree range across multiple states and numerous jurisdictions, an exhaustive review of all protective policies was not feasible within the limited window of the public comment period extension. The review encompassed those information sources for which data were publicly available and accessible via online resources; it does not constitute a comprehensive catalog of all protective policies. The area and proportion of the species ranges protected by a given policy was quantified specific to its jurisdiction using GIS spatial analyses. Coverage was calculated specific to the northern and the southern ranges of the Western Joshua Tree as well as the combined range. To provide context as to the implications of species listing, current or planned renewable energy development projects that overlap with the species' range were also reviewed and mapped (Figure 2).

Federal, state, and local regulations currently provide a variety of protections to this species, including specific protections related to the threats of invasive species, fire, and land development. In total 76.3 percent of the Western Joshua Tree range benefits from protective regulations (Figure 1). There are multiple feasible mitigation measures that are currently available or are required under CEQA to protect the Western Joshua Tree, and that typically require compensatory mitigation for unavoidable habitat impacts at a 1:1 ratio.

Research and species management strategies offer potentially the best opportunities for conserving Joshua trees. If Joshua trees are listed as a proposed candidate species, an Incidental Take Permit would be required prior to any project impacting Joshua trees. The Incidental Take Permit would require additional administrative steps that would otherwise not be required and any requirement imposed by the ITP conditions can be required by existing regulations. Agency and jurisdictional conflicts may also arise with existing regulations and policies.


Western Joshua Tree Analysis
Figure 1
Regulatory Protections within Joshua Tree Range
LOS ANGELES, KERN, SAN BERNADINO, RIVERSIDE AND INYO COUNTIES, CA
YUBR North Range
YUBR South Range
County Boundary
State Boundary
City Protections
County Protections
Federal Protections
Bureau of Land Management
Department of Defense
U.S. Forest Service
National Park Service
Protections shown are limited to the species range
TETRA TECH
Reference Map
NOT FOR CONSTRUCTION
Miles
Esmeralda County
Mono County
Nye County
Lincoln County
Iron County
Washington County
Utah
Arizona
Nevada
California
Tulare County
Inyo County
Clark County
Mohave County
Kern County
San Bernardino County
Ventura County
Los Angeles County
Riverside County
Orange County
San Diego County
Imperial County
Yuma County
La Paz County
Pearblossom
Adelanto
Victorville
Hesperia
Yucca Valley

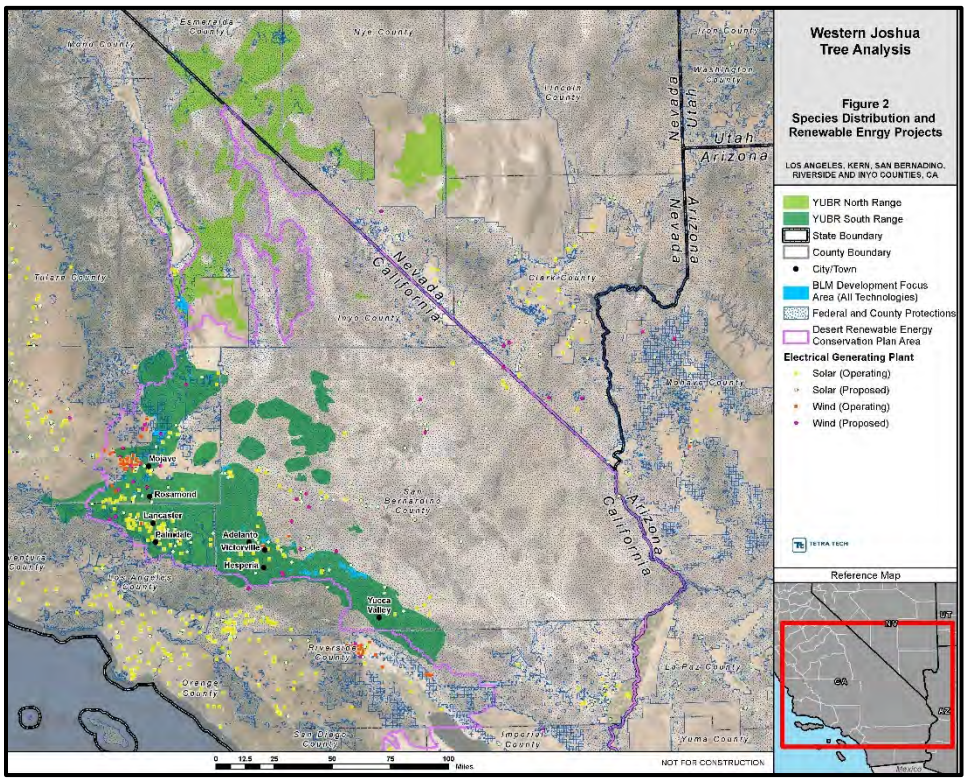

Western Joshua Tree Analysis
Figure 2
Species Distribution and Renewable Energy Projects
LOS ANGELES, KERN, SAN BERNADINO, RIVERSIDE AND INYO COUNTIES, CA
YUBR North Range
YUBR South Range
State Boundary
County Boundary
City/Town
BLM Development Focus Area (All Technologies)
Federal and County Protections
Desert Renewable Energy Conservation Plan Area
Electrical Generating Plant
Solar (Operating)
Solar (Proposed)
Wind (Operating)
Wind (Proposed)
TETRA TECH
Reference Map
NOT FOR CONSTRUCTION
Miles
Mojave
Rosamond
Lancaster
Palmdale
Adelanto
Victorville
Hesperia
Yucca Valley

Table of Contents

1.0 Introduction 1
2.0 Methods 1
3.0 Results 2
3.1 Protections and Policies for Western Joshua Tree 2
3.1.1 Federal 2
3.1.2 State 4
3.1.3 County 5
3.1.4 City 9
3.1.5 Cumulative Protected Area 11
3.2 Review of Existing Threats to the Species 11
4.0 Discussion and Conclusions 12
4.1 Effectiveness of Existing Protections Against Threats 12
4.2 Implications of Listing 12
4.3 Mitigation Requirements and Limitations 12
5.0 Literature Cited 14

List of Figures

Figure 1. Regulatory Protections within Joshua Tree Range

Figure 2. Species Distribution and Renewable Energy Projects

List of Attachments

Appendix A. Existing Regulations Pertaining to the Current Distribution of Western Joshua Tree (*Yucca brevifolia*)

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1.0 Introduction

The Center for Biological Diversity (CBD) submitted a petition (Petition) to the California Fish and Game Commission (Commission) to list the Western Joshua Tree (*Yucca brevifolia*) as threatened under the California Endangered Species Act (CESA). CBD identified climate change as the single greatest threat to the continued existence of Western Joshua Tree, with habitat loss due to development (in addition to other threats) further contributing to the likelihood of extirpation. The petition summarized existing federal, state, and local regulatory mechanisms to protect Western Joshua Tree habitat from loss and degradation and concluded they were insufficient. At the request of the Commission, the California Department of Fish and Wildlife (Department) prepared an evaluation (Evaluation) of the Petition and concluded that the species may be warranted for listing (CDFW 2020). However, neither the Petition nor the Evaluation provided sufficient detail regarding existing protections for the Western Joshua Tree and its habitat. As a result, several renewable energy trade associations contracted Tetra Tech to review and summarize existing land protections and protective policies within the current distribution of the Western Joshua Tree as delineated by the U.S. Fish and Wildlife Service (USFWS; USFWS 2018).

2.0 Methods

Tetra Tech reviewed publicly available data to identify existing protections and policies at the federal, state, and local levels. Data reviewed included:

- Petition
- Evaluation
- Spatial data (e.g., DataBasin, USFWS shapefiles)
- Conservation plans
- Land use plans
- Species status assessments
- Federal and state listing petitions and decisions for the Western Joshua Tree
- Municipal codes
- Acts of Congress

Given the expanse of the Western Joshua Tree range across multiple states and numerous jurisdictions, an exhaustive review of all protective policies was not feasible within the limited window of the public comment period extension. The review encompasses those information sources for which data were publicly available and accessible via online resources; it does not constitute a comprehensive catalog of all protective policies.

Spatial analyses were performed in a geographic information system (GIS) using ESRI ArcGIS software. The entire range of the Western Joshua Tree was analyzed, as well as the northern region (YUBR North) and southern region (YUBR South) using spatial layers generated by USFWS in the species status assessment (USFWS 2018; Figure 1). The area and proportion of the species (entire range as well as subregions) protected by a given protection or policy was quantified specific to its jurisdiction (e.g., plan area, county or city). Additionally, to provide context as to the implications of species listing, current and planned renewable energy development projects (i.e., wind and solar) were reviewed and mapped relative to the species range.

3.0 Results

3.1 Protections and Policies for Western Joshua Tree

The below narrative provides details of protective policies pertaining to the Western Joshua Tree organized by jurisdiction (federal, state, county, city). A tabular summary of the regulations by jurisdiction and regulatory agency is included in Appendix A and provides the degree of protection, spatial extent, and proportion of the Western Joshua Tree range that is covered (YUBR North, YUBR South, and Total). As mentioned above, these results do not constitute a comprehensive catalog of all protective policies pertaining to the Western Joshua Tree.

3.1.1 Federal

3.1.1.1 Bureau of Land Management - DRECP

The Desert Renewable Energy Conservation Plan (DRECP) Bureau of Land Management (BLM) Land Use Plan Amendment (LUPA) represents the public-lands component of the DRECP, permanently restricting areas where renewable energy development is permitted (Figure 2), and permanently protecting areas deemed important for biological, environmental, cultural, recreation, social, and scenic conservation, consistent with the Federal Land Policy and Management Act of 1976 as Amended (FLPMA) multiple use and sustained yield requirements. The DRECP boundary covers 61.3 percent of the range of Western Joshua Tree within the state of California (Figure 2).

The BLM LUPA is a comprehensive land use plan amendment that applies to specified activities on public land administered by BLM within the Decision Area. It addresses a full range of impacts, including, but not limited to, impacts to plant, wildlife, vegetation types, recreation, and cultural resources. Under federal law, BLM is solely responsible for implementation of the LUPA, and all activities that take place on BLM-administered public lands will ultimately require BLM authorization. BLM's ongoing responsibilities regarding land use plan implementation include implementation of the California Desert Advisory Committee chartered under the Federal Advisory Committee Act.

The BLM LUPA, which covers approximately 10 million acres of land, set aside 4,926,000 acres for permanent conservation while identifying 388,000 acres for potential renewable energy development in Development Focus Areas (DFAs; Figure 2). Joshua Tree Woodlands are called out

specifically, with 3,000 acres identified within National Conservation Lands designated under the LUPA that did not already receive legislative or legal protection. Lands designated for conservation are closed to renewable energy. Renewable energy and transmission development activities are required to implement Conservation and Management Actions (CMAs)- of which there are 384 - to avoid and minimize impacts inside and outside the DFAs as well as CMAs to compensate for the impacts. Specific CMAs related to the Western Joshua Tree include:

- CMA "LUPA-BIO-1" requires conducting a habitat assessment of Focus and BLM Special Status Species' suitable habitat, subsequent presence-absence surveys and identification and/or delineation of DRECP vegetation types, rare alliances, and special features, including the Joshua Tree.
- CMA "LUPA-BIO-SVF-1" requires a map delineating potential sites and a habitat assessment of special vegetation features including Joshua Tree Woodlands (for activity-specific NEPA analysis).
- CMA "LUPA-BIO-SVF-5" requires avoidance of impacts to Joshua Tree Woodland (*Yucca brevifolia* Woodland Alliance) to the maximum extent practicable, except for minor incursions.

3.1.1.2 Department of Defense

The Sykes Act (16 U.S.C. 670g-670l, 670o) directs the Secretary of Agriculture to plan, develop, maintain, coordinate, and implement programs for the conservation and rehabilitation of wildlife, fish and game species, including habitat improvement projects on public lands under their jurisdiction. This pertains to native habitats such as Joshua Tree Woodlands on military lands. Military lands contain 10.5 percent of the YUBR North region and 15.3 percent of the YUBR South region (Figure 1).

3.1.1.3 National Park Service

Joshua Tree National Park, Death Valley National Park and Mojave National Preserve are part of the California Desert Protection Act of 1994. Lands in Joshua Tree National Park have been withdrawn for mineral and geothermal leasing, but rights-of-way issued to the Metropolitan Water District remain intact.

Allowed activities in the Mojave National Preserve are limited to the following.

- Hunting, fishing, trapping in accordance with applicable federal and state laws.
- Mining claims that are subject to applicable laws and regulations related to mining.
- Grazing.

Existing rights-of-way for the Southern California Edison Company and the Southern California Gas Company remain intact. Land development is prohibited within National Parks, with the exception of necessary facilities related to Park maintenance and management. Thus, Western Joshua Tree habitat is in effect protected from anthropogenic habitat loss. National Parks contain 14.0 percent of the YUBR North region and 5.8 percent of the YUBR South region (Figure 1; Appendix A).

3.1.1.4 United States Forest Service

The Wilderness Act prohibits certain uses including commercial enterprises and no permanent roads within any wilderness area designated by the Wilderness Act except as necessary to meet minimum requirements for the administration of the area for the purposes of the Wilderness Act. The Act does not limit the following.

- Prospecting for the purposes of gathering information about mineral or other resources as long as the prospecting is conducted in a manner that preserves the wilderness environment and mineral drilling, production, mining and processing for leases in existence prior to midnight, December 31, 1983.
- Water reservoirs, water conservation works, power projects, transmission lines, road construction and maintenance.
- Grazing of livestock.
- Commercial services for realizing the recreational or other wilderness purposes.

The Forest Service Manual (USFS 2008) 2000, chapter 2070 related to vegetative ecology provides a detailed list of legal authority for management of National Forest System (NFS) lands that includes the promotion of the use of native plants (such as Western Joshua Tree) for revegetation and restoration/rehabilitation of NFS lands.

3.1.2 State

3.1.2.1 California Environmental Quality Act (CEQA)

The California Environmental Quality Act (CEQA) requires public agencies to analyze and disclose the impacts of any discretionary activity they approve and to adopt realistic measures to mitigate for any significant impacts identified. The law includes a mandate requiring agencies to not approve discretionary projects or activities as proposed if there is a feasible alternative(s) or measures that would substantially minimize significant environmental impacts. CEQA also provides a process for public engagement so interested private entities have the ability to be involved in the decision process. The Department advises public agencies during the CEQA process to ensure that any action approved does not significantly impact endangered, threatened, candidate for listing, rare, or species of special concern.

During CEQA review, public agencies must address impacts to plant species protected under the CESA and the Native Plants Protection Act (NPPA), in which most cases require mitigation of all significant impacts to these species to a level of less than significant. In addition, public agencies must also address plant species that may not be listed under CESA or the NPPA but may nevertheless meet the definition of rare or endangered provided in CEQA, or are otherwise protected under local regulations or policies. As required by CEQA, the analysis of impacts from a project must determine if the project would cause direct or indirect impacts that would have a substantial adverse effect on a sensitive natural community identified in local or regional plans, policies or regulations or by the Department or USFWS (OPR 2019). Joshua Tree Woodland is

designated as a sensitive plant community by the Department. Further, CEQA also requires that project impacts be evaluated that would conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. If the project would cause impacts to Joshua tree woodlands or conflict with local policy or ordinance for Joshua trees, but can be fully mitigated a less than significant impact would occur. If the project would cause an impact that cannot be fully mitigated, a significant impact would occur and the CEQA lead agency would be required to provide a Statement of Overriding Considerations for why the project should be implemented despite the unmitigated impact to Joshua Trees.

3.1.2.2 California Desert Native Plants Act (CDNPA)

The California Desert Native Plants Act (CDNPA) prohibits the unlawful harvest of California desert native plants on both public and privately-owned lands without a relevant county-issued permit. The CDNPA encompasses Imperial, Inyo, Kern, Los Angeles, Mono, Riverside, San Bernardino, and San Diego Counties, in which the harvest, transport, sale, or possession of specific native desert plants is prohibited unless a person has a valid permit or wood receipt, and the required tags/seals. The appropriate permits, tags and seals must be obtained from the sheriff or commissioner of the county where the collection will occur. All species of the family Agavaceae (century plants, nolinsa, and yuccas), including the Western Joshua Tree are protected under this law.

3.1.3 County

Note: all counties must comply with CEQA in addition to any county-specific ordinances or plans.

3.1.3.1 Kern County

As part of the Environmental Impact Reporting under CEQA, Kern County has frequently included requirements for development of a Joshua Tree Impact Plan or Joshua Tree Preservation Plan for those developments which may impact the Joshua Tree Woodlands. Plans are expected to include surveys and delineations of habitat, and may include measures such as avoidance of trees, minimization of impacts, and compensatory mitigation for impacted habitat at a 1:1 ratio, and/or such measures would be included in adopted mitigation measures. Kern County may also require a Transportation Plan if relocation is proposed. Construction setbacks are also enforced by Kern County for Joshua Tree Woodlands that are adjacent to developments. These measures are required prior to the issuance of any permits.

Willow Springs Specific Plan

The Willow Springs Specific Plan developed by Kern County in 1992 for the development of 50,560 acres identified a series of conservation measures for Western Joshua Trees and is summarized as follows. Where possible, project development within the Specific Plan would be designed to avoid displacement or destruction of Joshua Tree habitat, to the satisfaction of the Kern County Agricultural Commissioner's Office. Areas adjacent to Joshua Tree Woodland would have a 50-foot setback from the Joshua Tree plants. Within that setback, a native plant cover should be restored to natural habitat values to serve as a buffer, if such plant cover is not present. Finally, a Joshua Tree

Preservation and Transportation Plan shall be developed by the applicant for each parcel where Joshua Trees are located within the Specific Plan area. The plan would be submitted to the Kern County Agricultural Commissioner's Office for review and approval prior to grading permit issuance.

3.1.3.2 Los Angeles County

Some unincorporated portions of Los Angeles County are within Los Angeles County Significant Ecological Area (SEA) general plan designations, which indicate the presence of sensitive resources and require county environmental review (Los Angeles County 2020a). The Los Angeles County General Plan has analyzed Joshua tree habitats throughout the Antelope Valley. Areas with significant concentrations of Joshua trees are placed in SEA #60, "Joshua Tree Woodland Habitat" (Kern County 2011). Joshua Tree Woodlands are located and protected within the Antelope Valley, Joshua Tree, and San Andreas SEAs.

The SEA Program objective is to conserve genetic and physical diversity with Los Angeles County by designating biological resource areas that are capable of sustaining themselves into the future. The SEA ordinance establishes the permitting, design standards and review process for developing within SEAs to balance preservation of the County's natural biodiversity with private property rights.

The SEA program was originally adopted in the 1970s, and currently the County of Los Angeles is reviewing the SEA program as part of the General Plan Update. The intent of the proposed SEA regulations is to allow limited, controlled development that does not jeopardize the unique biotic diversity within the County. The SEA conditional use permit requires development activities be reviewed by the Significant Ecological Area Technical Advisory Committee (SEATAC). The SEATAC may provide recommendations to avoid development in sensitive resource area present on a site. The SEA does not change the land use designation or the zoning of a property; however, a conditional use permit is required for development activities within a SEA, unless the activity is exempt from the ordinance.

The Western Joshua Tree also receives protection from energy development as a result of Los Angeles County adopting a Renewable Energy Ordinance in 2016 that prohibits ground-mounted utility-scale solar facilities in the SEAs (Los Angeles County 2020a). Development of utility-scale wind facilities is prohibited in all zones and areas within the unincorporated County (Los Angeles County 2020b), providing protection to the Western Joshua Tree from wind energy development in these areas.

3.1.3.3 Riverside County/Coachella Valley Multiple Species Habitat Conservation Plan (MSHCP)/Natural Community Conservation Plan (NCCP)

The overall goal of the MSHCP is to enhance and maintain biological diversity and ecosystem processes while allowing future economic growth. This goal would allow preservation of a quality of life characterized by well-managed and well-planned growth integrated with an associated open-space system. The MSHCP/NCCP allows take of sensitive species and includes measures to restore, enhance and manage habitat that includes Joshua tree habitat. The Department determined that

approval of the MSHCP/NCCP could result in potentially significant adverse impacts to the following plant species covered by the plan: Coachella Valley milk vetch (*Astragalus lentiginousus* var. *coachellae*), tripled-ribbed milkvetch (*Astragalus tricarinatus*), little San Bernardino linanthus (*Linanthus maculates*) and Orocopia sage (*Salvia greatae*). The NCCP Permit (2835-2008-001-06) for the MSHCP plan area of the Coachella Valley was issued in August 2008. An ESA Section 10(a)(1)(B) Incidental Take Permit for the Coachella Valley Association of Governments MSHCP was issued on October 1, 2008. The MSHCP establishes a simple and uniform mechanism for mitigating the effects of development through the payment of a Local Development Mitigation Fee ("Fee"). The Fee applies to all projects within the Plan's jurisdiction. The amount of the Fee will vary based on the type and size of the project. Certain areas have been identified in the Plan as Conservation Areas and are generally hillsides and open desert. Development in Conservation Areas is subject to additional review, and certain limits on the amount and location of development can apply.

3.1.3.4 San Bernardino County

County of San Bernardino Development Code, Chapter 88.01 Plant Protection and Management.

San Bernardino County Code Title 8, Chapter 88.01 of the County of San Bernardino code provides regulations and guidelines for the management of plant resources in the unincorporated areas of the County on property or combinations of property under private or public ownership. The intent of this development code is to provide the following standards related to native trees and plants including Joshua trees.

- Promote and sustain the health, vigor and productivity of plant life and aesthetic values within the County through appropriate management techniques.
- Conserve the native plant life heritage for the benefit of all, including future generations.
- Protect native trees and plants from indiscriminate removal and to regulate removal activity.
- Provide a uniform standard for appropriate removal of native trees and plants in public and private places and streets to promote conservation of these valuable natural resources.
- Protect and maintain water productivity and quality in local watersheds.
- Preserve habitats for rare, endangered, or threatened plants and to protect animals with limited or specialized habitat.

Hacienda at Fairview Valley Specific Plan.

The Hacienda at Fairview Valley project is located in San Bernardino County, California approximately two miles east of the Town of Apple Valley and within the Town of Apple Valley's sphere of influence. Hacienda at Fairview Valley Specific Plan provides a mixed-use community with a wide variety of housing opportunities that supports active adult and equestrian-friendly, clustered around recreational and open space areas located in San Bernardino County. As part of

the approval of this Specific Plan, the Hacienda at Fairview Valley Joshua Tree Management Program was prepared and adopted. This Program is consistent with County of San Bernardino Development Code Chapter 88.01, Plant Protection and Management, and provides additional provisions and guidelines relating to grading parameters, construction activities and conservation areas within the Hacienda at Fairview Valley Specific Plan. A Multi-Species Habitat Conservation Plan/Natural Community Conservation Planning Plan for the Town of Apple Valley is currently in preparation.

Joshua Tree Community Plan.

The Joshua Tree Community Plan identifies a goal to retain the existing rural desert character of the community. Policies toward that goal include the requirement that development shall be required to maintain, conserve and be complementary to environmentally sensitive areas and elements, including but not limited to Joshua trees, Mojave yuccas, creosote rings and other protected plants, protected fauna, hillsides, scenic vistas, drainage areas, habitat, and unique geological features.

Lucerne Valley Community Plan and Homestead Valley Community Plan.

Both the Lucerne Valley Community Plan and the Homestead Valley Community Plan to the County of San Bernardino General plan are in areas of the county that includes the following general habitat types:

- Sage scrub;
- Joshua Tree Woodland;
- Mojave Desert scrub;
- Saltbush scrub;
- Alkali sinks; and
- Sand dunes.

Both the Lucerne Valley Community Plan and Homestead Valley Community Plan identifies as a policy a goal to conserve and protect unique environmental features including the protection of native vegetation.

Morongo Valley Community Plan.

The Morongo Valley Community Plan also encourages conservation and protection of native wildlife and habitat but identifies more restrictive regulations requiring greater retention of existing vegetation with an emphasis for the retention of Joshua trees.

Conservation of Joshua tree and other native plants within the Morongo Valley Community Plan includes the following steps for project development that are also found in the County of San Bernardino General Plan (2007).

- Requiring an approved landscape plan as part of the development plan review and approval process for all new development projects.

- Requiring the Building Official to make a finding that no other reasonable siting alternatives exist for development of the land prior to removal of a Joshua tree.
- Encourage on-site relocation of Joshua trees. However, if on-site relocation is not feasible, encourage residents to consult a list that will be established and maintained in the County of San Bernardino Building and Safety Office of residents willing to adopt and care for relocated trees.
- The developer/home builder would bear the cost of tree relocation.
- Retention and transplantation standards will follow best nursery practices.

Oak Hills Community Plan.

The Oak Hills Community Plan identifies as a policy a goal to conserve and protect unique environmental features including the protection of native vegetation. The Oak Hills Community Plan encourage the retention of specimen sized Joshua Trees by requiring the building official to make a finding that no other reasonable siting alternative exists for the development of the land. Specimen size trees are defined in Section 88.01.050 of the County of San Bernardino Development Code.

Phelan/Piñon Hills Community Plan.

The Phelan/ Piñon Hills Community Plan Lucerne Valley Community Plan is in an area of the county that includes the following general habitat types:

- White fir woodland;
- Piñon/juniper woodland;
- Sage scrub;
- Joshua Tree Woodland;
- Mojave Desert scrub;
- Salt brush scrub;
- Conifer forest;
- Alkali sinks; and
- Sand dunes.

The Phelan/Piñon Hills Community Plan identifies as a policy a goal to conserve and protect unique environmental features including the protection of native vegetation.

3.1.4 City

All cities and towns must comply with CEQA in addition to any local ordinances or plans.

3.1.4.1 Adelanto (San Bernardino County)

The City of Adelanto has identified an ordinance for the relocation of Joshua trees. City of Adelanto Municipal Code Chapter 17.57.040 identifies that development projects must comply with requirements of the County of San Bernardino for relocation of Joshua trees. The permit required by the City of Adelanto specifies adherence to Title 8, Division 9 of the County of San Bernardino Code with regards to Joshua trees. Title 8, Division 9 of the County of San Bernardino refers to public facilities financing. County of San Bernardino Code Title 8, Division 8 refers to Resource Management and Conservation and specifically to the requirements for conserving Joshua trees. The City of Adelanto requires that a project applicant apply for a permit to conduct a Joshua tree survey and removal.

3.1.4.2 Lancaster (Los Angeles County)

The City of Lancaster has identified an ordinance to preserve the habitat of Joshua Trees. Per Lancaster City Ordinance 848, Chapter 15.66 of the Municipal Code, a biological impact fee ($770/acre) is required for any new land subdivision, development, or previously approved subdivision/development requesting a time extension. The biological impacts fees are then used for the acquisition of mitigation land, restoration of habitat, environmental education, and other uses approved by the City Council. Therefore, replacement lands can be purchased to preserve Joshua Tree habitat.

3.1.4.3 Hesperia (San Bernardino County)

The City of Hesperia has identified an ordinance to manage protected plants that include Joshua trees. City of Hesperia Municipal Code Chapter 16.24 applies to private and public lands within the city. The City of Hesperia requires a removal permit prior to the removal of native trees or plants. Joshua trees that are proposed to be removed must be transplanted or stockpiled for future transplanting. The applicant is required to post a bond to ensure that stockpiled Joshua trees are transplanted appropriately. Prior to issuance of a native tree/plant removal permit, the applicant must provide a plan that shows exactly where the plants will be transplanted to. Penalties are specified for violation of the ordinance. The ordinance also identifies the prohibition of commercial harvesting of desert native plants that includes all Joshua trees.

3.1.4.4 Palmdale (Los Angeles County)

The City of Palmdale has identified an ordinance that directs protection and preservation measures for desert vegetation and particularly Joshua trees. Palmdale Municipal Code Chapter 14.04 for Joshua tree and native desert vegetation preservation specifies that all development applications of lands with native desert vegetation shall include a desert preservation plan that includes preservation criteria for Joshua trees, California juniper and other desert vegetation. The City of Palmdale also identifies maintenance requirements for transplanted Joshua trees or other desert vegetation. Additionally, the code requires reservation of two Joshua trees per acre but this metric can also be met by donating removed trees to an offsite City-administered tree bank (Palmdale Municipal Code §§ 14.04.010).

3.1.4.5 Victorville (San Bernardino County)

The City of Victorville has identified an ordinance for the preservation and removal of Joshua trees. City of Victorville Municipal Code Chapter 13.33 specifies that it is unlawful for any person to cut, damage, destroy, dig up, or harvest any Joshua tree without the prior written consent of the director of parks and recreation or his designee. A violation of this section of the municipal code is a misdemeanor punishable by up to six months in jail and/or a five-hundred-dollar fine.

3.1.5 Cumulative Protected Area

When the spatial extent of the protective policies described above were totaled (not counting overlap; Appendix A), they represented a minimum of 80.5 percent of the YUBR North region and a minimum of 74.1 percent of the YUBR South region (Figure 1). Combined, 76.3 percent of the Western Joshua Tree range benefits from protective regulations (Figure 1).

3.2 Review of Existing Threats to the Species

Tetra Tech reviewed several sources to identify existing threats to the Western Joshua Tree, including the USFWS Species Status Assessment (USFWS 2018), the Petition, the Evaluation, as well as other literature and reports as cited below. Analyses performed by USFWS suggest that threats to individual trees such as wildlife, increasing temperatures, drought, and habitat loss may affect the resiliency of the species; however, they concluded that these threats are not likely having population-level impacts (USFWS 2018). Introduction of invasive annual grasses was also noted as a threat by the Department in the Evaluation (CDFW 2020). Note that these threats are interrelated and altered fire regimes and invasive annual grasses in particular may be exacerbated by climate change.

Fire regimes across the range of *Yucca brevifolia* have likely increased in frequency over recent decades in certain parts of the range, and this broader altered fire regime has been largely driven by the proliferation of invasive annual grasses which act as fine fuels and connect vegetation previously less connected (USFWS 2018). However, the impact of fire on the Western Joshua Tree is not clear. As summarized in the Evaluation, two GIS-based analyses conducted by the U.S. Air Force on Western Joshua Tree populations at Edwards Air Force Base showed that the population on the Base was “stable to increasing” (USAF 2017a) and the other that the population in the study area of an earlier fire was “stable” (USAF 2017b).

Climate change is anticipated to result in increased temperatures and an increase in interannual variability of precipitation in the Mojave Desert. A variety of climate change models and research studies were summarized in the Petition and Evaluation, including two specific to the effects of climate change on Western Joshua Tree (i.e., Barrows and Murphy-Mariscal 2012, and Sweet et al. 2019). Modeled effects of climate change included constriction or shifting of the current range and potentially reduced juvenile recruitment. USFWS concluded that climate change and the interactions with fire and habitat loss were unlikely to prevent the species from persisting across the landscape through the end of the century (USFWS 2018).

4.0 Discussion and Conclusions

4.1 Effectiveness of Existing Protections Against Threats

As described above and shown in Figure 1 and Appendix A, existing federal, state, and local regulations currently provide widespread protections to this species, including protections that target select threats to this species. Federal agencies, the State of California, and several communities have adopted and implemented laws and ordinances that protect *Yucca brevifolia* from harvesting and removal to some degree (USFWS 2018; Appendix A), which limits potential habitat loss from urban development and military activities. Additionally, the DRECP contains measures to avoid removing individual plants by avoiding areas classified as Joshua Tree Woodland (Section 3.1.1.1), which would reduce the number of individual trees and habitat potentially lost to renewable energy development (USFWS 2018). Current protections on federal land (e.g., BLM- and DOD-managed land) include management actions to remove invasive plants and monitor Joshua Tree Woodland population trends, and perform habitat improvements (Appendix A), which reduces the threat of invasive species and the associated effects of wildfire on *Yucca brevifolia*.

4.2 Implications of Listing

Given that there are numerous existing ordinances/policies providing protection for Joshua Trees, listing the species under the CESA will lead to additional agencies having jurisdiction, requiring additional review and coordination. Furthermore, listing would likely cause project delays as counties and local agencies incorporate the change in status into their ordinances. Programs such as the CVMSHCP may require updating to include the Western Joshua Tree. This could cause regional delays for projects with sites that have Joshua trees. Once the change in status has been incorporated, the process for negotiating full mitigation for take could proceed using the approach under CESA. However, these additional review and permitting requirements could place at risk renewable energy project developments with near-term commercial online delivery obligations.

4.3 Mitigation Requirements and Limitations

Multiple mitigation measures are available and sometimes required to protect the Western Joshua Tree within the 76 percent (minimum) of the species distribution area where regulations are present. Typical mitigation requirements for the Western Joshua Tree include onsite or offsite preservation of Joshua Tree Woodland habitat or conservation easements and compensatory mitigation, with avoidance and minimization measures being the first preferences. If relocation is included as a mitigation option, the mitigation measure would typically require, per CEQA, a period of monitoring post-relocation, the required success rates for relocation, contingency measures should relocation prove unsuccessful, and that a certified botanist oversee the relocation, planting, and monitoring. Impact plans or preservation plans (or documentation of a similar variety) are usually required and typically include requirements to set back from Joshua tree habitat so as to avoid impacts, and a delineation of habitat and description of the total area of impact.

Measures such as avoidance of impacts to Joshua Tree Woodland, minimization of impacts, and compensatory mitigation, typically through provision and protection of in-lieu habitat at a 1:1 ratio, are typically required by Kern County as part of mitigation for projects with impacts to Joshua Tree Woodland.

Examples of avoidance, minimization, and compensatory mitigation measures required include:

First Solar's Windhub B Solar Project (Kern County 2018)

- Prior to any ground disturbing activities, a Joshua Tree Preservation Plan shall be submitted for review and approval by the appropriate agencies. Upon approval of the Plan, and prior to initiating project construction, the project proponent/operator shall have a qualified biologist document the location and acreage of Joshua tree woodland that would be subject to permanent disturbance.
- The Joshua Tree Preservation Plan shall describe field methods used to delineate acreage of Joshua tree woodland and shall provide a detailed compensatory mitigation strategy, based on one or both of the following options:
    - Preservation of Joshua tree woodland habitat shall occur on parcels within the project site. The project proponent/operator may mitigate all or part of the project's impacts to Joshua trees, as follows: Delineate and designate one or more parcels for dedication for permanent conservation management. The mitigation lands shall provide habitat at a 1:1 ratio for impacted lands, comparable to habitat to be impacted by the project (i.e., similar abundance and size of Joshua trees, similar dominant vegetation community, similar levels of disturbance or habitat degradation). Suitable mitigation lands provided for other species may be used for Joshua tree woodland mitigation, at a 1:1 ratio.
    - In lieu monetary funding. For any Joshua tree woodlands not part of relocation efforts, the project proponent/operator shall submit funding for the acquisition and management in perpetuity of Joshua tree woodland habitat or habitats similar to those that contain impacted Joshua trees on site. Funding and management shall be provided through conservation plan approved by the appropriate agencies, either through an existing mitigation bank (e.g., as managed by the City of Lancaster Parks, Recreation and Arts Department) or through a third-party entity such as the Wildlife Conservation Board or a regional Land Trust. The in-lieu fee shall provide sufficient funds to acquire appropriate lands to provide habitats containing Joshua tree woodland at a 1:1 ratio for impacted lands, comparable to habitat to be impacted by the project (i.e., similar abundance and size of Joshua trees, similar dominant vegetation community, similar levels of disturbance or habitat degradation). Suitable mitigation lands provided for other species may be used for Joshua tree woodland mitigation, at a 1:1 ratio.

Daggett Solar Power Facility Project (San Bernardino County 2019)

- A Joshua Tree Relocation Plan is included as a standard condition for all projects requiring a Conditional Use Permit, even if Joshua trees are not onsite. The developer is required to submit an approved relocation plan for Joshua trees within the developed site area, if present. The relocation plan requires a certification from an appropriate arborist, registered professional forester or a Desert Native Plant Expert that the proposed tree removal, replacement, or revegetation activities are appropriate, supportive of a healthy environment, and are in compliance with Chapter 88.01 of the San Bernardino County Development Code. The certification will include the information in compliance with Department procedures. Transplantation onsite will be the primary method of addressing a Joshua tree removal from the subject property.

Gaskell West Solar Project (Kern County 2016)

- Compensatory mitigation is required to mitigate impacts to Joshua tree woodlands whereby equivalent Joshua tree woodland (or habitats similar to those that contain impacted Joshua trees on site that are located within the same bioregion and/or watershed) on another site is protected in perpetuity. This is performed in-lieu of fee for loss of Joshua tree woodland. This mitigation must be approved by the Kern County Planning and Natural Resources Department and funding/management will be provided by a Kern County approved Conservation Plan, either through an existing mitigation bank or a third-party entity. The in-lieu fee will provide sufficient funds to acquire appropriate lands to provide habitats containing Joshua trees at a 1:1 ratio, comparable to the habitat to be impacted by the project (similar abundance/size, codominant vegetation, suitable soils and hydrology, and levels of disturbance or habitat degradation). The County-approved biologist will submit confirmation of the total area of Joshua tree woodland and an estimate of the number of individual Joshua trees that will be removed.

Joshua trees are found in the Mojave Desert at elevations between 400 and 1,800 meters (1,300 to 5,900 feet) above sea level. Suitable habitat based on soils, weather conditions and rainfall for the Western Joshua Tree is limited to areas within the Mojave, Sonoran and Colorado Deserts. Opportunities for in-kind compensatory mitigation in the form of land conservation will likely be very limited and best focused on areas with suitable microclimates such as identified by Sweet et al. 2019. Mitigation strategies that involve research and species management within the national parks and publicly owned lands may present opportunities for conserving Joshua trees.

5.0 Literature Cited

Barrows, C.W. and M.L. Murphy-Mariscal. 2012. Modeling impacts of climate change on Joshua trees at their southern boundary: How scale impacts predictions. Biological Conservation 152:29–36.

CDFW (California Department of Fish and Wildlife). 2008. Findings of Fact under the California Environmental Quality Act and the Natural Community Conservation Planning Act and Natural Community Conservation Plan Permit (2835-2008001-06)

CDFW. 2020. Evaluation of a petition from the Center for Biological Diversity to List the Western Joshua Tree (*Yucca brevifolia*) as Threatened under the California Endangered Species Act. Report to the Fish and Game Commission. State of California Natural Resources Agency Department of Fish and Wildlife. February 2020.

CBD (Center for Biological Diversity). 2019. A Petition to List the Western Joshua Tree (*Yucca brevifolia*) as Threatened under the California Endangered Species Act (CESA). Before the California Fish and Game Commission. October 15, 2019.

City of Adelanto. 2020. Adelanto Municipal Code Chapter 17.57.

City of Hesperia. 1997. Hesperia Municipal Code Chapter 16.24. Protected Plants.

City of Palmdale. 2019. Palmdale Municipal Code Chapter 14.04. Joshua Tree and Native Desert Vegetation Preservation.

City of Victorville. 1988. Victorville Municipal Code Chapter 13.33. Preservation and Removal of Joshua Trees.

Coachella Valley Association of Governments. 2007. Coachella Valley Multiple Species Habitat Conservation Plan. Online at: http://www.cvmshcp.org/

County of Kern. 2008. Circulation Amendment, Willow Springs Specific Plan, 1992. Kern County Department of Planning and Development Services. Board of Supervisors Resolution Number 2008-082, Adopted April 1,2008

County of San Bernardino. 2003. Oak Hills Community Plan. Adopted February 25, 2003. Effective March 27, 2003. Amended June 18, 2013.

County of San Bernardino. 2007a. Development Code. Plant Protection and Management. Code Title 8, Chapter 88.01 Adopted March 13, 2007. Effective April 12, 2007. Amended May 2, 2019.

County of San Bernardino. 2007b. General Plan. Adopted March 13, 2007. Effective April 12, 2007. Amended April 24, 2014.

County of San Bernardino. 2007c. Homestead Valley Community Plan. Adopted March 13, 2007. Effective April 12, 2007.

County of San Bernardino. 2007d. Joshua Tree Community Plan. Adopted March 13, 2007. Effective April 12, 2007.

County of San Bernardino. 2007e. Lucerne Valley Community Plan. Adopted March 13, 2007. Effective April 12, 2007.

County of San Bernardino. 2007f. Morongo Valley Community Plan. Adopted March 13, 2007. Effective April 12, 2007.

County of San Bernardino. 2007g. Phelan/Piñon Hills Community Plan. Adopted March 13, 2007. Effective April 12, 2007.

County of San Bernardino. 2014. Hacienda at Fairview Valley Specific Plan. Adopted February 25, 2014. Effective March 27, 2014. County of San Bernardino Land Use Services.

County of San Bernardino. 2019. Daggett Solar Power Facility Final Environmental Impact Report. SCH No. 2018041007 https://files.ceqanet.opr.ca.gov/57854-2/attachment/MQ41Ijv7VVN48L7bKigKLDHmNDidnM9OAZdHt4BfawqqJ4kAIGL6aVQv4Dzh0CYBdMAZfqTut5U-5yGk0 Accessed August 6, 2020.

DRECP (Desert Renewable Energy and Conservation Plan). 2016. Land Use Plan Amendment to the California Desert Conservation Area Plan, Bishop Resource Management Plan, and Bakersfield Resource Management Plan, BLM/CA/PL-2016/03+1793+8321

Kern County. 2011. Draft Environmental Impact Report. Antelope Valley Solar. Kern County Planning and Community Development Department. Bakersfield, California. April 2011. https://psbweb.co.kern.ca.us/planning/pdfs/eirs/av_solar/av_solar_deir.pdf

Kern County. 2016. Draft Environmental Impact Report. RE Gaskell West Solar Project. SCH# 2016071004 December 2016.

Kern County. 2018. Draft Environmental Impact Report. Windhub Solar Project. Kern County Planning and Natural Resources Department. Bakersfield, California. August 2018. https://psbweb.co.kern.ca.us/UtilityPages/Planning/EIRS/windhub/DEIR/windhub_solar_deir_vol1.pdf

Los Angeles County. 2020a. Department of Regional Planning. Significant Ecological Areas. http://planning.lacounty.gov/sea/faqs Accessed July 28, 2020.

Los Angeles County. 2020b. Department of Regional Planning. Renewable Energy. http://planning.lacounty.gov/energy Accessed August 5, 2020.

OPR (State of California Office of Planning and Research). 2019. Appendix G Environmental Checklist Form. https://resources.ca.gov/CNRALegacyFiles/ceqa/docs/ab52/final-approved-appendix-G.pdf Accessed August 6, 2020.

Sweet, L.C., T. Green, J.G.C. Heintz, N. Frakes, N. Graver, J. S. Rangitsch, J.E. Rodgers, S. Heacox, and C.W. Barrows. 2019. Congruence between future distribution models and empirical data for an iconic species at Joshua Tree National Park. Ecosphere 10(6):e02763 10.1002/ecs2.2763.

USAF (U.S. Air Force). 2017a. Joshua Tree Historical Status on Edwards AFB. 412th Civil Engineering Group. Environmental Management Division. Edwards Air Force Base.

USAF (U.S. Air Force). 2017b. Joshua Tree Survivorship and/or Regeneration in Fire Area on Edwards Air Force Base (AFB). Prepared by the 412th Civil Engineer Group Environmental Management Division Environmental Assets Branch. Edwards AFB, CA.

USFWS (US Fish and Wildlife Service). 2008. Endangered Species Act section 1O(a)(l)(B) incidental take permit for the Coachella Valley Association of Governments Multispecies Habitat Conservation Plan (CVAG MSHCP).

USFWS. 2018. Joshua Tree Status Assessment. Dated July 20, 2018. 113 pp. Appendices A–C.

USFS (United States Forestry Service). 2008. Forest Service Manual, Chapter 2070-Vegetation Ecology.

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Figures

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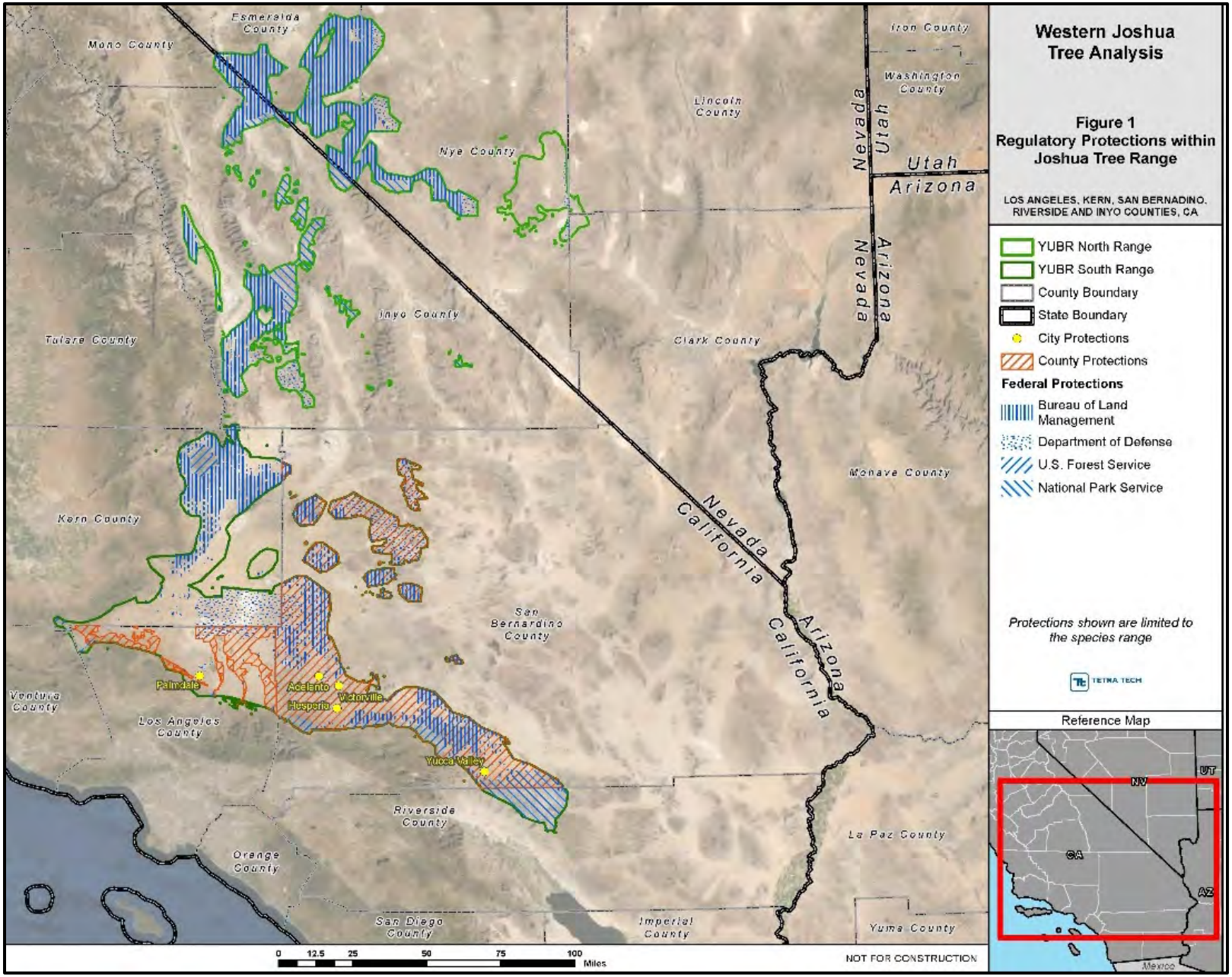
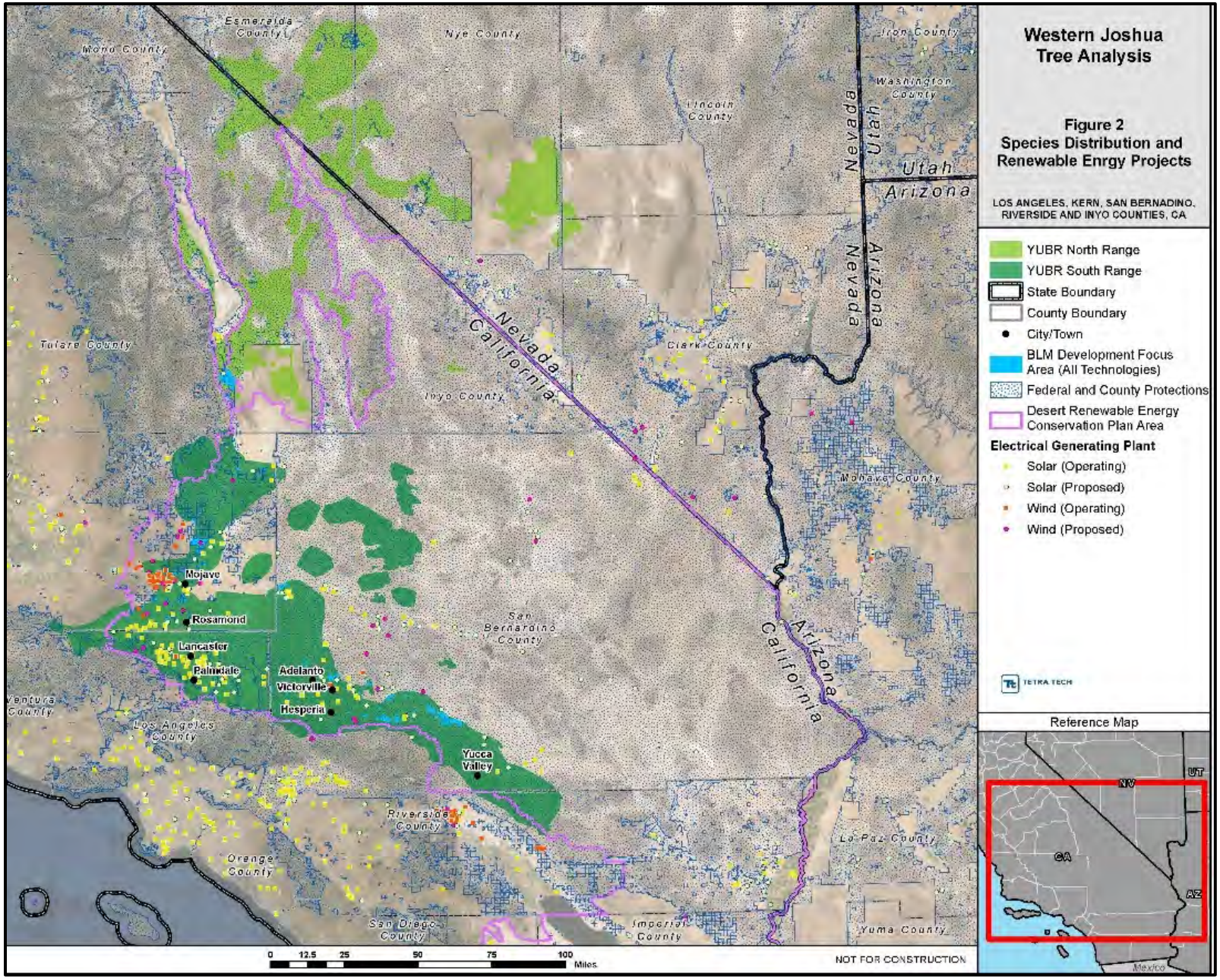

Western Joshua Tree Analysis
Figure 1
Regulatory Protections within Joshua Tree Range
LOS ANGELES, KERN, SAN BERNADINO, RIVERSIDE AND INYO COUNTIES, CA
YUBR North Range
YUBR South Range
County Boundary
State Boundary
City Protections
County Protections
Federal Protections
Bureau of Land Management
Department of Defense
U.S. Forest Service
National Park Service
Protections shown are limited to the species range
TETRA TECH
Reference Map
NV
UT
CA
AZ
Mexico
Esmeralda County
Mono County
Iron County
Washington County
Lincoln County
Nye County
Nevada
Utah
Utah
Arizona
Nevada
Arizona
Inyo County
Tulare County
Clark County
Mohave County
Kern County
Nevada
California
Arizona
California
San Bernardino County
Palmdale
Adelanto
Victorville
Hesperia
Ventura County
Los Angeles County
Yucca Valley
Riverside County
La Paz County
Orange County
San Diego County
Imperial County
Yuma County
0 12.5 25 50 75 100 Miles
NOT FOR CONSTRUCTION


Western Joshua Tree Analysis
Figure 2
Species Distribution and Renewable Enrgy Projects
LOS ANGELES, KERN, SAN BERNADINO, RIVERSIDE AND INYO COUNTIES, CA
YUBR North Range
YUBR South Range
State Boundary
County Boundary
City/Town
BLM Development Focus Area (All Technologies)
Federal and County Protections
Desert Renewable Energy Conservation Plan Area
Electrical Generating Plant
Solar (Operating)
Solar (Proposed)
Wind (Operating)
Wind (Proposed)
TETRA TECH
Reference Map
NV
UT
CA
AZ
Mexico
Esmeralda County
Nye County
Mono County
Lincoln County
Iron County
Washington County
Utah
Arizona
Nevada
Tulare County
Clark County
Inyo County
Mohave County
San Bernardino County
Mojave
Rosamond
Lancaster
Palmdale
Adelanto
Victorville
Hesperia
Yucca Valley
Ventura County
Los Angeles County
Riverside County
Orange County
San Diego County
Imperial County
La Paz County
Yuma County
0 12.5 25 50 75 100 Miles
NOT FOR CONSTRUCTION

Appendix A. Existing Regulations Pertaining to the Current Distribution of Western Joshua Tree (*Yucca brevifolia)*

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Appendix A. Western Joshua Tree – Existing Regulations Pertaining to Current Distribution (North, South)

Regulatory Agency	Name of Regulation and/or Policy Instrument	Description of Existing Regulation	Degree of Protection (Required vs Voluntary)	Extent of Area Protected by Regulation	Protected Area	
					Percentage of YUBR Range Covered by Regulation	YUBR Range within Jurisdiction (Acres/Sq. Mi)
FEDERAL						
Bureau of Land Management (BLM)	California Desert Protection Act; Code of Federal Regulations	Designated 69 wilderness areas as additions to the National Wilderness Preservation System within the California Desert Conservation Area (CDCA). Joshua trees are protected in these areas. No surveys required.	Required	CDCA Plan Boundary	Not calculated, see DRECP	Not calculated, see DRECP
Bureau of Land Management (BLM)	Desert Renewable Energy Conservation Plan, Land Use Plan Amendment	Conserve unique landscape features, important landforms, and rare or unique vegetation types identified within BLM land (NLCS, ACEC, etc.), including areas of dense Joshua Tree Woodland. Management actions include removal of invasive plants, rehabilitating disturbed areas, protecting populations of special status plants, and monitoring Joshua Tree Woodland population trends, removing threats, and taking remedial actions when impacts occur. Impacts to Joshua Tree Woodlands will be avoided to the maximum extent practicable, except for minor incursions. Suitable habitat may require surveys.	Required	DRECP Plan Area Boundary	Total: 34.1 (BLM lands only) North: 55.7 (BLM lands only) South: 22.7 (BLM lands only)	North:1,104,262/1,725 (BLM lands only) South: 843,999/1,319 (BLM lands only)
Department of Defense (DOD)	Sykes Act	Requirement of Integrated Natural Resources Management Plans (INRMP) for military installations. Plan, develop, maintain, coordinate, and implement programs for the conservation and rehabilitation of wildlife, fish and game species, including specific habitat improvement projects, on public land.	Required	INRMP Plan Boundary	Total: 13.6 North: 10.5 South: 15.3	North: 209,102/327 South: 569,566/890
National Park Service (NPS)	Enabling legislation for National Park; California Desert Protection Act, Code of Federal Regulations	Established Death Valley and Joshua Tree National Parks and Mojave National Preserve; Joshua trees are protected in these areas. Minimize human impacts on native plants, animals, populations, communities, and ecosystems, and the processes that sustain them within these parks. Withdraws all Federal lands within the Park from the same forms of appropriation or entry under public land, mining, and mineral and geothermal leasing laws as are applicable to lands within Death Valley National Park. No surveys required.	Required	All National Park Lands	Total: 8.7 North: 14.0 South: 5.8	North: 278,934/436 South: 216,284/338
STATE						
California Department of Fish and Wildlife (CDFW)	California Desert Native Plants Act	California law that prohibits unlawful harvesting of desert plants on both public and privately-owned lands, without a permit, in all California deserts. Specifically prohibits commercial harvesting of Joshua trees.	Required	Boundaries of Imperial, Inyo, Kern, Los Angeles, Mono, Riverside, San Bernardino, and San Diego counties	Total: 74.9 North: 39.8 South: 100.0	North: 789,089/1,233 South: 3,721,813/5,815
Multiple (state and county)	California Environmental Quality Act (CEQA)	The California Environmental Quality Act (CEQA) generally requires state and local government agencies to inform decision makers and the public about the potential environmental impacts of proposed projects, and to reduce those environmental impacts to the extent feasible. Impacts are reviewed for those species which are endangered, threatened, candidate for listing, rare, or considered by CDFW to be a species of special concern. Joshua Tree Woodland is designated as a sensitive plant community by CDFW.	Required	Statewide	Total: 79.1 North: 39.8 South: 100.0	North: 789,095/1,233 South: 3,724,081/5,818
LOCAL						

Regulatory Agency	Name of Regulation and/or Policy Instrument	Description of Existing Regulation	Degree of Protection (Required vs Voluntary)	Extent of Area Protected by Regulation	Protected Area	
					Percentage of YUBR Range Covered by Regulation	YUBR Range within Jurisdiction (Acres/Sq. Mi)
Kern County	California Environmental Quality Act (CEQA)	Kern County typically requires development of a Joshua Tree Preservation Plan for those developments which may impact the Western Joshua Tree. For those trees which cannot be avoided and require removal, removal is limited to those trees within ground-disturbance areas. Mitigation of project impacts to the species requires dedicating an equal area of comparable habitat as a conservation easement (or in lieu fee) at a 1:1 ratio for impacted trees. Surveys required.	Required	Countywide	Total: 20.4 North: 0 South: 31.3	North: 0 South: 1,166,353/1,822
Los Angeles County	General Plan – Significant Ecological Areas (SEA)	Joshua Tree Woodlands are located and protected within the Antelope Valley, Joshua Tree, and San Andreas SEAs. This protection applies to all Joshua trees (*Yucca brevifolia*) regardless of size. Joshua trees must be 20' tall to be considered a heritage tree, which would require a Conditional Use Permit (CUP) to remove or relocate for development. Removal of two or more Joshua trees (non-heritage) would also require a CUP. A survey would likely be required to determine the plant locations which are required for inclusion with the CUP. A Protected Tree Permit would also be required for removal of up to two Joshua trees. Failure to apply could result in a 5-year ban to apply for new permits. Some developments are exempt from the SEA policies (see Section 22.102.040).	Required	Antelope Valley, Joshua Tree, and San Andreas SEAs	Total: 4.0 North: 0 South: 7.0	North: 0 South: 253,611/396
San Bernardino County	General Plan, Section F, Goal D/CO, Policies 1.3 and 1.11	Require retention of existing native vegetation for new development projects, particularly Joshua trees (including specimen sized Joshua trees). May require a landscape plan, determination that no other siting alternative exists, on-site relocation of the tree(s). Specimen size trees are defined in Section 88.01.050 of the Development Code. No surveys required.	Required	Countywide	Total: 13.3 North:0 South:46.0	North: 0 South: 1,711,907/2,675
San Bernardino County	Development Code – Title 8 – Development Code, Section V, 83.10.080(c)(1) Section 88.01.050(f)(3)(A), (B), and (C) Section 88.01.060(c)(4)	Any existing native desert plant material, or any part thereof, except the fruit, shall not be removed without the issuance of a tree removal permit (including all plants in the Agavaceae family and Joshua trees). If Joshua trees exist on-site and are proposed to be relocated, they shall be relocated on-site in the landscaped areas; unless, the Director of the Land Use Services Department specifically allows another option. Joshua trees that are proposed to be removed will be transplanted or stockpiled. Transplanting shall comply with the Desert Native Plants Act provisions. No surveys required.	Required	Countywide	Total: 13.3 North: 0 South: 46.0	North: 0 South: 1,711,907/2,675
San Bernardino County	Hacienda Fairview Valley Specific Plan	Re-establish natural desert landscape – use open space areas for transplanting of candidate Joshua trees. Requires preservation in place and/or relocation of existing on-site Joshua Trees per a Joshua Tree Management Program. This Program is consistent with County Development Code Chapter 88.01, Plant Protection and Management, and provides additional provisions and guidelines relating to grading parameters, construction activities and conservation areas within the Hacienda at Fairview Valley Specific Plan. The Environmental Impact Report shall establish appropriate mitigation measures and monitoring requirements for any potentially significant impacts. Encourage the retention of specimen sized Joshua Trees (as defined below) by requiring the building official to make a finding that no other reasonable siting alternative exists for the development of the land. No surveys required.	Required	Plan Area	Total: <0.1 North: 0 South: <0.1	North: 0 South: 1,557/2

Regulatory Agency	Name of Regulation and/or Policy Instrument	Description of Existing Regulation	Degree of Protection (Required vs Voluntary)	Extent of Area Protected by Regulation	Protected Area	
					Percentage of YUBR Range Covered by Regulation	YUBR Range within Jurisdiction (Acres/Sq. Mi)
San Bernardino County	Homestead Valley Community Plan Phelan/Pinon Hills Community Plan Oak Hills Community Plan Lucerne Valley Community Plan Morongo Valley Community Plan Joshua Tree Community Plan	Preserve the unique environmental features, including native wildlife, vegetation, and scenic vistas (including the Joshua Tree Woodland). Encourage the retention of specimen sized Joshua Trees (as defined below) by requiring the building official to make a finding that no other reasonable siting alternative exists for the development of the land. Establish more restrictive regulations requiring greater retention of existing native vegetation for new development projects, particular attention shall be given to the retention of Joshua trees. This can be accomplished by adhering to provisions outlined in the General Plan, Section F, Goal D/CO, Policies 1.3 and 1.11. No surveys required.	Required	Plan Area	Not calculated	Not calculated
Riverside County / Coachella Valley	Coachella Valley Multiple Species Habitat Conservation Plan	Conserve and protects portion of Joshua Tree National Park and Indio Hills/Joshua Tree National Park linkage habitat that is within Coachella Valley. No surveys required.	Required	Plan Area	Not calculated	Not calculated
City of Adelanto	Native Vegetation Removal Permit and Joshua Tree Survey	Permit that allows for the removal and transport of native vegetation. Joshua trees and other vegetation requiring transportation must be supervised by a City-approved arborist while adhering to a City-approved Transplantation Plan. Per Title 8, Division 9 of San Bernardino County Code, every Joshua Tree Proposed for Removal is required to be inspected by the Local Jurisdiction to assure the Joshua tree is not a "specimen" class tree requiring preservation and transplantation. No surveys required or exemptions.	Required	Citywide	Total: <0.1 North: 0 South: <0.1	North: 0 South: 29/<0.1
City of Hesperia	PL-16, Protected Native Vegetation and PL-17, Protected Plant Policy	Joshua trees on single-family residential tract, multiple-family residential, commercial, and industrial developments are identified and avoided, if possible. If not possible, transplanting or adoption is an alternative. Must be transplanted or stockpiled for future use whenever possible. Shall not be harvested or removed except use a permit. No surveys required.	Required	Citywide	Total: <0.1 North: 0 South: <0.1	North: 0 South: 8/<0.1
City of Palmdale	Joshua Tree and Native Desert Preservation	City ordinance that protects and preserves desert vegetation, and in particular *Yucca brevifolia.* Joshua tree shall not be removed, nor caused to be removed, on or from any parcel of land, without a native desert vegetation removal permit. Permit package requires site plan which may require surveys to determine exact locations of plants. Violators will be penalized. Exemptions include routine maintenance of a Joshua tree or desert vegetation to ensure its continued health or trees that have been planted, grown and/or held for sale by a licensed nursery (Section 14.04.090 for full list of exemptions). No surveys required.	Required	Citywide	Total: <0.1 North: 0 South: <0.1	North: 0 South: 730/1
City of Victorville	City Ordinance No. 1224, Joshua Tree Inspection Program, Chapter 13.3 Preservation and Removal of Joshua Trees	Under this ordinance, *Yucca brevifolia* on undeveloped lands are protected. Grading a site, removing or damaging plants prior to completing the inspection procedures may result in fines and/or penalties for the property owner/ developer. No surveys required.	Required	Citywide	Total: <0.1 North: 0 South: <0.1	North: 0 South: 169/<0.1

Regulatory Agency	Name of Regulation and/or Policy Instrument	Description of Existing Regulation	Degree of Protection (Required vs Voluntary)	Extent of Area Protected by Regulation	Protected Area	
					Percentage of YUBR Range Covered by Regulation	YUBR Range within Jurisdiction (Acres/Sq. Mi)
Town of Yucca Valley	City Ordinance 140, Desert Native Plant Protection, Section 9.10.040 Native Landscape Documentation Package	A Native Plant Permit issued by the Community Development Director is required to remove *Yucca brevifolia*, with the exception of the fruit. Applies on all private lands within the town of Yucca Valley and public lands owned by Yucca Valley. Native landscape documentation shall be submitted to the division at the time of filing land use applications, which could require surveys.	Required	Entire range within Yucca Valley	Total: <0.1 North: 0 South: <0.1	North: 0 South: 192/0.3

August 6, 2020

Mr. Eric Sklar, President and
Members of the Fish and Game Commission
P.O. Box 944209
Sacramento, CA 94244-2090

[*VIA EMAIL TO FGC@FGC.CA.GOV*]

RE: August 19-20 Meeting Agenda Item 25: Western Joshua tree listing petition

Dear President Sklar and Members of the Fish and Game Commission:

CalPortland Company ("CalPortland") submits this letter on its behalf and on behalf of a coalition of construction materials, housing, energy, and labor companies (for purposes of this letter, the "Coalition") and organizations concerning the pending petition to list the Western Joshua Tree (*Y. brevifolia* or "Joshua tree") as threatened under the California Endangered Species Act (Fish & G. Code § 2050 *et seq.* ["CESA"].)[1] For the reasons set out below, the Coalition urges the Commission to reject the Petition.

In order to be accepted by the Commission, CESA requires a listing petition to include certain scientific information, which when taken as a whole, must show that the "petitioned action may be warranted". (Fish & G. Code § 2072.3.) The Petition now before the Commission does not satisfy this standard. The Petition fails to include any scientific information at all regarding *Y. brevifolia*'s abundance and population trend, and other scientific information wholly undercuts the Petition's cited evidence regarding threats to the species and the degree and

[1] The Petition, which can be found online at https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=175218&inline, is hereby incorporated by reference.

immediacy of those threats. Taken as a whole, the Petition does not establish that listing of Joshua trees may be warranted.

Beside the Petition's failure to satisfy CESA's requirements for acceptance by the Commission, the Commission's consideration of the Petition at all during the continuing and intensifying COVID-19 pandemic is problematic from public access and procedural due process standpoints. The Commission's acceptance of the Petition would immediately affect land use decisions across millions of acres, an area larger than some states. Impaired access to the Commission as a result of the pandemic means that stakeholders and the public will not be able to fully participate in a decision that could profoundly impair housing construction and economic development in communities where both are most needed. At the same time, the Petition acknowledges that immediate protection of *Y. brevifolia* is unnecessary – the species is "not currently" "in serious danger of becoming extinct throughout all, or a significant portion, of its range". (Petition, p. 48.) Such a danger "is likely decades away." (*Ibid*.)

The Coalition urges the Commission to reject the Petition for its failure to meet CESA's basic informational requirements. Alternatively, CalPortland asks the Commission to postpone its consideration of the Petition until such time that the public can fully participate in the Commission's decision.

This letter proceeds in four parts: Part 1 establishes the Coalition's vested interest in the Commission's action on this matter. Part 2 addresses serious procedural and due process problems in the Commission's consideration of this matter during the ongoing COVID-19 pandemic. Part 3 outlines CESA's criteria and evidentiary standards governing the Commission's consideration of a listing petition. Part 4 outlines the patent defects in the Petition that require the Commission, as a matter of law, to find "the petition does not provide sufficient information to indicate that the petitioned action may be warranted[.]" (Fish and G. Code § 2072.4(e)(1).)

Finally, this letter encloses and incorporates by reference WestLand Resources, Inc.'s *Assessment Of Petition To List The Western Joshua Tree (Yucca Brevifolia) As Threatened Under The California Endangered Species Act* (August 2020) ("WestLand Assessment"). The WestLand Assessment provides an expert critical analysis of evidence and arguments offered in the Petition, and identifies the Petition's critical scientific and evidentiary shortcomings.

1. <u>Coalition Members' Beneficial Interest</u>

Coalition members, which include those companies and organizations identified at the top of this letter, as well as other entities with similar interests, are landowners, essential businesses, employers, and community leaders within the Mojave Desert region and surrounding areas that would be impacted by the Commission's acceptance of the Petition. Coalition members provide essential construction materials, public infrastructure, housing, energy, and skilled labor, and their ability to carry out these critical functions would be impaired by acceptance of the Petition.

2. Procedural and Due Process Problems

The Commission Should Exercise Its "Sound Discretion" To Postpone Its Hearing On The Petition. Governor Newsom's Executive Order N-29-20 (March 17, 2020) imposes a temporary partial exception to Bagley-Keene Act requirements that "would prevent, hinder, or delay appropriate actions to *prevent and mitigate the effects of the COVID-19 pandemic*." (Executive Order N-25-20 [emphasis added].) Executive Order N-29-20 waives aspects of the Bagley-Keene Act that require state agencies to be physically present during a meeting or to make physical facilities available to members of the public for meetings addressing "actions to prevent and mitigate the effects of the COVID-19 pandemic."

The Executive Order makes these same partial waivers applicable to state agency meetings for all other purposes, subject, however, to the following mandate:

> All state and local bodies are urged to use *sound discretion* and to make reasonable efforts to *adhere as closely as reasonably possible to the provisions of the Bagley-Keene Act* and the Brown Act, and other applicable laws regulating the conduct of public meetings, *in order to maximize transparency and provide the public access to their meetings*.

(Executive Order N-29-20, ¶ 3 [emphasis added].) In other words, while agencies may proceed under the modified access rules established by the Executive Order, agencies are encouraged to exercise their "sound discretion" to do more than the minimum to "maximize transparency and provide the public access to their meetings." Compliance with this direction is not a "one size fits all" proposition. Some routine matters may be appropriate for consideration by electronic means, while other matters, including non-urgent matters and matters with significant geographic, social, and economic impacts, should be postponed to such a time that the public can be afforded full access to the Commission's meetings.

The Commission's consideration of the Petition is not an "appropriate action to prevent and mitigate the effects of the COVID-19 pandemic"; it is business as usual. The Commission's decision to consider the Petition by exclusively electronic means even while the current pandemic intensifies in California evidences no effort by the Commission to exercise "sound discretion" to "adhere as closely as reasonably possible to the provisions of the Bagley-Keene Act". Nor does the Commission's action show any effort to "maximize transparency and provide the public access to their meetings" as directed by Executive Order N-29-20 and consistent with the Commission's own Core Value of Transparency.

Virtual meeting technologies do not provide fair and equal access to all members of the public, but rather impose new challenges to public participation for those that do not have access to required technologies. Members of the public that wish to participate must do so by electronic or telephonic devices that they purchase or otherwise obtain themselves, which imposes a barrier to participation that has a known negative effect on participation by members of the

public living in rural and low income areas, as are many of the communities that would impacted by the Commission's acceptance of the Petition. (See, e.g., Goss, Justin et al, Public Policy Institute of California, *California's Digital Divide* (March 2019) available at: https://www.ppic.org/publication/californias-digital-divide/.)

These electronic challenges are compounded by poor accessibility to key Department staff members, as detailed in CalPortland's June 11, 2020 letter to the Commission, as well as by staff's inability to timely respond to Public Records Act ("PRA") requests for documents relevant to this matter. Attorneys on behalf of CalPortland submitted two Public Records Act requests each to the Department and to the Commission on June 8. The requested records relate narrowly to documents concerning the Commission's Joshua tree listing process and the Department's evaluation of the Joshua tree listing process, among other documents.

Despite multiple follow-up communications with the Department and Commission's PRA coordinator and reviewing staff since June 8, the Department provided the required 10-day response indicating that it would provide certain records for only one of the two requests submitted on June 8. The Department failed to comply with the PRA's 10-day response requirement for the second records request. On July 22, accompanying a limited production of responsive documents, the Department transmitted a letter to CalPortland's attorneys stating as follows, in relevant part:

> Due to the COVID-19 emergency, most Department staff are working remotely and do not have access to all Department records. For this reason, our search for responsive records has been limited to those records Department staff can access remotely.

(Department Response to Public Records Act Request No. 20-06-212, July 22, 2020.)

The Commission, by comparison, failed to respond to both records requests within the 10-day initial response period, and did not respond in any fashion until July 21, when a Commission staff person communicated the following by email:

> We will be happy to complete the Public Records Request (PRA) for the Letters received for the Western Joshua tree petition. Please be aware that due to the volume of comments received (over 5,000), it will take several months to complete this project.

(Email from J. Greaves to M. Harrison, July 21, 2020.)

Apart from the Department's and Commission's violation of basic PRA response requirements, these communications show that the pandemic is impeding state government's ability to carry out normal operations, even those as fundamental as responding to requests for public records. The practical consequence of the Department and Commission's failure to

respond and timely produce requested records is that CalPortland and other stakeholders are unable to review the complete administrative record before the Commission as is necessary to fully comment on the Petition.

Rather than proceed with consideration of the Petition while COVID-19 social distancing orders remain in effect, we urge the Commission to use its "sound discretion" to postpone consideration of the Petition until social distancing is no longer required in order to "maximize transparency and provide the public access to their meetings". (See Executive Order N-29-20, ¶ 3.) The Petition makes clear that such a delay will result in no harm to *Y. brevifolia*. As noted above, danger, if any, to Joshua trees "is likely decades away." (Petition, p. 48.)

The Fish and Game Code's timeframe for the Commission to hold a public hearing on a Petition is directory, not mandatory. Prevailing California law allows the Commission to postpone its consideration of the Petition without consequence. Fish and Game Code section 2074 provides that the Commission shall consider a petition "at its next available meeting" after the Department completes is evaluation of the petition, while section 2074.2(d) allows the Commission to continue the public hearing on a petition for an additional 90 days.

As a general rule, "requirements relating to the time within which an act must be done are directory rather than mandatory or jurisdictional, unless a contrary intent is clearly expressed." (*Edwards v. Steele* (1979) 25 Cal. 3d 406, 410 ["*Edwards*"]; *Briggs v. Brown* (2017) 3 Cal. 5th 808, 877.) In the absence of statutory provisions clearly expressing that intent, courts have routinely found deadlines or time limitations directory where no "consequence or penalty is provided for failure to do the act within the time commanded." (*Edwards*, at p. 410; *Kabran v. Sharpe Memorial Hospital* (2017) 2 Cal. 5th 330, 340.) Here, the Fish and Game Code intent that the timeframes set out in sections 2074 and 2074.2 are mandatory rather than directory. The Commission can postpone consideration of the Petition without consequence.

Finally, even if the Commission's timeframe to consider the Petition were mandatory, such deadlines never supersede the people's right to constitutional due process, and such deadlines may be adjusted as necessary to avoid infringement of constitutional protections, such as the right to due process. (See *Ursino v. Superior Court* (1974) 39 Cal.App.3d 611, 621-622.)

As stated above, the Petition makes clear that a delay – even a delay as long as may be necessary for the COVID-19 pandemic to subside – will result in no immediate harm to *Y. brevifolia*. The species is not in serious danger of becoming extinct; rather, such a danger "is likely decades away." (Petition, p. 48.) The Petition further acknowledges that *Y. brevifolia* has been remarkably stable for the past 11,000 years or more. (*Id*., at p. 17.) The circumstances do not demand immediate action by the Commission; to the contrary, the Executive Order, the continuing pandemic, "sound discretion," and basic principles of due process and public participation all militate toward postponement of this matter until the public can fully participate in the Commission's process.

3. CESA Criteria and Evidentiary Standard

Fish and Game Code section 2072.3 establishes the criteria a listing petition must meet in order "to be accepted" by the Commission. Specifically, a petition "shall" include "sufficient scientific information that a petitioned action may be warranted", as well as sufficient scientific information for each of the following categories:

(A) Population trend;
(B) Range;
(C) Distribution;
(D) Abundance;
(E) Life history;
(F) Kind of habitat necessary for survival;
(G) Factors affecting the ability to survive and reproduce;
(H) Degree and immediacy of threat;
(I) Impact of existing management efforts;
(J) Suggestions for future management;
(K) Availability and sources of information;
(L) A Detailed distribution map.

These criteria are mandatory (i.e., a petition "shall include"), not directory. (Fish & G. Code § 2072.3; Cal. Code Regs., tit. 14, § 670.1(d) [emphasis added].) "A petition will be rejected by the commission if it fails to include sufficient scientific information under the categories of Section 2072.3 of Fish and Game Code (subsections d(1)(A) through (L) above) that the petitioned action may be warranted." (Cal. Code Regs., tit. 14, § 670.1(e)(1) [emphasis added].)

In other words, CESA and implementing regulations bar the Commission from accepting a petition that (1) fails to include any information at all concerning any one of the above categories; or (2) fails to include "sufficient scientific information" concerning any one of the above categories. (Cal. Code Regs., tit. 14, § 670.1(e)(1).)

"Sufficient scientific information" is undefined in CESA, but the phrase "sufficient information" in the CESA listing context has been interpreted to mean "that amount of information, when considered with the Department's written report and the comments received, that would lead a reasonable person to conclude the petitioned action may be warranted." (*Center for Biological Diversity v. Fish & Game Com.* (2008) 166 Cal.App.4th 597, 609-610 ["*Center for Biological Diversity*"].) Evidence proffered with a petition is sufficient to meet the "may be warranted" standard "only if it is material to the criteria at issue, is credible, supports the petition, and, when weighed against the department's written report and any comments received, is strong enough to indicate" that the requested action may be justified. (*Central Coast Forest Assn. v. Fish & Game Com.* (2018) 18 Cal.App.5th 1191, 1204 ["*Central Coast Forest Assn*."].)

Even where a petition includes otherwise "sufficient scientific information", that information may be rendered insufficient where "countervailing information and logic persuasively, wholly undercut some important component of that prima facie showing." (*Center for Biological Diversity v. Fish & Game Com*. (2008) 166 Cal.App.4th 597, 612.)

The Petition falls short of the above standards in the following ways:

- The Petition fails to provide any evidence whatsoever that the northern or southern populations of *Y. brevifolia* meet the Department's own definition of an Evolutionary Significant Unit ("ESU"). As a result, evidence offered by the Petition concerning factors affecting the species' ability to survive and reproduce (criterion "G" above) and concerning the degree and immediacy of the threat to the species (criterion "H" above) is scientifically insufficient when viewed range-wide.

- The Petition fails to provide any evidence whatsoever regarding *Y. brevifolia's* abundance and population trend (criteria "D" and "A" above), and fails to address evidence that wholly undercuts the Petition's claim that the species' population is declining range-wide;

- The Petition mischaracterizes the evidence regarding factors affecting *Y. brevifolia*'s ability to survive and reproduce (criterion "G" above);

- The Petition provides no evidence that either fire or climate change present an immediate range-wide threat to *Y. brevifolia* (criterion "H" above), and fails to address other evidence that wholly undercuts the Petition's claim that these factors are in fact a threat to the species.

- The Petition's primary suggestion for future management is infeasible and exceeds the Commission's and Department's authority under CESA (criterion "J" above).

Taken as a whole, the Petition fails to provide scientific information sufficient to "lead a reasonable person to conclude the petitioned action may be warranted." (*Center for Biological Diversity, supra,* 166 Cal.App.4th at pp. 609-610; *Central Coast Forest Assn., supra,* 18 Cal.App.5th at p. 1204.) We discuss these defects in detail below.

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4. The Petition Does Not Satisfy CESA Criteria For Acceptance By The Commission

The Petition Provides No Evidence That Northern or Southern *Y. Brevifolia* Populations Qualify As ESUs. The Petition asks the Commission to list the Joshua tree as a "species" or a "subspecies or variety" across the species' entire range, or as various, distinct ESUs. (Petition, pp. ii, 16, fn. 8.) The Petition, however, fails to provide any evidence whatsoever supporting its argument for recognizing *Y. brevifolia* ESUs.

By the Department's own adopted definition, a population may qualify as an ESU where it meets two criteria: (1) it must be reproductively isolated from other conspecific (i.e., same species) population units, and (2) it must represent an important component of the evolutionary legacy of the species. (See WestLand Assessment, p. 3.) The Petition provides no such evidence. To the contrary, studies cited for other purposes in the Petition show that it is likely that the Joshua tree northern and southern populations are not reproductively isolated, and that there is gene flow between the two populations. (*Id*., at pp. 3-5.)

The consequence of this is that the Petition presents "(1) a biased discussion of the population status and dynamics of Joshua trees across their range and (2) a biased conclusion of threats to Joshua trees." (WestLand Assessment, p. 5.) In other words, because the Joshua tree northern and southern populations are not ESUs, the Petition must address the species across the entire range, rather than one population or the other, in order to show that listing "may be warranted." (Fish & G. Code § 2072.3.)

The Petition wholly fails in this regard. Rather, the Petition supports its assertions by improperly extrapolating findings from a limited dataset developed from within a geographical fraction of *Y. brevifolia*'s range. As explained in the WestLand Assessment:

> While ecologists often extrapolate population dynamics by subsampling populations of the organism of interest, the statistical reliability of this subsampling depends on multiple procedural and ecological factors. . . . Critically, a failure to account for these factors when sampling or extrapolating data can lead to spurious conclusions that do not reflect the biological processes that are occurring.

(WestLand Assessment, p. 6.) The Petition fails to follow standard scientific practices necessary to properly extrapolate data. As a consequence, the studies cited in the Petition concerning factors affecting survival and reproduction, and degree and immediacy of the threat cannot and do not constitute scientifically sufficient evidence supporting the Petition's range-wide assertions regarding *Y. brevifolia*.

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The Petition Provides No Evidence Regarding *Y. Brevifolia's* Abundance or Population Trend. "Abundance" in the CESA context refers to the number of individuals of a taxon in a given area. "Population trend" relates to the directional change in abundance of a specific taxon in a given area through time. Data on abundance and population trend is essential to adjudging whether a particular species is "likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts" required by CESA. (Fish & G. Code § 2067.) On both required components, the Petition includes no information, much less scientifically sufficient information.

The Department's *Evaluation of a Petition from the Center for Biological Diversity to List Western Joshua Tree (Yucca Brevifolia) as Threatened Under the California Endangered Species Act* (February 2020) ("Department Evaluation") openly acknowledges these two deficiencies: "[T]he Petition does not present an estimate of western Joshua tree population size, nor does it provide evidence of a range-wide population trend . . ." (Department Evaluation, p. 9 [emphasis added].) Instead, "the Petition includes information demonstrating that western Joshua tree currently has a relatively widespread distribution in southern California," and that "the abundance of western Joshua tree is currently relatively high." (Department Evaluation, p. 13.) The Petition also cites to studies indicating that Joshua trees have been stable in at least Joshua Tree National Park for more than 11,000 years. (Petition, p. 17; Department Evaluation, p. 10.) According to the Department, the only information presented in the Petition regarding abundance and population trend show that the petitioned action is not warranted. (See Fish & G. Code § 2072.3.)

The Department Evaluation, however, concludes without support that because "the Petition does provide information showing that some populations of western Joshua tree are declining, particularly within Joshua Tree National Park . . ., sufficient information on population trend, range . . . distribution was shown." (Department Evaluation, p. 2.) With all due respect to the Department, the identified *lack* of information does not transform into "sufficient information" because studies may have indicated a potential decline in Joshua Tree National Park—a tiny fraction of the "range and population" for which the Petition seeks listing.

Further, the Petition's "information showing that some populations of western Joshua tree are declining" does not constitute "sufficient scientific information." Studies cited in the Petition to support its argument that the Joshua tree population is declining (e.g., DeFalco et al. (2010), Harrower and Gilbert (2018)) are based on a few, discrete study plots within Joshua Tree National Park, which lies at the extreme southern end of the species' range. This evidence is not scientifically sufficient for two reasons: first, the Petition improperly extrapolates the data across the Joshua tree's entire range without satisfying any of the scientific and statistical criteria to do so. (WestLand Assessment, pp. 5-7.) In other words, study data from, as in one case, as little as a single hectare within Joshua Tree National Park do not accurately represent conditions across the Joshua tree's more than six million-acre range.

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Second, the Petition fails to address other studies that wholly contradict its cited studies. For example, USAF 2017a (cited in the Department Evaluation) shows that Joshua tree populations on Edwards Air Force Base are stable to increasing. (WestLand Assessment, p. 7.) The Edwards Air Force Base data, like the data presented in the Petition, are both part of the body of data regarding the Joshua tree species, but neither dataset by itself describes the entire species. (*Ibid*.)

At the same time, accurate information concerning *Y. brevifolia*'s abundance and population trend can be ascertained. *Y. brevifolia* is not like the elusive California Tiger Salamander, which lives most of its life underground. Instead, abundance and population trend data on *Y. brevifolia* could be gathered through straightforward and common scientific means that include representative sampling and statistically-valid data extrapolation.

The Department Evaluation, as noted, acknowledges that the Petition contains no information concerning *Y. brevifolia*'s abundance and population trend. The Petition is accordingly incomplete as a matter of law, and incomplete as a practical matter as well – without this data, it is impossible for the Commission to determine whether *Y. brevifolia* is "likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts" required by CESA. (Fish & G. Code § 2067.) The Commission must decline to accept the Petition without this data.

The Petition Contains Insufficient Scientific Information On Factors Affecting The Ability to Survive and Reproduce. The Petition relies heavily on a few studies to support its argument that threat factors are impeding recruitment, leading toward population decline and range reduction. (See Petition, p. 20.) The Petition's evidence offered in this regard does not constitute "sufficient scientific evidence" for two reasons.

First, the Petition again improperly extrapolates studies on recruitment at specific sites within Joshua Tree National Park across the species' entire six million-acre range. (WestLand Assessment, p. 9.) The consequences of improper data extrapolation are evident even among the studies cited by the Petition. While the Petition cites certain studies (Barrows and Murphy-Mariscal 2012, Sweet et al. 2019) for the proposition that recruitment "has already largely stopped" within Joshua Tree National Park, these same studies note continued recruitment elsewhere in Joshua Tree National Park. (*Ibid*.) Other long-term data from northern portions of the Joshua tree range show evidence of new plants between 1963 and 2001, which wholly undercuts the Petition's assertion that recruitment is declining range-wide. (*Ibid*.)

"Evidence" cited in the Petition drawn from limited study areas and improperly extrapolated across the entire *Y. brevifolia* range is simply not "sufficient scientific information." Recruitment may indeed be declining in the specific, limited geographic areas discussed in the Petition, but the Petition provides no evidence that such information accurately describes conditions anywhere else within the species' range. The Petition's claims in this regard are pure conjecture.

Second, the studies cited by the Petition to support its arguments concerning recruitment address only sexual reproduction, despite the fact that *Y. brevifolia* recruitment can occur through both sexual and asexual reproduction. (See Petition, p. 8; WestLand Assessment, pp. 9-10.) Thus, according to WestLand, "studies cited by the Petition may be systematically underestimating total recruitment (sexual and asexual) at the locations where asexual reproduction is more likely to occur – namely, lower elevations and post-fire habitat." (*Ibid*.) In other words, the evidence provided by the Petition concerning recruitment is fundamentally incomplete, and cannot constitute "sufficient scientific information."

The Petition's reliance on incomplete, geographically-limited data means that the Petition fails to provide "sufficient scientific information" regarding *Y. brevifolia*'s ability to survive and recruitment capacity. These failings also mean that the Petition provides no evidentiary basis for the Commission to conclude that *Y. brevifolia* recruitment is declining range-wide. To the contrary, as the U.S. Fish & Wildlife Service ("USFWS") recently found following extensive scientific review: "Threats to individual trees are not likely influencing population resiliency on a population or species scale since there is no evidence to indicate any recent population size reductions or range contractions and limited demographic studies indicate recruitment is occurring." (*Endangered and Threatened Wildlife and Plants; 12-Month Findings on Petitions to List Eight Species as Endangered or Threatened Species*, 84 Fed. Reg. 41694 (August 15, 2019) ["USFWS Findings"], p. 41697.)

The Petition Provides No Evidence To Support Its Claim That Climate Change And Fire Immediately Threaten *Y. Brevifolia* Range-Wide. The Petition claims that wildfire and climate change are the two most significant threats to *Y. brevifolia*'s continued viability. (Petition, p. 24 ["Wildfire is one of the greatest threats to the persistence of *Yucca brevifolia*"]; p. 32 ["Climate change represents the single greatest threat to the continued existence of *Yucca brevifolia*"].) A petition must provide sufficient scientific information concerning the degree and immediacy of threat to a species so that the Commission may evaluate whether the species "is likely to become an endangered species in the foreseeable future" and thus appropriate for listing. (Fish & G. Code § 2067.) The Petition, however, provides no evidence showing that either factor threatens *Y. brevifolia* range-wide, now or in the foreseeable future. Further, the Petition fails to address other evidence, particularly concerning fire, that appears to wholly undercut the evidence cited by the Petition.

With respect to wildfire, the Petition relies primarily on a single study, DeFalco et al. (2010), for the assertion that wildfire threatens individuals and recruitment throughout *Y. brevifolia*'s range. (WestLand Assessment, p. 10.) As with its arguments concerning abundance, population trend and recruitment, the Petition again improperly extracts data from a limited geographic area within Joshua Tree National Park to the entire Joshua tree range. The fundamental scientific and statistical defects in this approach are set out above. (*Id*., at p. 11.)

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The Petition further compounds its evidentiary missteps by mischaracterizing the findings of certain studies. As stated in the WestLand Assessment:

> The Petition cites scientific papers that undermine the Petition's argument that increasing wildfire frequency and intensity have considerable effects on the continued existence of Joshua trees. For example, the Petition cites Brooks and Matchett (2006) as evidence that an increase in fire size and frequency in the Mojave Desert will impact the ability of Joshua trees to survive and reproduce. However, Brooks and Matchett (2006) actually concluded the opposite: for the 15 years of data analyzed, there was a *decrease* in the observed frequency of fires and no clear trend in the amount of area burned.

(WestLand Assessment, p. 11 [emphasis in original].) The Petition cites other studies, including Esque et al. (2015) (Petition, p. 30) and Abella et al. (2009) (Petition, p. 31), as evidence that wildfire negatively impacts Joshua trees individuals and recruitment when, in fact, neither study analyzed fire impacts on Joshua trees. (*Ibid*.)

Finally, the Petition ignores other evidence, including USAF 2017b, as cited in the Department Evaluation, showing that the number of individual Joshua trees had actually increased post-fire. (See WestLand Assessment, p. 11.) While this data may be no more appropriate for range-wide extrapolation than the data cited in the Petition, this evidence wholly undercuts the Petition's claim that fire is unequivocally a significant threat to the species.

The Petition's analysis of climate change as a threat to *Y. brevifolia* is equally troubled. As stated in the WestLand Assessment:

> The Petition relies largely on three sources to argue that climate change constitutes a significant and immediate threat to the species: Cole et al. (2011), Barrows and Murphy-Mariscal (2012), and Sweet et al. (2019). The latter two studies are limited to modeling efforts in Joshua Tree National Park. The results of Cole et al. (2011) have been explicitly refuted by other researchers.

(WestLand Assessment, p. 12.) Data improperly extrapolated is scientifically invalid, as explained above. Studies of certain areas of Joshua Tree National Park cannot be extrapolated range wide because, among other reasons, fine scale topographic and climactic data are necessary to understand how a particular species will react to climate change, as acknowledged by Sweet et al. (2019), one of the studies cited by the Petition. (Id., at p. 13.) In other words, the effects of climate change do not present in the same way across the entire Joshua tree range, which varies widely in topography, elevation, temperature, and in other important metrics.

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As respects Cole et al. (2011), which the Petition cites extensively at pages 36-40, the study's models based on assumptions of climate predictions and other factors "have been explicitly rejected by recent genetic and distribution modeling efforts that were not cited by the Petition." (WestLand Assessment, p. 12.) In particular, Smith et al. (2011) documents evidence of population growth historically and argues that previous periods of climate change do not explain historical changes to Joshua tree population size, in conflict with Cole et al. (2011). (*Ibid*.)

The Petition does not address these evidentiary challenges directly, other than to acknowledge, as noted, that "extirpation is likely decades away." Even this prediction, however, rings hollow. As the Petition notes, the Joshua tree's imminent demise has been predicted since at least 1953. (See Petition, p. 24, citing to Webber (1953).) While the body of data regarding the species may have grown since that time, the data does not support a conclusion that the species is in decline, or, more specifically, climate change threatens *Y. brevifolia* range-wide.

The Commission has previously confronted and rejected listing in a similar context. Specifically, the Commission declined to list the American pika for the following reasons:

> Based on the criteria described above, the best scientific information currently available to the Department indicates the American pika is not in serious danger in the next few decades of becoming extinct throughout all or a significant portion of the species' range in California, nor by the end of the century should the existing climate change models and predicted trajectory of suitable pika habitat come to fruition. At the present time, the species is widespread through its known range in California and the scientific uncertainty associated with current modeling efforts do not establish with scientific certainty or otherwise provide a sufficient scientific basis for the Department to know categorically or to state the actual threat climate change ultimately poses to the species at this time or through the end of this century. Even the models currently available predict a reduction in pika habitat and therefore populations, distribution, and abundance, but not extinction.

(Department of Fish & Wildlife, *Report to the Fish and Game Commission, Status Review of the American Pika (Ochotona pinceps) In California*, February 25, 2013, pp. 55-56 ("Pika Status Review").)

This same rationale applies to *Yucca brevifolia*: the species is not in serious danger of extirpation in the next few decades; the species is widespread through its known range in California; and current climate models do not provide a sufficient scientific basis to know categorically or to state the actual threat climate change ultimately poses to the species at this time or through the end of this century.

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The Petition's Primary "Suggestion For Future Management" Is Infeasible. CESA requires a petition to include "suggestions for future management." (Fish & G. Code § 2072.3; Cal. Code Regs., tit. 14, § 670.1(d)(1)(J).) This phrase is not elsewhere defined in CESA, but a closely-related term, "special protection and management efforts", appears in CESA's definition of "threatened species", as follows:

> "Threatened species" means 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*. Any animal determined by the commission as "rare" on or before January 1, 1985, is a "threatened species."

(Fish & G. Code § 2067 [emphasis added].) Given that a petition filed pursuant to section 2072.3 seeks to list a species as "threatened", it stands to reason that section 2072.3's requirement that such a petition include "suggestions for future management" is intended to facilitate the Commission's identification of "special protection and management efforts." Importantly, however, such "management efforts" must be those that are "required by this chapter", i.e., CESA. (*Ibid*.) Thus, any "suggestions for future management" identified in a petition must also fall within the requirements and authority of CESA. It stands equally to reason that any suggested measures must actually be feasible, or in other words, bear some possibility of occurring.

The Petition states that climate change "represents the single greatest threat to the continued existence of the *Yucca brevifolia*", and that "the lack of effective regulatory mechanisms to address greenhouse pollution is largely determinative as to the question of whether *Y. brevifolia* qualifies for CESA protection. (Petition, pp. 32, 50-51.) Because the Petition contends that climate change is the primary threat to the species, only actions that can reduce or eliminate the effects of climate change would be effective in preventing the asserted threat. (See Department Evaluation, p. 27 ["The Petition states that the most important recovery actions for western Joshua tree are those that lead to rapid and steep greenhouse gas emission reductions to minimize the additional warming that will occur in the climate system"].)

In this regard, the Petition offers the following management action:

> The governor declares a climate emergency and takes all necessary action to set California on a path to full decarbonization of our economy by no later than 2045 (e.g. banning the sale of new fossil fuel vehicles by 2030 and requiring the generation of all electricity from carbon-free sources by 2030).

(Petition, p. 65.) Even casual observers of California's long and difficult process toward regulating greenhouse gas emissions will understand that such a "declaration" by the governor is itself unlikely, but that the probability of such drastic regulatory measures being implemented by declaration is even less likely. This measure is infeasible on its face.

More fundamentally, however, this suggested measure lies well outside the Commission's and the Department's purview under CESA. The Department obliquely acknowledges this: "some of the [management] suggestions are not within the Department's jurisdiction." (Department Evaluation, p. 27.) The Petition's central management suggestion, in fact the only management suggestion oriented toward minimizing additional climate warming, is consequently neither feasible nor actionable or enforceable by the Commission or the Department. None of the Petition's other nine management suggestions entail measures to counteract climate change, and so the Petition functionally fails to satisfy CESA's requirement in this regard.

Conclusion and Recommendations

The Petition, as shown above, fails to provide any information whatsoever concerning *Y. brevifolia*'s abundance and population trend, even though such data is ascertainable. The Petition also fails to provide sufficient scientific information concerning factors affecting the species' ability to thrive and reproduce, and the degree and immediacy of the threat to the species. Finally, the Petition's management suggestion for the primary threat factor to the species is infeasible and unenforceable. Subsection (e)(1) of section 670.1 of Title 14 of the California Code of Regulations mandates that the Commission decline to accept the Petition.

As the Commission is well aware, a decision to not accept a petition is not a pronouncement that the species does not or will not require protection. To the contrary, a model for appropriate action can be found in the Commission's Pika Status Review, which states, in relevant part:

> It will be imperative for the Department and for the scientific community to study and monitor the distribution and abundance of the American pika over the next few decades, and as climate change models become more data driven, to be able to better assess the foreseeable future. Such monitoring will ultimately inform scientific understanding as to whether the American pika is trending toward serious danger of extinction or not.

(Pika Status Review, pp. 55-56.)

The Petition fails to show that the Joshua tree is likely to become "extinct" throughout its range in the "foreseeable future." Joshua trees have a life span of approximately 200 years. They are admittedly abundant. There is no evidence presented that their extinction in the foreseeable future is likely. It is clear from the data gaps in the Petition that the species merits further study. But the wisdom of further study is not the same as possessing sufficient scientific information currently to warrant listing.

/ / /

The Commission should also pay special attention to the vast geographic area that would be impacted by acceptance of the Petition, and the particularly challenging economic and social issues within these areas that would be compounded by the Commission's action. As other commenters will no doubt explain, acceptance of the Petition would result in real hardship to already-challenged communities. This fact provides all the more reason for the Commission to postpone consideration of the Petition until these communities can be fully heard.

For the reasons set out above, CalPortland respectfully requests that the Commission decline to accept the Petition at this time, and to instead encourage the scientific community to study and monitor *Yucca brevifolia* over the next few decades.

* * *

Very truly yours,

By

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Encl: WestLand Resources, Inc., *Assessment Of Petition To List The Western Joshua Tree (Yucca Brevifolia) As Threatened Under The California Endangered Species Act* (August 2020)

ASSESSMENT OF PETITION TO LIST THE WESTERN JOSHUA TREE (*YUCCA BREVIFOLIA*) AS THREATENED UNDER THE CALIFORNIA ENDANGERED SPECIES ACT

Prepared for: CalPortland, Inc.

Prepared by: WestLand Resources, Inc.

Date: August 4, 2020

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY 2
2. PETITION DOES NOT PROVIDE SUFFICIENT SCIENTIFIC INFORMATION TO SUPPORT DESIGNATION OF AN EVOLUTIONARILY SIGNIFICANT UNIT(S) FOR JOSHUA TREE 3
3. THE PETITION PROVIDES NO INFORMATION ON THE RANGE-WIDE POPULATION STATUS OF JOSHUA TREES 5

3.1 The Information Provided by the Petition Regarding the Abundance and Population Trends of Joshua Trees is Misleading 7

3.2 The Information Provided in the Petition Regarding the Recruitment of Joshua Trees is Misleading 9

4. THE PETITION MISINTERPRETS THE AVAILABLE SCIENTIFIC DATA REGARDING THE DEGREE AND IMMEDIACY OF POTENTIAL THREATS TO JOSHUA TREES 10

4.1 The Petition Provides No Evidence that Fire Is A Range-Wide Threat to Joshua Trees 10

4.2 The Petition does not Provide a Comprehensive Review of the Threats of Climate Change to Joshua Trees 11

5. CONCLUSION 13
6. LITERATURE CITED 15

TABLES

Table 1. Ecoregions occupied by Joshua tree (*Yucca brevifolia*) across range 14

FIGURES

(*follow text*)

Figure 1. Joshua tree (*Yucca brevifolia* or YUBR) range and ecoregions

APPENDICES

Appendix A. Population polygons of Joshua tree (*Yucca brevifolia*) across range

1. EXECUTIVE SUMMARY

On October 15, 2019, the Center for Biological Diversity (CBD or Petitioner) submitted a petition (the Petition) to the California Department of Fish and Wildlife Service (CDFW) to list the purported Western Joshua Tree (*Yucca brevifolia* or Joshua tree) as threatened under the California Endangered Species Act (CESA). WestLand Resources, Inc. (WestLand) has reviewed the Petition and available scientific information on *Y. brevifolia*. Our review of the Petition indicates that the evidence provided in the Petition is limited in its scope and does not meet the standards required by CESA. The evidence provided in the Petition is based primarily on studies conducted in Joshua Tree National Park, and these findings are improperly extrapolated to represent dynamics of *Y. brevifolia* across its range, including population trends, threat factors, and immediacy and degree of threats. The Petition, however, does not address this lack of evidence or provide a reasoned argument to justify that studies conducted in Joshua Tree National Park can properly be extrapolated to represent dynamics of Joshua tree across its range. Critically, the Petition does not appropriately address this lack of evidence or provide sufficient scientific information to inform the decision of whether the species warrants listing under CESA. Collectively, these issues demonstrate that the Petition does not provide sufficient scientific information to indicate that the listing of this species is warranted under CESA.

Specifically, the fundamental issues we identify in the Petition and discuss in greater detail below are:

- The Petition lacks sufficient scientific information to justify the conclusion that Joshua tree populations should be considered Evolutionary Significant Units (ESUs).
- The Petitioners extrapolate range-wide patterns from a small subset of the Joshua tree's range to support their conclusion regarding population trends, threat factors, and degree and immediacy of threats, without providing scientific evidence to justify that their extrapolation is statistically and biologically appropriate.
- The Petition does not contain sufficient scientific information on the population status of Joshua trees to support the Petitioner's claims.
- The Petition misinterprets the available data of potential threats to Joshua trees, and does not survey scientific evidence providing alternate findings regarding potential threats to Joshua trees.

In our discussion below we first address the Petitioner's arguments that there are two Joshua tree ESUs in California. We then discuss limitations of the available scientific data regarding the population dynamics of Joshua tree and the Petitioner's inappropriate extrapolation of those data from studies of limited geographic extent to the population of Joshua tree throughout its range in California. Understanding these fundamental questions is essential to the critical evaluation of the rest of the Petitioner's arguments regarding population trends and the potential threats to this species.

2. PETITION DOES NOT PROVIDE SUFFICIENT SCIENTIFIC INFORMATION TO SUPPORT DESIGNATION OF AN EVOLUTIONARILY SIGNIFICANT UNIT(S) FOR JOSHUA TREE

The Petition argues that *Y. brevifolia* is a listable taxonomic entity under CESA and should be considered for listing as threatened. The Petition also states that Joshua trees in the western Mojave Desert are subdivided into two populations, North and South, and declares that these populations can be considered ESUs for the purposes of listing under CESA (Petition, pg. 64). The CDFW's definition of an ESU requires sufficient scientific evidence to support listing under CESA. Specifically, to conclude that a species or subspecies includes ESUs, CDFW has adopted the definition proposed by the National Marine Fisheries Service for an ESU that a population must meet two criteria (CDFW 2015): (1) it must be reproductively isolated from other conspecific (i.e., same species) population units, and (2) it must represent an important component of the evolutionary legacy of the species (Waples 1991). However, scientific evidence supporting the Petitioner's argument that these two populations should collectively, or individually, be considered ESUs consistent with CDFW's adopted definition has not been provided. Rather, the Petitioners support their position with a simple declarative statement, relying upon USFWS' (2018) delineation of populations of *Y. brevifolia*, a small gap between the putative north and south populations of this taxon, and differences in the associated vegetation between populations as the sole evidence to conclude that CDFW should recognize these populations as ESUs.

Waples (1991) stresses the importance of genetic information, stating that "population characteristics that are important in an evolutionary sense must have a genetic basis." For example, in CDFW's status review of the fisher (*Pekania pennanti*) in California (CDFW 2015), CDFW relied upon mitochondrial genetic data and explicit empirical evidence and modeling of dispersal as justification to conclude that fishers in northern and southern California are "genetically distinct and were effectively isolated from each other." Yet, the Petition contains no genetic, dispersal, or other data to establish that the northern and southern populations are reproductively isolated or represent an important component in the evolutionary legacy of the species. Indeed, while the Petition relies upon USFWS' (2018) delineation of northern and southern population, USFWS makes no conclusion that these populations are ESUs. In fact, USFWS (2018) acknowledges that the structure of Joshua tree populations is unknown and that "more research is needed to better inform our understanding of where local populations occur on the landscape, how the local populations interact, and how this structure influence regional population demographics…" (pp. 18).

Critically, genetic studies cited in the Petition (that were not discussed in the context of ESU designation), show that it is likely that the purported northern and southern populations are not reproductively isolated. Per the map provided in the Petition (Petition, pp. 1), the proposed northern and southern populations of *Y. brevifolia* are separated by a "small gap" (Petition, pp. 64) measuring less than 10 miles (**Figure 1**; calculated from maps provided by Petition, pp. 1, and USFWS 2018). While the arguments made in the Petition focus on the dispersal rate of *Y. brevifolia* seeds transported

by rodent species within their relatively small home ranges (Petition, pp. 11; Vander Wall et al. 2006, Waitman et al. 2012), USFWS (2018) documents *Y. brevifolia* fruits being consumed by cattle, mule deer, horses and burros (pp. 24; internal citations omitted). Ungulates have much larger range sizes than rodents and an ~10-mile gap would not be as great an impediment to seed dispersal for such species. Moreover, *Y. brevifolia* is pollinated by the yucca moth *Tegeticula antithetica* (Yoder et al. 2013), which may be capable of transporting pollen between populations. Thus, the scale of dispersal of both *Y. brevifolia*, its seed dispersers, and its pollinator *T. antithetica* must be understood to determine the realized spatial separation between populations and potential for reproductive isolation. An analysis cited in the Petition regarding *T. antithetica* genetic population structure across the range of *Y. brevifolia* suggests that its pollinator "disperses widely" (Yoder et al. 2013, pp. 1231), although the distance over which *T. antithetica* may transport pollen is not well-understood. Importantly, despite extensive sampling across the north and south populations of *Y. brevifolia,* Yoder et al. (2013) found little evidence for population genetic structure within the "pure" *Y. brevifolia* populations across its range. This suggests that there is gene flow between the north and south populations and thus that there is little evidence to support reproductive isolation. While Yoder et al. (2013) did find some evidence for greater genetic differences the farther away *Y. brevifolia* populations were from each other, this occurred at a far greater scale than the ~10-mile gap between the proposed northern and southern ESUs (Yoder et al. 2013). Indeed, disjunct populations *within* the proposed ESUs are separated by a greater spatial distance (e.g., ~11.4 miles; **Appendix A**) than the gap *between* the proposed North and South ESUs (~9 miles)[1], yet the Petitioner's do not acknowledge this discrepancy. Together, these data do not support the idea that the north and south populations of *Y. brevifolia* are reproductively isolated from one another, nor that the gap constitutes a major barrier to dispersal that could produce geographic isolation.

The arguments made in the Petition also rely upon purported differences in associated vegetation between the northern and southern populations to conclude they should be recognized as ESUs. Waples (1991) states that populations that occupy unique habitats may be an ESU. However, for this designation to be supported, there needs to be evidence that occupancy of different, unique habitat types is an indication of ecological and genetic differences between those populations. The Petition contains no evidence that the habitats occupied by the Petition's proposed northern and southern ESUs are unique to either region. To the contrary, the USFWS' Species Status Assessment for Joshua tree (USFWS 2018) shows that there is substantial overlap in the ecoregions present in the northern

[1] To calculate distances between populations within and between the proposed North and South ESUs, WestLand used the Generate Near Table (https://pro.arcgis.com/en/pro-app/tool-reference/analysis/generate-near-table.htm) in ArcgIS Pro 2.6. The 35 polygons of both the north and south populations (data from Cole et al. 2011, USFWS 2018) were digitized the analysis ran to generate a stand-alone table with the closest distance (meters) to the other 34 polygons (**Appendix A**). The distance from boundary to boundary, was used to derive measures of the maximum dispersal distance between adjacent populations.

and southern populations of *Y. brevifolia* (**Figure 1, Table 1**)[2]. Specifically, the proposed southern and northern ESUs overlap in the ecoregions present for approximately 75% of the range of *Y. brevifolia* (**Table 1**), indicating that the ecoregions within each proposed ESU are not unique to either. Considering (1) the generally similar habitats occupied by the northern and southern populations of *Y. brevifolia*, (2) an apparent lack of genetic differences between the two populations (described above), and (3) a lack of evidence to support isolation, the Petitioners have provided no compelling evidence that the north and south populations of *Y. brevifolia* occupy unique habitats that would confer some ecological or genetic distinctness on one population over the other that would warrant designation of an ESU.

The consequences of the Petition's unsupported conclusion that northern and southern populations of *Y. brevifolia* should be recognized as ESUs are (1) a biased discussion of the population status and dynamics of Joshua trees across their range and (2) a biased conclusion of threats to Joshua trees. Specifically, the lack of evidence supporting the conclusion that the north and south populations are ESUs makes the extrapolation of data from a small subset to the range of the species statistically and biologically inappropriate (see below). Illustration of the biases that resulted from the limited data presented in the petition are provided in the sections that follow.

3. THE PETITION PROVIDES NO INFORMATION ON THE RANGE-WIDE POPULATION STATUS OF JOSHUA TREES

A fundamental flaw in the Petition, that is particularly evident in the Petitioner's conclusions regarding the population status of Joshua trees, is the misapplication and inappropriate extrapolation of findings from a small portion of the range of *Y. brevifolia* to the species as a whole. Extrapolating range-wide population dynamics from a subset of non-random data can produce erroneous and biased conclusions. While ecologists often extrapolate population dynamics by subsampling populations of the organism of interest, the statistical reliability of this subsampling depends on multiple procedural

[2] *Y. brevifolia* is located almost exclusively in the Mojave Desert with a small portion of its northern population extending into the Great Basin Desert. Near the northeastern extent of the range of *Y. brevifolia* there is a hybrid zone where *Y. brevifolia* and *Y. jaegeriana* overlap and hybrids occur (USFWS 2018). The USFWS (2018) describes the ecoregion of the northern and southern populations where *Y. brevifolia* (see Figure 1). According to the EPA, ecoregions are identified by analyzing the biotic and abiotic composition of the area, including geology, landforms, soils, vegetation, climate, wildlife, and hydrology (epa.gov).

The southern population occurs mostly within the Western Mojave Basin ecoregion from Joshua Tree National Park north to Ridgecrest and Red Mountain. Level-four ecoregions common in the southern population area that support *Y. brevifolia* include Eastern Mojave Basin, Eastern Mojave Mountain Woodland and Shrubland, Western Mojave Basin, Western Mojave Low Ranges and Arid Footslopes and Western Mojave Mountain Woodland and Shrublands. Occupied habitats in this portion of *Y. brevifolia*'s range extend from approximately 750 to 2,200 meters in elevation (ca 2,400 to 7,200 feet) and rainfall ranges from 82.4mm (3.24in) to 738.1 mm (29.06in). Temperatures through the year in this area are also variable with mean winter minimum temperatures ranging from -5.7°C (22°F) to 4.8°C(41°F) to summer mean high temperatures of 23.4°C (74°F) to 37.2°C (99°F) (USFWS 2018).

The northern population of *Y. brevifolia* in California includes northern Mojave Desert, southern Great Basin Desert and transitional vegetation types between the Great Basin and Mojave Desert. Common level-four ecoregions in the northern part of the species range include, but are not limited to, Western Mojave Basin, Western Mojave Low Ranges and Arid Footslopes, Western Mojave Mountain Woodland and Shrublands, and Eastern Mojave Low Ranges and Arid Footslopes. Occupied habitats in this portion of *Y. brevifolia*'s range extend from approximately 1,500 to 2,200 meters in elevation (ca 4,900 to 7,200 feet) and rainfall ranges from 95.8mm (3.77in) to 429mm (16.89in). Temperatures through the year in this area are also variable with mean winter minimum temperatures ranging from -8.1°C (17°F) to 3.6°C(38°F) to summer mean high temperatures of 20.4°C (69°F) to 36.3°C (97°F) (USFWS 2018).

and ecological factors. As described by (Conn et al. 2015), these factors include how intensive the sampling effort is, the spatial proximity of the sampling area to the areas the data are extrapolated to, variability of the ecological process in question, and the similarity of explanatory covariates in the sampled area to the explanatory covariates across range of the organism of interest. Critically, a failure to account for these factors when sampling or extrapolating data can lead to spurious conclusions that do not reflect the biological processes that are occurring. Yet, the Petition does just that and does not take these considerations into account when extrapolating data from Joshua Tree National Park to infer the range-wide population status of Joshua trees.

First, Joshua Tree National Park is located at the extreme southern edge of the species' range and constitutes less than 5% of the total area known to be currently inhabited by *Y. brevifolia* (311,961 acres in Joshua Tree National Park, out of total 6,463,397 acres of Y. brevifolia range, calculated from data included in Cole et al. 2011, USFWS 2018). Therefore, sampling solely within Joshua Tree National Park does not represent intensive random sampling that can be reasonably expected to accurately reflect population trends, nor is it in close proximity to the rest of the range.

Second, the range of *Y. brevifolia* encompasses a wide diversity of habitat types, such that Joshua trees experience spatiotemporal variation in the conditions that promote reproduction, recruitment and survival. Thus, subsampling one region does not accurately represent conditions in other parts of the range, because this sampling does not capture the variation in Joshua tree density, climactic conditions, soil and vegetation characteristics that are known to occur throughout the range of the species (**Figure 1**; USFWS 2018, pp. 57-58; Esque et al. 2010) and are discussed throughout the Petition (e.g., the highly variable population density (pg. 19) and climactic conditions (pg. 18)). Joshua trees occupy a wide elevational (750 to 2220 meters) and geographical range extending from southeastern California to Nevada (Petition, pg. 16), encompassing a broad diversity of habitats with varying ecological communities (Turner and Brown 1982, USFWS 2018). Indeed, *Y. brevifolia* in Joshua Tree National Park are found in only two out of the 24 Level IV-ecoregions inhabited by *Y. brevifolia* across its range (**Figure 1**, **Table 1**). According to the EPA, ecoregions are identified by analyzing the biotic and abiotic composition of the area, including geology, landforms, soils, vegetation, climate, wildlife, and hydrology (epa.gov). For this reason, it is unlikely that Joshua Tree National Park is representative of the broad range of variation experienced by Joshua trees (see below). Moreover, *Y. brevifolia* demonstrate irregular sexual reproduction that is highly dependent on local conditions and asexual reproduction that can result from local factors that vary across the landscape (see below). Together, the statistical reliability for extrapolating data from a small, non-random subset of the *Y. brevifolia* range is poor and will likely fail to reflect population dynamics and status across the range of Joshua tree.

Despite the flaws inherent in extrapolating from a small, biased subset of data, the Petition does not provide scientific evidence or justification to support the extrapolation of data from Joshua Tree National Park across the range of *Y. brevifolia*. Indeed, both the Petition and CDFW's evaluation of the Petition acknowledge that there are no reliable estimates of species population size or documented

range-wide population trends for *Y. brevifolia* (Petition, pp. 19). In fact, based on the best data available, CDFW has determined that Joshua trees are relatively abundant (CDFW 2020b). Yet, based on data from a few, discrete study plots on the extreme southern edge of the species boundary, the Petition concludes that, for the species as a whole, "recruitment is limited, and mortality is increasing, all of which would likely reflect a population already starting to decline" (Petition, pp. 19). This extrapolation from a limited study area at the edge of the species range to conclude that *Y. brevifolia* is experiencing a range-wide population decline, when other studies, e.g., USAF 2017a (cited in CDFW 2020), show that Joshua tree populations on Edwards AFB were stable to increasing, is a striking example of how insufficient scientific information can potentially lead to inappropriate conclusions. Moreover, the Petition misinterprets the available scientific data and does not include key data in its analysis of the population status of Joshua trees. We discuss these issues in the sections below.

3.1 THE INFORMATION PROVIDED BY THE PETITION REGARDING THE ABUNDANCE AND POPULATION TRENDS OF JOSHUA TREES IS MISLEADING

In the discussion of abundance and population trends, the Petition cites three studies to support its contention that Joshua tree populations are declining: DeFalco et al. (2010), Harrower and Gilbert (2018), and Cornett (2014)[3]. All three studies were limited to Joshua Tree National Park. Critically, the Petition's extrapolation of data from these three studies across the species' entire range is scientifically inappropriate for the reasons set out above. As survival and reproduction of *Y. brevifolia* varies based on local conditions (e.g., due to elevation and temperature; Harrower and Gilbert 2018, St. Clair and Hoines 2018), Joshua Tree National Park is unlikely to be representative of range-wide patterns in Joshua tree abundance and population trends due to variation in elevation, climactic, soil type, temperature ranges, rainfall amounts, and vegetation characteristics. This point is highlighted by the fact that Joshua Tree National Park only contains a small subset of the Level IV ecoregions that are encompassed by the range of *Y. brevifolia* (USFWS 2018, pp. 19). Specifically, the ecoregions present in Joshua Tree National Park only account for approximately 12% of the land occupied by *Y. brevifolia* (**Table 1**), and the ecoregions present in Joshua Tree National Park are not the dominant ecoregion types found throughout the range of Joshua trees (**Figure 1**). Thus, population trends documented solely within Joshua Tree National Park are unlikely to provide an accurate representation of the abundance and population trends of *Y. brevifolia* across their range.

The Petition cites three studies conducted within Joshua Tree National Park to support the conclusion that Joshua tree populations are declining. To understand how fire influenced Joshua tree populations, DeFalco et al. (2010) selected 10 study sites, five each in burned and unburned areas of Joshua Tree National Park sampled from 1999-2005. Within each burned and unburned area, DeFalco et al. (2010) randomly selected four to five 300-600 meter transects for a total of 46 transects within Joshua Tree

[3] The Petition also cites St. Clair and Hoines (2018) as evidence that Joshua tree density is negatively correlated with increasing temperature, but this study was performed across Joshua tree species, such that the relevance of any findings to *Y. brevifolia* is limited and there appears to have been no attempt to randomly sample locations. No information was provided about how sites were selected except "site selection in our study maximized coverage across Joshua tree's range…" (St. Clair and Hoines 2018, pp. 3).

National Park. Harrower and Gilbert (2018) evaluated Joshua tree demographic parameters at 11 sites across the 1,200 meter elevational distribution of the species in Joshua Tree National Park (two sites were included just outside of the park's boundaries) in 2016 and 2017. Finally, Cornett (2014) studied Joshua trees at a single one-hectare study plot in Joshua Tree National Park from 1990-2013 and discusses studies conducted at two additional one-hectare study plots within Joshua Tree National Park.

The findings of these studies are limited in their explanatory power for range-wide population dynamics of *Y. brevifolia*, as the results do not appear to capture the environmental variation of occupied habitat throughout the range of the species (see above; **Figure 1**). For example, the single, one-hectare study site investigated by Cornett (2014) renders it impossible for researchers to understand how representative these results are for Joshua trees outside of the single study site. Harrower and Gilbert (2018), Cornett (2014) and DeFalco et al. (2010) are case studies, that, if combined with other studies conducted throughout the range of the species, would contribute to a range-wide understanding of *Y. brevifolia* population dynamics. Alone however, these studies do not and cannot provide evidence of a range-wide population decline, as claimed in the Petition. Indeed, a cursory review of the available scientific literature cited by USFWS (2018) indicates that the densities of Joshua trees are increasing in other portions of its range (e.g., Webb et al. 2003; USAF 2017a as Cited in CDFW 2020). In short, the Petition cites as evidence studies conducted only in a small portion of the species range, the results of which cannot provide inference beyond the specific sites sampled. As such, rather than providing sufficient evidence documenting population declines, the Petition bases its conclusions on data that is insufficient to inform species-wide inferences of population status.[4]

[4] For species such as the Joshua tree that occur across broad geographic distributions, study designs should include several elements to make reliable inference about population abundance, trends, and other population parameters such as recruitment. We suggest several possible actions by which strong inference into Joshua tree population abundance and trends can be gained. First, range-wide stratified random samples are required to be certain that the population estimate is "weighted" based on relevant ecological factors that influence the species' distribution (Edwards 1998, Thompson 2012). Range-wide stratification of the occupied habitat should be based on important ecological features, including soil type, lithology, vegetation type, and climactic zone (Vojta et al. 2013). This measure is particularly necessary, as Joshua Tree National Park only contains two of the ecoregions inhabited by Joshua trees, and these two ecoregions do not represent the dominant type found throughout their range. Due to this variation in ecoregions across the range of *Y. brevifolia*, stratified samples throughout the range are required to gain strong inference into population trends. Second, the spatial extent of sampling (e.g., the number of study sites where individuals are sampled) should be sufficient to estimate summaries (abundance or density) of interest and measures of uncertainty (e.g., 95% confidence intervals) and to examine how covariates of interest may be associated with these summaries (Williams et al. 2002). Multiple plots should be sampled (sub-samples) in order to characterize variation within and across study sites (Hurlbert 1984). Finally, given the broad spatial distribution of the Joshua tree, and the longevity of individuals, a power analysis should be conducted to estimate the spatial extent and temporal duration of the sampling period required to estimate parameters of interest at desired levels of confidence (Steidl et al. 1997).

3.2 THE INFORMATION PROVIDED IN THE PETITION REGARDING THE RECRUITMENT OF JOSHUA TREES IS MISLEADING

Joshua tree recruitment is one of the key population parameters that the Petition focuses on in its discussion of the factors affecting the ability for Joshua trees to survive and reproduce. The Petition contends that recruitment is currently being substantially impacted by threats to Joshua trees and that this lack of recruitment will lead toward population declines and range reductions (Petition, pp. 20).

The Petition, however, inappropriately extrapolates patterns of recruitment occurring at specific sites within Joshua Tree National Park to represent recruitment rates across the range of *Y. brevifolia*. This extrapolation is inappropriate for two reasons. First, reproduction and recruitment of juveniles into the population is contingent on local microhabitat and ecological contexts (Reynolds et al. 2012) that can be highly variable both within and across habitat types (e.g., Borchert and DeFalco 2016, pp. 833, Webb et al. 2003). Even within Joshua Tree National Park, which according to the Petition has "limited" recruitment that has "largely stopped", studies cited by the Petition noted recruitment across the park (Barrows and Murphy-Mariscal 2012, pp. 34, Sweet et al. 2019, pp. 7). Long-term data from the northern portions of the *Y. brevifolia* range show evidence of new plants between 1963 - 2001, which does not support range-wide reductions in recruitment (Webb et al. 2003).

Second, the Petition cites studies that do not comprehensively measure recruitment. As discussed by the Petition (pp. 8), recruitment can occur into *Y. brevifolia* populations through both sexual and asexual reproduction (Gucker 2006), such that some populations are "largely if not entirely clonal" (Petition, pp. 8). However, the studies cited by the Petition do not inventory asexual reproduction (Barrows and Murphy-Mariscal 2012, pp. 31, Harrower and Gilbert 2018, pp. 4, Sweet et al. 2019, pp. 4). This bias limits the predictive power of data from Joshua Tree National Park to infer recruitment in other parts of the range, as patterns of sexual and asexual reproduction will differ across habitats occupied by *Y. brevifolia* due to variation in the conditions that promote each type of reproduction.[5]

Specifically, there is some evidence that asexual reproduction is more common at elevational extremes (Harrower and Gilbert 2018, pp. 7,12), that it may occur in response to fire (DeFalco et al. 2010, pp. 244, Loik et al.2000, pp. 82, Webber 1953) and, in some cases, herbivory (Esque et al. 2015, pp. 87). Thus, the studies cited by the Petition may be systematically underestimating total recruitment (sexual and asexual) at the locations where asexual reproduction is more likely to occur – namely, lower elevations and post-fire habitat. In the absence of a comprehensive investigation of sexual and asexual recruitment, it is not possible to state whether recruitment is limited at lower elevations, or whether that result follows from a selective appraisal of only one of the reproductive strategies available to *Y.*

[5] To better understand recruitment across the range of *Y. brevifolia*, we propose several actions. Joshua trees are long-lived species with irregular sexual reproduction. Population age-structures can be elucidated by measuring the height of Joshua trees (a common means by which to estimate age) within random stratified plots across the range of *Y. brevifolia*. Sensitivity and power analyses can be used to determine how large a sample, and how many years of sampling, are required to estimate population trends with a sufficient level of confidence. Moreover, a life stage analysis can provide inference into the mortality of each life stage of *Y. brevifolia*, how these patterns vary across the range, and how mortality of different life stages may impact population dynamics in the future.

brevifolia. Indeed, asexual reproduction is critical to population dynamics in other clonal tree species like quaking aspen, where asexual reproduction is common following fire and herbivory (Kulakowski et al. 2013, Mock et al. 2008). Mock et al. (2008) states that "the relative frequency of sexual vs. asexual reproduction determines long-term dominance and persistence of clonal plants at the landscape scale" (pp. 4827) and notes that "the proportion of these reproductive strategies varies across the species' range" (pp. 4828; internal citation omitted). Thus, it is inappropriate to exclude measures of asexual reproduction, as it may systemically bias measures of recruitment in particular kinds of habitats and for those long-lived species that are subject to "irregular" sexual reproduction, such as *Y. brevifolia* (Esque et al. 2010, pp. 11).

4. THE PETITION MISINTERPRETS THE AVAILABLE SCIENTIFIC DATA REGARDING THE DEGREE AND IMMEDIACY OF POTENTIAL THREATS TO JOSHUA TREES

The Petitioner's inappropriate extrapolation of data from a non-random subset to the entire *Y. brevifolia* range is also pervasive in the Petitioner's conclusions regarding the potential threats to Joshua trees. The Petition concludes that the degree and immediacy of threats to the species is such that immediate listing under CESA is required. The Petition attempts to justify this conclusion by relying heavily on the putative impacts from fire and climate change. However, the spatial bias and inappropriate extrapolation that is prevalent throughout the Petition results in a misinterpretation of the available data. Moreover, the Petition incorrectly cites numerous studies that do not support the conclusion that fire and climate change are significant threats to Joshua trees.

4.1 THE PETITION PROVIDES NO EVIDENCE THAT FIRE IS A RANGE-WIDE THREAT TO JOSHUA TREES

The Petition cites various studies to show that fire represents a considerable threat to Joshua trees. However, several of these citations are either misinterpreted by the Petition or do not support the Petition's claims.

The Petition relies heavily on DeFalco et al. (2010) to assert that fires have had a demonstrative effect on Joshua trees and threatens individuals throughout the species' range. DeFalco et al. (2010), however, provides data from a single fire complex in Joshua Tree National Park with apparently limited variability in fire intensity (i.e., "all burned sites were nearly denuded of shrub and perennial grass cover, and…lacked the safe sites beneath nurse plants"). As such, the results of DeFalco et al. (2010) have limited utility for predicting how fire will affect Joshua trees across its range; the results of a fire at a single location cannot be extrapolated across highly variable vegetative, soil, and climactic conditions such as those experienced by *Y. brevifolia* across its range. Sweet et al. (2019), another study upon which the Petition relies, provides caution against oversimplification of the effects of fire on Joshua trees noting that burn area polygons do not reflect the variability in fire dynamics. Despite several sample sites within burn area polygons, Sweet et al. (2019) did not observe evidence of fire on sample sites in Joshua Tree National Park (with a single exception where a light burn occurred within

a sample site). Consequently, taking into account fire intensity is particularly important when drawing conclusions on the effects of fire on Joshua trees at Joshua Tree National Park or predicted refugia within the park, and even more so when extrapolating results to the range of the species. In point of fact, second-hand review of research cited by USFWS (2018) conducted in other parts of the *Y. brevifolia* range provide contrary results, showing that the number of individual *Y. brevifolia* plants had increased post-fire (USAF 2017b, pp. 1-3 as cited in CDFW 2020). The Petition fails to acknowledge this direct evidence of the importance of capturing the variation in conditions when drawing broad conclusions about the effects of fire on Joshua trees.

The Petition cites scientific papers that undermine the Petition's argument that increasing wildfire frequency and intensity have considerable effects on the continued existence of Joshua trees. For example, the Petition cites Brooks and Matchett (2006) as evidence that an increase in fire size and frequency in the Mojave Desert will impact the ability of Joshua trees to survive and reproduce. However, Brooks and Matchett (2006) actually concluded the opposite: for the 15 years of data analyzed, there was a *decrease* in the observed frequency of fires and no clear trend in the amount of area burned.

The Petition also cites scientific studies as evidence of the effects of fire on Joshua trees that do not measure or report results regarding the effects of fire on *Y. brevifolia*. For example, the Petition cites Esque et al. (2015) and implies that they provide evidence of significant impacts of fire frequency and intensity on Joshua trees (Petition, pg. 30). Esque et al. (2015) does not report or analyze impacts of fire on Joshua trees, instead, this study tracks the survival of a cohort of young plants with a focus on herbivory. The potential effects of fire are briefly mentioned in the discussion, but this study does not include any data on fire. The Petition cites Abella et al. (2009) as evidence that Joshua tree woodlands are not adapted to fire and recover slowly (Petition, pg. 31) and that "Joshua trees have low post-fire survival, are slow to repopulate burned areas, and successful recruitment from resprouting requires sufficient precipitation in the years following fire (Petition, pg. 24). Yet, Abella et al. (2009) neither measures the effects of fire on Joshua trees nor reports any data whatsoever on Joshua trees. Instead, Abella et al. (2009) examined plant communities, soils and seed banks several years after a fire had taken place in the Mojave Desert, with no mention of *Y. brevifolia* outside of a brief statement in the introduction.

4.2 THE PETITION DOES NOT PROVIDE A COMPREHENSIVE REVIEW OF THE THREATS OF CLIMATE CHANGE TO JOSHUA TREES

The issues of inappropriate extrapolation of results to the species as a whole and the general lack of critical review of the available scientific literature are also prevalent in the Petition's analysis of the threats of climate change on Joshua trees. The Petition relies largely on three sources to argue that climate change constitutes a significant and immediate threat to the species: Cole et al. (2011), Barrows and Murphy-Mariscal (2012), and Sweet et al. (2019). The latter two studies are limited to modeling

efforts in Joshua Tree National Park. The results of Cole et al. (2011) have been explicitly refuted by other researchers. We discuss each of these below.

The Petition relies heavily on Cole et al. (2011) to conclude that no suitable habitat for Joshua trees will exist by the end of the century. Cole et al. (2011) models predicted Joshua tree habitat into the future by combining assumptions of climate predictions, the current distribution of the species, the assumed response of Joshua trees to climate warming in the paleontological past, and the extinction of mega-faunal seed dispersers that limit dispersal. In particular, the predictions of Cole et al. (2011) assume that Joshua trees underwent a range contraction in response to warming conditions in the past and that future expansions in their range will be extremely limited due to reduced dispersal capability, as the megafauna that once acted as seed dispersers are now extinct. These assumptions have been explicitly rejected by recent genetic and distribution modeling efforts that were not cited by the Petition. Specifically, Smith et al. (2011) did not find evidence that Joshua trees have undergone substantial declines in its historical range based on genetic data and distribution modeling. They also found no evidence that dispersal rates have changed dramatically due to extinction of megafauna. In fact, Smith et al. (2011) found evidence of population growth historically in Joshua trees, although not in the recent past, and argues that previous climate change does not explain historical changes to population size. Regardless, Smith et al. (2011) explicitly question the assumptions of Cole et al. (2011) and cast doubt upon the assumptions and predictions of Cole et al. (2011) relied upon so heavily by the Petition. Yet, the Petition does not acknowledge or discuss the findings of Smith et al. (2011).

The Petition relies upon other modeling efforts that predict the locations of future suitable habitat conditions for Joshua tree within Joshua Tree National Park: Barrows and Murphy-Mariscal (2012) and Sweet et al. (2019). Both reports predict reductions in suitable habitat across the park. To project population changes that could result from climate change, baseline distributions and trends of *Y. brevifolia* must be generated and then these baseline measures are used to project into the future, based on the assumptions incorporated into climate models. The lack of data that initially used to calibrate such climate models are critically important, because a lack of representative data will bias the conclusions of the projections. Sweet et al. (2019) and Barrows and Murphy-Mariscal (2012), however, are limited to Joshua Tree National Park, and cannot be appropriately extrapolated past the boundaries of the park for two main reasons. First, there is insufficient range-wide distribution data for *Y. brevifolia*. The outcomes of predictive models depend on the parameters and assumptions they are founded on. By supplying such models with a non-random subset of data that does not represent the overall population, the likelihood that model parameters will not reflect current reality of range-wide *Y. brevifolia* distribution is high and makes it very probable that future distribution projections will be skewed. Indeed, there is some evidence that pairing an underestimate of current distributions with a climate scenario that predicts conditions will be less favorable to Joshua trees, as was done by Sweet et al. (2019), will likely lead to a drastic underestimate of future Joshua tree distributions at the landscape scale (Smith et al. 2011).

Second, where species are distributed on the landscape depends on a complex suite of factors, including factors external to the organism - such as abiotic and biotic conditions - and factors internal to the individual – such as physiological tolerance. As explicitly recognized and discussed by Sweet et al. (2019), fine scale topographic and climactic data are necessary to understand how a particular species will react to climate change. The studies cited by the petition use a correlative approach that links *Y. brevifolia* distribution data to climactic and soil characteristics, and use these to project how *Y. brevifolia* will respond to future conditions (Barrows and Murphy-Mariscal 2012, Cole et al. 2011, Sweet et al. 2019). While this correlative approach can provide meaningful insight, it does not consider the physiological tolerances of *Y. brevifolia*, nor how changes in biotic communities may influence *Y. brevifolia* populations. This is an important distinction, as Pearson and Dawson (2003) state, "the species distributions as they appear today may not be in equilibrium with the current climate, nor indeed are they necessarily determined primarily by climate." Moreover, the reality of how climate change will affect ecological systems is complex and the reliability of models to estimate these effects depend on how representative the population data are over time and space. If non-random samples are taken, and if the number of samples and years of observation are limited in scope and duration, then resulting estimates are likely to be biased. Importantly, the direction of potential bias is also unknown. As such, the extrapolation of results from a limited area to the entire range of *Y. brevifolia* is biologically and statistically inappropriate for determining the range-wide effects of climate change.

5. CONCLUSION

A critical review of the Petition indicates that there is not sufficient scientific evidence to provide strong inference into either range-wide population trends or the threats that may be affecting Joshua trees. Critically, the Petition does not appropriately address this lack of evidence or provide sufficient scientific information to inform the decision of whether the species warrants listing under CESA. First, the Petition suggests that North and South *Y. brevifolia* populations are ESUs but provides no supporting evidence under the criteria required by CFDW. Second, the Petition improperly extrapolates data from Joshua Tree National Park, comprising less than 5% of the total population range, as representative of range-wide processes. This extrapolation is likely to produce spurious conclusions, as Joshua trees occur in many different habitat types across their range that may influence local survival and reproduction. For example, contrary to the overarching claim made in the Petition that populations are declining based upon patterns observed in Joshua Tree National Park, the Petition does not review the evidence that Joshua tree populations are increasing in other parts of their range. Third, the potential threats to the species are mischaracterized in the Petition and are not supported by the references cited by the Petition. The Petition also does not fully survey the literature on potential threats to *Y. brevifolia*, as studies not cited by the Petition directly contradict the conclusions therein (e.g., the potential effects of climate change based on models). Together, these issues demonstrate that the Petition does not provide sufficient scientific information to indicate that the listing of this species under CESA is warranted.

Table 1. Ecoregions occupied by Joshua tree (*Yucca brevifolia*) across range

Ecoregions shared between YUBR North and South	YUBR North	YUBR South	YUBR within JTNP	Total of Each Ecoregion Type	Percentage of YUBR Total Range
14a Eastern Mojave Basins	177,486	161,793	49,799	339,279	6.02%
14b Eastern Mojave Low Ranges and Arid Footslopes	243,139	91,484	163,617	334,623	5.93%
14f Mojave Playas	315	61,428		61,743	1.09%
14j Western Mojave Basins	120,368	2,045,394		2,165,762	38.40%
14k Western Mojave Low Ranges and Arid Footslopes	434,802	557,426		992,227	17.59%
5i Eastern Sierra Great Basin Slopes	1,912	97,773		99,685	1.77%
5j Eastern Sierra Mojavean Slopes	9,851	202,977		212,829	3.77%
Total shared Ecoregions between YUBR North and South (acres)	**987,874**	**3,218,275**		**4,206,149**	**74.57%**

Ecoregions unique to YUBR North or South	YUBR North	YUBR South	YUBR within JTNP	Total of Each Ecoregion Type	Percentage of YUBR Total Range
13ac Upper Owens Valley	46,631			46,631	0.83%
13h Lahontan and Tonopah Playas	2,439			2,439	0.04%
13u Tonopah Basin	598,194			598,194	10.61%
13v Tonopah Sagebrush Foothills	304,124			304,124	5.39%
13w Tonopah Uplands	47,055			47,055	0.83%
13x Sierra Nevada-Influenced Ranges	23,934			23,934	0.42%
13y Sierra Nevada-Influenced High Elevation Mountains	127			127	0.00%
14g Amargosa Desert	37,168			37,168	0.66%
14h Death Valley/Mojave Central Trough	2,608			2,608	0.05%
14l Western Mojave Mountain Woodland and Shrubland	40,766			40,766	0.72%
14o Mojave Sand Dunes	22			22	0.00%
14n Mojave Lava Fields		806		806	0.01%
5o Tehachapi Mountains		59,118		59,118	1.05%
8c Arid Montane Slopes		199,157		199,157	3.53%
8e Southern California Lower Montane Shrub and Woodland		8,320		8,320	0.15%
8f Southern California Montane Conifer Forest		6,094		6,094	0.11%
8g Northern Transverse Range		57,716		57,716	1.02%
Total Ecoregions unique to YUBR North or South (acres)	**1,103,069**	**331,211**	**0**	**1,434,280**	**25.43%**
Grand Total (acres)	**2,090,943**	**3,549,487**	**213,416**	**5,640,429**	

6. LITERATURE CITED

Abella, S. R., E. C. Engel, C. L. Lund, and J. E. Spencer. 2009. "Early post-fire plant establishment on a Mojave Desert burn." *Madroño* 57 (3):137-148.

Barrows, C.W., and M.L. Murphy-Mariscal. 2012. "Modeling impacts of climate change on Joshua trees at their southern boundary: How scale impacts predictions." *Biological Conservation* 152:29-36.

Borchert, M.I., and L.A. DeFalco. 2016. "Yucca brevifolia fruit production, predispersal seed predation, and fruit removal by rodents during two years of contrasting reproduction." *American Journal of Botany* 03 (5):830:836.

Brooks, M.L., and J.R. Matchett. 2006. "Spatial and temporal patterns of wildfires in the Mojave Desert, 1980-2004." *Journal of Arid Environments* 67:148-164.

California Department of Fish and Wildlife. 2015. Report to the Fish and Game Commission: A Status Review of the Fisher (*Pekania* [formerly Martes] *pennanti*) in California. Sacramento, USA: California Department of Fish and Wildlife.

_____. 2020a. Report to the Fish and Game Commission: Evalution of a Petition From the Center for Biological Diversity to List Western Joshua Tree (*Yucca brevifolia*) as Threatened Under the California Endangered Species Act. State of California Natural Resources Agency. February 2020.

_____. 2020b. Staff Summary for April 15-16, 2020. California Department of Fish and Game.

Cole, Kenneth L., Kirsten Ironside, Jon Eischeid, Gregg Garfin, Phillip B. Duffy, and Chris Toney. 2011. "Past and ongoing shifts in Joshua tree distribution support future modeled range contraction." *Ecological Applications* 21 (1):137-149.

Conn, Paul B., Devin S. Johnson, and Peter L. Boveng. 2015. "On Extrapolating Past the Range of Observed Data When Making Statistical Predictions in Ecology." *PLoS ONE* 10 (10).

Cornett, James W. 2014. "Population dynamics of the Joshua tree (*Yucca brevifolia*): twenty-three-year analysis, Lost Horse Valley, Joshua Tree National Park." In *Not a drop left to drink*, edited by Robert E. Reynolds. California State University Desert Studies Center.

DeFalco, Lesley A., Todd C. Esque, Sara J. Scoles-Sciulla, and Jane Rodgers. 2010. "Desert wildfire and severe drought diminish survivorship of the long-lived Joshua tree (*Yucca brevifolia* ; Agavaceae)." *American Journal of Botany* 97 (2):243-250.

Edwards, Don. 1998. "Issues and Themes for Natural Resources Trend and Change Detection." *Ecological Applications* 8 (2):323-325.

Esque, T.C., B. Reynolds, L.A. DeFalco, and B.A. Waitman. 2010. "Demographic studies of Joshua tree in Mojave Desert National Parks: demography with emphasis on germination and recruitment." *Mojave National Preserve Science Newsletter* (1):9-12.

Esque, Todd, Phillip A. Medica, Daniel F. Shryock, Lesley A. DeFalco, Robert H. Webb, and Richard B. Hunter. 2015. "Direct and Indirect Effects of Environmental Variability on Grouth and Survivorship of Pre-Productive Joshua Trees, *Yucca Brevifolia* Engel. (Agavaceae)." *American Journal of Botany* 102 (1):85-91.

Gucker, C.L. 2006. Yucca brevifolia. In: Fire Effects Information System, U. S. Dept. of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer).

Harrower, Jennifer, and Gergory S. Gilbert. 2018. "Context-dependent mutualisms in the Joshua tree–yucca moth system shift along a climate gradient." *Ecosphere* 9 (9:e02439. 10.1002/ecs2.2439):1-17.

Hurlbert, S.H. 1984. "Pseudoreplication and the design of ecological field experiments." *Ecological Monographs* 54 (2):187-211.

Kulakowski, Dominik, Margot W. Kaye, and Daniel M. Kashian. 2013. "Long-term aspen cover change in the western US." *Forest Ecology and Management*.

Loik, Michael E., Christine D. St. Onge, and Jane Rogers. 2000. "Post-Fire Recruitment of *Yucca brevifolia* and *Yucca schidigera* in Joshua Tree National Park, Califomia." In *2nd Interface Between Ecology and Land Development in California*, edited by Jon E. Keeley, Melanie Baer-Keeley and C.J. Fotheringharn. U.S. Geological Survey Open-File Report OM2.

Mock, K.E., C.A. Rowe, M.B. Hooten, J. Dewoody, and V.D. Hipkins. 2008. "Clonal dynamics in western North American aspen (*Populus tremuloides*)." *Molecular Ecology* 17:4827-4844.

Pearson, Richard G., and Terence P. Dawson. 2003. "Predicting the impacts of climate change on the distribution of species: are bioclimate envelope models useful?" *Global Ecology & Biogeography* 12 (5):361-371.

Reynolds, M. Bryant J., Lesley A. DeFalco, and Todd Esque. 2012. "Short seed longevity, variable germination conditions, and infrequent establishment events provide a narrow window for *Yucca brevifolia* (Agavaceae) recruitment." *American Journal of Botany* 99 (10):1647-1654.

Smith, Christopher Irwin , Shantel Tank, William Godsoe, Jim Levenick, Eva Strand, Todd Esque, and Olle Pellmyr. 2011. "Comparative Phylogeography of a Coevolved Community: Concerted Population Expansions in Joshua Trees and Four Yucca Moths." *PLoS ONE* 6 (10).

St. Clair, Samuel B., and Joshue Hoines. 2018. "Reproductive ecology and stand structure of Joshua tree forests across climate gradients of the Mojave Desert." *PLoS ONE* 13 (2).

Steidl, R.J., J.P. Hayes, and E. Schauber. 1997. "Statistical power analysis in wildlife research." *The Journal of Wildlife Management* 61 (2):270-279.

Sweet, L.C., T. Green, J.G.C. Heintz, N. Frakes, N. Graver, J.S. Rangitsch, J.E. Rodgers, S.Heacox, and C.W. Barrows. 2019. "Congruence between future distribution models and empirical data for an iconic species at Joshua Tree National Park." *Ecosphere* 10 (6):e02763/ecs2.2763.

Thompson, S.K. 2012. *Sampling*. Third Edition ed: John Wiley & Sons, Inc.

Turner, R. M., and D.E. Brown. 1982. "Sonoran Desertscrub." In *Biotic Communities of the American Southwest – United States and Mexico*, edited by D. E. Brown. University of Arizona for the Boyce Thompson Southwestern Arboretum. 4 181-221.

U. S. Fish and Wildlife Service. 2018. Joshua Tree Species Status Assessment. U. S. Fish and Wildlife Service. July 20, 2018. 113.

Vander Wall, Stephen B, Todd Esque, Dustin Haines, Megan Garneet, and Ben A. Waitman. 2006. "Joshua tree (*Yucca brevifolia*) seeds are dispersed by seed-caching rodents." *Ecoscience* 13 (4):539-543

Vojta , C.D., L.L. McDonald, C.K. Brewer, K.S. McKelvey, M.M. Rowland, and M.I. Goldstein. 2013. Planning and Design for Habitat Monitoring. *A Technical Guide for Monitoring Wildlife Habitat Gen. Tech. Report WO-89*: U.S. Department of Agriculture. October 2013.

Waitman, B.A., S.B VanderWall, and Todd Esque. 2012. "Seed dispersal and seed fate in Joshua tree (*Yucca brevifolia*)." *Journal of Arid Environments* 81:1-8.

Waples, Robin S. 1991. Definition of "Species" Under the Endangered Species Act: Application to Pacific Salmon. *NOAA Technical Memorandum NMFS F/NWC-194*. Seattle WA: National Marine Fisheries Service. March 1991.

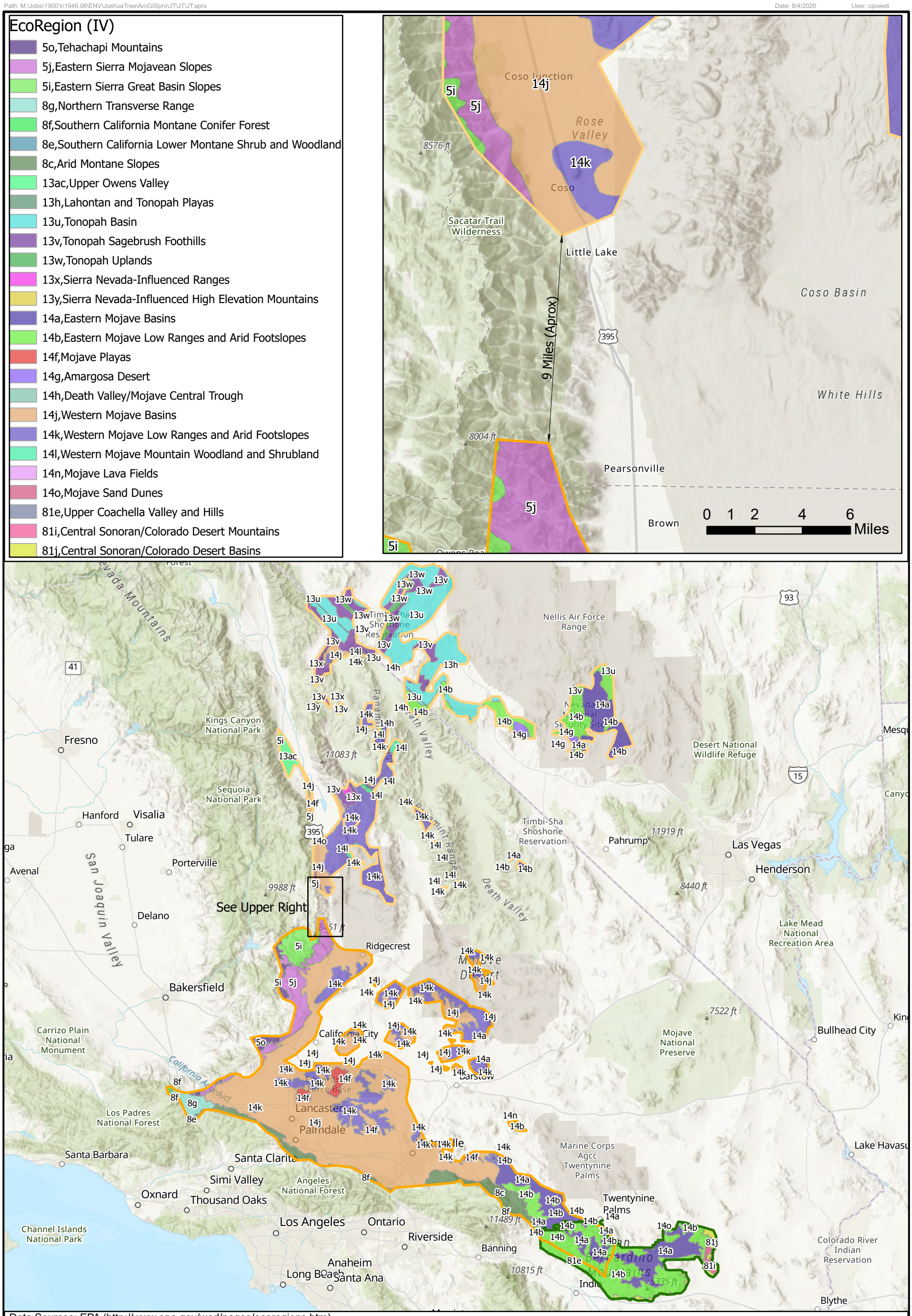
Webb, Robert H., Marilyn B. Murov, Todd C. Esque, Diane E. Boyer, Lesley A. DeFalco, Dustin F. Haines, Dominic Oldershaw, Sara J. Scoles, Kathryn A. Thomas, Joan B. Blainey, and Philip A. Medica. 2003. Perennial Vegetation Data from Permanent Plots on the Nevada Test Site, Nye County, Nevada. *Prepared as part of the Recoverability and Vulnerability of Desert Ecosystems Project of the U.S. Geological Survey Open-FIle Report 03-336*. Tucson, Arizona: U.S. Geological Survey. 2003.

Webber, J.M. 1953. Yuccas of the Southwest. *Agriculture Monograph No. 17*. Washington, DC: U.S. Department of Agriculture, Forest Service. 97.

Williams, B.K., J.D. Nichols, and M.J. Conroy. 2002. Analysis and Management of Wildlife Populations. San Diego, California: Academic Press.

Yoder, J.B., C. I. Smith, D.J. Rowley, R. Flatz, W. Godsoe, C. Drummond, and O. Pollmyr. 2013. "Effects of gene flow on phenotype matching between two varieties of Joshua tree (*Yucca brevifolia*; Agavaceae) and their pollinators." *Journal of Evolutionary Biology* 26:1220-1233.

FIGURES



Data Sources: EPA (http://www.epa.gov/wed/pages/ecoregions.htm)
NPS (https://services1.arcgis.com/fBc8EJBxQRMcHlei/arcgis/rest/services/NPS_Park_Boundaries/FeatureServer)
UFWS (Digitized from PDF Report Sirchia et al 2018)
Image Source: ArcGIS Online World Topographic Map

WestLand Resources

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Legend

Joshua Tree National Park

Population

YUBR North

YUBR South

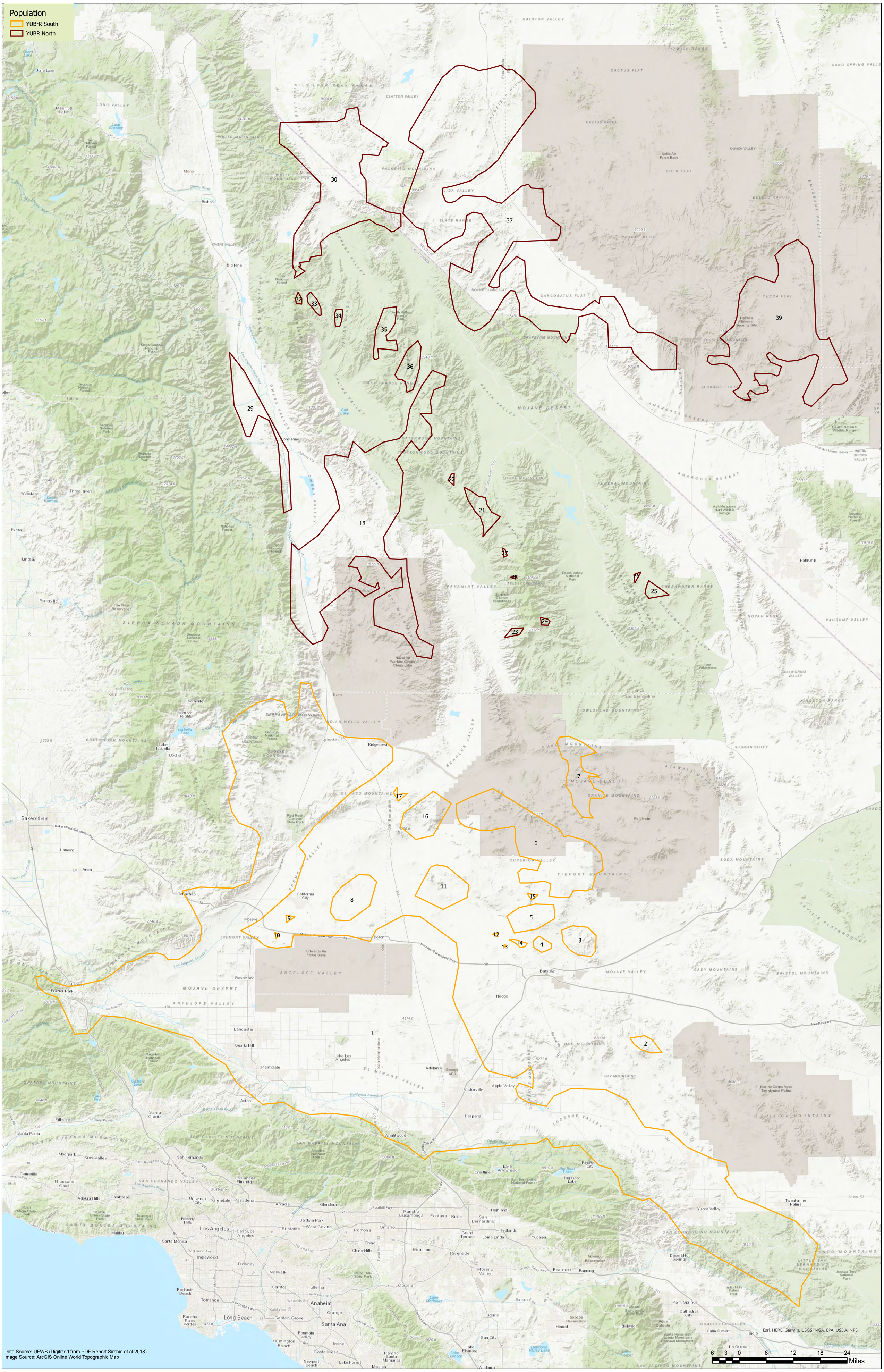
Assessment of Petition to List the Western Joshua Tree as Threatened under the California Endangered Species Act

Joshua tree (*Yucca brevifolia* or YUBR) range and ecoregions

Figure 1

APPENDIX A

Population polygons of Joshua tree (*Yucca brevifolia*) across range


Population
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Data Source: UFWS (Digitized from PDF Report Sirchia et al 2018)
Image Source: ArcGIS Online World Topographic Map
Esri, HERE, Garmin, USGS, NGA, EPA, USDA, NPS
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June 11, 2020

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Sacramento, CA 94244-2090
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Re: Petition to List the Western Joshua Tree (*Yucca brevifolia*) as Threatened Under the California Endangered Species Act

Dear President Sklar and Commission Members:

The County of San Bernardino (County) and Town of Yucca Valley (Town) jointly submit this letter in response to the Center for Biological Diversity's Petition (Petition) for the listing of the western Joshua tree (*Yucca brevifolia*) as a threatened or endangered species under the California Endangered Species Act (CESA). The County and Town strongly oppose the Petition and the listing of the western Joshua tree under CESA.

The Fish and Game Commission (Commission) is scheduled to consider as Item 27 at its June 24-25, 2020, meeting (1) the Petition; (2) the Department of Fish and Wildlife's (Department) "Report to the Fish and Game Commission: Evaluation of a Petition from the Center for Biological Diversity to List Western Joshua Tree (*Yucca brevifolia*) as Threatened Under the California Endangered Species Act" (Report); and (3) public comments. The posted agenda indicates that staff has recommended the Commission's consideration of the Petition be continued to the August 19-20, 2020 meeting based on input from stakeholders, among others. As key stakeholders, the County and Town are grateful for the additional time to address the important issues raised by the Petition and to work with the Department with respect to the proposed listing.

The County and Town submit these joint comments now to further the anticipated dialogue and to highlight three vital concerns to the Commission that justify denial of the Petition. First, the California Desert Native Plants Act, the California Environmental Quality Act (CEQA) and numerous local ordinances already provide strong and comprehensive protections to preserve western Joshua tree populations and their habitat. Indeed, the County and Town both have specific provisions preventing improper removal of the western Joshua tree and actively enforce these measures to ensure the protection of this iconic species. Second, the Petition fails to provide sufficient data of actual impacts to the western Joshua tree to warrant listing at this time.

Existing management efforts have been successful, as demonstrated by the current population trend, range, distribution and abundance of the western Joshua tree. Although climate change may pose certain threats to this species (along with nearly every other species), at present nearly all of the threats identified in the Petition are based on widely variable modeling assumptions. Third, granting candidate status to the western Joshua tree would interfere with existing regulations and thwart critically needed housing, infrastructure and other projects. This is a huge and undue burden on the desert communities, particularly given the speculative grounds for the Petition.

For these reasons, as discussed in more detail below and in the enclosed Technical Memorandum from Heritage Environmental Consultants, the Petition does not meet the criteria for listing the western Joshua tree as a threatened species pursuant to Fish and Game Code section 2072.3 and California Code of Regulations, Title 14, section 670.1. These concerns are not exclusive, and the County and Town will be supplementing this letter with additional comments and supporting materials in advance of the August meeting.

Current Law Already Provides Strong and Comprehensive Protections for the Western Joshua Tree and Grounds for Denying the Petition

The western Joshua tree is an iconic species of the California desert and deserving of strong regulation to protect its continued survival. These protections are already in place and, contrary to the assertions in the Petition, these protections are effective in reducing impacts to western Joshua trees throughout their range in California. Thus, these protections serve as grounds for denying the Petition.

Federal

At the federal level, the California Desert Protection Act (16 U.S.C. § 410) established the Death Valley and Joshua Tree National Parks and the Mojave National Preserve in the California desert, protecting a vast range of western Joshua tree. In addition, there are approximately 69 wilderness areas within the U.S. Bureau of Land Management lands in the California Desert Conservation Area. The federal government recognized the protections these vast areas afford the species when it declined to list the western Joshua tree under the federal Endangered Species Act last year (a proceeding more fully discussed below).

State

The California Desert Native Plants Act (Cal. Food & Agric. Code, § 80001 *et seq*.) (DNP Act) was enacted in 1981 expressly to protect California desert native plants, including the western Joshua tree, in the Counties of Imperial, Inyo, Kern, Los Angeles, Mono, Riverside, San Bernardino, and San Diego, from unlawful harvesting on both public and privately owned lands. Under the DNP Act, the harvest, transport, sale, or possession of western the Joshua tree is prohibited unless a person has a valid permit that strictly regulates the grounds and procedures

for any removal. The DNP Act has been enforced for nearly 40 years to ensure that no western Joshua trees are removed or damaged unless as permitted by the applicable county.

County

The County's Desert Native Plant Protection Ordinance (San Bernardino County Code (County Code) § 88.01.050) (Ordinance) implements the DNP Act. The Ordinance provides regulations for the removal or harvesting of specified desert native plants in order to preserve and protect the plants and to provide for the conservation and wise use of desert resources. The Ordinance requires a permit for the removal of all Joshua trees, regardless of trunk or stem size. In addition, permit conditions for Joshua trees must include provisions for transplanting wherever feasible. (County Code § 88.01.050(f)(3)(A).) Additional protections are in place to require transplanting for specimen trees, which have a circumference greater than 50 inches or height taller than 15 feet. Violation of this section constitutes a misdemeanor punishable by a fine of up to $1,000, up to six months of jail time, and a replacement program for disturbed Joshua trees that were illegally removed. (County Code § 88.01.050(j).) The provisions are intended to augment and coordinate with the DNP Act and the efforts of the State Department of Food and Agriculture to implement and enforce the DNP Act.

Town and Other Municipalities

The western Joshua tree also already enjoys substantial protection within the Town of Yucca Valley. Under section 9.10.040 of the Town's Municipal Code, the Joshua tree is listed as a "regulated desert native plant." For all commercial development projects within the Town, an applicant must submit a native landscaping documentation package that identifies the regulated native plants within the development area, documents their size, height, health, and proposed placement or disposition of the plant. "All regulated desert native plants identified … as likely to survive transplanting shall be made available for adoption or shall be transplanted on site as part of the project's landscaping plan. All native plant permit applications shall illustrate <u>maximum utilization of regulated desert native plants in the project's landscaping plan</u>." (Municipal Code section 9.10.040 [emphasis added].) Moreover, the Town's Municipal Code requires that all Joshua trees that are likely to survive transplanting procedures, and which are not incorporated into the project's landscaping plan, must be made available for adoption. (Id.) Therefore, the Town already endeavors to ensure that the Joshua tree is protected during commercial development.

The Town regulation is just one of the many local protections for the western Joshua tree. For example, the Cities of Hesperia (Hesperia Municipal Code Ch. 16.24 "Protected Plants"), Palmdale (Palmdale Municipal Code Ch. 14.04 "Joshua Tree and Native Desert Vegetation Preservation"), and Victorville (Victorville Municipal Code Ch. 13.33 "Preservation and Removal of Joshua Trees") all have similar ordinances intended to protect or avoid impacts to western Joshua trees. The County and Town will endeavor to provide a more comprehensive survey of local regulations for the August 19-20, 2020, meeting.

For Projects By or Under Permit at All Governmental Agencies within the State – CEQA

Because of the heightened protection of western Joshua trees by local ordinance, projects that may affect the western Joshua tree are also scrutinized under the California Environmental Quality Act (Public Resources Code § 21000 et seq.) (CEQA) and its implementing guidelines to ensure mitigation for any impacts. In addition, the Petition omits that Joshua trees are listed as a "sensitive natural community" within the California Natural Diversity Database (CNDDB). As a result, projects under CEQA are often required to inventory all accessible Joshua trees within the proposed project disturbance areas and have a qualified botanist identify those likely to survive transplantation. Suitable trees are relocated prior to grading to off-site reclamation or restoration areas, and maintained to ensure successful transplantation. Alternatively, project applicants are often required to permanently conserve land (on or off the project site) that comprises suitable Joshua tree habitat as mitigation for the clearance of any Joshua trees on their site.

In addition, the Petition falsely states that local agencies can circumvent impacts to Joshua trees merely by adopting a statement of overriding considerations. One of the most well-settled principles of CEQA is that all feasible mitigation measures must be implemented. Measures to avoid impacts to biological resources, such as transplanting, permanently conserving habitat, or replanting fresh saplings, are all measures that have been deemed feasible under California law and therefore must be incorporated into environmental analysis, when applicable under CEQA.

In sum, the State, the County, the Town and other local jurisdictions have adopted policies that protect Joshua trees from unregulated removal and habitat loss in the urbanizing areas within the species' current habitat range. The existence of these policies, and the listing of Joshua trees within the CNDDB, both trigger substantive requirements under CEQA to conserve habitat and otherwise mitigate impacts to Joshua trees by new development. The County and Town intend to submit additional information prior to the August meeting to demonstrate that these robust protections fully enforce and provide the necessary protections to the western Joshua tree, so that listing under the CESA is not warranted.

The Petition's Claims that the Western Joshua Tree's Survival is Uniquely Threatened and Can Be Preserved by the Listing Under CESA Are Unsupported

The County and Town further want to direct the Commission's attention to the unsupported nature of the Petition. Under CESA, the decision to list a species as threatened or endangered must be based upon the best available scientific information. (Fish & Game Code § 2070.) A petition for listing a species as threatened must provide sufficient scientific information under CESA regulations regarding the population trend, abundance, degree and immediacy of the threat, impact of existing management efforts, and suggestions for future management. (Fish and Game Code, § 2072.3; 14 Cal. Code Reg. § 670.1(d)(1).)

The best available scientific information does not warrant a finding that the survival of the western Joshua tree is threatened at this time. The Petition cites several studies that model the future impact of global climate change on the western Joshua tree. The County and Town have

serious concerns, however, that the Petition relies too heavily on the modeling of future climate change impacts as a basis for listing the western Joshua tree as threatened, given that the U.S. Fish & Wildlife Service (USFWS) concluded that there has been no major reduction in Joshua tree populations during the last 40 years, and the existing potential habitat for the western Joshua tree currently exceeds 5 million acres.[1] The Petition also fails to adequately and accurately account for the strong protections already in place (as discussed above) to relocate, replant or replace any trees impacted by new development, therefore these local programs will assist in ensuring the survival of western Joshua trees in lower elevations.

The enclosed Technical Memorandum on Scientific basis for listing the western Joshua tree (*Yucca brevifolia*) as threatened under the California Endangered Species Act, dated June 10, 2020, from Heritage Environmental Consultants (Technical Memo) raises significant questions regarding the Petition's overall premise that climate change will cause extirpation of the species. The Technical Memo notes that all of the major studies cited by the Petition were based on data from Joshua Tree National Park, which the Petition acknowledges to be the southernmost range of the species. The Technical Memo further notes that results from Joshua Tree National Park may not accurately represent population trends farther north in the species' range. The report specifically questions whether the Petition's conclusions regarding impacts from greater wildfires, climate change, and encroaching development hold true in its northern range. More data is therefore needed to confirm whether northern populations will be affected by predation, invasive grasses and other species, wildfires and climate change in the same manner as those populations located within Joshua Tree National Park.

The Petition argues that modeling of future climate change scenarios indicates that the western Joshua tree will face more difficult challenges to its survival than other species. At this time, however, it is wholly premature to list the Western Joshua tree as threatened where the rationale for listing is based entirely on future modeling (not present activity), and where measures are in place to protect the western Joshua tree in areas where the hypothetical threats identified in the future modeling, i.e., lower elevations and urbanizing areas, are the greatest.

Furthermore, the long-range modeling of potential impacts from climate change do not provide a reasonable basis for listing the western Joshua tree as threatened because current populations have remained stable and recruitment continues throughout most of its habitat. The Petition noted that a 2018 study published by the USFWS[2] provides "the most complete synthesis of range data" for the western Joshua tree. By the Petition's own admission, the USFWS Assessment therefore provides the best available science on the western Joshua tree's population trend and abundance. The Petition and USFWS Assessment noted, however, that "a reliable estimate of Joshua tree population size is not available," due largely to patchy distribution of the species within its range, highly variable population density (4 to 840 trees per acre) and a lack of

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[1]Summary of Findings https://www.regulations.gov/document?D=FWS-R8-ES-2016-0088-0028

[2] U.S. Fish and Wildlife Service. 2018. Joshua Tree Species Status Assessment. Dated July 20, 2018. 113 pp. + Appendices A–C (USFWS Assessment).

range-wide population surveys. (Petition, p. 19.) Nevertheless, the Petition and the USFWS Assessment found more than 3.2 million acres of potential habitat in the area identified as YUBR South, and almost 2 million acres of potential habitat in the area identified as YUBR North, for a total of more than 5 million acres of potential habitat for the western Joshua tree. (Petition, pp. 18-19.)

Despite its reliance on the USFWS Assessment, the Petition fails to mention the key finding in that report: threats to individual Joshua trees are not likely influencing population resiliency on a population or species scale since there is no evidence to indicate any recent population size reductions or range contractions over the past 40 years, based on distribution mapping and limited demographic studies that indicate recruitment is occurring. (USFWS Assessment, pp. 1-2, 61, 65.) Rather, the Petition seeks to distinguish the threats analysis in the USFWS Assessment by asserting, without any justification or support, that "political influence" factored into its ultimate conclusions. (Petition, p. 4, fn. 3.)

The underlying premise of the Petition is that: "Regardless of whether Joshua tree abundance is already declining, it is virtually certain that abundance will decline in the foreseeable future… [due to] the impacts of climate change, fire, habitat loss and other sources of mortality." (Petition, p. 18.) This is akin to saying that there is no evidence today, but someday there will be proof. Spokespersons for the Center for Biological Diversity also admitted as much when they stated to news outlets that "the idea is to get ahead of the curve…. The Joshua tree, because it has protected public land and a whole lot of other private land, it provides an opportunity to collectively figure out how to get adaptation right… as our climate warms."[3] The USFWS Assessment, however, contradicts the Petition's first assumption that western Joshua tree populations are currently in decline. The Petition's remaining rationale for listing the western Joshua tree relies on modeling of future climate change scenarios through the end of the 21st century. This is not the standard under CESA, which requires a documented immediacy of the threat to the species. Although the County appreciates the significant work that the academic community has produced to evaluate the viability of the western Joshua tree, such work at this time remains highly speculative given the massive complexities in the intersection of climate change, species migration and other interrelationships, such as the western Joshua tree's symbiotic relationship with its pollinating moth.

The County and Town do not dispute that climate change may affect the ability of many plant species, including California desert species like the western Joshua tree, to adapt and survive. However, as explained in the enclosed Technical Memo, the Petition does not provide adequate analysis of how this global concern would be unique to the western Joshua tree, would directly affect the tree's migration and other resiliency factors, and would be redressed through management and listing as threatened under CESA. For similar reasons, the Commission denied

[3] Brendan Cummings, senior counsel and conservation director for the Center for Biological Diversity https://www.desertsun.com/story/news/environment/2019/10/15/conservationists-seek-protect-california-joshua-trees-climate-change/3990631002/

listing the American pika as a threatened species, a decision that was upheld by the courts despite several lawsuits by the Center for Biological Diversity.[4]

Based on its current population and range, the local measures to protect, relocate and replant the western Joshua tree, and its wide range of habitat zones, additional studies are needed to validate the accuracy of models that are predicting significant habitat loss for the western Joshua tree. That the models run for 80 years through 2100 further suggests that additional studies can be reasonably performed without any immediate threat to the survival of the species. These additional studies may ultimately show that the modeling is correct, however, the County and Town will bear a heavy burden if western Joshua tree is regulated under CESA, and such burden is not appropriate if it is not actually needed to protect the western Joshua tree's survival. These factors make it too speculative to warrant consideration of the western Joshua tree as a candidate at this time.

The Commission Should Ensure that any Action on the Proposed Listing Does Not Interfere with the Existing Regulatory Regime for Protection of the Western Joshua Tree

The County and Town again express appreciation for the staff's recommendation that the consideration of the Petition be continued to the August meeting. In addition to facilitating a complete substantive analysis, this continuance is critical to ensure that if the Commission considers granting candidate status to the western Joshua tree, measures can be put into place to avoid interference with the existing regulation protecting the species and confirm that essential infrastructure, affordable housing and other important development projects can proceed.

It cannot be overstated how listing the western Joshua tree under CESA would have drastic and detrimental effect on the County, Town and other desert communities. As has been expressed by numerous letters already submitted to the Commission, the western Joshua tree is widespread and its presence is addressed in nearly every development project in the area. Usurping the long-standing protections in place under the California Desert Protection Act and the local ordinances by granting candidate status to the western Joshua tree would cause havoc to the existing regulatory regime and prevent the development of critically needed projects.

For example, the Town is presently in the middle of a two-phase waste water treatment plant project that involves the construction of a treatment plant, infrastructure throughout the Town, and individual connections to approximately 6,000 homes and businesses. This significant project is in response to a related discharge prohibition imposed upon the Town by other state agencies. In some instances, Joshua trees must be removed in order to install the collection systems and related private property connections. The placement of added restrictions on the

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[4] See *Ctr. for Biological Diversity v. California Fish & Game Comm* (2011) 195 Cal. App. 4th 128, 124 Cal. Rptr. 3d 467; CDFW denied petition for listing American pika; court rejected attorneys' fee claim where petition was again denied after court ordered reconsideration.

removal of the Joshua Tree would hinder this project by causing delays and increasing costs to the Town and individual residents and business owners who are responsible for constructing the new connections to their homes and businesses. In this time of economic hardship and uncertainty, these additional costs could significantly affect residents and businesses within the Town. Listing the Joshua Tree as a candidate species would also impact development projects that have already been approved by the Town, including Yucca Plaza (a 23,056 square foot multi-tenant commercial shopping center) and Princeton Equine (an equine veterinary clinic).

Additionally, listing the western Joshua tree as a candidate species could severely hinder future development. The County's rural desert areas have many small projects that would have incidental *de minimis* impacts on the western Joshua tree's survival; imposing the incidental take process on such projects would seriously deter and likely stop many of these small projects, typically single homes or home additions. For the Town, various developers are in development review for the construction of affordable housing. Placing additional hurdles on development, where the margins for a developer are already razor thin, could force these developers to look elsewhere and deprive the Town of much needed affordable housing, as identified in the Town's Regional Housing Needs Assessment. Similarly, other projects, including a campground that would service the Joshua Tree National Park, a housing subdivision, and a carwash, are in the pre-application phase. Listing the western Joshua tree as a candidate species could result in many of these projects being postponed or abandoned entirely.

These projects (and others like it) need to be allowed to proceed without additional requirements that may be imposed if the western Joshua tree is granted candidate status, and the County and Town intend to propose regulations to ensure those protections under California Fish and Game Code section 2084. The regulatory burden for local agencies to comply with the CESA is especially unjustified given that the potential threats to the western Joshua tree from global climate change or other factors are unsupported or, at most, not imminent.

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The County and Town thanks the Commission for considering these preliminary comments and look forward to working with the Department on these issues over the next several months.

Sincerely,

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Enclosures: Heritage Environmental Consultants, Technical Memorandum on Scientific basis for listing the western Joshua tree (*Yucca brevifolia*) as threatened under the California Endangered Species Act, June 10, 2020 3537965.6

Technical Memorandum

Prepared For: County of San Bernardino

Prepared By: Heritage Environmental Consultants

Subject: Scientific basis for listing the western Joshua tree (*Yucca brevifolia*) as threatened under the California Endangered Species Act

Date: June 10, 2020

Background

On October 15, 2019, the Center for Biological Diversity (CBD) submitted a petition to the California Fish and Game Commission to list the western Joshua tree (*Yucca brevifolia* [YUBR]) as threatened under the California Endangered Species Act (CESA) (CBD 2019). In February 2020, the California Department of Fish and Wildlife (CDFW) completed a review of the petition, as well as other scientific information available to CDFW. In its review, CDFW determined that "the petition provides sufficient scientific information to indicate that the petitioned action may be warranted" and recommended that the commission "accept the petition for further consideration under CESA" (CDFW 2020a). In the event that the commission accepts the petition, YUBR would become a candidate for listing as threatened under CESA.

Petition Review

Heritage Environmental Consultants was asked to review existing information and provide expert opinion regarding the scientific basis for listing YUBR as threatened under the CESA. The following review is based primarily on the petition itself (CBD 2019) and CDFW's subsequent review of the petition (CDFW 2020a) because of the limited time available for a more in-depth review of the supporting literature for these two documents. As such, this review accepts in a general sense that both CBD and CDFW have reviewed the existing literature and represent it accurately in their respective documents. The following sections provide review comments following the same outline as CBD's petition.

Life History

Most aspects of the life history of YUBR have been well-researched and are generally accepted. The current taxonomy of *Y. brevifolia* as a distinct species from *Y. jaegeriana* has been accepted. The previous taxonomy, with two subspecies (*Y. brevifolia brevifolia*) and (*Y. brevifolia jaegeriana*), would also provide a suitable basis for listing of either one or both subspecies under the CESA, if the current taxonomy were to be rejected.

Flowering, seed production, dispersal, predation, germination, and growth are generally understood, although several points are worth noting, as follows.

Seed production is an episodic event, correlated with increased precipitation. Sufficient moisture is also required for survival of young YUBR. In a desert environment, conditions for recruitment of YUBR seedlings may only occur "a few times in a century" (Esque and others 2015, in CBD 2019) and no seed production or seedling survival can be expected in drought years.

Individual YUBR cannot be aged in the same way as true trees because they lack annual growth rings. In previous studies, growth (size) has been used as a surrogate for age, on the assumption that larger trees must be older. At the level of this review, it is unclear how well previous studies have been able to correlate size with age, or if any studies have been conducted for sufficient time to even demonstrate a statistically significant correlation.

Considering that seedling recruitment is a rare event, and that age structure in the existing population is uncertain, it is questionable whether a demographic shift (reduced frequency of younger YUBR) has actually occurred, or if the observed reduction of younger plants is an artifact of the infrequent nature of recruitment events. That is, has it just been a long time since the last recruitment event, such that no younger plants are present? In asking this question, it is important to acknowledge the role of climate change, which may have reduced the probability of recruitment events by increasing temperature and the incidence of drought.

Current and Historical Distribution

The current range of YUBR is essentially the same as its historical distribution (post-European contact), demonstrating that human actions have not affected its distribution at present. Some studies (for example, Cole et al. 2011, in CBD 2019) reported model results that indicate future reductions in the southern portion of the range. This same model showed a substantial northward expansion of suitable habitat, albeit without consideration of the dispersal ability of YUBR, which appears to be relatively slow.

It has been suggested that the species is divided into two populations; however, the separation between these populations is a relatively short distance ("a small gap", CBD 2019, page 64) that appears similar to within-population gaps. Habitat differences have been suggested between the two populations, with more creosote bush in the south, and more pinyon pine, juniper, and sagebrush in the north. No evidence was provided to show that this gradient causes any sort of separation between the two purported populations, other than being a convenient correlation. Other differences between populations, in terms of temperature and precipitation, show substantial overlap and are not likely to be statistically valid.

Abundance and Population Trends

The petition stated that "a reliable estimate of Joshua tree population size is not available" and that "no range-wide population trends have been documented" (CBD 2019, page 19). In the absence of any estimate of population size or trend, and for a species that is relatively abundant and widespread, it is not clear how it is "likely to become an endangered species in the

foreseeable future in the absence of the special protection and management efforts" (California Fish and Game Code Section 2067, in part).

Nevertheless, the petition provided information from several studies at Joshua Tree National Park (JTNP) that showed recruitment is limited and mortality is increasing, as well as a correlation between higher temperatures and lower density, and contraction of the species' range at lower elevations. CBD (2019) asserted that these results all point to a population in decline. It is important to note that the studies referenced by CBD were all conducted at JTNP, which is located at the extreme southern edge of the species current and historical range, at the transition between the Mojave Desert to the north and the hotter Sonoran Desert to the south. It seems possible that study results from JTNP may not accurately represent population trends farther north in the species' range.

CDFW (2020a) cited two studies at Edwards Air Force Base, near the center of the range of YUBR, that appeared to show stable or increasing populations, although at least one of these studies was not without some uncertainty. CDFW (2020a, page 13) stated that "the range, distribution, and density information available to the Department indicates that the abundance of western Joshua tree is currently relatively high". In the absence of robust range-wide abundance and population trend data, or at least additional samples from other locations within the species' range, it is uncertain what the actual abundance and population trends are for YUBR.

Factors Affecting Ability to Survive and Reproduce

The petition suggested that factors including predation, invasive species, wildfires, climate change, and habitat loss to development "collectively threaten the continued viability of the species" (CBD 2019, page 20). This is a bold statement considering the lack of population abundance and trend data, much less the level of demographic data needed to truly assess long-term viability. Regardless, the threats listed in the petition were generally reasonable, with a few exceptions noted here.

JTNP has hosted several large wildfires in recent years. The petition used this fact to suggest that fire risk has increased across the range of YUBR; however, it is not clear that this is the case, or if the recent large fires at JTNP represent a more local anomaly. Recent studies (for example, Brooks and others 2018, in CBD 2019, page 28) found that "although fire occurrence across large parts of the warm deserts may be relatively low, they can be much higher and pose significant land management challenges in localized areas."

It appears that most of the recent studies on the effects of fire on YUBR were carried out at JTNP and showed a significant reduction in the local population in burned areas (CBD 2019). However, CDFW (2020a) cited a study at Edwards Air Force Base (located in the center of the species range) that showed a stable long-term local population following wildfire. This result reinforces the idea that studies in a small area on the edge of the species' range (JTNP) may not be applicable across its entire range.

There is no doubt that human-caused climate change is an ongoing process that may increase temperatures within the range of YUBR. Existing studies suggest that precipitation may increase in the area, but that it will also become more variable, meaning long periods of drought can be

expected. "Climate change represents the single greatest threat to the continued existence of *Yucca brevifolia*" (CBD 2019, page 32). The question is, how will YUBR as a species be affected, given the uncertainty among different climate model scenarios? And perhaps more importantly, how does listing YUBR as threatened under the CESA improve the situation, given that climate change is best addressed at the regional and global levels?

In answer to the first question, the petition (CBD 2019, pages 34 to 45) reviewed a number of studies that examined the effects of climate change on YUBR at several scales. The most detailed of these studies, and the ones most relied on by the petition to demonstrate ongoing and future effects of climate change on the species, were focused on JTNP. As noted above, it is unclear if results obtained at JTNP are applicable across the range of the species.

Habitat loss to development is another likely threat to YUBR; however, the extent of this threat is uncertain. The petition stated (CBD 2019, page 46) that an estimated 41.6% of suitable habitat for YUBR in the south population area would be lost to development by 2095, based on an Environmental Protection Agency model (cited to USFWS 2018 in CBD 2019, page 46). The parameters and assumptions of this model were not examined, but this result seems speculative. It appears that the model predicted that almost all private lands in the western Mojave Desert would be developed. Given the desert climate, lack of water, distance from the greater Los Angeles area (as a source of jobs), and perhaps other factors, this projection needs to be strongly questioned.

Inadequacy of Existing Regulatory Mechanisms

While existing regulatory mechanisms that protect YUBR as a species may be limited at the state and federal levels, it is unclear how a CESA listing would lead to substantial changes in the current situation. For example, the petition acknowledged climate change as the greatest risk and that "ultimately the species cannot be saved absent global action to reduce such emissions" (CBD 2019, page 48). A CESA listing of YUBR would have little or no bearing on efforts to reduce carbon emissions at a global scale. Similarly, the CESA has no legal standing on federal lands, which make up 48% of the south population area and 96% of the north population area. In practice, state-listed species are sometimes considered during project analysis under the National Environmental Policy Act (NEPA); however, there is no requirement for such consideration.

The petition suggested that CESA listing would bring focus to preservation of YUBR and its habitat for projects analyzed pursuant to the California Environmental Quality Act (CEQA). While listing may increase findings of significance on the basis of effects to YUBR, this may not necessarily equate to a reduction of effects to YUBR because agencies can still approve projects that may have a significant effect, as acknowledged in the petition (CBD 2019, page 55).

The petition gives relatively little space to local ordinances, although it does list Hesperia, Palmdale, Victorville, Yucca Valley, and Los Angeles and San Bernardino Counties as local jurisdictions that have plant protection ordinances or similar measures (CBD 2019, page 53). At the level of this review, these ordinances were not reviewed to determine if they "nominally protect" YUBR, or if in fact they provide substantial protections within the limits of local control over private land use.

Recommended Management and Recovery Actions

The list of recommended management and recovery actions (CBD 2019, page 65), while ambitious, is notable in that only one (a recovery plan) is directly related to CESA listing. The remainder could easily be enacted independently, although a CESA listing may provide focus for YUBR and spur such actions. CDFW (2020a, page 27) noted that "some of the suggestions are not within the Department's jurisdiction."

Conclusions

The ultimate question to be answered by this review is whether the existing scientific information in CBD's petition and the CDFW's review of that petition demonstrates that the YUBR, "…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…" (California Fish and Game Code Section 2067, in part, emphasis added).

It appears that CDFW has previously defined "foreseeable future" to include the contemplated timeline in the petition, which examines climate change modeling through the end of the 21st century (CBD 2019, page 63). In this case, the prolonged timeline further complicates some of the questionable assumptions raised above, which further increases the substantial uncertainty as to the actual effects of some threats to YUBR, including wildfire, climate change, and human development, particularly at the farther reaches of the foreseeable future. It may be that these threats, while seemingly real at present, would not reach the level of actually threatening YUBR for an uncertain and perhaps lengthy period of time, if at all.

Other entities have examined the rarity and threats to YUBR and found that it is not at sufficiently high risk at this time to warrant special status. At the federal level, the U. S. Fish and Wildlife Service (USFWS) determined that listing the Joshua tree as threatened or endangered under the federal Endangered Species Act (ESA) was not warranted on August 15, 2019. The California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants of California, which is considered a definitive source on the rarity of plants in the state, lists the Joshua tree as "Considered But Rejected" because it is "too common" (CNPS 2020).

The conclusion to the petition makes sweeping statements about the listing of YUBR as a symbolic action, as "an emblem of our society's failure to address the climate crisis" (CBD 2019, page 66). It should be noted that symbolism is not one of the criteria used to consider listings under the CESA. Nor is symbolism a noteworthy scientific principle. A symbolic listing of YUBR would likely divert staff time and funding to special protection and management actions. There are 286 taxa of federally- and/or state-listed plants in the state of California, including 100 taxa that are only listed by the state (CDFW 2020b). In addition, there are 168 taxa of federally- and/or state-listed wildlife in the state of California, including 39 taxa that are only listed by the state (CDFW 2019). The great majority of these taxa are rarer, and more likely to be threatened with extinction, than YUBR. Yet, a listing of YUBR would likely draw some staff resources and funding away from these other species, increasing their risk of extinction. While admittedly the CESA contains no provision for weighing risk of extinction of other species in a listing decision, it is worth asking if a symbolic listing is worth that risk.

References

California Department of Fish and Wildlife. 2020a. Evaluation of a Petition from the Center for Biological Diversity to List the Western Joshua Tree (*Yucca brevifolia*) as Threatened under the California Endangered Species Act. Available online at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=178625&inline. Accessed June 9, 2020.

California Department of Fish and Wildlife. 2020b. State and Federally Listed Endangered, Threatened, and Rare Plants of California. January 2, 2020.

California Department of Fish and Wildlife. 2019. State and Federally Listed Endangered, Threatened Animals of California. August 7, 2019.

California Native Plant Society. 2020. Inventory of Rare and Endangered Plants of California. Available online at: http://www.rareplants.cnps.org. Accessed June 9, 2020.

Center for Biological Diversity. 2019. A Petition to list the Western Joshua Tree (*Yucca brevifolia*) as Threatened under the California Endangered Species Act. Available online at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=175218&inline. Accessed June 3, 2020.

June 11, 2020

Original on file,
received June 11, 2020

Mr. Eric Sklar
President
California Fish and Wildlife Commission
P.O. Box 944209
1416 Ninth Street, Suite 1320
Sacramento, CA 94244-2090

Also emailed to fgc@fgc.ca.gov

Re: Petition to List the Western Joshua Tree; June 24-25 Hearing; Agenda item #27

Dear President Sklar,

Granite Construction Company is writing in strong opposition to the petition submitted by the Center for Biological Diversity to list the western Joshua tree as a threatened species under the California Endangered Species Act. The Joshua tree already receives protections at the federal, state, and local levels. Listing the tree would add redundant protections that place a significant financial burden on private landowners while doing little to address the long-term threat to the species.

The California desert is comprised of rural, underserved communities that face economic challenges unlike other areas of our state. Listing the Joshua tree would effectively halt future development at a time when California is grappling with housing shortages and rising homelessness.

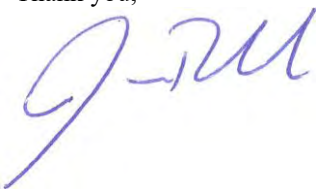
Even more troubling is the fact that the petition submitted by the Center for Biological Diversity fails to provide scientific evidence to substantiate a decline of the Joshua tree population. Instead, the petition predicts a future decline due to global climate change. The proposed listing is nothing more than a solution in search of a problem. Much of the western Joshua tree population resides on federally protected lands and state preserves, giving them the highest level of protection. As an example, Joshua Tree National Park's contains 792,623 acres (over 1,200 sq. miles) of habitat for the Joshua tree where it already has the ultimate protection. The Mojave National Monument is over 1.6 million acres and the National Park Service describes the desert solitude there as containing a "large Joshua tree forest". Outside of those jurisdictions, they are also already protected under state law through the California Desert Native Plants Act, which requires permitting for removal or transplant.

Granite Construction Co is the largest transportation infrastructure contractor in California with more than 2,800 employees in the state. Based in Watsonville, California and founded in 1922, the work that Granite performs is considered an essential public service, from making aggregate (sand and gravel), to producing asphalt and concrete paving materials, to rebuilding our roads, streets and bridges for state and local entities. The production of aggregate, asphalt and concrete requires years of planning, engineering, environmental review and permitting – all an expensive and risky venture process for private companies that invest in this state. Active aggregate production facilities that have been permitted under environmental review and mitigation under the authority of the California Endangered Species Act (CEQA) result in appropriate mitigation measures arising from guidelines such as the California Desert Native Plants Act. For operational aggregate and production facilities in the California desert, changing the mitigation measures for previously approved

facilities will result in increased costs, uncertainty, and a reduction in the ability to produce and utilize such aggregate reserves. This means lower employment, more costly public and private construction, and less efficiency in spending the valuable SB1funding approved by the legislature and Governor, and subsequently upheld by an overwhelming margin by the voters. Given that these active facilities are operational, have previously undergone science-based impact analysis, and are operating under CEQA-approved mitigation measures for many species including the western Joshua tree, Granite urges the Commission to recognize these types of facilities and exempt or grandfather them from the effects of a candidate listing review that is not science-based.

I urge you to consider the significant impacts this potential listing will have on the employees and businesses in the rural desert communities and respectfully ask that you deny this petition.

Thank you,



Jim Radich
Senior Vice President
California Operating Group

Original on file,
received August 5, 2020

August 5, 2020

Mr. Eric Sklar
President
California Fish and Game Commission
1416 9th Street, Suite 1320
Sacramento, CA 95814

Re: California Fish and Game Commission Meeting - August 19-20, 2020
Agenda Item 25: Petition to list the Western Joshua Tree as Threatened pursuant to the California Endangered Species Act

Dear President Sklar:

Our organizations endorse the attached comments from Briscoe, Ivester & Bazel on behalf of the California Building Industry Association, California Alliance for Jobs, California Business Properties Association, California Farm Bureau Federation, California Construction and Industrial Materials Association, California Manufacturers and Technology Association, California Cattlemen's Association, Joshua Tree Gateway Association of Realtors, and Southwest Riverside County Association of Realtors regarding Item #25 on the August 19-20, 2020, California Fish and Game Commission meeting agenda – Western Joshua Tree. As noticed on the Commission's August 19-20, 2020 agenda, the Commission will consider and potentially act on the Petition to determine whether the petitioned action may be warranted.

As discussed in the attached document, our organizations are concerned by the clear absence of "sufficient information" in the Petition, as prescribed in Fish and Game Code section 2072.3, regarding the "abundance" and "population trend" of the western Joshua tree to indicate that listing the species may be warranted. For example, the Petition fails to offer any estimate of the abundance of the western Joshua tree, so there is no showing for the Department or Commission to even evaluate with respect to this statutorily required factor.

We are concerned that should the Commission determine that the petitioned action may be warranted – even in light of the fact that there is zero information in the petition regarding "abundance" and "population trend" – that it will provide a justification for future petitioners to

dispense with any pretense of addressing the abundance and population trend of a species (or, indeed, any other statutorily required factor impacting species survival). This is not a question regarding whether the petitioned action may be warranted, but rather whether there is sufficient information regarding each of the statutorily required categories upon which the Commission can base its findings.

Based on the issues raised in the attached document as well as other concerns raised by other commenters objecting to the Petition, we urge the Commission to find that the Petition does not contain sufficient information regarding abundance and population trend to indicate that listing the western Joshua tree may be warranted, and reject the Petition.

Sincerely,

Tyler Munzing
American Council of Engineering Companies, California

Peter Tateishi
Associated General Contractors of California

Michael Quigley
California Alliance for Jobs

Michael Miiller
California Association of Winegrape Growers

Nick Cammarota
California Building Industry Association

Rex S. Hime
California Business Properties Association

Kirk Wilbur
California Cattlemen's Association

Frank T. Sheets, III
California Cement Manufacturers Environmental Coalition

Valerie Nera
California Chamber of Commerce

Sunshine Saldivar
California Farm Bureau Federation

Rich Gordon
California Forestry Association

Lance Hastings
California Manufacturers and Technology Association

Adam Harper
California Construction and Industrial Materials Association

Dan Macon
California Wool Growers Association

Jody Rich-Ramirez
Joshua Tree Gateway Association of REALTORS®

James Camp
National Association of Industrial and Office Properties – California Chapters

Gene Wunderlich
Southwest Riverside County Association of Realtors®

Gail Delihant
Western Growers Association

cc: Commission Vice President Samantha Murray
Commissioner Jacque Hostler-Carmesin
Commissioner Russell Burns
Commissioner Peter S. Silva
Executive Director Melissa Miller-Henson, California Fish and Game Commission
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August 5, 2020

By Email
California Fish and Game Commission
1416 Ninth Street, Suite 1320
Sacramento, CA 95814

Re: Petition to List Western Joshua Tree

Dear Members of the Commission:

Introduction

I write on behalf of the California Building Industry Association, California Alliance for Jobs, California Business Properties Association, California Farm Bureau Federation, California Construction and Industrial Materials Association, California Manufacturers and Technology Association, California Cattlemen's Association, Joshua Tree Gateway Association of Realtors, and Southwest Riverside County Association of Realtors to call to the Commission's attention deficiencies in the Petition, dated October 15, 2019, by the Center for Biological Diversity (CBD) to list the western Joshua tree as threatened under the California Endangered Species Act (CESA). The Petition plainly fails to provide "sufficient information," as prescribed in Fish and Game Code section 2072.3, regarding the "abundance" and "population trend" of the western Joshua tree to indicate that listing the species may be warranted. Abundance and population trend, naturally, are two of the most obvious and important factors in determining whether a species warrants listing, yet CBD acknowledges that its Petition does not provide either an estimate of western Joshua tree abundance or evidence of a rangewide population trend. Nor does CBD explain why it failed to obtain or provide any such information. If a petition as deficient as this one is deemed acceptable, one is hard put to imagine why the Legislature bothered to require petitions to include such information or direct the Commission to assess the "abundance" and "population trend" of a species when deciding whether to accept a petition for further consideration. (Fish & Game Code §§ 2072.3, 2074.2.) The Commission should reject the Petition in keeping with section 2074.2.

Legal Background

The Commission is authorized to list certain species as threatened or endangered under CESA. The Act allows an interested person to petition the Commission to list a species (Fish & Game Code § 2071) and establishes a process for the Commission's consideration of such a petition. After referring a petition to the Department of Fish and Wildlife to evaluate whether the petition

contains sufficient information to indicate that the petitioned action may be warranted and receiving the Department's evaluation report and recommendations, the Commission must hold a public hearing and then determine whether the petition contains "sufficient information" to indicate that the petitioned action "may be warranted." (Fish & Game Code §§ 2073, 2073.5, 2074.2.) If the Commission determines that the petition does not provide sufficient information, it must reject the petition (*Id.* § 2074.2(e)(1)), and that ends the process. If the Commission determines that the petition does provide sufficient information, it must accept it for consideration. (*Id.* § 2074.2(e)(2).) If the petition is accepted, the species becomes a "candidate" for listing (*id.*) and is treated under CESA much the same as a listed species (*id.* § 2085). The Department must then review the status of the species and, within 12 months, submit to the Commission a report indicating whether the listing is warranted. (*Id.* § 2074.6.) After receiving the Department's report, the Commission must hold a public hearing and then determine whether the petitioned action "is warranted." (*Id.* § 2075.)

The Legislature prescribed the necessary contents of a petition:

> To be accepted, a petition shall, at a minimum, include sufficient scientific information that a petitioned action may be warranted. Petitions shall include information regarding the population trend, range, distribution, abundance, and life history of a species, the factors affecting the ability of the population to survive and reproduce, the degree and immediacy of the threat, the impact of existing management efforts, suggestions for future management, and the availability and sources of information. The petition shall also include information regarding the kind of habitat necessary for species survival, a detailed distribution map, and any other factors that the petitioner deems relevant.

(*Id.* § 2072.3.)

The California Court of Appeal has elaborated on the standard to be applied by the Commission in finding facts and exercising its discretion regarding accepting or rejecting a petition:

> "[T]he term 'sufficient information' in section 2074.2 means that amount of information, when considered with the Department's written report and the comments received, that would lead a reasonable person to conclude the petitioned action may be warranted." The phrase "may be warranted" "is appropriately characterized as a 'substantial possibility that listing could occur.'" (*Natural Resources Defense Council, supra*, at p. 1125.) "Substantial possibility," in turn, means something more than the one-sided "reasonable possibility" test for an environmental impact report [under the California Environmental Quality Act] but does not require that listing be more likely than not [akin to the "reasonably probable" standard required for preliminary injunctions].

(*Center for Biological Diversity v. Fish & Game Com.* (2008) 166 Cal.App.4th 597, 609-610.)

Petition

As noted above, section 2072.3 provides that to be accepted, a petition to list a species must, at a minimum, include sufficient scientific information that the listing may be warranted and must include information regarding, among other things, the "population trend" and "abundance" of the species.

CBD's discussion of both population trend and abundance, comprising but one page of its petition, may readily be summarized. CBD first admits:

> Due to the species' patchy distribution within its range, highly variable population density (4 to 840 trees per acre) and lack of range-wide population surveys, a reliable estimate of Joshua tree population size is not available (USFWS 2018). Similarly, no range-wide population trends have been documented.

(Petition, p. 19.) It then points to some recent studies and speculates about population decline:

> However, recent studies carried out in portions of the species' range indicate that density is negatively correlated with increasing temperature, the species range is contracting at lower elevations, recruitment is limited, and mortality is increasing, all of which would likely reflect a population already starting to decline.

(*Id.*) After briefly describing four studies, none of which speak of the rangewide abundance or population trend of the western Joshua tree, CBD concludes:

> Regardless of whether Joshua tree abundance is already declining, it is virtually certain that abundance will decline in the foreseeable future. The impacts of climate change, fire, habitat loss and other sources of mortality are discussed further [elsewhere in the Petition].

(*Id.*, p. 20.)

Department's Evaluation Report

The Department's discussion of both population trend and abundance in its Evaluation Report, dated February 2020, is similarly brief.

With respect to population trend, the Department observes:

> The Petition acknowledges that a reliable estimate of western Joshua tree population size is not available and that no range-wide population trends have been documented. The Petition therefore relies on studies indicating that western Joshua tree density is negatively correlated with increasing temperature, the species range is contracting at lower elevations, recruitment is limited, and plant mortality is increasing.

(Evaluation Report, p. 8.) It then summarizes the four studies in a brief paragraph devoted to each. The Department also states that it received two other reports on western Joshua tree populations at Edwards Air Force Base:

> One of these reports describes a geographic information system (GIS) based analysis that was conducted to determine population trends for western Joshua tree at Edwards Air Force Base between 1992 and 2015 (USAF 2017a). The report suggests that western Joshua tree populations on the base were stable to increasing; however, the report describes several issues that increase the uncertainty of the results. The second report describes a GIS analysis, literature review, and field survey conducted of a 1999 fire area on Edwards Air Force Base to evaluate western Joshua tree survivorship and/or regeneration (USAF 2017a). The report used aerial photography taken in 1992 to count all identifiable western Joshua trees present in two areas prior to the 1999 fire and compared this information with the results of a 2017 field survey that identified all western Joshua trees in these same two areas. This report concludes that Joshua tree populations were stable in the sampled areas of the fire area from 1992 to 2017.

(*Id.*, p. 9.)

The Department concludes:

> The Petition does not present an estimate of western Joshua tree population size, nor does it provide evidence of a range-wide population trend; nevertheless, the Petition does provide information showing that some populations of western Joshua tree are declining, particularly within Joshua Tree National Park. The Petition provides sufficient information on the population trend of western Joshua tree for the Department to make the recommendation [that the Commission accept the Petition for further consideration].

(*Id.*)

With respect to abundance, the Department observes that "[t]he Petition acknowledges that a reliable estimate of western Joshua tree population size is not available." (*Id.*, p. 13.) The Department notes that the Petition states that "the western Joshua tree has a patchy distribution and a variable population density of 4 to 840 trees per acre" and "includes information demonstrating that western Joshua tree currently has a relatively widespread distribution in southern California." (*Id.*)

The Department describes, apart from the Petition, other relevant scientific information that it has indicating the relatively high abundance of western Joshua trees:

> [T]he Department possesses vegetation maps that cover a large portion of the California deserts where western Joshua tree occurs. It may be possible to use cover estimates from these maps as a rough proxy for western Joshua tree abundance;

> however, the Department does not possess this information for the entire western Joshua tree distribution in California. The range, distribution, and density information available to the Department indicates that the abundance of western Joshua tree is currently relatively high.

(*Id.*)

The Department concludes:

> The Petition acknowledges that a reliable estimate of western Joshua tree population size is not available; however, information available to the Department indicates that the abundance of western Joshua tree is currently relatively high. The Petition provides sufficient information on the abundance of western Joshua tree for the Department to make the recommendation [that the Commission accept the Petition for further consideration].

(*Id.*, pp. 13-14.)

Discussion

The Petition Does Not Contain Sufficient Information Regarding The Abundance Of Western Joshua Tree To Indicate That Its Listing May Be Warranted

For many reasons, the Petition falls far short of providing sufficient information regarding the abundance of the western Joshua tree to indicate that listing of the species may be warranted.

First and most obvious, the Petition does not provide an estimate of the abundance of the western Joshua tree. Indeed, CBD acknowledges as much. (Petition, p. 19.)

Second, while the Petition points to four studies of certain characteristics of the western Joshua tree, it does not even venture to assert what, if anything, these studies may reveal about the abundance of the western Joshua tree. Put bluntly, the Petition says nothing to indicate the current abundance of the western Joshua tree.

Third, the Department in any event observes that available evidence belies any implicit suggestion that the abundance of the western Joshua tree is anything but robust. Noting that it "possesses vegetation maps that cover a large portion of the California deserts where western Joshua tree occurs," the Department confirms that "[t]he range, distribution, and density information available to the Department indicates that the abundance of western Joshua tree is currently relatively high." (Evaluation Report, p. 13.)[1]

[1] After acknowledging that the Petition does not estimate western Joshua tree abundance and offering its own assessment that its abundance is "relatively high," the Department nonetheless concludes that "[t]he Petition provides sufficient information on the abundance of western Joshua tree" for the Department to recommend accepting it. (Evaluation Report, pp. 13-14.) One might be forgiven for wondering how the Department could reach such a conclusion, since it appears contrary to the cited facts and the Department offers no explanation of how or

Fourth, while the Commission and the Court of Appeal have, *in appropriate circumstances*, allowed petitioners to get by without providing reliable information about a species' abundance and instead resort to reasonable inferences about abundance drawn from incomplete evidence, no such alternative approach is warranted here, nor is any such inference justified by the information in the petition. In *Center for Biological Diversity v. Fish & Game Com.* (2008) 166 Cal.App.4th 597, the court considered whether a petition to list the California tiger salamander (CTS) contained sufficient information to indicate its listing may be warranted. As the court observed, CTS spend most of their adult lives out of sight in underground burrows, and individual CTS emerge only infrequently, sporadically, and briefly to breed. (*Id.*, pp. 601-603.) In that case too limited scientific data was available on the abundance of the species, and there was no comprehensive, rangewide population estimate. (*Id.*, p. 602.) Owing to the difficulty of estimating total population size, the Department concluded that "absent long-term monitoring data produced by a scientifically designed study, attempting to estimate the total population size rangewide is not appropriate." (*Id.*, pp. 602-603.) CBD offered instead an estimate of the number of breeding females, 4,479, derived from statistical analysis (comprised largely of assumptions) regarding known breeding ponds. (*Id.*, p. 603.) Noting again the characteristics of CTS complicating estimating abundance, the court found CBD's estimate of breeding female salamanders plausible and found that it supported a prima facie showing that CTS may be threatened or endangered. (*Id.*, p. 611.)

Here, circumstances are anything but appropriate to accept the paltry information in the Petition. As noted above, CBD fails to offer *any* estimate of the abundance of the western Joshua tree, so there is no showing even to evaluate with respect to this statutorily required factor.

Even if CBD had ventured an estimate of abundance, there is no reason for it to suggest it could do so by resorting to some less reliable, indirect approach. Unlike the CTS, the western Joshua tree does not move and does not hide. Rather, it stands still and stands out prominently on the desert landscape, 24/7/365—just waiting to be observed and counted. CBD offers no excuse for its failure simply to look and count. Given the relative ease with which a reliable estimate of western Joshua tree abundance may be obtained, this is not an appropriate circumstance for a petition to fail to provide such an estimate.

Similarly, even if CBD had asserted that inferences might be drawn from the studies it cited to derive an estimate of western Joshua tree abundance, no such inference is appropriate here. As the court explained in *Center for Biological Diversity v. Fish & Game Com.* (2008) 166 Cal.App.4th 597, when presented with information supporting a prima facie showing, a reasonable person would conclude there is a substantial possibility that listing could occur, "unless the countervailing information and logic, persuasively, wholly undercut some important component of that prima facie showing." (*Id.*, p. 612.) The court then considered the absence of an estimate of CTS abundance

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why it concluded otherwise. California courts have long called on agencies to "set forth findings to bridge the analytic gap between the raw evidence and ultimate decision or order." (*Topanga Assn. for a Scenic Community v. County of Los Angeles* (1974) 11 Cal.3d 506, 515.) The Department has failed to do so here. With apologies to Ricky Ricardo, "Lucy, you got some 'splainin' to do."

and concluded "[t]he absence of historic population counts of the species, *given its reclusive characteristics*, does not greatly diminish the strength of the inferences of threat or endangerment that arise from the showing of habitat loss." (*Id.*, emphasis added.) Noting that the strength of inferences from circumstantial evidence varies, the court added:

> Pointing to an absence of evidence that could provide a stronger inference of population decline, alone, does nothing to diminish the evidence that was provided. That would only undermine the existing showing if the absent evidence was available but was suppressed because it was unfavorable.

(*Id.*, fn. 15.)

Here, unlike the CTS, the western Joshua tree is not reclusive nor hard to find; one need only look and count. CBD though averted its eyes from such evidence, failed to provide it to the Commission, and failed to provide any estimate of western Joshua tree abundance. Moreover, the Department independently concluded from information apart from the Petition that western Joshua tree abundance is "relatively high"—not a finding that, in and of itself, would suggest the species is threatened or endangered. Under these circumstances, any contrary inference CBD may wish to draw from its cited studies is wholly undercut.

The Petition Does Not Contain Sufficient Information Regarding The Population Trend Of Western Joshua Tree To Indicate That Its Listing May Be Warranted

CBD does not offer a separate discussion of population trend, and instead collapses its discussion of both abundance and population trend into a single page in the Petition. Glossing over these fundamental factors suggests that information regarding them would not advance a finding that listing the western Joshua tree may be warranted. Because CBD treated abundance and population trend together in its Petition, the reasons the Petition is deficient with respect to population trend track in many respects those discussed above with respect to abundance.

First, the Petition does not provide information of a rangewide population trend of the western Joshua tree. CBD acknowledges as much. (Petition, p. 19.)

Second, rather than attempt to demonstrate what, if anything, the four studies it cites may reveal about a rangewide population trend of the western Joshua tree, CBD punts. It instead asserts that "[r]egardless of whether Joshua tree abundance is already declining," it will decline in the future and impacts of climate change, fire, and habitat loss are discussed elsewhere in the Petition. (Petition, p. 20.)

Third, much as explained above with respect to abundance, while the Commission and the Court of Appeal have, in appropriate circumstances, allowed petitioners to get by without providing reliable information about a species' population trend and instead resort to reasonable inferences drawn from incomplete evidence, this is not such a circumstance. Even if CBD had ventured to assert a rangewide population trend, there is no reason for it to suggest it could do so by resorting to some less reliable, indirect approach like resorting to studies, such as it cites, regarding other aspects

of the species.[2] The western Joshua tree does not move and does not hide. Moreover, it stands prominently on the desert landscape. One need only look to observe them on the landscape or on current and historical aerial photographs. CBD offers no excuse for its failure simply to look and count to ascertain a population trend. Given the relative ease with which a reliable population trend of the western Joshua tree could be derived, this is not an appropriate circumstance for a petition to fail to provide such fundamental, important information.

Moreover, even if one deemed resort to some alternative approach otherwise reasonable, no inference about population trend that might conceivably be drawn from the studies CBD cited is appropriate here, since CBD failed even to try to obtain the most obvious, definitive, and readily available evidence simply by looking and counting. Blinding itself to such evidence does not lend credence to whatever inference CBD might posit from the paltry information it offered.

Indeed, the U.S. Air Force provided two reports on western Joshua tree populations at Edwards Air Force Base to the Department that showed how such a direct assessment of population trend can and should be done. As described by the Department, two geographic information system (GIS) based analyses were conducted, drawing on aerial photography, literature review, and field surveys, to determine population trends, one from 1992 to 2015 and the other from 1992 to 2017. One concluded that the western Joshua tree population on the Base was "stable to increasing," and the other that the population in the study area of an earlier fire was "stable." (Evaluation Report, p. 7.)

Any inference about population trend that might be drawn from CBD's cited studies would be wholly undercut by CBD's failure to seek and obtain the best evidence readily available to it and by the forthright observe-and-count studies that show populations in sampled areas to be stable and even increasing.

Conclusion

CBD's Petition fails to provide even the most basic information about two critical factors in determining whether a species' listing may be warranted: information about its "abundance" and "population trend." CBD indeed seems to dismiss these statutory requirements of a petition as all but unnecessary. It describes a few studies of various aspects of the western Joshua tree apparently as eyewash, but fails even to assert, much less explain, what, if anything, these studies might show about the species' rangewide abundance or population trend. Rather, CBD summarily dispenses with these statutory requirements by turning instead to argue only that "[r]egardless of whether Joshua tree abundance is already declining," it will decline in the future. (Petition, p. 20.)

The Legislature though presumably included "abundance" and "population trend" among the factors that must be addressed in petitions for good reason. It presumably had good reason as

[2] The Department inexplicably seems to give more credence to the studies CBD cites than CBD even asserts, and concludes that the Petition provides sufficient information on population trend for it to recommend acceptance of the Petition. (Evaluation Report, p. 9.)

well to call on the Commission to consider these two factors in deciding whether a petition provides sufficient information to indicate a species' listing may be warranted.

Were CBD's Petition to be deemed adequate, and accepted for further consideration, the Legislature's requirements would be rendered a dead letter. Future petitioners may well dispense with any pretense of addressing the abundance and population trend of a species (and, indeed, perhaps other factors prescribed in section 2072.3), and instead hire experts simply to opine what the future may bring with climate change, fires, and all.

The Commission should adhere to the Legislature's requirements, find that the Petition does not contain sufficient information regarding abundance and population trend to indicate that listing the western Joshua tree may be warranted, and reject the Petition.

Very truly yours,

BRISCOE IVESTER & BAZEL LLP

David Ivester

DMI/mh

CALCIMA

California Construction and
Industrial Materials Association

August 6, 2020

**Original on file,
received August 6, 2020**

Eric Sklar
President
California Fish and Game Commission
P.O. Box 944209
Sacramento, CA 94244-2090
fgc@fgc.ca.gov

Re: Comments – Petition to list western Joshua tree (*Yucca brevifolia)* as a threatened species under the California Endangered Species Act

Dear Mr. Sklar,

California Construction and Industrial Materials Association ("CalCIMA") submits this letter opposing further action on the petition ("Petition") submitted by the Center for Biological Diversity ("CBD") to list the western Joshua tree as a threatened species under the California Endangered Species Act ("CESA") Fish & Game Code §§ 2050 *et seq.*. We respectfully request the California Fish and Game Commission ("Commission") reject the Petition for the enumerated reasons expressed in this letter, including: (i) the Petition's failure to include statutorily required scientific information regarding western Joshua tree population trends and abundance; (ii) the Petition's failure to demonstrate that neither threats such as climate change and habitat loss, nor the western Joshua tree's response to those threats, will occur within the "foreseeable future;" and (iii) the Petition's failure to include sufficient information regarding existing regulations.[1]

CalCIMA is a statewide trade association representing construction and industrial material producers operating in California. Our members supply the materials that build our state's infrastructure, including public roads, rail, and water projects; help build our homes, schools and hospitals; assist in growing crops and feeding livestock; and play a key role in manufacturing wallboard, roofing shingles, paint, low-energy light bulbs, and battery technology for electric cars and windmills. The continued availability of our members' materials are critical to ensuring California meets its renewable energy, affordable housing, and infrastructure goals. CalCIMA represents its member-producers on a statewide level on issues involving regulation, land use, and environmental protections, among other things. Because the proposed listing of the western Joshua tree fails to meet the basic listing criteria under the California Endangered Species Act ("CESA") and will have drastic impacts on CalCIMA's members, CalCIMA urges the listing be rejected from further consideration.

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[1] CalCIMA requests this letter be included in the administrative record for this Petition. Additionally, CalCIMA incorporates by reference herein the arguments and factual assertions contained in the various letters submitted to the Commission by individual members of CalCIMA opposing further action on the Petition, as well as the prior letter submitted by the California Cement Manufacturers Environmental Coalition (CCMEC) that includes CalCIMA, dated June 11, 2020.

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www.calcima.org
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On November 12, 2019, the California Fish and Game Commission ("Commission") provided public notice that it received, on October 21, 2019, a petition ("Petition") from the Center for Biological Diversity ("CBD") to list the western Joshua tree (*Yucca brevifolia*) as threatened under CESA. Also in November 2019, the Commission provided the Petition to the California Department of Fish and Wildlife ("CDFW") for further evaluation. In February 2020, CDFW provided the 90-day "Evaluation of a Petition from the Center for Biological Diversity to List the Western Joshua Tree (*Yucca Brevifolia*) as Threatened Under the California Endangered Species Act" ("90-Day Evaluation"). CDFW's 90-Day Evaluation recommended "the Commission accept the Petition for further consideration under CESA" because the Petition contains sufficient scientific information indicating further listing of the western Joshua tree "may be warranted." (90-Day Evaluation at p. 29.)

EXECUTIVE SUMMARY

Neither CDFW's 90-Day Evaluation nor the Petition itself contain sufficient scientific information to support further consideration of the proposed listing, and no reasonable person could find the western Joshua tree should be listed as threatened. Accordingly, and as discussed in greater detail below, **CalCIMA urges the Commission to reject the Petition and not declare the western Joshua tree as a candidate species for the following reasons:**

1. The Petition does not include the statutorily required scientific information regarding western Joshua tree population trends and abundance;
2. The Petition does not demonstrate that either threats such as climate change and habitat loss, or the western Joshua tree's response to those threats, will occur within the "foreseeable future;" and
3. The Petition fails to include sufficient scientific information that demonstrates existing regulations are insufficient.

CalCIMA sincerely appreciates both the opportunity to provide comments to the Commission regarding the Petition and the Commission's careful consideration of the Petition's failure to meet the basic statutory requirements, especially given the unnecessary and substantial impacts accepting the Petition would have on CalCIMA and its members.

DISCUSSION

1. The Petition Fails to Include Sufficient Scientific Information Regarding Western Joshua Tree Population Trends and Abundance

The Commission must follow specific CESA statutory requirements and regulatory guidance when determining whether a petition is complete. Specifically,

> *[a]n incomplete petition shall be returned to the petitioner by the commission staff within 10 days of receipt. A petition shall be deemed incomplete if it is not submitted on [Form] FGC-670.1 (3/94) or fails to contain information in each of the required categories set forth in subsection (d)(1).*

(14 CCR § 670.1(b).)[2]

Furthermore, CDFW must independently assess whether the information contained in the petition is accurate and credible and cannot simply accept the petitioner's claims as sufficient to support further action. (*Natural Resources Defense Council v. Fish & Game Com.* (1994) 28 Cal.App.4th 1104, 1125.) Thus, regulations require *both* the Commission and CDFW to review the Petition for completeness and determine that the Petition contains information in each of the required categories set forth in statute and regulation, including population trends and abundance. (Fish & G. Code §§ 2072.3, 2073.5; 14 CCR §670.1(d).) The petitioned action may be warranted *only if* the Petition contains the required information.[3]

CDFW acknowledges in the 90-Day Evaluation that "The Petition does not present an estimate of western Joshua tree population size, nor does it provide evidence of a range-wide population trend" and that "a reliable estimate of western Joshua tree population size is not available." (90-Day Evaluation at p. 2.) CDFW further admits "Although a reliable estimate of western Joshua tree population size is not available, information available to the Department indicates that western Joshua tree is currently relatively abundant" (*Ibid.*)

The Petition acknowledges its own insufficiencies, stating,

> *"Due to the species' patchy distribution within its range, highly variable population density (4 to 840 trees per acre) and lack of range-wide population surveys, a reliable estimate of Joshua tree population size is not available (USFWS 2018). Similarly, no range-wide population trends have been documented."*

(Petition at p. 19.)

The Petition relies solely on "[a] series of small-scale studies in Joshua Tree National Park, at the *very edge of the species' range*, summarized in Cornett (2014)." (Petition at 20.) The Petition fails to demonstrate that these small-scale studies support a reasonable conclusion that western Joshua tree abundance is declining; that the studies are somehow more valid than other population studies that show stable western Joshua tree populations; or that decline is occurring uniformly across the species' range. Additionally, the Petition fails to discuss significantly larger and more recent studies undertaken at Edwards Air Force Base, located within the middle of the species' range, that describe *increasing*

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[2] Petition requirements are enumerated in California Fish & Game Code sections 2072.3, 2073.5, and regulations governing the administration of the requirements for listing, uplisting, downlisting, and delisting species are found in Title 14 of the California Code of Regulations section 670.1.

[3] The 90-Day Evaluation must evaluate whether a petition contains sufficient information on: (i) population trend; (ii) range; (iii) distribution; (iv) abundance; (v) life history; (vi) kind of habitat necessary for survival; (vii) factors affecting the ability to survive and reproduce; (viii) degree and immediacy of threat; (ix) impact of existing management efforts; (x) suggestions for future management; (xi) availability and sources of information; and (xii) a detailed distribution map. (Fish & G. Code §§ 2072.3, 2073.5; 14 CCR § 670.1(d).)

western Joshua tree populations.[4] Ignoring these less favorable (to its argument) and even contradictory studies, the Petition instead relies on conjecture and conclusory language and asserts, "[r]egardless of whether Joshua tree abundance is already declining, it is virtually certain that abundance will decline in the foreseeable future." (Petition at p.20). The term 'virtually' indicates a lack of evidence to support CBD's dire predictions and CBD's attempts to mischaracterize the state of scientific information and otherwise ignore required legal standards.

Despite CDFW's and CBD's recognition that the scientific evidence is lacking, and the Petition's failure to provide a balanced discussion of the science that is available, CDFW's 90-Day Evaluation concludes that the Petition is sufficient, *in violation of regulatory requirements*. In short, there is no legally supportable basis that allows CDFW to determine that the Petition contains sufficient information on either population trends or abundance.

CDFW and the Commission cannot disregard regulatory requirements and cannot lawfully allow, let alone recommend further consideration of the Petition. The Petition does not include sufficient scientific information regarding western Joshua tree population trends or abundance, and further action under CESA is not warranted.

2. The Petition Does Not Provide Sufficient Scientific Information to Demonstrate that the Western Joshua Tree is Likely to Become Endangered in the "Foreseeable Future" Due to Climate Change or Habitat Loss

A species may be listed as "threatened" only if it "is likely to become an endangered species in foreseeable future." (Cal Fish & G. Code § 2067.) As it relates to endangered species, "foreseeable future" is generally defined as the time period in which one "can reasonably determine *both* the future threats and the species' response to those threats are likely." (50 C.F.R. § 424.11(d); *see also Natural Resources Defense Council, supra*, 28 Cal.App.4th at 1124 (by definition, a species to be listed as threatened is "on the brink of survival" not simply subject to possible threats).) Thus, the western Joshua tree can only be listed as threatened if the Petition provides sufficient information regarding *both* threats *and* the species' response to such threats. Here, the Petition fails to demonstrate the western Joshua tree will likely become endangered in the "foreseeable future" and CBD does not provide sufficient information regarding *either* the future threats of climate change or habitat loss or the western Joshua tree's response to those threats.

First, the Petition fails to reconcile multiple, divergent climate models. The Petition admits that "While temperature projections for the Mojave are unidirectional . . . precipitation projections are complicated and divergent." (Petition at p. 33.) Furthermore, when describing the anticipated impacts of climate change on the western Joshua tree, the Petition describes a laundry-list of climate models

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[4] See U.S. Air Force, Joshua Tree Historical Status on Edwards AFB. 412th Civil Engineering Group. Environmental Management Division. Edwards Air Force Base (2017a); U.S. Air Force, Joshua Tree Survivorship and/or Regeneration in Fire Area on Edwards Air Force Base. 412th Civil Engineering Group. Environmental Management Division. Edwards Air Force Base (2017b).

(primarily conducted between 1998 and 2003) but does not address those models' scattershot findings. For example, the Petition describes one 2003 model and acknowledges that while "a considerable portion of the current range of *Y. brevifolia* will become climatically unfavorable . . . significant amounts of new habitat may become available." (Petition at p. 35.) Despite the models indicating that the models themselves and climate change impacts are unknown and may vary significantly, the Petition presents only the worst-case scenarios. Simply stating the worst case scenario is not sufficient to demonstrate that climate change presents a foreseeable threat to the western Joshua tree or that the species' response to climate change will result in a change in the species' status in the foreseeable future. The models CBD presents simply provide too many different potential outcomes, making it impossible to understand both the scope of potential future threats *and* the species' response thereto.

There have been nearly 40 years of dire predictions regarding the health of western Joshua tree populations; which have thus far been inaccurate. Nevertheless, the Petition requests the Commission look 80 years in the future without sufficient data. Simply put, the Petition offers conjecture regarding a hypothetical future fate of the western Joshua tree but does not sufficiently demonstrate that the western Joshua tree is likely to become endangered in the foreseeable future.

Second, the Petition argues the western Joshua tree is facing significant habitat loss due to urban development and infrastructure development (roads, highways, transmission lines, industrial facilities, and renewable energy projects). (Petition at pp. 46-47.) The Petition also argues that existing local and state regulations are insufficient to protect against habitat loss. The Petition insinuates that California state parks are the only adequate existing protection for western Joshua tree habitat and that state statutes, including the California Environmental Quality Act ("CEQA") and Desert Native Plant Act ("DNPA"), and local tree protection ordinances are insufficient because the regulations do not outright prohibit western Joshua tree removal or may be amended or rescinded. (Petition at pp. 52-53, 57-58.)

Despite the Petition's ready dismissal of existing regulatory mechanisms, the western Joshua tree is sufficiently protected by state and local regulations, as further discussed below. Removal of a western Joshua tree generally requires a permit from the local authority and requires the removed western Joshua tree to be replanted, rather than destroyed. (*See, e.g.,* San Bernardino County Code § 88.01.50; .Hesperia Municipal Code § 16.24; *see also* Appendix A for a list of existing regulatory programs and policies.) Additionally, a significant portion of the species' habitat is already subject to a level of protection by virtue of being located on Federally owned lands.[5] (Felicia Sirchia, Scott Hoffman, and Jennifer Wilkening, "Joshua Tree Species Status Assessment," U.S. Fish and Wildlife Service (July 20, 2018) at 2.)

The Petition's predictions of climate change and habitat loss, and its presumption that existing regulatory mechanisms are insufficient to prevent negative impacts to the western Joshua tree, do not demonstrate that the western Joshua tree is likely to become endangered in the foreseeable future, as

[5] There are two regions populated by western Joshua tree. The *Yucca brevifolia* ("YUBR") South population region is comprised of approximately 3,661,960 acres, of which 47 percent is federally owned. The North population region is comprised of approximately 1,977,837 acres, of which 96 percent is federally owned.

is required to list a species as threatened under CESA (Cal Fish & G. Code § 2067.) The Petition instead presents hypothetical threats – of inconsistent statutory application – and panders to misplaced fear of political discretion rather than demonstrating sufficient scientific information of actual threats to the species.

3. The Petition Does Not Include Sufficient Scientific Information Discussing Existing Management Efforts and Does Not Acknowledge that CESA Protections are Duplicative of Existing Management Efforts

The Petition misleadingly states, "No existing regulatory mechanism are [sic] currently in place at the international, national, state or local level that adequately address the threats facing *Y. brevifolia*" (Petition, p. 48). This statement is wholly inaccurate. Land throughout the YUBR South region is subject to a vast number of existing regulations and policies that protect western Joshua trees. The Petition does not meaningfully address these regulatory protections. Rather, the Petition's arguments reflect mere disagreement with how existing statutes are implemented. The Petition insinuates that the only effective species' protections are absolute prohibitions on "take." (Petition at p. 53.) However, even CESA does not prohibit take; it simply requires a permit to engage in take – a limitation similar to existing regulations.

The Petition's 'Inadequacy of Existing Regulatory Mechanisms' section also focuses on CBD's political convictions that the current Presidential administration's "harmful rollbacks of federal climate policy" (Petition, p. 49) should be redressed on the state level. The Petition provides no meaningful discussion of California's multiple existing climate change policies that protect our State's communities and natural environments. The Petition also fails to discuss the multiple local regulations that directly protect western Joshua trees. These regulations include:

- Eight municipalities, including towns, cities, and counties which protect western Joshua trees and require permits prior to disturbance or removal;
- Multiple designations of western Joshua trees as "ecologically significant" or requiring additional environmental review of impacts to western Joshua trees;
- State-level environmental review laws, including the California Environmental Quality Act ("CEQA") and Desert Native Plant Act ("DNPA"), which require environmental review and mitigation; and
- Multiple local "Climate Action Plans" that address climate change impacts on desert ecosystems.[6]

Taken together, these local and state regulatory requirements adequately protect the western Joshua tree and CESA's protection provisions will therefore be redundant. That is, "take" of western Joshua tree is already prohibited or otherwise regulated at the local and county level and projects that impact

[6] A table summarizing local and state regulations that protect the western Joshua tree is attached as Appendix A to this letter.

western Joshua trees are required to obtain permits and mitigate for those impacts to western Joshua trees. CESA protections will not add a meaningful additional layer of protection, and, instead, will simply shift permitting requirements from the desert to Sacramento.

The volume and breadth of existing regulations adequately protect the western Joshua tree. Additional protection under CESA will be redundant and will not provide any additional protection. Imposing these duplicative and unnecessary restrictions would be especially inappropriate given the extensive and harmful impacts the listing process would have on numerous operations and projects of CalCIMA's members. CBD's failure to address existing protections is yet another example of how the Petition mischaracterizes the status of the western Joshua tree in order to try and force a listing decision lacking scientific merit.

CONCLUSION

CalCIMA thanks the Commission for considering these comments. We respectfully ask the Commission to reject the Petition and not declare the western Joshua tree to be a candidate species pursuant to being listed as threatened under CESA. Please contact Suzanne Seivright-Sutherland with any questions or concerns at (951) 941-7981 or at sseivright@calcima.org.

Sincerely,

Robert Dugan
President & CEO

cc: Charlton Bonham, Director, California Department of Fish and Wildlife
Kerry Shapiro, Esq., Jeffer Mangels Butler & Mitchell LLP
Dan L. Quinley, Esq., Jeffer Mangels Butler & Mitchell LLP

APPENDIX A: CHART OF EXISTING STATE AND LOCAL WESTERN JOSHUA TREE REGULATIONS

Authority	Description of management effort	Code/General Plan/Policy Links
	Local Management Efforts	
City of Adelanto	Permit required for removal - code requires compliance with requirements of San Bernardino for relocation of western Joshua trees.	Permit Application and Plant Protection Management Code
Town of Apple Valley	No existing western Joshua tree shall be disturbed, moved (transplanted or otherwise), removed or destroyed unless such disturbance, move, removal or destruction is first reviewed and approved by the Town of Apple Valley. Sets specific findings which need to be made in order to authorize removal.	Apple Valley Code 9.76.040 Joshua Trees
Town of Apple Valley	Climate Action Plan	https://www.applevalley.org/services/planning-division/climate-action-plan
City of Hesperia	Arborist/botanist developed plan and relocation / adoption program - includes single family residence provisions protecting healthy trees.	Protected Plant Policy
City of Hesperia	Climate Action Plan	http://www.cityofhesperia.us/DocumentCenter/View/1587/Climate-Action-Plan-7210?bidId=
City of Lancaster	Objective with six supporting policies to maintain important biologic systems specifically including western Joshua trees. Also required CEQA monitoring plan (BR-8) requires planning department in Grading Plans to provide protection for special status plants in western Joshua tree woodlands including translocation, weed control BMPs.	Link to General Plan(pg. 2-25) and CEQA Mitigation Monitoring Plan (pg. 12-10)
City of Palmdale	Requires site plans permits avoidance transplanting and as a last resort if other actions infeasible, mitigation required.	City code
City of Victorville	Makes it a misdemeanor to cut, damage, destroy, dig up, or harvest any western Joshua tree without the prior written consent of the director of parks and recreation or his designee	Victorville Code
City of Victorville	Climate Action Plan	https://www.victorvilleca.gov/government/city-departments/development/planning/land-use-plans
City of Yucca Valley	Requires Native Plant Permit for Removal - Includes relocation and transplanting options and adoption provision.	Native Plant Permit Policy
	County Management Efforts	
County of Los Angeles	Joshua Tree Woodlands Significant Ecological Area (SEA) Included on SEA protected tree list across multiple SEA's.	County Ordinance and SEA Planning Guide
County of Los Angeles	Community Climate Action Plan	http://planning.lacounty.gov/ccap/background
County of San Bernardino	Tree removal permit and plot plan map - approval by authority - extra protections for specimen tree's as defined and allows enforcement by CA department of forestry as applicable.	Title 8 Division 8 (88.01) County Ordinance
County of San Bernardino	83.10.080(c)(1) Regional Landscaping Standards - The County of San Bernardino's 'San Bernardino County Development Code (Development Code)' details policy regarding the protection of western Joshua trees inclusive of 'Regional Landscape Standards' that applies to all new and rehabilitated landscapes associated	

	with homeowner installed residential uses, and rehabilitated landscapes associated with any develop-installed residential uses. One of the aims of the 'Regional Landscape Standards' is to preserve existing natural vegetation. Specifically, section 83.10.080(c)(1) of the 'Regional Landscaping Standards' addresses western Joshua trees in the desert region prohibiting removal of western Joshua trees without a tree removal permit, and requires the western Joshua tree to be relocated on-site unless specific permission from the County of San Bernardino Land Use Services Department is obtained as detailed below.	
County of San Bernardino	88.01.050 Tree or Plant Removal Permits - Additionally, the County of San Bernardino addresses western Joshua trees via a 'Plant Protection and Management' policy within the Development Code to manage plant resources under private or public ownership inclusive of conserving the native plant life heritage for the benefit of all, including future generations. Section 88.01.050 'Tree or Plant Removal Permits' requires a permit to be required for the removal of a regulated tree or plant that is inclusive of western Joshua trees. The County of San Bernardino provides limited justification for removal of regulated plants in Section 88.01.050(f), and administers supplemental guidance specific to western Joshua trees in Section 88.01.050(f)(3) as detailed below.	
County of San Bernardino	88.01.060 Desert Native Plant Protection - Section 88.01.060 'Desert Native Plant Protection' regulates the removal or harvesting of specified desert native plants in order to preserve and protect the plants and to provide for the conservation and wise use of desert resources. This section is intended to augment and coordinate with the Desert Native Plants Act (Food and Agricultural Code Section 80001 et seq.) and the efforts of the State Department of Food and Agriculture to implement and enforce the Act.	
County of San Bernardino	County of San Bernardino Mining Permits / Reclamation Plans - The County of San Bernardino implements policies within their mining permit and reclamation plan procedures to protect western Joshua trees by providing that mineral extraction does not result in significant adverse environmental effects. Mining can be meet present needs without compromising needs of future generations with minimized environmental impacts associated with minerals extraction activities. The County of San Bernardino is focused on reducing environmental impacts and implements strategies for assessing the sustainability of mining operations inclusive of measuring, monitoring, and working to improve various performance metrics to minimize land disturbance, pollution reduction, and efficient reclamation activities. Posted below are example strategies that the County of San Bernardino implements within their 'Mine Permit Conditions'.	
County of San Bernardino	Greenhouse Gas Emissions Reduction Plan	http://www.sbcounty.gov/Uploads/lus/GreenhouseGas/FinalGHGFull.pdf
	State Management Efforts	
	California Environmental Quality Act ("CEQA") – Projects that face CEQA approvals must take special account of western Joshua trees because the species is listed as a "sensitive natural community" within the California Natural Diversity Database.	
	Surface Mining And Reclamation Act ("SMARA")	

	California Desert Native Plants Act (Cal. Food & Agric. Code § 80001 *et seq.*) Prohibits harvest, transport, sale, or possession absent of a permit.	
	Climate change initiatives...	
Federal Management Efforts		
	Desert Renewable Energy Conservation Plan ("DRECP")	
	California Desert Protection Act (16 U.S.C. § 410)	

Original on file,
received August 6, 2020

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August 6, 2020

Eric Sklar, President
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Sacramento, CA 95814
fgc@fgc.ca.gov

VIA EMAIL ONLY

Re: Petition to list western Joshua tree as threatened under California Endangered Species Act and 90-day evaluation

Dear President Sklar,

This letter is submitted on behalf of CEMEX Construction Materials Pacific, LLC ("CEMEX") in opposition to the petition ("Petition") submitted by the Center for Biological Diversity ("CBD") to list the western Joshua tree (*Yucca brevifolia*) as a threatened species under the California Endangered Species Act ("CESA"), Fish & Game Code §§ 2050 *et seq*. We request the California Fish and Game Commission ("Commission") reject the Petition.

The Petition is unwarranted and unprecedented in that:

(1) the Petition fails to demonstrate that the western Joshua tree meets the statutory definition of a "threatened" species;

(2) the Petition mischaracterizes existing regulatory programs to improperly suggest that CESA is the sole viable method of protecting western Joshua trees;

(3) the California Department of Fish and Wildlife ("Department") failed to independently analyze the Petition for adequacy; and

(4) the Department's recommendation to the Commission is wholly unsupported by the 90-day evaluation ("Evaluation").

Further, if the Petition were granted and the western Joshua tree were listed, it could significantly affect CEMEX's future operating plans at its existing mining and production sites, and potentially impose dramatically higher mitigation costs. The imposition of additional, Department-administered processes will be redundant of CEMEX's existing management obligations under local and state regulations, including (1) the California Native Plant Protection

Act ("CNPPA") (Fish and Game Code §§ 1900-1913), (2) the Desert Native Plant Act ("DNPA") (Food and Agriculture Code § 80001 *et seq*.), and (3) local ordinances implementing and supplementing the CNPPA and DNPA.

Yet these potential consequences are unnecessary. The Department should not have overlooked its legal duty to analyze the Petition and should not have arbitrarily accepted the claims made in the Petition. Although the standard for finding that listing "may be warranted" is not as stringent as the standard for listing a species following the Department's full status review, there must nevertheless be sufficient information in the Petition such that a reasonable person would conclude that listing may be warranted. As demonstrated below, the Petition does not contain sufficient information, and no reasonable person could find additional action on the Petition warranted.

I. Background on CEMEX's Operations Affected by Western Joshua Tree Listing

CEMEX is a construction materials manufacturing company specializing in the production of cement, aggregates, and ready-mixed concrete, employing nearly 2,000 people in California. With operations throughout California, CEMEX serves both public and private construction projects with the much-needed supply of these construction materials necessary to support essential infrastructure like roads, bridges, water conveyance and flood protection, housing, hospitals, and schools.

Further, the California Department of Conservation has identified substantial areas potentially impacted by this Petition as important sources of natural resources necessary to produce construction aggregates. For example, according to the Department of Conservation's 2017 Report,[1] the San Bernardino-Riverside Production-Consumption Region will need approximately 993 million tons of aggregate construction materials over the next 50 years. Moreover, the demand for cement has already outstripped the state's supply and must be regularly supplemented by imports year after year.

CEMEX owns, occupies, or has mineral rights to thousands of acres in the region potentially affected by the Petition and operates a cement manufacturing plant as well as various mining operations in that region. These facilities produce (1) limestone, the main constituent in cement and a critical input for the supply of cement from CEMEX's plant, (2) construction aggregate materials necessary for producing local and regional building materials such as concrete and asphalt, and (3) silica and alumina, required additives for the production of cement. These facilities have western Joshua trees on-site, although not within the footprint of existing operations.

Should the western Joshua tree be listed under CESA, the potentially duplicative mitigation requirements resulting therefrom could substantially impact project implementation and increase costs for CEMEX's ongoing mining operations. These increased costs will be borne by

[1] State Mineral and Geology Board Updated Designation Report No. 14 (March 2017).

CEMEX's customers, whether public or private, and thus ultimately borne by consumers and taxpayers. Importantly, CESA's duplicative mitigation measures and costs would not directly correlate to increased conservation benefits for the western Joshua tree because CEMEX is already required under existing management and protection mechanisms to relocate and re-establish any removed western Joshua trees.

II. The Commission Should Reject CBD's Petition

CESA defines a "threatened" species 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 be become an endangered species in the foreseeable future in the absence of the special protection and management efforts required by this chapter." (Fish & G. Code § 2067.) And while anyone may submit a petition to list a species under CESA, to be accepted, a petition must include sufficient scientific information to indicate that the petitioned action may be warranted. (Fish & G. Code § 2072.3.)[2] A species will not qualify for candidate status if there is not sufficient information to lead a reasonable person to conclude that the petitioned action may be warranted. (*Nat. Resources Defense Council v. Fish & Game Com.* (1994) 28 Cal.App.4th 1104, 1119.)

In light of the foregoing, the Department and the Commission cannot arbitrarily and carelessly accept assertions regarding the status of the species and its habitat(s) in a listing petition. Both agencies have a legal duty to evaluate the information in the petition – and other readily available information – to determine whether a petition's claims are accurate and credible. (*Id.* at pp. 1119, 1125.) Further consideration of the petition "may be warranted" only if there is a "substantial possibility" that the petitioned-for action is warranted. (*Id.*)

Here, the Petition fails this test, and the Commission should reject it from further consideration. Specifically, no reasonable person could find that the petitioned-for action is warranted because:

> (i) the Petition fails to demonstrate the western Joshua tree could be a "threatened" species, as defined by CESA;
>
> (ii) the Petition fails to demonstrate CESA is the only existing management tool that can adequately protect the species;
>
> (iii) the Department's Evaluation is significantly deficient because it failed to independently analyze the content of the Petition; and

[2] A petition must contain sufficient information on: (i) population trend; (ii) range; (iii) distribution; (iv) abundance; (v) life history; (vi) kind of habitat necessary for survival; (vii) factors affecting the ability to survive and reproduce; (viii) degree and immediacy of threat; (ix) impact of existing management efforts; (x) suggestions for future management; (xi) availability and sources of information; and (xii) a detailed distribution map. (Fish & G. Code §§ 2072.3, 2073.5; 14 CCR § 670.1(d).)

(iv) the Department's recommendation is unsupported by the information and conclusions in the Evaluation.

These shortcomings are discussed in more detail below.

A. CBD's Petition Fails to Demonstrate the Western Joshua Tree Meets the Statutory Criteria to be Listed as "Threatened"

A "threatened" species is one which is likely to become endangered in the "foreseeable future." "Foreseeable future" is undefined by CESA and traditionally interpreted by the Department to align with the term's application under the Federal Endangered Species Act ("ESA").[3] In September 2019, the United States Fish and Wildlife Service ("USFWS") and National Marine Fisheries Service ("NMFS") promulgated regulations and defined "foreseeable future" as being only so far in the future as when the appropriate wildlife service can reasonably determine *both* future threats and a species' *likely* (*i.e.*, more likely than not) response to those threats. (50 CFR § 424.11(d) ("2019 Regulations").) Case law is also clear that the "foreseeable future" *must* be based on facts found within the administrative record. For example, prior to the 2019 Regulations, USFWS determined foreseeable future based on a "timeframe over which the best available scientific data allow[s] [USFWS] to reliably assess the effects of threats" on the species. (*In re Polar Bear Endangered Species Act Listing* 794 F.Supp.2d 65, 93 (D.D.C. 2011).) When analyzing whether it was appropriate to list the polar bear as threatened, USFWS found that the foreseeable future extended only so far as 45 years, during which time multiple factors – including biological and habitat factors – could be "confidently predict[ed]."[4] (*Id.*)

Here, the Petition urges the Commission to list the western Joshua tree as "threatened" because CBD "is virtually certain that abundance will decline in the foreseeable future," based on asserted threats of (1) climate change, (2) fire, (3) habitat loss, and (4) unspecified "other" threats. (Petition at p. 20.) Yet, CBD's assertions do not demonstrate that the western Joshua tree could meet the statutory definition of "threatened." There is no evidence that the western Joshua tree is racing toward the precipice of extinction. Rather, the Petition requests that the Commission look nearly <u>80 years</u> into the future based on wholly speculative threats. Such long range forecasting into the distant future would, if accepted, obliterate the concept of "foreseeable" future, and is not consistent with *either* existing regulatory requirements or the body of case law that require *both* impacts and responses to be reasonably predictable.

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[3] *See* Tara L. Mueller, Guide to Federal and California Endangered Species Law 90 (1994); *see also* Brad D. Kern, "Permitting the Take: An Analysis of Section 2081 of the California Endangered Species Act" 102 N.Y.U. Law Journal 74, 75-76.

[4] CBD was also a proponent of the polar bear listing and argued that USFWS should have considered the "foreseeable" future to extend to 2100 – approximately 90 years. The court was "perplexed" by CBD's argument for extending USFWS's "foreseeable future" analysis. (*In re Polar Bear Endangered Species Act Listing*, 794 F.Supp.2d at 93, fn. 34.)

Indeed, CBD asserts that the western Joshua tree has been under threat since the middle of the 20th century, claiming that researchers have been "raising the alarm" that "regardless of the present wide distribution and large concentration of yuccas, [the Joshua tree's] future appears dim." (Petition at p. 34.) 70 years later, the western Joshua tree's "wide distribution and large concentration" has not changed and there has been no observable downward trend in population; but CBD continues to paint an alarmist picture of the western Joshua tree.

To support its specious arguments, CBD relies on a limited number of studies that are generally confined to western Joshua tree's extreme southern range, and then extrapolates select findings from those limited studies to support alleged range-wide assumptions. For example, the Petition relies on a single 2010 study for the proposition that wildfire poses a significant threat to western Joshua trees based on post-fire survival rates. (Petition at p. 25.) However, that study was limited to a small portion of the species' range located in Joshua Tree National Park. CBD improperly infers, generalizes, and applies the study's conclusions to the entire range of the western Joshua tree, when in fact, multiple other studies provide contradictory evidence regarding fire risk. Indeed, studies from *other* areas of the western Joshua tree's range indicate (1) decreased fire frequency and (2) increased western Joshua tree recruitment *after* fires.[5]

The misapplication of limited data to support CBD's general conclusions is foundational to the Petition and thus fatally undermines the Petition. Simply, CBD relies on insufficient data and urges the Commission to rely on faulty future assumptions, ignore applicable legal standards, and list a species that does not – and could not – meet the legal definition of "threatened."

B. CBD's Petition Mischaracterizes Existing Regulatory Mechanisms and Improperly Suggests CESA Listing is the Sole Method of Adequately Protecting the Western Joshua Tree

Section 2072.3 of the Fish and Game Code[6] requires a petition to include specific information, including, "the impact of existing management efforts." CBD states, "No existing regulatory mechanism are [sic] currently in place at the international, national, state, or local level that adequately address the threats facing *Y. brevifolia*." (Petition at p. 48.) Although the Petition briefly discusses local plant protection ordinances in, "Hesperia, Palmdale, Victorville, Yucca Valley, and Los Angeles and San Bernardino counties" it dismisses these existing management mechanisms, stating that "none act as an actual bar to tree removal." (Petition at p. 53.)

This discussion fatally misconstrues both the existing local regulatory landscape *and* CESA's scope. The Petition's discussion presupposes that local regulatory mechanisms *must* bar any

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[5] M.L. Brooks & J.R. Matchett (2006) "Spatial and Temporal Patterns of Wildfire in the Mojave Desert, 1980-2004," 64 JOURNAL OF ARID ENVIRONMENTS 148 (concluding that observed wildfire frequency in the Mojave Desert decreased without demonstrated change in the amount of impacted area); U.S. Air Force, Joshua Tree Survivorship and/or Regeneration in Fire Area on Edwards Air Force Base." 412th Civil Engineering Group. Environmental Management Division. Edwards Air Force Base (2017) (concluding there was increased recruitment of western Joshua trees after fires).

[6] Hereinafter, all references to "Section" shall refer to the California Fish and Game Code.

removal of the western Joshua tree for such protections to be of any consequence. However, even CESA is not an absolute bar on Joshua tree removal – it prohibits "take" of a listed species absent an incidental take permit. (Cal. Fish & G. Code § 2081.) This exemption is similar to existing management mechanisms, which often require a permit prior to removing a western Joshua tree and mandates removed trees be "transplanted or stockpiled for future transplanting wherever possible." (*See e.g.*, Palmdale Municipal Code §§ 14.04.010-14.04-120; San Bernardino County Dev. Code § 88.01.050.)

This mischaracterization of existing local regulatory protections is fatal to the Petition. A CESA threatened listing is warranted when, among other things, it demonstrates that a species "is likely to become an endangered species . . . *in the absence of the special protection and management efforts* required by [CESA]." (Cal. Fish & G. Code § 2067.) Here, CESA's "special protection and management efforts" are duplicative of multiple existing regulations that already prohibit Joshua tree removal and require "removed" Joshua trees to be relocated. Thus, CESA will provide little, if any, additional protections to the western Joshua tree.

Presently, if CEMEX were to remove a western Joshua tree, it would be required to comply with existing regulations in place to protect the western Joshua tree.[7] For example, under certain county or municipal tree protection ordinances, CEMEX would be required to obtain tree removal permits, demonstrate such removal is necessary, and do everything it can to offset the tree removal, including replanting the trees. Accordingly, CESA protections would require CEMEX to undertake similar and potentially duplicative permitting and minimization measures, but with the Department acting as the overseeing body rather than the local county or municipal authority. Although the Petition fails to adequately discuss existing protections, an impartial review of those existing protections demonstrates that no further action on the Petition is warranted.

C. The Department Failed to Independently Analyze the Petition for Adequacy

Section 2073.5 requires the Department to "evaluate the petition on its face *and* in relation to other relevant information the department possesses or receives." (Cal. Fish & G. Code § 2073.5 (emphasis added).) Indeed, courts have reiterated the requirement that the Department's Evaluation adhere to a "sufficient information" standard – *i.e.*, is the information contained in the petition *actually* sufficient. (*Nat. Resources Defense Council v. Cal. Fish & Game Com.* (1994) 28 Cal.App.4th 1104, 1122 (emphasis added).)

First, in analyzing the information available to it, the Department actively ignores USFWS's 12-Month Evaluation of the Joshua tree and determination to *not* list the species under the Federal ESA. (*See* 84 FR 41694 (Aug. 15, 2019.) In that evaluation, USFWS determined, among other reasons, that the Joshua tree did not merit federal protection because (1) there was no significant population decline over the past 40 years and recruitment continues to occur across the species'

[7] *See* Appendix A of the August 6, 2020 letter submitted by CalCIMA for a detailed summary of existing regulations.

range; (2) despite threats, including wildfire, invasive plants, effects of climate change, there was not a threat "of population-or-species level decline in the foreseeable future," and (3) significant portions of the species' habitat is protected lands that require additional environmental review and/or permitting before impacting the species. (*Ibid.*) The Department's failure to identify, acknowledge, or otherwise engage with the significant work of a fellow wildlife service is indicative of the Evaluation's deficiencies and a troubling sign of the Department's failure to undertake its legal duty to evaluate the Petition.

Second, despite the requirement to evaluate the Petition's information, the Department's Evaluation does not actually *analyze* the Petition so much as it simply re-states the information contained within the Petition absent any critical assessment. Indeed, multiple sections of the Department's Evaluation simply say, "The Petition cites" a chosen study, followed by a summary of said study that emulates the Petition's phrasing. More is needed from the Department than a recitation of the Petition. The table below demonstrates just how closely the Department's Evaluation mirrors the Petition when discussing invasive species:

Petition	**The Department's Evaluation**
"Invasive plant species are widely established in the Mojave Desert throughout the range of the *Yucca brevifolia*. And while invasive species represent a relatively small percentage of the flora, they represent a huge percentage of the biomass." (Petition at page 22.)	"Invasive plant species are widely established in the Mojave Desert throughout the range of the western Joshua tree, and represent a large percentage of biomass on the landscape." (Evaluation at page 16.)
"The abundance of diversity of alien species in the Mojave is positively correlated with disturbance, including livestock grazing, off-highway/off-road vehicle (OHV or ORV) use, fire, urbanization, roads, and agriculture." (*Ibid.*)	"The abundance of invasive plant species in the Mojave Desert is positively correlated with disturbances such as livestock grazing, off-road vehicle use, fire, urbanization, roads, and agriculture." (*Ibid.*)
"Invasive species are also aided by nitrogen deposition as a result of air pollution." (*Ibid.*)	"These invasive species are also aided by nitrogen deposition as a result of air pollution." (*Ibid.*)

Petition	The Department's Evaluation
"To the degree there is competition is [sic] would likely be most significant with emergent seedlings under nurse plants as this is the most vulnerable life stage of the Joshua tree. The much bigger issue is that these invasive plants have altered fire dynamics, leading to more frequent fires that are killing innumerable Joshua trees." (*Id.* at p. 23.)	"Although it is possible that invasive species may compete with emergent western Joshua tree seedlings, the biggest impact to the western Joshua tree from invasive plant species is through altered fire dynamics. Invasive plant species in the Mojave Desert have resulted in larger and more frequent fires that are killing a large number of western Joshua trees." (*Ibid.*)
"As discussed below, the altered fire regimes in the Mojave represent a significant threat to the Joshua tree at the individual and population level." (*Id.* at pp. 23-24.)	"The Petition describes this as a significant threat to western Joshua tree at the individual and population level." (*Ibid.*)

The Department's cursory analysis and summary of the Petition is inadequate to satisfy the requirements of Section 2073.5. Statutory language and case law plainly state that the Department is required to *analyze* the information in the Petition, not *summarize* the information in the Petition. The Department's failure to adequately analyze the Petition renders the Evaluation as nothing more than a governmental rubber stamp instead of a critical analysis – and the Commission cannot rely on it when determining the sufficiency of the Petition.

D. The Department's Recommendation that the Commission Accept the Petition is Inconsistent With and Unsupported by Its Own Purported Evaluation

The Department's Evaluation recommends to the Commission that it accept the Petition for further consideration. The Department makes this recommendation despite multiple conclusions throughout the Evaluation to the opposite effect that demonstrate there is insufficient evidence to support a listing.

The Department's conclusion, in whole, states,

> Pursuant to Section 2073.5 of the Fish and Game Code, the Department has evaluated the Petition on its face and in relation to other relevant information the Department possesses or received. In completing its Petition Evaluation, the Department has determined there is sufficient scientific information to indicate that the petitioned action for western Joshua tree may be warranted. Therefore, the Department recommends the Commission accept the Petition for further consideration under CESA."

(Evaluation at 29.) The Department's conclusion offers no summation and no details as to why it recommends further consideration of the Petition. This omission is striking given the sheer number of times in the Evaluation that the Department offered unsupported and contradictory conclusions, including:

- Population Trend

  "The petition **does not** present an estimate of western Joshua, nor does it provide evidence of a range-wide population trend; nevertheless the Petition does provide information showing that some populations of western Joshua tree are declining [at the extreme southern end of the species' range] . . . [t]he Petition provides sufficient information on the population trend . . . to make the recommendation in … this Petition Evaluation." (Evaluation at 9 (emphasis added).)

- Abundance

  "The Petition acknowledges that a reliable estimate of western Joshua tree **is not available**; however, information available to the Department indicates that the abundance of western Joshua tree is currently **relatively high**. The Petition provides sufficient information on the abundance of western Joshua tree for the Department to make the recommendation in … this Petition Evaluation." (Evaluation at 13-14 (emphasis added).)

- Degree and Immediacy of Threat

  "[T]he Petition **suggests** that western Joshua tree is already being affected by threats described in the Petition, and these threats are likely to intensify significantly by the end of the century. The Petition provides sufficient information on the degree and immediacy of threat to western Joshua tree for the Department to make the recommendation in … this Petition Evaluation." (Evaluation at 23 (emphasis added).)

- Suggestions for Future Management

  "The Petition provides several suggestions for future management of western Joshua tree, although some of the suggestions are **not within the Department's jurisdiction**. The Petition provides sufficient suggestions for future management of western Joshua tree for the Department to make the recommendation in … this Petition Evaluation." (Evaluation at 27 (emphasis added).)

The Department's conclusion that the Petition warrants further consideration, despite multiple admissions of the Petition's inadequacies and the Department's analysis of contradictory information, strains credulity to put it mildly. The Department's recommendation is wholly unsupported by information within the Department's own conclusions throughout the Evaluation.

III. Conclusion

Neither listing nor candidacy for the western Joshua tree is appropriate at this time. The species does not – and cannot – meet the definition of "threatened" under CESA. Furthermore, there are fatal deficiencies in *both* the Petition and the Evaluation that preclude further action. Should the Commission decide to accept the Petition for further consideration, its decision would violate the minimal standards CESA requires because the Petition is deficient on multiple fronts, including, most importantly, the failure to include sufficient scientific information. The Department's blind acceptance of the Petition, absent any independent review, undermines its recommendation to accept the Petition. Furthermore, the increased cost of anticipated mitigation were the species to be listed under CESA is expected to be significant – with little-to-no additional conservation benefits beyond those required by existing regulations.

Based on these factors, no reasonable person could find the western Joshua tree is likely to be listed. CEMEX thus urges the Commission to reject the Petition. Thank you.

Very truly yours,

KERRY SHAPIRO of
Jeffer Mangels Butler & Mitchell LLP

cc: Chuck Bonham, Director
Debbie Haldeman, CEMEX
Daniel Quinley, Esq.

JMBM Jeffer Mangels Butler & Mitchell LLP
jmbm.com

July 23, 2020

Original on file, received July 23, 2020

California Fish and Game Commission
P.O. Box 944209
Sacramento, CA 94244

Re: Petition to List the Western Joshua Tree as a Threatened Species – OPPOSE

Dear President Sklar and Commission Members:

On behalf of the above business organizations in the Inland Empire, we write in opposition to the petition submitted by the Center for Biological Diversity to list the western Joshua tree as threatened under the California Endangered Species Act (CESA). If this proposal is approved, it would set a dangerous precedent that would subject any tree or animal that is not endangered to protection under CESA because they could be impacted by climate change.

Much of the western Joshua tree population resides on federally protected lands and state preserves, giving them the highest level of protection. Outside those jurisdictions, they are protected under state law through the California Desert Native Plants Act, which requires permitting for removal. The Center for Biological Diversity filed a petition with the California Department of Fish and Wildlife to increase existing protections by listing the tree as threatened despite their own acknowledgment that the species is currently not in decline. Rather, the petition argues that the species may be threatened in the future by global climate change, a threat that will not be mitigated through increased regulations on local property owners. Additionally, the Petition does not present

an estimate of western Joshua tree population size, nor does it provide evidence of a range-wide population trend. Despite all of this information staff from the Department of Fish and Wildlife determined the Petition provides sufficient scientific information to indicate that the petitioned action may be warranted for western Joshua tree.

The state of California has never protected a species primarily on the threat of climate change. The imposition of the CESA will create unnecessary impediments, as well as greatly increased costs, to the delivery of much-needed infrastructure improvements throughout the Inland Empire region. In many cases, these limitations upon infrastructure development will prevent the agencies from delivering much needed housing development, transportation network capacity enhancements and job creation through commercial development opportunities. Placing significant constrains and financial burdens on infrastructure development will not address the theoretical decline in the species as outlined in the Petition. The Commission must recognize when conflicting state public policies create an untenable framework for communities and local governments to navigate.

For the reasons stated above and others, we urge you to reject the Petition. If you have any questions or would like to discuss our position in greater detail, please contact Luis Portillo at 909-944-2201 or by email at lportillo@ieep.com. Thank you.

Sincerely,

Janice Moore
Apple Valley Chamber of Commerce

Bette Rader
Beaumont Chamber of Commerce

Zeb Welborn
Chino Valley Chamber of Commerce

Bobby Spiegel
Corona Chamber of Commerce

Gloria Martinez
Fontana Chamber of Commerce

Joshua Bonner
Greater Coachella Valley Chamber of Commerce

Peggi Hazlett
Greater Ontario Business Council

Cyndi Lemke
Hemet San Jacinto Chamber of Commerce

Shannon Shannon
Hesperia Chamber of Commerce

Andrea De Leon
Highland Chamber of Commerce

Paul Granillo
Inland Empire Economic Partnership

Oscar Valdepeña
Moreno Valley Chamber of Commerce

Patrick Ellis
Murrieta/Wildomar Chamber of Commerce

Jennifer Walker
Perris Valley Chamber of Commerce

Monique Manzanares
Pomona Chamber of Commerce

Robert Hufnagel
Rancho Cucamonga Chamber of Commerce

Mills
RCOC Designee
John Mills
Redlands Chamber of Commerce

Emily Falappino
Temecula Valley Chamber of Commerce

Peggy Robertson
Upland Chamber of Commerce

Mark Creffield
Victor Valley Chamber of Commerce

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Original on file,
received August 6, 2020

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August 6, 2020

Mr. Eric Sklar
President
California Fish and Wildlife Commission
P.O. Box 944209
Sacramento, CA 94244-2090

Re: Petition to List the Western Joshua Tree

Dear President Sklar,

I write in strong opposition to the petition submitted by the Center for Biological Diversity to list the western Joshua tree as a threatened species under the California Endangered Species Act. The Joshua tree already receives protections at the federal, state, and local levels. Listing the tree would add redundant protections that place a significant financial burden on private landowners while doing little to address the long-term threat to the species.

The California desert is comprised of rural, underserved communities that face economic challenges unlike other areas of our state. Listing the Joshua tree would effectively halt future development at a time when California is grappling with housing shortages and rising homelessness.

Even more troubling is the fact that the petition submitted by the Center for Biological Diversity fails to provide scientific evidence to substantiate a decline of the Joshua tree population. Instead, the petition predicts a future decline due to global climate change. The proposed listing is nothing more than a solution in search of a problem. Much of the western Joshua tree population resides on federally protected lands and state preserves, giving them the highest level of protection. Outside those jurisdictions, they are protected under state law through the California Desert Native Plants Act, which requires permitting for removal.

I urge you to consider the significant impacts this will have on rural desert communities and respectfully ask that you deny this petition.

Sincerely,

Sylvia S. Duarte
President, AV Hispanic Chamber of Commerce

c: Palmdale City Council
J.J. Murphy, Palmdale City Manager

Original on file,
received June 19, 2020

Buchalter

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dwance@buchalter.com

June 19, 2020

VIA U.S. MAIL AND VIA E-MAIL (FGC@FGC.CA.GOV)

Eric Sklar, President
California Fish and Game Commission
PO Box 944209
Sacramento, CA 94244-2090

Re: Petition to list the western Joshua tree as threatened or endangered under the California Endangered Species Act

Dear President Sklar:

This letter is prepared and submitted on behalf of Hesperia Venture I, LLC and Terra Verde Group, LLC ("HVI/TVG") to respond to the Petition submitted, under the California Endangered Species Act (California Fish & Game Code ("Code") § 2050 et seq.) ("CESA"), by the Center for Biological Diversity ("Petitioner") requesting the California Fish and Game Commission ("Commission") to take any one of three actions: (1) list the western Joshua tree (Yucca brevifolia) as threatened; (2) list a subspecies of the western Joshua tree (Yucca brevifolia brevifolia) as threatened; or (3) list as ecologically significant units ("ESUs") either or both the North or South population clusters of the western Joshua tree (Yucca brevifolia) species.

We understand that the Commission's staff will recommend at the June 24-25, 2020 meeting that the Commission continue review of the Petition until the August 19-20, 2020 Commission meeting. We support this recommendation for the reasons stated by staff as well as the challenges created by the COVID-19 pandemic, which is affecting the public's thorough review and analysis of the Petition and the Petition evaluation report ("Report") to the Commission by the Department of Fish and Wildlife ("Department"), as well as the public's participation in the hearing process.

If the Commission chooses to proceed with the hearing on the Petition, we request the Commission reject the Petition. Under CESA and its implementing regulations, the Petition is inadequate to warrant listing of the western Joshua tree or the other actions requested by Petitioner. Various stakeholders in their submitted comments to the Commission have outlined

many of the Petition's deficiencies. In addition, we have concerns that granting the Petition will also have a detrimental impact on the availability of affordable housing needed within southern California. These concerns derive from the potential financial consequences of listing the western Joshua tree to a recently approved Tapestry project of HVI/TVG's in the City of Hesperia. The Tapestry project is intended to address the significant housing shortage that currently exists in California by providing an affordable option for homebuyers that is not available in the Southern California market. The Tapestry project, from the beginning, was designed to bring essential affordable housing stock to market while addressing the local environmental concerns.

Unlike most new housing projects, Tapestry was designed from the outset to be the most environmentally sensitive project in the state. All homes and commercial buildings will be required to use solar energy to the maximum extent possible. Even public buildings, such as schools, will be required to implement the solar energy directive. Tapestry is also making the most efficient use of our precious water resources. All homes and commercial buildings will have dual plumbing so that all irrigation needs can be met with non-potable water. Parks, schools, parkways, etc. will all use non-potable water for irrigation purposes. Tapestry will require building to CalGreen standards and will implement recycling to the maximum extent possible.

All environmental and conservation measures for Tapestry will be implemented to address important issues affecting the quality of life in California, including measures to protect Joshua trees. The City of Hesperia required several mitigation measures to protect Joshua trees for Tapestry, including protocols for transplanting, incorporating or managing Joshua trees as part of the project. In accordance with the City of Hesperia's Protected Plant Policy (City of Hesperia 2009), Tapestry will prepare a transplant plan, which will describe the salvage procedures for Joshua trees prior to construction. It is anticipated that a portion of the salvaged Joshua trees will be incorporated into Tapestry's landscaping. The remaining Joshua trees will be available for public adoption. Further, Tapestry is creating a Habitat Management Plan for the conservation easement and open space portions of the project. Joshua trees are present in the northern and central portions of Tapestry's conservation easement and open space areas that altogether encompass 3,533 acres of the project, which will be managed in perpetuity.

The listing of western Joshua trees would significantly increase costs to develop any housing within southern California, thereby decreasing the availability of affordable housing. These costs and impacts are unwarranted at this time based on the evidence presented by Petitioners for a possible impact to the western Joshua tree, which is based on possible detrimental impacts to the western Joshua tree. The plain rationale of Petitioner for the listing boils down to the contention that climate change will occur and detrimental impacts will likely occur to the

western Joshua tree. Petitioner presents no concrete evidence of the extent of the detrimental impacts to the western Joshua tree, its habitat, or its range. In fact, the Petition at page 19 states that "no range-wide population trends have been documented." The simplicity of Petitioner's contention would justify listing almost all plants and animals within California as threatened, even if those plants and animals, like the western Joshua tree, are currently abundant and range stable.

The stability and abundance of the western Joshua tree is noted within several sources before the Commission. First, the Department states in its Report on the Petition that "information available to the Department indicates that the abundance of western Joshua tree is currently relatively high" (CDFW 2020, page 2). Second, USFWS compiled a Joshua Tree Species Status Assessment (USFWS 2018), which on page 2 states :

> "Currently, populations of both Joshua tree species have large distributions, ecological diversity, and a large amount of intact habitat. Therefore, we consider that Joshua tree populations now have: (1) a high capacity to withstand or recover from stochastic disturbance events (resilience); and (2) both species likely can recover from catastrophic events (redundancy) and (3) adapt to changing conditions (representation)."

Third, Petitioner's own reference materials, regarding the current distribution of Joshua tree, Sweet et. al 2019, page 2, states that:

> "Joshua Tree National Park straddles the lower elevation Colorado and higher elevation Mojave Deserts in southern California. Evidence from paleo-biological records indicates that Joshua trees, among many species, have shifted their distribution since the Pleistocene, when they were more broadly distributed in the southwestern United States (Smith et al. 2011). Today, Joshua trees occur in a jagged continuous band across the western Mojave Desert and in fragmented populations to the north and east (Cole et al. 2011); the occurrence of Joshua trees within JTNP defines the current southern extent of the Mojave Desert before it transitions into the Colorado Desert within the park. While the ecotone between these deserts has shifted during glacial and inter-glacial cycles, as a whole, it is believed to have been quite stable since the end of the Pleistocene (Holmgren et al. 2010)."

Regardless of the conclusions of abundance of trees and range, Petitioner maintains that the Commission must take one or more of the actions noted above for the western Joshua tree. The

Commission has a duty to follow the CESA and its implementing regulations and deny all of Petitioner's requested actions, since none are warranted based upon the current Petition and its wholly lacking evidence. For the Commission to do otherwise would cause great harm to the rule of law at the expense of affordable housing desperately needed for Californians.

Very truly yours,

BUCHALTER
A Professional Corporation

Douglas E. Wance

DEW:gt

COMMERCIAL REAL ESTATE SERVICES

Original on file,
received August 6, 2020

CBRE

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August 6, 2020

Mr. Eric Sklar
President
California Fish and Wildlife Commission
P.O. Box 944209
Sacramento, CA 94244-2090

Re: Petition to List the Western Joshua Tree

Dear President Sklar,

I write in strong opposition to the petition submitted by the Center for Biological Diversity to list the western Joshua tree as a threatened species under the California Endangered Species Act. The Joshua tree already receives protections at the federal, state, and local levels. Listing the tree would add redundant protections that place a significant financial burden on private landowners while doing little to address the long-term threat to the species.

The California desert is comprised of rural, underserved communities that face economic challenges unlike other areas of our state. Listing the Joshua tree would effectively halt future development at a time when California is grappling with housing shortages and rising homelessness.

Even more troubling is the fact that the petition submitted by the Center for Biological Diversity fails to provide scientific evidence to substantiate a decline of the Joshua tree population. Instead, the petition predicts a future decline due to global climate change. The proposed listing is nothing more than a solution in search of a problem. Much of the western Joshua tree population resides on federally protected lands and state preserves, giving them the highest level of protection. Outside those jurisdictions, they are protected under state law through the California Desert Native Plants Act, which requires permitting for removal.

I urge you to consider the significant impacts this will have on rural desert communities and respectfully ask that you deny this petition.

Sincerely,

Mark McGaughey
First Vice President

c: Palmdale City Council
J.J. Murphy, Palmdale City Manager

Original on file,
received August 6, 2020

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August 6, 2020

Mr. Eric Sklar
President
California Fish and Wildlife Commission
P.O. Box 944209
Sacramento, CA 94244-2090

Re: Petition to List the Western Joshua Tree

Dear President Sklar,

I write in strong opposition to the petition submitted by the Center for Biological Diversity to list the western Joshua tree as a threatened species under the California Endangered Species Act. The Joshua tree already receives protections at the federal, state, and local levels. Listing the tree would add redundant protections that place a significant financial burden on private landowners while doing little to address the long-term threat to the species.

The California desert is comprised of rural, underserved communities that face economic challenges unlike other areas of our state. Listing the Joshua tree would effectively halt future development at a time when California is grappling with housing shortages and rising homelessness.

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I urge you to consider the significant impacts this will have on rural desert communities and respectfully ask that you deny this petition.

Sincerely,

Vincent M. Roche
Executive Director/Principal

c: Palmdale City Council
J.J. Murphy, Palmdale City Manager

California State Council of Laborers

Laborers' International Union of North America

LiUNA!
Feel the Power

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Jose Mejia
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Council of Laborers

Rocco Davis
LiUNA Vice President at Large
Regional Manager
Pacific Southwest Region
Special Assistant to the
General President

May 8, 2020

**Original on file,
received May 8, 2020**

Eric Sklar
President
California Fish and Game Commission
P.O. Box 944209
Sacramento, CA 94244

RE: Proposed Listing of the Joshua Tree Under the California Endangered Species Act—OPPOSITION

Dear President Sklar:

On behalf of the California State Council of Laborers, I write in strong **OPPOSITION** to the petition submitted by the Center for Biological Diversity to list the western Joshua Tree as a threatened species under the California Endangered Species Act. The Joshua Tree already receives protections at the federal, state, and local levels. This would add redundant protections that would place a significant financial burden on private landowners, while doing little to address the long-term threat to the species. We too live in these communities and are families that seek to protect our environment just like anybody else but feel this proposal is completely unnecessary!

The California desert is comprised of rural, underserved communities that face economic challenges unlike other areas of our state. Listing the Joshua Tree would effectively halt future development, which would impact not only the jobs of our members but the potential jobs and tax revenues to local governments providing essential services.

The petition submitted by the Center for Biological Diversity fails to provide scientific evidence to substantiate a decline of the Joshua Tree population, instead predicting a future decline due to global climate change. Additionally, much of the western Joshua Tree population is on federally protected lands and state preserves, giving them the highest level of protection. Outside of those jurisdictions, they are protected under state law through the California Desert Native Plants Act, which requires permitting for removal.

For these reasons, we respectfully ask that you deny this petition. Should you have any questions, please contact Katie Donahue-Duran or myself at (916) 447-7018.

Sincerely,

Jose Mejia
Director

cc: Secretary Wade Crowfoot, CA Natural Resources Agency

URGENT: PROPOSED LISTING OF THE JOSHUA TREE UNDER THE CALIFORNIA ENDANGERED SPECIES ACT

A proposal to list the western Joshua tree as a threatened species is under consideration by the California Fish and Game Commission. If this proposal is approved, the Joshua tree would be protected under the California Endangered Species Act, a move that would effectively halt the development of private property within large swaths of the California desert and bring the state government into the backyards of desert residents uninvited.

How will this impact me?

A threatened species designation requires private property owners to obtain California Environmental Quality Act (CEQA) compliance for any activity that may disturb a threatened species, including homebuilding. If the Joshua tree is listed, activities that may remove any amount of Joshua trees will require a CEQA compliance document, thereby forcing the property owner to employ biologists and specialists to prepare the environmental documents. This requirement would apply to ***any*** construction, or even yard work, that would not normally require a permit, adding tens of thousands of dollars to the cost of development. Complicating matters further is the need for mitigation, which may include financial contributions to various conservation funds or the mandated purchase of undisturbed land that is restricted from development in perpetuity. Once the environmental review is complete, property owners will be required to obtain an incidental take permit, again subjecting the project to additional state scrutiny and costs.

Background information

Much of the western Joshua tree population resides on federally protected lands and state preserves, giving them the highest level of protection. Outside those jurisdictions, they are protected under state law through the California Desert Native Plants Act, which requires permitting for removal. The Center for Biological Diversity recently filed a petition with the California Department of Fish and Wildlife to increase existing protections by listing the tree as threatened despite their own acknowledgment that the species is currently not in decline. Rather, the petition argues that the species may be threatened in the future by global climate change, a threat that will not be mitigated through increased regulations on local property owners.

Local communities take pride in the Joshua tree and have enacted additional protective measures through local ordinances. Moreover, the tree is considered an iconic species that generally adds property value. In fact, many builders go out of their way to plan developments around existing trees. Listing the Joshua tree on the California Endangered Species list will put unnecessary burdens on land owners, significantly limits development, and adversely impacts local economies.

What can you to do stop this shortsighted proposal?

The public is encouraged to send letters of opposition (sample letter attached) to the California Fish and Game Commission. Letters may be submitted by mail or email before **Wednesday, May 20, 2020**. Here is where to send your correspondence:

Mailing Address: California Fish and Game Commission, P.O. Box 944209, Sacramento, CA 94244
Email Address: fgc@fgc.ca.gov (Include "Petition to List the Western Joshua Tree" in the Subject Line)

ASSOCIATION OF WESTERN EMPLOYERS

Original on file,
received June 11, 2020

June 11, 2020

Mr. Eric Sklar
President
California Fish and Wildlife Commission
P.O. Box 944209
Sacramento, CA 94244-2090

Re: Petition to List the Western Joshua Tree

Dear President Sklar,

I write in strong opposition to the petition submitted to list the western Joshua tree as a threatened species under the California Endangered Species Act. The Joshua tree already receives protections at the federal, state, and local levels and is prized locally and throughout the country for its beauty and as a symbol of a healthy desert. Adding redundant protections will place significant financial burden on private land owners, in the development of public facilities, affordable housing, and career building jobs all of which have been planned while successfully protecting the Joshua tree already.

Contributing to the very real and often severe challenges of lack of housing, homelessness, and real economic progress in the California desert's many rural, underserved communities serves no useful public policy goal and runs counter to many well established goals put forth with wide agreement from multiple Legislatures and Administrations.

Even more troubling is the fact that the petition submitted by the Center for Biological Diversity fails to provide scientific evidence to substantiate a decline of the Joshua tree population. Instead, the petition predicts a future decline due to global climate change. The proposed listing is nothing more than a solution in search of a problem. Much of the western Joshua tree population resides on federally protected lands and state preserves, giving them the highest level of protection. Outside those jurisdictions, they are protected under state law through the California Desert Native Plants Act, which requires permitting for removal.

On behalf of the thousands of career building jobs relying on the work of our Association and others, I urge you to not follow through on this listing request.

Thank you for your consideration.

Sincerely,

Assembly member Jeff Miller, retired (Riverside County)
Chair, Association of Western Employers

30211 Avenida Banderas #200 Rancho Santa Margarita, CA 92688
(949) 438-0448

Steve Harris
[redacted]

June 12, 2020

Mr. Eric Sklar, President
California Fish and Game Commission
P.O. Box 944209
1416 Ninth Street, Ste. 1320
Sacramento, CA 94244-2090

Sent via U. S. Mail
And by Email to Melissa Miller-Henson@fgc.ca.gov

Re: Opposition to Petition of Center for Biological Diversity to declare Western Joshua Tree an Endangered Species; Report to Fish and Game Commission "*Evaluation of a Petition from The Center for Biological Diversity to List Western Joshua Tree as Threatened Under the Endangered Species Act*" - *February 2020*
278 Acres in Kern County, California; Parcel No. 244-040-14 and Parcel No. 244-040-15; Boron, California; Britton Associates, LLC

Dear Mr. Sklar:

I am writing to you on behalf of my family members who, together with me, form Britton Associates, LLC, the owner of 278 acres in Boron, California. We are writing to strongly protest and oppose the Petition submitted by the Center for Biological Diversity to list the Western Joshua Tree as a threatened species under the California Endangered Species Act. I have had the opportunity to review the above-listed 41-page Report and I would like to make you aware of several things in it that I think are weaknesses and probably militate against using it as a basis to institute such a sweeping action.

Probably the first and best place to start is the report's executive summary. On its Page 2, it states this:

"The Petition does not present an estimate of western Joshua tree population size, nor does it provide evidence of a range-wide population trend; nevertheless, the Petition does provide information showing that some populations of western Joshua tree[s] are declining, particularly within Joshua Tree National Park. Although a reliable estimate of western Joshua tree population size is not available, information available to the Department indicates that western Joshua tree is currently relatively abundant."

(Report to the Fish and Game Commission of February 2020, Page 2, Paragraph 2)

While we know and understand the emotional importance of the Joshua Tree to the identity of the State of California, this statement alone makes it clear that this isn't a species that is dying out and it's not one that really is threatened, whether in the colloquial sense or in the scientific or legal sense, either.

Much is made in Pages 2 through 7 of the Report to indicate that a very low threshold or standard is required for the Commission to entertain a Petition. Rather than go through each of the precedents, I can properly conclude that the Commission is clearly invested with discretion and authority to look at common sense facts and trends rather than simply adopt wholesale the report's findings; they are based on the opinions and conclusions of an entity of an entity whose mission, as it puts it, is "saving life on earth". (Biological Diversity.org; home page)

The Report continues on its Page 8 reflecting that the deterioration of the current Western Joshua Tree population trend is primarily the result of a massive fire:

"The Petition cites a study by DeFalco et al. (2010) that examined the mortality of western Joshua tree[s] across several study sites five years after a fire in Joshua Tree National Park burned nearly 5700 hectares (22 square miles (mi2)) in May 1999. The study found that approximately 80 percent of western Joshua trees that were burned by the fire died by 2004, and approximately 26 percent of the unburned trees died as well, with drought a likely contributing factor."

This passage alone introduces a factor that clearly had little to do with a declining population for environmental reasons. A massive wild fire, whether the cause of climate change, arson or other reasons, is an unforeseen circumstance that cannot be planned for in the context of insulating any species from extinction, threatened or otherwise. It is a catastrophic event.

Interestingly, the Report reaches a conclusion on its Page 13 as to abundance:

"The discussion of western Joshua tree's "Current and Historical Distribution" on pages 16 through 19 of the Petition includes information demonstrating that western Joshua tree[s] currently has a relatively widespread distribution in southern California. The Petition

acknowledges that a reliable estimate of western Joshua tree population size is not available."

Notwithstanding that factual statement, the Report indicates that:

***"...information available to the Department indicates that the abundance of western Joshua tree[s] is currently relatively high**. The Petition provides sufficient information on the abundance of western Joshua tree[s] for the Department to make the recommendation in Section IV of this Petition Evaluation."*

(Report, Pages 13 and 14)

Findings that Joshua trees are abundant, that a fire geographically wiped out a number of them in a relatively small and narrow region and that there is no reliable information as to their total population seems antithetical to a decision that the Joshua tree is an endangered species. Certainly, given these weaknesses, along with the admission that the pollination of the Joshua tree through asexual reproduction, flowering, pollination, seed production and other methods are not deteriorating or apparently reduced to a level that the existence of the tree as a species is now threatened.

I don't want this entire letter to simply be a critique and analysis of the Report; I bring it up only because it seems weak on its face even to me, a lay person. If you look at the entire Report, in essence, its sole reason for existence is the threat of climate change. The body of law that the Petitioners are relying on, the California Endangered Species Act (CESA) most likely never contemplated its own expansion to take in the prediction of a future decline due to global climate change. Certainly, this would open a Pandora's box for species protections and most likely would do hard and serious damage to local governments and economies. Our land is in a rural and underserved community with little housing and proximity to the main east-west highway (CA 58) connecting US 395 (north-south) and CA 14, the Palmdale Freeway. The Mojave Air and Space Port is located in this region as is Edwards Air Force Base. Other uses, such as vehicle testing and proving grounds, exist here as well. In point of fact, we store over 100,000 tons of mined clay on our property, too.

Our family has owned this property since the 1930s and operated a clay mine on it until the 1960s.

With the Mojave Space Port, Edwards AFB and other federal lands (including one directly adjacent to us) there is little opportunity for new housing or economic development if this petition were granted. California is grappling with housing shortages and rising homelessness, caused in part by a lack of necessary housing in more populated areas.

In just my doing some basic research, I have learned that just last year, the John D. Dingell, Jr. Conservation, Management and Recreation Act placed into protected status hundreds of thousands of acres of federal lands on which Joshua trees grow. Three years prior to that, nearly two million acres of desert lands containing Joshua tree habitat were placed into protection through the use of the Antiquities Act. It would be hard to find a single species benefitting more from these land preservation efforts than the Joshua tree. The Joshua tree is also protected under State law through the California Desert Native Plants Act, which requires permitting for removal. Clearly, the overwhelming majority of Joshua trees exist on land already protected by the State and federal governments.

Our family has significant longevity in owning and maintaining this property. For us, such a decision would not only render it valueless but essentially useless, too. To take such a drastic and massive decision based solely upon climate change without any objective evidence (I have looked at the Report and I just don't see any), wanders quite closely to a taking without compensation. That isn't good for us and it isn't good for the State, either. There needs to be a common sense fact-based process and findings that in fact show that the species is very nearly extinct. The Report hasn't presented that and, since the Report relies on the Petition, it must not have, either.

For all of these reasons, my family and I urge you to deny the Petition in its entirety. Rural desert communities will suffer enormous impacts if it is granted and I just do not see a logical basis for that.

Yours truly,

Steve Harris
For Britton Associates, LLC, Owners

tc

From: Daniela Bellissimo
Sent: Friday, May 29, 2020 12:03 PM
To: FGC <FGC@fgc.ca.gov>
Subject: Petition to List the Western Joshua Tree

May 30 2020
Mr. Eric Sklar
President
California Fish and Wildlife Commission P.O. Box 944209
Sacramento, CA 94244-2090

Dear President Sklar,
I write in strong opposition to the petition submitted by the Center for Biological Diversity to list the western Joshua tree as a threatened species under the California Endangered Species Act. The Joshua tree already receives protections at the federal, state, and local levels.

Listing the tree would add redundant protections that place a significant financial burden on private land owners while doing little to address the long-term threat to the species.

The California desert is comprised of rural, underserved communities that face economic challenges unlike other areas of our state. Listing the Joshua tree would effectively halt future development at a time when California is grappling with housing shortages and rising homelessness.

Even more troubling is the fact that the petition submitted by the Center for Biological Diversity fails to provide scientific evidence to substantiate a decline of the Joshua tree population. Instead, the petition predicts a future decline due to global climate change. Further, the proposed action conflicts with other public policy directives such as affordable housing mandates and wastewater discharge prohibitions. As you know, much of the western Joshua tree population resides on federally protected lands and state preserves, giving them the highest level of protection. Outside those jurisdictions, they are protected under state law through the California Desert Native Plants Act, which requires permitting for removal.
I urge you to consider the significant impacts this will have on rural desert communities and respectfully ask that you deny this petition.

Thank you,

Daniela Bellissimo

Original on file,
received April 13, 2020

Submitted via email to fgc@fgc.ca.gov

April 10, 2020

Eric Sklar, President
California Fish and Game Commission
1416 Ninth Street, Suite 1320
Sacramento, CA 95814

Subject: Support for the petition to list the western Joshua tree (Yucca brevifolia) as a Threatened species under the California Endangered Species Act (CESA)

Dear President Sklar and Members of the Fish and Game Commission:

Since our founding in 1976, the California Wilderness Coalition (CalWild) has been promoting conservation on the federal public lands in the California desert. As you know, the Joshua tree is a true icon of the Mojave Desert ecosystem.

We are increasingly concerned that this iconic species is threatened by development, climate change, the invasion of non-native species (especially grasses that increase the frequency and severity of fire), and other factors. This is especially true in the western portion of the species' range.

We therefore support the petition to consider listing the western Joshua tree as Threatened under the CESA. We urge the Commission to carefully consider the science applicable in this case to determine whether listing is warranted. Regardless of the ultimate determination, we urge the Commission to institute protections and recovery measures that can prevent the downgrading of the species to Sensitive or Endangered status.

Thank you for considering our input. Please keep us abreast of your conservation efforts in regards to the western Joshua tree and other key species of plants and wildlife.

Sincerely,

Ryan Henson
Senior Conservation Director
3313 Nathan Drive
Anderson, CA 96007
530-365-1455
rhenson@calwild.org

Original on file,
received June 11, 2020

Antelope Valley Conservancy
P.O. Box 3133, Quartz Hill, CA 93586-0133
Tele (661) 943-9000
www.avconservancy.org avconservancy@yahoo.com

June 11, 2020

Eric Sklar, President
California Fish and Game Commission
via electronic communication to fgc@fgc.ca.gov

Dear President Sklar and Members of the Commission,

Thank you for this opportunity to submit comment regarding the Mojave Desert's iconic western Joshua tree. As a conservancy founded in the Mojave Desert in 2005 and authorized by the California Department of Fish and Wildlife to hold conservation lands, Antelope Valley Conservancy writes to you in **strong support** of the petition submitted by the Center for Biological Diversity, requesting the formal listing of the western Joshua tree (yucca brevifolia) as a threatened species under the California Endangered Species Act..

As desert stewards and Antelope Valley residents, the board members of the Antelope Valley Conservancy recognize the value and uniqueness of Joshua tree habitats and the importance of protecting them for future generations. Joshua tree woodlands face an uncertain future, threatened by invasive species, drought, wildfires, grazing, off-roading, and development. Climate change may leave Joshua Tree National Park without its namesake Joshua trees by the end of the century. With approximately 40% of the western Joshua tree's range on private land, projections indicate all of this habitat could be lost in the coming years without CESA protection.

Clearly, the Mojave Desert's iconic western Joshua trees need protection.

We request your support for the designation of western Joshua trees as a formal candidate for protection under CESA.

Thank you for your consideration,

Antelope Valley Conservancy

By Christina Andrews
Corporate Secretary

Original on file,
received June 11, 2020

MBCA
morongo basin conservation association

June 11, 2020

Mr. Eric Sklar
President
California Fish and Game Commission
P.O. Box 944209
Sacramento, California 94244-2090
Via email: fgc@fgc.ca.gov

Re: Strong Support for Candidacy of Western Joshua Tree as Threatened

Dear President Sklar,

Founded in 1969, over 50 years ago, the Morongo Basin Conservation Association is pleased, honored, and continues to present our voice to support our mission:

to advocate for a healthy desert environment that nurtures the region's rural character, cultural wealth and economic well-being.

We believe that a healthy desert is essential for the well-being of desert residents and for the health of our local economy. These are the three pillars of sustainability: environment, society, and the economy.

As the effects of climate change become ever more apparent, the recognition and listing of the western Joshua tree as threatened will help preserve and protect our Joshua tree woodlands. Unique and beautiful, the stands of Joshua trees provide an irreplaceable link in the desert ecosystem. The Western Joshua tree is suffering and withering under the impact of climate change with reduced precipitation, increased heat, reduced recruitment, and wildfires due to the spread of invasive plants. The loss of these woodlands due to climate change and poorly planned ongoing development undermines the foundations on which our thriving desert communities have been built.

Combatting and adapting to climate change must be the driver in making appropriate land use and planning decisions. The Mojave Desert is the largest intact ecosystem in the contiguous 48 states and includes the habitat of the western Joshua tree. This special habitat is a global biological 'hot-spot,' home to a large number of unique and diverse species. As extinction rates continue to

grow worldwide, it is imperative we embrace biological diversity as an asset to the health of the entire planet.

We recognize that classifying *Yucca brevifolia* as a threatened species under the California Endangered Species Act (CESA) has significant ramifications both for planned development and for developments now underway. However these represent only a small fraction of the anticipated impacts coming to our world due to the effects of climate change.

Vulnerability of the Joshua tree has long been recognized; we see it singled out for protected status in development code plant ordinances in Apple Valley, Yucca Valley, Palmdale and other municipalities; however, existing local and State regulations are often inadequate, and too often un-enforced. To pin survival of the iconic Joshua tree on the existing patchwork of regulations will almost certainly lead to the erosion of these woodlands and the natural communities that have grown up around them.

Given the scale, rate of change, and magnitude of the climate crisis, a landscape-level planning framework is essential to guide development within the range of the Joshua tree. An opportunity is now presented for the creation of a Natural Community Conservation Plan (NCCP) that covers the range of the western Joshua tree which would provide such a framework and allow for continued smart, and appropriate development while incorporating protection and mitigation measures. Creation of an NCCP would streamline processing of development entitlements and spare individual property owners from having to apply for incidental take permits for small projects or improvements.

There are many examples of the successful implementation of a regional planning process. Claims that the listing will halt or forestall development, are hyperbolic. One need only look at other examples where a regional planning process has been implemented to see that this listing will not inevitably halt development. The Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP) provides evidence of how a region can utilize landscape level planning practices without adversely affecting development. These NCCP frameworks provide for a rational science-based framework and certainties for land use proposals for decision makers, developers, and homeowners while protecting our ecosystems.

This listing will create an opportunity from which to build the broad scale landscape planning that is desperately needed if we are to nurture preservation of this slow-growing species and the desert ecosystem to which it is linked. Taking the proactive step of protecting the western Joshua tree offers an opportunity to get out ahead of the massive adaptations climate change will necessitate. We must seize this opportunity to define a purpose and need in the creation of a NCCP that would include not just the Joshua tree, but a range of issues integral to our continued existence in our ever-warming environment.

Decisive action offers the prospect of a future where the desert is appropriately valued not only for its beauty, but also for the role it plays in the sequestration of large amounts of CO^2 and its ability to ensure healthy air quality across vast stretches of land. Recognition of existing land use patterns within the range of the Joshua tree have the potential to accommodate additional housing, either through in-fill housing or by construction of Accessory Dwelling Units (ADUs) and 'tiny' houses as are now being encouraged by State legislation.

Will sparing the requirements of managed development be worth the gamble if the Western Joshua tree disappears from the desert landscape in the near future? To relinquish the opportunity to keep the Mojave Desert ecosystem intact through prudent, managed care in order to avoid inconvenient but proven best management practices is to risk a loss that may not be possible to recover. It is our hope that the Commission will grant the listing for the Joshua tree under CESA so that we protect the legacy of this desert icon for future generations.

At its very best, protection of the Joshua tree could be the first step in laying a foundation for a future where fossil fuels have been traded for renewables; where policies and practices provide for social and environmental justice for all; where maintaining a diversity of species in the natural desert environment is given priority; and where prudent use of water resources is recognized as being essential. It is for the reasons above that we urge you to give the strongest possible consideration to listing the western Joshua tree.

Thank you for your consideration and attention.

Steve Bardwell

Steve Bardwell, president
Morongo Basin Conservation Association

MBCA Board members:

David Fick, vice president
Meg Foley, director
Janet Johnston, director
Mike Lipsitz, director
Ruth Rieman, director
Marina West, treasurer
Pat Flanagan, director
Brian Hammer, director
Sarah Kennington, past president
Arch McCulloch, director
Laraine Turk, secretary

California Fish and Game Commission
P.O. Box 944209
Sacramento, CA 94244-2090

Original on file,
received April 16, 2020
Thursday, April 16, 2020

President Sklar, esteemed Commissioners;

The National Parks Conservation Association is the nation's only independent, nonpartisan membership organization devoted exclusively to advocacy on behalf of the National Parks System. Our mission is to protect and enhance America's National Park System for present and future generations. We have worked to establish and protect national parks and monuments in the California desert for more than two decades. We also take a strong interest in preserving the ecological integrity of lands surrounding the California desert's parks and monuments.

Our support of the petition to list the western Joshua tree as Threatened under CESA derives in part from the tree's importance to the landscape integrity of several national parks and monuments in the California desert. Besides the National Park that bears the name of this iconic species, Joshua Tree National Park, the western Joshua tree is an important member of vegetative communities in the northern and western reaches of Death Valley National Park, and plays a similar role in the Mojave Desert portion of Sand to Snow National Monument.

Further, the trees are an important visual resource associated with the Old Spanish National Historic Trail in that trail's stretch between Barstow and Cajon Pass, where they preserve a few remaining vestiges of the landscape that greeted 19th century travelers along that forbidding trail route.

Our interest in the species, however, is not limited to those western Joshua trees that are part of a national park setting. The southernmost population of western Joshua trees, referred to by petitioner as "YUBR South," constitutes the largest assemblage of continuous Joshua tree habitats to be found in the Mojave Desert. This assemblage runs for hundreds of miles westward from Joshua Tree National Park to the vicinity of Tejon Pass and then northeastward along the eastern foothills of the Tehachapi Mountains to Ridgecrest. While the individual forests may not be contiguous, their proximity along this wide swath of California provides for a significant measure of habitat connectivity for animals that depend on Joshua trees, and for the trees' genetic diversity as well. Outlier populations in the central Western Mojave between Boron and Barstow only augment the diversity to be found in this population.

Throughout the expansive range of YUBR South, only in the eastern and northern extremes are Joshua trees protected, and even there only stemming from their location in a park or wilderness area. In the east, a cluster of protective designations including Joshua Tree NP, Sand to Snow NM, and the Bighorn Mountains Wilderness protects important populations of the tree. Near Ridgecrest and Walker Pass, the Kiavah, Owens Peak, and El Paso Mountains Wildernesses offer protection to a few more critical Joshua tree forests. Throughout all the rest of the range of YUBR South, aside from a handful of acres in the extreme north sections of San Gabriel Mountains National Monument, federal protection of the trees is nonexistent. The state of California fills a few of these gaps, with protected groups of Joshua trees in Saddleback Butte, Ripley Desert Woodland, and Red Rock Canyon state parks. Elsewhere, the trees are covered by an inconsistent mosaic of differing and even conflicting county and municipal codes, with enforcement of applicable municipal native plant ordinances sporadic at best.

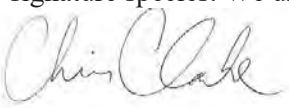
Conservation of a single species – or population within a species – is ill-served by such a patchwork of policies. Add to this the reality that this broad swath of unprotected Joshua trees is the same group of trees most vulnerable to development pressure, as communities develop open land between Apple Valley, Lancaster, and Ridgecrest, and it becomes clear that more stringent and consistent protections for the western Joshua tree are in order as development proceeds.

Petitioner has done a thorough job of documenting the threats the trees face. For the sake of brevity, we will only resummarize here:

1) The trees face an existential threat from the prospect of climate change, including reproductive failure, failure of the trees' obligate pollinator *Tegeticula synthetica* to contend with changing temperatures and precipitation, disruption of nurse plant vegetative regimes, and the strong likelihood that even established trees may be damaged as herbivores desperate for moisture girdle the trunks.
2) Wildland fire, on the increase due to introductions of exotic grasses and other weeds, is likely to permanently convert thousands of acres of Joshua tree habitat to a periodically burning annual grassland.
3) Physical damage to the trees, through either deliberate vandalism or negligence, is likely to increase as the population of the trees' range increases.
4) Physical removal of the trees, usually fatal in the medium term even if efforts to transplant the trees are made, will increase as demand for residences, commercial development, and renewable energy facilities also increase in the West Mojave.
5) The development described in point 4 substantially augments the threats in points 1 through 3.

NPCA suggests that the cause of protecting Joshua trees in Joshua Tree National Park and other protected areas is best served by ensuring those protected areas do not become isolated from other populations of the tree. As a keystone species in much of its range, Joshua trees provide important services to species ranging from the yucca moths that rely on the tree for reproduction and the yucca giant-skipper moths whose larvae feed on Joshua tree branch tissue, to antelope ground squirrels who rely on Joshua tree seeds in mast years for food caches, to species such as desert night lizards and ladderback woodpeckers to whom the trees offer shelter. To protect Joshua trees throughout their range is to protect these species as well.

Again, we thank you for the opportunity to comment on this pivotal moment in the future of the Mojave Desert's signature species. We urge you to protect the western Joshua tree under the California Endangered Species Act.



Chris Clarke
Associate Director, California Desert Program
National Parks Conservation Association
61325 29 Palms Highway #D
Joshua Tree, CA 92252
cclarke@npca.org | (760) 600-0038

California Fish and Game Commission
1416 Ninth Street, Room 1320
Sacramento, CA 95814

June 10, 2020

Dear Commissioners,

We are writing in support of the designation of the western Joshua Tree as a candidate for listing under the California Endangered Species Act.

The Mojave Desert Land Trust is dedicated to the protection and conservation of the Mojave and Colorado Desert ecosystems and their scenic, natural, and cultural resources. Since our formation in 2006, we have protected more than 84,000 acres of desert lands. Our acquisitions have increased the size and integrity of existing protected lands such as wilderness, parks, and monuments, and permanently protected the wildlife corridors linking them. While much of the land we acquire is conveyed to the Bureau of Land Management and the National Park Service, we are also permanent stakeholders -- owning, monitoring, and managing thousands of acres of desert lands.

Among the lands we own are Joshua tree woodlands in a wildlife corridor connecting Joshua Tree National Park to lands managed for conservation on the 29 Palms Marine Corps base. As land managers and participants in studies of Joshua trees, we have witnessed first-hand the decline in their reproduction due to climate change and other factors such as the proliferation of non-native plants. Recently, we witnessed the effects of another threat -- wildfire -- when approximately 150 acres of our land within the wildlife corridor burned killing and damaging western Joshua trees, Mojave yuccas and other native vegetation. With warming temperatures and the spread of exotic species, fires are becoming more frequent and more intense and the fire season is becoming longer.

Climate change and wildfire are not the only threats to the western Joshua tree. Many thousands of acres have been lost due to residential and commercial development, and more recently from large scale renewable energy projects. The loss of desert lands also contributes to climate change: Mojave Desert plant communities are excellent carbon sinks.

Due to the combination of threats facing the western Joshua Tree, it is at risk of extinction. The protections provided by state listing are needed to help ensure its survival and recovery. Its conservation cannot be achieved solely on public lands because much of the species' habitat is on private land. Current protections afforded in some areas, while of some value in preventing direct mortality, are not adequate to meet the species' conservation needs.

MOJAVE DESERT LAND TRUST
P.O. Box 1544
60124 29 Palms Highway
Joshua Tree, California 92252
760.366.5440 • www.mdlt.org

We acknowledge that in addition to the pressing need to address threats to the western Joshua tree, there is also a need for affordable housing and renewable energy. However, these goals are not mutually exclusive. As a retired senior Fish and Wildlife Biologist with the federal government, I've seen how regional Habitat Conservation Plans and Natural Community Conservation Plans can achieve the conservation and recovery of species while also providing for smart growth (i.e. infill versus sprawl) including creating a streamlined development and permitting process.

The western Joshua Tree is a beautiful and iconic species. The very identities of our Joshua Tree community and the community of Yucca Valley are tied to this signature tree. The western Joshua tree and the unique and spectacular desert lands it occupies attracts visitors from around the world, underpinning many of our high desert economies. Doing what we can to help the western Joshua tree survive and recover is our moral responsibility. Its conservation is not only achievable, but it can be done while still maintaining a robust economy and meeting climate change goals. In fact, it is integral to it.

Sincerely,

Geary W. Hund
Executive Director

MOJAVE DESERT LAND TRUST
P.O. Box 1544
60124 29 Palms Highway
Joshua Tree, California 92252
760.366.5440 • www.mdlt.org

Transition Habitat Conservancy
PO Box 720026
Pinon Hills, CA 92372-0026
760 868 5136
Tax ID # 74-3146328

fgc@fgc.ca.gov

To the California Fish and Game Commission

August 4, 2020

We are writing to you in full support of listing the western Joshua Tree as Threatened or Endangered. Transition Habitat Conservancy is a 501 (c) (3) land trust operating in the West Mojave Desert. We purchase private land and provide perpetual stewardship on these habitat lands. We have raised and spent $24 million to date and own about 8,000 acres of important West Mojave desert habitat. Of that, about 1000 acres are Joshua Tree woodlands. Joshua Trees woodlands are being replaced by wind and solar farms in the west Antelope Valley at an alarming rate. We are saving what we can. Without listing this iconic species there are no requirements for protection of Joshua trees that exist on private lands in the unincorporated County lands. Further, if lands are zones agricultural the owners are free to bulldoze Joshua trees at will. If mitigation is required, then at least some of the remaining Joshua Trees will be saved.

Images of Joshua Trees and Poppies have become icons of the Antelope Valley- which is known around the world for the incredible and unique poppy and Joshua tree images that are in every coffee table book that show California's beauty. They are valuable symbols--parts of our valley's own group of "flagship species" identifying our high desert cities, rural communities, and open spaces that contribute to the economic vitality and attractions of suburban and rural living. If listed, the State together with the renewable energy project proponents could mitigation some of the loss of our Joshua Trees. Through improved conservation together we could balance renewable energy development with healthier communities, economic benefits, and preservation of the valuable open-space qualities that draw people to our area.

Please list the Western Joshua tree so we can save some of what once was covering the Antelpe Valley and much of the west Mojave desert.

Sincerely Yours,
Jill Bays
President
Transition Habitat Conservancy

Original on file,
received August 6, 2020

August 6, 2020

California Fish and Game Commission
Sacramento, CA

RE: Western Joshua Tree Listing – Please List as Threatened

Dear Members of the Commission,

I am writing on behalf of Hispanic Access Foundation to support a YES vote for advancement of the Western Joshua Tree to candidacy status under CESA as a threatened species. The Western Joshua Tree is not only unique and endemic, but also iconic to the California desert. Losing it would be a blow to our identity as California residents, and also do severe harm to the tourism industry that generates tens of thousands of jobs as well as hundreds of millions of government revenue. If we were to let that happen, it would disproportionately affect Latino communities in the region, who are already facing the harmful impacts of the climate crisis as frontline communities, along with the current economic crisis and coronavirus crisis afflicting us today. But with a CESA "threatened" status, this harm could be prevented.

The Western Joshua Tree has ample reason to be listed as threatened, as increased temperatures from climate change would make what was once its habitat largely uninhabitable. In addition, wildfires are projected to increase in area and intensity in the Western Joshua Tree habitat, with young trees particularly vulnerable. Private lands and local jurisdictions in the range of the Western Joshua Tree have minimal protections that allow bulldozing of trees for energy and other large development projects. CESA listing would provide stronger protection measures, while still allowing development projects that minimize and mitigate impacts to this amazing species.

When we bring under-privileged students to Joshua Tree National Park for the first time, they go from complaining about the lack of cell service on the bus ride to being breathless and altogether forgetting about their screens while inside the park. Losing a tree as special and iconic as the Western Joshua Tree would remove one of the reasons for feeling wonder and connection to California's incredible natural heritage. For all of these reasons, we urge a YES vote for advancement of the Western Joshua Tree to candidacy status under CESA as a threatened species.

Sincerely,

Shanna Edberg

Director of Conservation Programs
Hispanic Access Foundation
(818) 640 2936
https://hispanicaccess.org

Original on file,
received June 1, 2020

6/1/20

California Department of Fish and Game,

It has come to my attention that you are considering listing the Joshua tree as an endangered species in the state of California. It is critically important that the Joshua tree be listed.

We need to protect wildlife linkages connecting larger protected areas. Part of this protection is Joshua trees. It is crucial that their genetic material is able to transfer among multiple plants in order to prevent genetic bottlenecking and weakening of the species. Protecting this iconic species also protects other species - in particular the yucca moth that only reproduces in yucca flowers. If moths can't move pollen around from plant to plant, then the plants can't reproduce. No flowers, no moths. That impacts other species that use the moths for food. If we create disparate "islands" to which Joshua trees are restricted, then we resign ourselves to their extinction. Just as wild animals need variation in population, and the ability to reproduce with wide ranging individuals, plants need the same. The idea that they are protected within Joshua Tree National Park and the Mojave Preserve means nothing when it comes to long term viability of the species - especially when they aren't reproducing any longer in areas outside high elevation, north facing, ravines called “refugia”. This has the same effect as isolation on an island - lack of genetic variation and ability to mix up genes through combination of different individuals each time – for example: genetic recombination, crossing over, and independent assortment during meiosis. This is a complex ecosystem wide subject - one that I've studied for decades, have a degree in, and have taught for nearly 30 years. We need all the trees BETWEEN protected areas to be protected for movement of genes between populations.

As a biologist and ecologist, I support this action. Years of research have shown habitat availability for Joshua trees is declining at a significant rate. Overdevelopment, lack of adherence to the state native plant code, and climate change all contribute to the loss of mature plants. Additionally, climate change is causing mortality of baby trees before they have an opportunity to establish themselves. Dr. Cameron Barrows and Dr. Lynn Sweet, research ecologists for the Center for Conservation Biology at the University of California, Riverside, have done considerable field research, and published papers in the journals Ecosphere and Biological Conservation outlining current climate threats to these trees (Congruence between future distribution models and empirical data for an iconic species at Joshua Tree National Park, June 2019). Seedlings are establishing themselves successfully in exceedingly few microclimates, called refugia. As adult trees die, they are not being replaced. It is imperative everything possible is done to protect this species for the future.

I have dealt with this issue, in one capacity or another, for nearly 25 years. My introduction to the disregard for our desert environment by the town of Yucca Valley started with one event about 23 years ago. There was a majestic Joshua tree on the border of my property and the property next door. My yard was nearly all intact habitat except the house envelope; the property next door was completely intact desert habitat. A developer bought the property and decided to develop it. The tree was nowhere near the building envelope, nor the driveway, nor anything else. I came home from errands to find most of the huge tree knocked down and the bulldozer pushing the rest aside. The dozer operator told me he was told by the developer to knock it down. The other contractor told him to shut up. I took pictures. I made a formal complaint to code enforcement. The officer I spoke with said he knew the exact tree, as it was one of the most magnificent in the area. The code enforcement officer later told me there was nothing they could do with my complaint since the developer said the tree was "diseased" so he had to knock it down. However, the tree was in perfect health; my daughter and I had watched that tree and the birds nesting in it for years. It was a magnificent tree.

This sort of behavior has been going on for decades in Yucca Valley and surrounding areas, leading to the destruction of tens of thousands Joshua trees, yuccas, and creosote that are all on the protected species list for the state of California. However, San Bernardino County and its developers have demonstrated they cannot be trusted to adhere to the requirements for protection of trees in place whenever possible. When not possible, Joshua trees and yuccas are required to be transplanted on site. When that isn't possible, they are required to be transplanted off site. These actions are not enforced and are used as a loophole to avoid the cost of adhering to the laws regarding protected native species.

Recently, we even have our San Bernardino County supervisor, Dawn Rowe, writing to the Yucca Valley Town Council asking them to oppose the listing. She is an ELECTED official, using her position to force a specific action by a town council. Further, the town council, made op of developers and realtors, has posted on the government website – and included in the government newsletter – inflammatory fear speech coercing community members to write letters opposing the listing. This is at best unethical and at worst illegal as it is a tremendous conflict of interest.

Please use your position to protect our beautiful and threatened Joshua trees from those who want only to monetarily profit from their demise.

Sincerely,

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2017 JTNPA Minerva Hoyt Honoree
Field Ecology/Conservation of Natural Resources Instructor
Yucca Valley High School

Barrows, C. W., and M. L. Murphy-Mariscal. 2012. Modeling impacts of climate change on Joshua trees at their southern boundary: How scale impacts predictions. Biological Conservation 152:29–36.Bell, D. M., J. B. Bradford, and W. K. Lauenroth. 2014.

Sweet, et al. 2019. Congruence between future distribution models and empirical data for an iconic species at Joshua Tree National Park. Ecosphere, Volume 10(6), Article e02763.

July 19, 2020

Mr. Eric Sklar, President and Melissa Miler-Hensen
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Support for Petition to List the Joshua Tree, Yucca brevifolia as threatented under the California Endangered Species Act

Dear Mr. Sklar, Ms Miller-Hensen and Mr. Macedo:

I appreciate the opportunity to provide comments on the Brendan Cummings/Center for Biodiversity, petition to list the Joshua Tree*, Yucca brevifolia*, as threatened under the California Endangered Species Act (Cummings 2019). The Joshua tree has long been the most iconic species of the Mojave Desert and can be considered a keystone species as it provides special habitat for the moths that pollinate it but also structural habitat for wildlife and for other plant species regeneration. Indeed, the Mohave Desert is often defined by the range of the Joshua Tree.

I am an ecologist, botanist and forester who spent nearly 10 years working on the Sequoia National Forest as an Environmental Scientist and project planner. The Sequoia National Forest and adjacent federal and non-federal lands include Joshua trees and habitat. I am familiar both with the Joshua tree, its habitat and threats to habitat and its continuing existence.

Brendan Cummings/Center for Biodiversity (Cummings 2019) submitted a petition to list the western Joshua tree (*Yucca brevifolia*) as Threatened pursuant to the California Endangered Species Act (California Fish and Game Code §§ 2050 et seq., CESA). The western Joshua tree (*Yucca brevifolia*), long recognized as a subspecies or variety (*Yucca brevifolia brevifolia*), has recently (Lenz 2007) been recognized as a full species distinct from its close relative, the eastern Joshua tree (*Yucca jaegeriana*) based on a different pollinator.

Yucca brevifolia exists in a precarious equilibrium. It has evolved an obligate mutualistic relationship with the yucca moth, *Tegeticula synthetica,* on which it depends for pollination. While *Yucca jaergeriana* has a different pollinator *Tegeticula antithetica (*Pellmyr and Segraves 2003). *Tegeticula synthetica* is a moth of the family Prodoxidae. It is found in the United States in the Mojave Desert in southern Nevada, south-eastern California and from south-western Utah to north-western Arizona. The habitat for *Tegeticula synthetica* consists of desert areas with *Yucca brevifolia* (Pellmyr and Segraves 2003). The adult *Tegeticula synthetica* do not feed but

lay eggs in the developing seed pods of *Yucca brevifolia*. The larvae feed on the developing seeds of *Yucca brevifolia*. There is a balance between the seeds consumed by the larvae and the seeds remaining to be dispersed for reproduction. Larvae leave the mature *Yucca brevifolia* in a few weeks after eggs are laid and pupation of *Tegeticula synthetica* takes place in a cocoon in the soil (Davis 1967, Moisset 2020). The pupa will stay underground until the next spring. However, some pupae remain dormant for more than a year. If the yucca fails to bloom one year because of weather conditions, there will still be yucca moths around (Moisset 2020) barring disturbance.

Yucca brevifolia depends on the vagaries of rodent caching for seed dispersal. Only those seeds dispersed without consumption to sites within a narrow climate window and soil conditions will thrive. Lastly, Joshua trees are slow-growing, slow-reproducing plants and therefore respond very slowly to changes in their environment (Esque et al. 2015). *Yucca brevifolia* spends an extended period of time in a juvenile growth phase before it begins to bloom (Esque et al. 2015). *Yucca brevifolia* does not provide habitat for *Tegeticula synthetica* until it starts to bloom. *Yucca brevifolia* are long-lived; one population near St. George, Utah, had an estimated median age of 89 years, and five percent of that population are expected to reach 383 years of age (Gilliland et al. 2006). They have been described as "probably the oldest living things in the American southwest desert," with large trees estimated to be up to 300 years old (Johnson 1970). Some *Yucca brevifolia* are documented to be over 1,000 years old (Little 1950).

The Brendan Cummings/Center for Biodiversity petition (Cummings 2019) demonstrates that the western Joshua tree (*Yucca brevifolia*) is eligible for and warrants listing under CESA based on the factors specified in the statute and implementing regulations. Specifically, the western Joshua tree meets the definition of a "threatened species" since it is "a native species or subspecies of a ··· 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 (Cal. Fish & Game Code §2067).

While the Brendan Cummings/Center for Biodiversity petition (Cummings 2019) indicates that *Yucca brevifolia* is not at imminent risk of extinction, it still faces significant and growing threats, primarily from climate change, that ultimately threaten the viability of the species in all or a significant portion of its range in California in the foreseeable future; it consequently meets the definition of a "threatened species." Under CESA, a "threatened species" is "a native species or subspecies of a…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 (Cal. Fish & Game Code §2067)". A plant is an "endangered species" when it 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" (Cal. Fish & Game §2062). Moreover, CDFW has concluded–and appellate courts have upheld–that when determining whether a species is threatened or endangered under CESA, the term "range" is construed to refer to the range of a species or subspecies *within* California, not the worldwide range of the species or subspecies (*California Forestry Assn. v. California Fish & Game Com.)* (2007) 156 Cal.App.4th

1535, 1550-551. This means that regardless of how *Y. brevifolia* may fair in Nevada, the Commission and CDFW can only consider the status and fate of the species in California.

The petition (Cummings 2019) details the current and foreseeable threats to the continued existence of the Joshua Tree. From further investigation on my part, neither the Bureau of Land Management (BLM) nor the any of the adjacent National Forests (Sequoia, Inyo, San Bernadino) have recognized the Joshua Tree as a sensitive species nor a species of conservation concern.

Jones and Goldrick (2015) summarize threats as: climate change is first among them; climate models indicate that by 2100, as much as 90% of Joshua tree habitat may disappear. Secondary and interacting threats include drought, pollution, invasive plants, and changing fire regimes.

Sirichia et al. (2018) writing for the US Fish and Wildlife Service discuss major threats as: clearing large swaths of the desert of vegetation is on-going for solar energy projects and for housing and other industrial development, increasing (OHV) recreation vehicle use and other recreational uses. (Sirichia et al. 2018) also include threats such as wildfire, increasing temperatures (both minimum and maximum), drought, and habitat loss that may affect the resiliency of each species. Available data indicate these threats can lead to individual mortality, especially to small-size plants less than 25 centimeters (10 inches) tall. In evaluating the petition from Wild Earth Guardians, (Jones and Goldrick 2015) they note that "these threats to individual trees are not likely influencing population resiliency on a population or species scale since there is no evidence to indicate any recent population size reductions or range contractions and limited demographic studies indicate recruitment is occurring. (Below I present data to the contrary.)

Cole et al. (2011) modeled predicted climate change within the range of *Yucca brevifolia* by combining a geostatistical analysis of 20th-century climates over its current range, future modeled climates, and paleoecological data showing its response to a past similar climate change. As climate rapidly warmed 11,700 years ago, the range of Joshua tree contracted, leaving only the populations near what had been its northernmost limit. Its ability to spread northward into new suitable habitats after this time may have been inhibited by the somewhat earlier extinction of megafaunal dispersers, especially the Shasta ground sloth. They applied a model of climate suitability for the Joshua tree, developed from its 20th-century range and climates, to future climates modeled through a set of six individual general circulation models (GCM) and one suite of 22 models for the late 21st century. All distribution data, observed climate data, and future GCM results were scaled to spatial grids of ;1 km and ;4 km in order to facilitate application within this topographically complex region. All of the models project the <u>future elimination of Joshua tree throughout most of the southern portions of its current range</u>. **This represents the potential for a major range reduction in the future.**

During the Pleistocene*, Yucca brevifolia* had a more expansive distribution, occurring in middens as far south as Organ Pipe National Monument, as far north as the Amargosa Desert and Sheep Range of southern Nevada and as far east as the Waterman Mountains of southern Arizona, whereas its subsequent Holocene history has been one of contraction from the

southern and eastern limits of its Pleistocene range (Holmgren et al. 2009). **This represents a major range reduction in the past.**

While almost all authors recognize the current importance of rodent seed dispersal, several have hypothesized that the large effort in fruit production by Joshua trees without a specialized dispersal agent may indicate that current fruit production is an evolutionarily relict designed to attract a now extinct megaherbivore dispersal agent, with Cole et al. (2011) identifying ground sloths and Lenz (2007) suggesting Columbian mammoths. Cole et al. (2011) note that evidence supports "the concept that the species' current mobility is constrained by the earlier extinction of the Shasta ground sloth and other possible seed vector(s)." **This lack of a dispersal agent that would expand the current range is evident in the current distribution of *Yucca brevifolia and contributes to the range reduction discussed above*.**

Yucca brevifolia has been recognized as separate from *Yucca jaegeriana* (Lenz 2007). Sirichia et al. (2018) indicate that: *Yucca brevifolia* currently occurs in two regional populations across 5 million acres of habitat supporting resource needs in the western Mojave and southern Great Basin Deserts. *Yucca jaegeriana* currently occurs in three regional populations across 6.3 million acres of habitat supporting resource needs in the eastern Mojave, southern Great Basin, and western Sonoran Deserts. They also identified a Hybrid Zone (131,107 acres) to designate the area where both species occur together on the landscape, along with their obligate pollinating moths, and where hybrid trees occur. So rather than seeing *Yucca brevifolia* as occupying 11.3-11.4 million acres, *Yucca brevifolia* is now known to only occupy at most 5 million acres with much of that habitat unoccupied by individuals as *Yucca brevifolia* is known to occur widely spaced. **This represents an additional range reduction for *Yucca brevifolia*.**

Wildfire poses several threats to *Yucca brevifolia*. *Yucca brevifolia* burns readily as do the nurse plants that facilitate seedling development (Cummings 2019). Wildfire can result in the rapid recruitment of invasive vegetative species particularly grasses that burn easily. This can start a cycle of frequent wildfires that prevents the re-establishment of nurse plants and *Yucca brevifolia*. Brittingham and Walker (2000) investigated regeneration of *Yucca brevifolia* and found that a large majority of seedlings were found growing under the canopy of other woody shrubs. Local presence of specific perennial shrubs resulted in higher levels of recruitment. Brooks et al. (2018) indicate that *Yucca brevifolia* populations along the extreme western edge of the desert bioregion near the Sierra Nevada and Transverse Ranges often re-sprout and survive more readily after fire than populations further east. A cycle of relatively frequent fire and re-sprouting can result in short, dense clusters of Joshua tree clones, such as those found near Walker Pass, in the western end of the Antelope Valley, and in pinyon-juniper woodlands at ecotones with the Transverse Ranges such as Cajon Pass. High re-sprouting rates of Joshua trees in these areas may have evolved in local ecotypes that became adapted to shorter fire return intervals along the western desert ecotones than in other parts of the desert bioregion. Recruitment of new Joshua trees into burned areas is infrequent and slow. In one study, no seedlings or saplings were observed in burned areas less than 10 years old, and fewer than 10 individuals per hectare were present on burned areas more than 40 years old in Joshua Tree National Park (Brooks et al. 2018). Another study found that Joshua trees were still rare on a site 65 years after a fire (Vamstad and Rotenberry 2010). **Any long or continued absence of regeneration can represent an additional, on-going reduction in range.**

The amount and extent of cloning appears to be increasing and accompanies the trend toward absence of successful regeneration at the lower elevation margins of the current range of *Yucca brevifolia.* The extent of cloning apparently increases with increased elevation, with *Yucca brevifolia* in low-elevation dry areas rarely forming more than 1 or 2 stems, but 2 to 3 stems are common, and some clumps are found, in higher, moister areas. A mix of temperature, high winds and abundant snowfall, as well as fire, may be the causal mechanisms of higher levels of Joshua tree cloning (Gucker 2006). In a study following a large fire in Joshua Tree National Park in 1999, DeFalco et al. (2010) found that 33% of plants that were censused in burned areas sprouted from the root crown or stem after the fire compared with 15% in unburned areas. Recently, Harrower and Gilbert (2018) found enhanced clonality and lack of seedling recruitment on the lower elevation margins of the Joshua tree range in addition to the previously reported prevalence of cloning at higher elevation sites. **This represents an additional, on-going range reduction.**

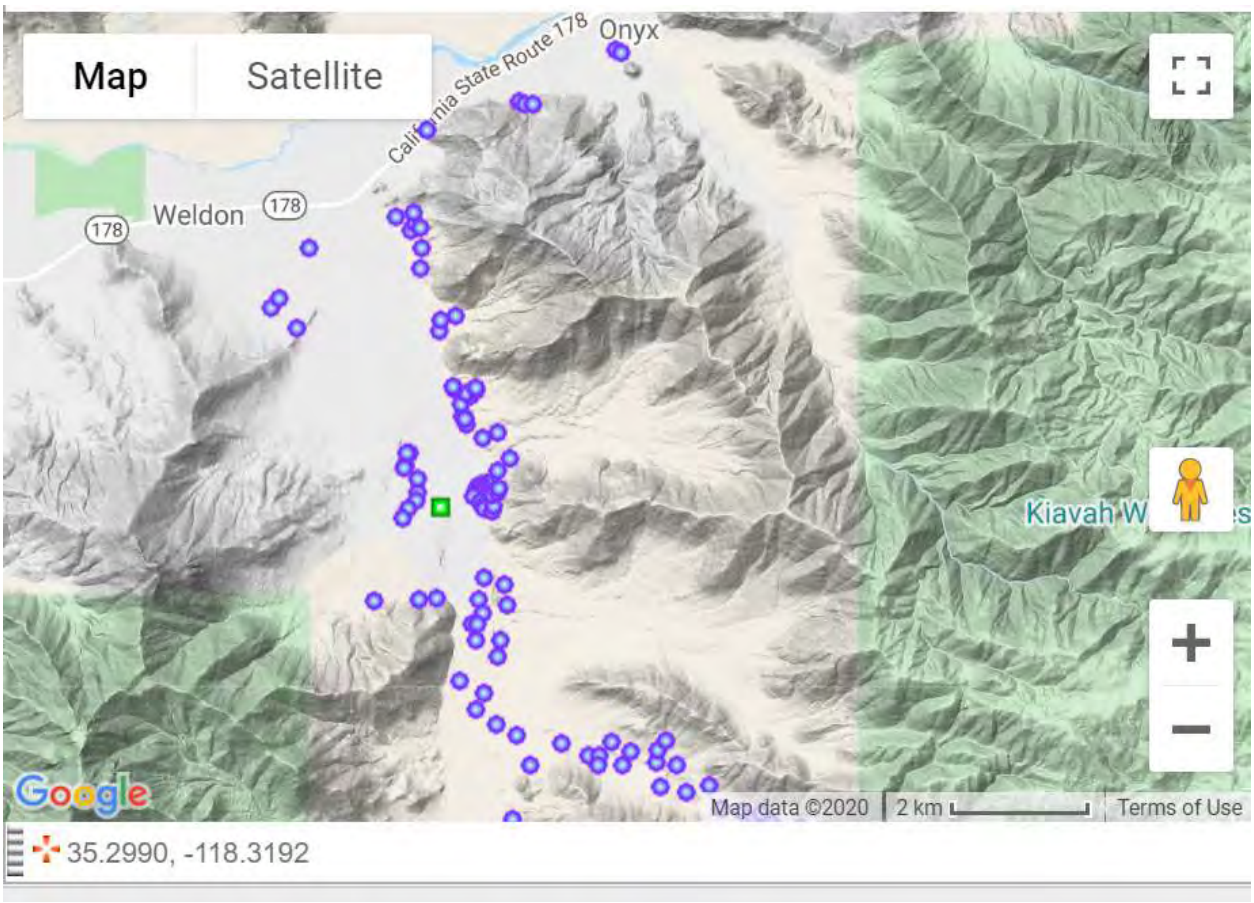
While few studies have discussed threats to its pollinator and its life cycle, many of the threats to *Yucca brevifolia* apply to also to *Tegeticula synthetica.* The moth would seem to be particularly to sensitive to influences to the soil including disturbance from development, recreation, wildfire, invasive vegetation species, air pollution and climate change. COSEWIC (2013) evaluated threats to Yucca moths associated with soapweed *Yucca glauca* and which have a similar life cycle to *Tegeticual synthetica.* They identified threats as dispersal ability, maintaining population size if *Yucca glauca* populations decrease in size, repeated reproductive failure of the Yucca plant over a 25-30 year period, ants, competing Yucca moths such as *Prodoxus quinquepunctellus,* the Five-spotted Bogus Yucca Moth, competing grasses, herbivory of Yucca plants and blossoms, development, OHV and other recreational use. **Any reduction in the moth would result in a reduction in *Yucca brevifolia* reproduction which would represent a reduction/contraction of its range. Other seemingly abundant insects have suddenly gone extinct from soil disturbance e.g. the Rocky Mountain Locust (Lockwood and DeBrey 1990).**

There is a lack of complete inventory data for *Yucca brevifolia*. Occurrence data in CalFlora (2020) shows occurrences mainly by roadsides in valley bottoms, while aerial photos as displayed in Goggle-Earth show *Yucca brevifolia* plants on midslopes as well.

Figure1. Probable *Yucca brevifolia* on uplands south of Weldon, California.

Source: Kathleen S. Roche 2020a. Prepared from Google Earth Image 07/18/2020.

Calflora data for *Yucca brevifolia* south of Weldon, CA.



Source: Kathleen S. Roche 2020b. Prepared from Calflora 07/18/2020.

However, a better inventory is unlikely to expand the known range of *Yucca brevifolia*.

The threats and trends discussed amply support the listing of *Yucca brevifolia* as endangered under the California Endangered Species Act.

Thank you for this opportunity to show support for listing the Joshua Tree, *Yucca brevifolia*, as threatened under the California Endangered Species Act.

Kathleen S Roche

Kathleen S. Roche

Literature Cited

Brittingham, S, and L.R. Walker. 2000. Facilitation of *Yucca brevifolia* recruitment by Mojave desert shrubs. Western North American Naturalist Vol. 60, No. 4 (October 2000), pp. 374-383. Abstract available at: https://www.jstor.org/stable/41717054?seq=1 [07/18/2020]. As cited in Cummings 2019.

Brooks, M.L., R.A. Minnich, J. Matchett. 2018. Southeastern Deserts Bioregion. In Fire in California's Ecosystems 2nd Edition. University of California Press. As cited in Cummings 2019. Available at: https://www.jstor.org/stable/10.1525/j.ctv1wxrxh [07/17/2020]. As cited in Cummings 2019.

Calflora: Information on California plants for education, research and conservation. [web application]. 2014. Berkeley, California: The Calflora Database [a non-profit organization]. Available: https://www.calflora.org/ [07/18/2020].

Cole, K.L., K. Ironside, J. Eischeid, G. Garfin, P.B. Duffy, and C. Toney. 2011. Past and ongoing shifts in Joshua tree distribution support future modeled range contraction. Ecological Applications 21(1):137–149. Available at: https://www.fs.fed.us/rm/pubs_other/rmrs_2011_cole_k001.pdf [07/18/2020]. As cited in Cummings 2019.

COSEWIC (The Committee on the Status of Endangered Wildlife in Canada). 2013. Yucca moth, various species: COSEWIC assessment and status report 2013. Available at: https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports/yucca-moth-various-species-2013.html#_tech_sum1 [07/19/2020].

Cummings, B. 2019. A Petition to List the Western Joshua Tree (*Yucca brevifolia*) as Threatened under the California Endangered Species Act (CESA). Before the California Fish and Game Commission. Center for Biological Diversity. Available at: https://www.biologicaldiversity.org/species/plants/pdfs/CESA-petition-Western-Joshua-Tree-10-15-19.pdf [07/17/2020].

Davis, D.R. 1967. A Revision of the Moths of the Subfamily Prodoxinae (Lepidoptera: Incurvariidae)." Bulletin of the United States National Museum. 1–170, 155 figures, 3 tables, 17 maps, 3 diagrams. https://doi.org/10.5479. Available at: https://www.biodiversitylibrary.org/page/7895220#page/13/mode/1up [07/18/2020].

DeFalco, L.A., T.C. Esque, S.J. Scoles-Sciulla, and J. Rodgers. 2010. Desert wildfire and severe drought diminish survivorship of the long-lived Joshua tree (*Yucca brevifolia*; Agavaceae). American Journal of Botany 97(2):243–250. Available at: https://www.researchgate.net/publication/51174558_Desert_Wildfire_and_severe_drought_diminish_survivorship_of_the_long-lived_Joshua_tree_Yucca_brevifolia_Agavaceae [07/18/2020].

Esque, T.C., P.A. Medica, D.F. Shrylock, L.A. DeFalco, R.H. Webb, and R.B. Hunter. 2015. Direct and indirect effects of environmental variability on growth and survivorship of prereproductive Joshua trees, *Yucca brevifolia* Engelm. (Agavaceae). American Journal of Botany 102(1):85–91. Available at: https://www.researchgate.net/publication/270965336_Direct_and_indirect_effects_of_environmental_variability_on_growth_and_survivorship_of_pre-reproductive_Joshua_trees_Yucca_brevifolia_Engelm_Agavaceae [07/19/2020]. As cited in Cummings 2019.

Gilliland, K.D., N.J. Huntly, and J.E. Anderson. 2006. Age and population structure of Joshua trees (*Yucca brevifolia)* in the northwestern Mojave Desert. Western North American Naturalist 66: 202–208. Available at: https://scholarsarchive.byu.edu/wnan/vol66/iss2/6/ [07/18/2020]. As cited in Cummings 2019.

Gucker, C.L. 2006. *Yucca brevifolia*. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: https://www.fs.fed.us /database/feis/plants/tree/yucbre/all.html [07/17/2020]. As cited in Cummings 2019.

Harrower, J. and G.S. Gilbert. 2018. Context-dependent mutualisms in the Joshua tree–yucca moth system shift along a climate gradient. Ecosphere 9(9):e02439. 10.1002/ecs2.2439. Available at: https://www.researchgate.net/publication/327872598_Context-dependent_mutualisms_in_the_Joshua_tree-yucca_moth_system_shift_along_a_climate_gradient [07/18/2020]. As cited in Cummings 2019.

Holmgren, C.A., J.L. Betancourt, and K.A. Rylander. 2009. A long-term vegetation history of the Mojave-Colorado Desert ecotone at Joshua Tree National Park. Journal of Quarternary Science, Vol 25: 222-236. Available at: https://www.researchgate.net/publication/227630503_A_long-term_vegetation_history_of_the_MojaveColorado_Desert_ecotone_at_Joshua_Tree_National_Park [07/18/2020]. As cited in Cummings 2019.

Johnson, C.M. 1970. Common Native Trees of Utah. Special Report 22. Logan, UT: Utah State University, College of Natural Resources, Agricultural Experiment Station. As cited in Gucker 2006.

Jones, T. and S. Goldrick. 2015. Petition to list the Joshua tree (*Yucca brevifolia*) under the Endangered Species Act. Wild Earth Guardians as submitted to the Secretary of the Interior and USFWS. 2015. Available at: https://ecos.fws.gov/docs/tess/petition/449.pdf [07/17/2020].

Lenz, L.W. 2007. Reassessment of *Yucca brevifolia* and recognition of *Y. jaegeriana* as a distinct species. Aliso: Vol. 24: Iss. 1, Article 7. Abstract available at: https://scholarship.claremont.edu/aliso/vol24/iss1/7/ [07/17/2020]. As cited in Cummings 2019.

Little, E.L. 1950. Southwestern trees: a guide to the native species of New Mexico and Arizona. Agricultural Handbook No. 9. Washington, DC: U.S. Department of Agriculture, Forest Service. 109 p. As cited in Gucker 2006.

Lockwood, J.A. and L.D. DeBrey. 1990. A solution for the sudden and unexplained extinction of the Rocky Mountain Grasshopper (Orthoptera: Acrididae), Environ. Entomol. 19, pp. 1194–1205 (abstract). Abstract available at: https://academic.oup.com/ee/article-abstract/19/5/1194/354423 [07/17/20].

Moisset, B. 2020. Yucca Moths (*Tegeticula* sp.). USDA Forest Service. Available online: https://www.fs.fed.us/wildflowers/pollinators/pollinator-of-the-month/yucca_moths.shtml [07/17/20].

Pellmyr, O. and K.A. Segraves. 2003. Pollinator divergence within an obligate mutualism: Two yucca moth species (Lepidoptera; Prodoxidae: *Tegeticula*) on the Joshua tree (*Yucca brevifolia*; Agavaceae). Annals of the Entomological Society of America 96:716–722. Available at: https://www.researchgate.net/publication/233567197_Pollinator_Divergence_within_an_Oblig

ate_Mutualism_Two_Yucca_Moth_Species_Lepidoptera_Prodoxidae_Tegeticula_on_the_Joshua_Tree_Yucca_brevifolia_Agavaceae [07/18/2020]. As cited in Cummings 2019.

Roche, K.S. 2020a. Google Earth Image of *Yucca brevifolia* south of Weldon, CA. [Accessed 07/18/2020].

Roche, K.S. 2020b. Calflora occurrence records for *Yucca brevifolia* south of Weldon, CA [Accessed 07/18/2020].

Sirchia, F., S. Hoffmann, and J. Wilkening. 2018. Joshua Tree Status Assessment. July 20, 2018. 113 pp. + Appendices A–C. U.S. Fish and Wildlife Service. 2018. Available on-line: https://www.researchgate.net/publication/335600680_Joshua_Tree_Species_Status_Assessment [07/08/2020].

Vamstad, M.S. and J.T. Rotenberry. 2010. Effects of fire on vegetation and small mammal communities in a Mojave Desert Joshua tree woodland. J. Arid Environ. 74, 1309–1318. Available at: https://www.researchgate.net/publication/274699910_Effects_of_fire_on_small_mammal_communities_in_frequent-fire_forests_in_California [07/18/2020]. As cited in Cummings 2019.

Mr. Eric Sklar
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California Fish and Wildlife Commission
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In support of the CESA Candidacy for Western Joshua Tree
Submitted via email June 9, 2020

Dear President Sklar,

As a landscape designer and horticulturalist, I would like to emphasize the recruitment and survival challenges facing the western Joshua tree (Yucca brevifolia ssp. brevifolia). During my research in Joshua Tree National Park and other field studies in Morongo Valley from 2014 – 2019, I have observed limited survival of young species in the wild in this region. In cultivation, container stock of seed grown species tends to survive well if the plants are caged and regularly irrigated and monitored. In general, germination in greenhouse conditions and in the wild can be high, but survival following germination is low due to a wide range of factors including climatic factors, soil conditions, and herbivory. Transplanting of moderately sized individuals tends to be variable, but possible. Transplanting of large mature species and pups is significantly less successful.

Esque and other researchers have observed challenges over time for the survival of seedlings. In a field study conducted over several decades, researchers observed that when precipitation was low, almost half of the Joshua Tree seedlings within the field site were consumed by the Black-tailed Jackrabbit (Esque et al., 2015). After twenty years, only 1/5 of the plants remained and those that remained were the ones that grew more than nine inches in height as seedlings (Esque et al., 2015, 87). These researchers also observed the role of nurse plants in the survival of Joshua tree seedlings. In specific, after the first year only 1/3 of the plants at the edge of the perennials survived whereas ¾ of the plants under perennials were still alive (Esque et al., 2015, 87). Similarly, in a different study by Reynolds and others (2012) that compared uncaged to caged species, researchers found that the impact of rodents on seedlings was incredibly significant, thus limiting seedling survival overall.

Fire may potentially be one of the most significant negative effects of climate change throughout California and it is particularly detrimental for desert regions where plants have not evolved to resprout. A study in 2010 by Defalco and others (2010) of the Juniper Fire Complex, researchers observed that the burned species at the lower elevation test sites declined faster than burned species at higher elevations. After five years, amongst the test sites, 80% of the burned Joshua Trees died and only 26% of the unburned species died due to other conditions like drought or consumption (Defalco et al., 2010). The small Joshua Trees (up to 1 meter) experienced the greatest amount of loss during fire because they are more vulnerable to the intense heat close to the ground (Esque 2004). In addition, fire dramatically reduces the storage of seeds in the ground and the understory plant canopies, thus making it more difficult for species to reproduce

and survive (Esque, Young, & Tracy 2010). All these factors contribute to the slow recovery rate of the Joshua Tree following disturbance.

These added challenges combined with the negative effects resulting from climate change, which have been acknowledged in the petition, such as fire, drought, and temperature increases prose difficulty for the survival of the species at its southern border (Barrows and Murphy-Mariscal 2012). An elevated state of protection for the species, may be remarkably successful in encouraging more cautious and thoughtful planning when it comes to site design and layout. I would like to emphasize the benefits of careful site planning that strives to integrate development into the landscape while preserving as much of the terrain, understory plants, and Joshua trees as possible because this unique landscape has significant ecological and aesthetic value.

Barrows, C. W., & Murphy-Mariscal, M. (2012). Modeling Impacts of Climate Change on Joshua Trees at their Southern Boundary: How Scale Impacts Predictions. *Biological Conservation*. 152:29-36.

Defalco, L. A., Esque, T. C., Scholes-Scuilla, S. J., & Rodgers, J. (2010). Desert Wildfire and Severe Drought Diminish Survivorship of the Long-Lived Joshua Tree (Yucca brevifolia; Agavaceae). *American Journal of Botany*. 97(2):243 -250.

Esque, T.C. (2004). The role of fire, rodents and ants in changing plant communities in the Mojave Desert. Ph.D. dissertation. University of Nevada. Reno, Nevada, U.S.A.

Esque, T. C., Medica, P. A., Shyrock, D. F., Defalco, L. A., Webb, R. H., & Hunter, R. B. (2015). Direct and Indirect Effects of Environmental Variability on Growth and Survivorship of Pre-reproductive Joshua Trees, Yucca brevifolia Engelm. (Agavaceae). American Journal of Botany. 102(1):85-91.

Esque, T. C., Young, J. A., and Tracy, R. C. (2010). Short-term effects of experimental fires on a Mojave Desert seed bank. *Journal of Arid Environments*. 74:1302-1308.

Loik, M. E., St. Onge, C.D., & Rogers, J. (2000). Post-fire recruitment of Yucca brevifolia and Yucca schidigera in Joshua Tree National Park, California. In J. E. Keeley, M. Baer-Keeley, and C. J. Fotheringham [eds.], Second interface between ecology and land development in California, 79 – 85. Open-File Report 00-62, U.S. Geological Survey, Sacramento, California, USA.

Thank you!

Sincerely,
Marinna Wagner
[redacted]

From: Alec Goodman
Sent: Thursday, June 11, 2020 3:40 PM
To: FGC <FGC@fgc.ca.gov>
Subject: Western Joshua tree protection

California Fish and Game Commission,

My name is Alec Goodman. I am a wildlife biologist working with sensitive species in the vast Mojave desert. I am writing this email to urge you to support the recommendations of the California Department of Fish and Wildlife and vote YES for the advancement to candidacy status for the western Joshua tree under the California Endangered Species act. This iconic plant is beneficial not only to the ecosystem it resides in but also economically, attracting thousands of visitors and stimulating local communities. There are many threats facing this species, and I have personally seen huge areas of Joshua tree woodlands - which can support a number of other sensitive species - bulldozed for development projects. But there are also a number of other threats that we are still grasping their full effects such as climate change and a changing fire regime due to non native grasses in the desert. Listing this species would lend it protection and give it a fighting chance at a time when the species population is predicted to decline throughout most of its range. Protection of this species protects the desert as a whole, providing habitat for other species including the desert tortoise and Mojave ground squirrel among many others, conserving scenic desert vistas, battling urban sprawl, and preserving the economic benefits of ecotourism associated with Joshua trees and desert wild lands.
I hope that you see the importance of protecting this special desert resident and vote for its increased level of protection.

Thank you.

Alec Goodman

From: MARIJA MINIC
Sent: Tuesday, August 4, 2020 12:20 PM**To:** FGC <FGC@fgc.ca.gov>
Subject: Consideration of Western Joshua Tree as a "Threatened Species" pursuant to the California Endangered Species Act (C.E.S.A.).

Hello,

My name is Marija Minić and I currently work as an Authorized Mojave Desert Tortoise (Gophurus agassizii) biologist here in Needles, California. I wanted to comment on the consideration of the Western Joshua Tree (Yucca brevifolia) being listed as "Threatened" pursuant to the California Endangered Species Act (C.E.S.A.). This important species is under a barrage of threats, including climate change impacts, wildfire risk, and large-scale development projects. Four published studies have concluded that without intervention, climate change alone creates a high risk of losing western Joshua tree habitat almost entirely.

The presence of the Western Joshua Tree benefits our economy. Its iconic presence attracts people to visit, live and work in the high desert. Its protection will encourage responsible development, preventing urban sprawl and overcrowding, increase property values, and preserve the rural quality of life which attracts people to our area.

While some protection is provided by local ordinances, these are inadequate to respond to the multitude of threats that could lead to its disappearance. Not all Joshua Trees are within National Park and National Monument boundaries. In fact, 40% of Joshua Tree habitat is on private land, where it has only modest protection at best. We are at a critical juncture for the Western Joshua Tree. A collection of scientific studies predict the widespread decline of this iconic endemic species.

Joshua Trees don't grow anywhere else on Earth. They attract visitors and new residents which, in turn, support our economy. In 2018, visitors to the National Park created an economic benefit of nearly $196 million both within the Park and its vicinity — that's almost double the expenditure in 2014. For the local communities adjacent to the Park, 1,823 jobs were related to visitation.

Attracted by the area's scenic beauty and Joshua Trees, the real estate market in the Joshua Tree/Yucca Valley region has steadily increased. New residents generally are not seeking a home in densely developed areas such as a subdivision, but instead are looking for a more rural lifestyle, ideally with proximity to the National Park, and Joshua Trees are a very desirable feature.

We recognize that the rapid growth of our communities and the dramatic increase in visitation at the National Park has resulted in its own issues such as traffic. These issues need to be addressed, but protection of the Joshua Tree will help, not hurt those communities. Its listing will encourage local governments to develop a regional approach to conservation through a Natural Communities Conservation Plan. These plans focus on the conservation of large undeveloped areas, while encouraging new development on vacant land in already developed areas. This helps prevent sprawl and overdevelopment.

Thank you for taking the time to read my letter!

Sincerely yours,

Marija Minić

REED COLLEGE

BIOLOGY DEPARTMENT
3203 SE Woodstock Boulevard, Portland, Oregon 97202-8199
phone: 503-777-7239 fax: 503-777-7239

August 5, 2020

Eric Sklar
President of California Fish and Wildlife

Dear Mr. Sklar:

Why protect the Western Joshua Tree (*Yucca brevifolia*?)

Joshua Trees may appear to be quite abundant and widespread if you live in the Mojave Desert, so why put burdens on land developers? In fact they are rare when seen through a wider lens. They only live in the Mojave Desert, giving the desert it's unique value in terms of tourism and recreation let alone quality of life for those who are fortunate enough to live there. Their inherent value as a keystone for plants and animals in the Mojave is well documented and beyond question. Once a tree is gone there is one less tree. The incremental loss is unidirectional especially in light of uncertainties concerning the tree's ability to reproduce and adapt in a changing world. I urge you to approve protecting the Western Joshua Tree and take a stand that makes sense both economically and scientifically.

Thank you.

Sincerely,

Robert H. Kaplan, Ph. D.
Professor of Biology Emeritus
[redacted]
Joshua Tree, CA [redacted]
[redacted]

Ernesto Nevarez
[redacted]
Morongo Valley, [redacted]

Original on file,
received August 5, 2020

To: Eric Sklar
President of California Fish and Wildlife
fgc@fgc.ca.gov

Before the California Fish and Game Commission
Re: Petition to List the Western Joshua Tree (Yucca brevifolia) as Threatened under the California Endangered Species Act (CESA)

I support the listing of the Western Joshua Tree as Threatened under CESA. Even those that are against the listing, such as the Town of Yucca Valley mean well for the tree but have a position that the tree can best be protected by having it done at a local level. It is the intent of my written testimony to objectively present the recent practices of the Town of Yucca Valley and their failure to protect any trees at all. My presentation will be based on the copies of the permit applications for this calendar year which the Town of Yucca Valley provided to me under a Freedom of Information Act request. The files as given to me have been attached for your reference.

The application (Native Plant Permit Application) is a one page document which lists the number of Joshua Trees to be destroyed, relocated or trimmed. It also lists other endangered plants not an issue in this proceeding. A simple signature by the alleged property owner is all that is required. There is no certification of any sort that the information is correct or that the relocation would be done. Also, there is no verification done by the town to confirm that the applicant is the property owner, no inspection of the conditions of the trees and no documentation that the trees had been relocated or where they were relocated. I have attached a list of the dates the permits were submitted and when they were approved or denied. None of the 147 permits applied for this year were denied and all were approved upon filing without any changes, all having the same date for the filing date and the approval date. I have attached a list of dates on the 147 permit applications submitted/approved this year. See PDF file Processing Dates.

The staff that "reviewed" these permit applications were a handful of office clerks and a supervisor that had no credentials to make decisions on which trees were to live or die. The only skill exercised was to rubber stamp all applications without any question nor changes. The staff lacked proper supervision and there was no accountability for the quality of their work. Of the 147 permits issued this year, 68 of the permits were based on photos in the file according to the staff notes on the permits. Only 24 of the files include any photos at all, a discrepancy of 44 cases with missing photos. Either the staff fabricated the information in order to approve the

permit on the spot or they were incompetent in documenting their decisions by saving the alleged exhibits. I would hate to allege any fabrication and would only suggest incompetence.

This inability to professionally process the permit applications, both by staff and the Town Council itself, has come at a great price to the Western Joshua Tree population. From January 1, 2020 through July 22, 2020 here are the statistics:

Destroyed (killed)	213	
Relocated on-site	122	less than 10% survival rate
Relocated off-site	47	less than 10% survival rate
Doomed trees	382	

Again, these statistics come from the actual permits issued this year. Not a single permit was denied in whole nor in part. This was a rubberstamp operation with no regards for saving any of the trees.

I ask the Commission to take caution on any testimony by the Town of Yucca Valley. The attached reports come from the actual permits which are also attached. Quite possibly you will hear as to how the town has specific regulations in place to protect the tree but what good are they if they are not enforced? If it is true that there are such rules in place and they are not enforced it says a lot as to the intent of the town not to protect the trees. None of the permit requests make any references to any of the rules, especially not since there were no permits denied or altered. The Town of Yucca Valley is not capable of enforcing its' own rules. The Town Clerk confirms the Town's inability and lack of interest in protecting the trees;

> *Further, the Town has searched for potentially responsive records concerning service requests and reports of potential violations, service requests, and reports of tree removals, citations, fines, and prosecutions for violating the Town's ordinances concerning the removal of Joshua Trees during the last three years; however, no such records were found.*
> (From the file Town Clerk)

Please do not allow the Town of Yucca Valley to continue the slaughter of OUR trees.

Respectfully,

Ernesto Jesus Nevarez
August 4, 2020

Chad Dibble
Deputy Director Ecosystem Conservation Division
chad.dibble@wildlife.ca.gov

Stafford Lehr
Deputy Director Wildlife and Fisheries Division
stafford.lehr@wildlife.ca.gov

Wendy Bogdan
General Counsel Office of the General Counsel
wendy.bogdan@wildlife.ca.gov

Joshua Tree Permits

Case #	Received	Address	Killed	Relocated On-site	Relocated Off-site	Protected	Trimmed
20-001	1/2/2020	[redacted] Tr	1				1
20-002	1/2/2020	[redacted] ave					3
20-003	1/2/2020	[redacted] hwy					1
20-004	1/2/2020	[redacted] hwy	1				
20-005	1/2/2020	[redacted] ave	1				
20-006	1/6/2020	[redacted] ave	1				
20-007	1/6/2020	[redacted] ave	1		1		
20-008	1/6/2020	[redacted] ave	2				
20-009	1/9/2020	[redacted] Rd	2				
20-010	1/9/2020	[redacted] Trail	1				
20-011	1/9/2020	[redacted] Dr	1				
20-012	1/13/2020	[redacted] dr					3
20-013	1/13/2020	[redacted] Dr.	1				
20-014	1/13/2020	[redacted]					1
20-015	1/15/2020	[redacted] ave	1				
20-016	1/20/2020	Same as above					3
20-017	1/23/2020	[redacted]					1
20-019	1/28/2020	[redacted] Dr	3				
20-020	1/28/2020	[redacted]	1				
20-021	1/28/2020	[redacted]	1				
20-022	1/28/2020	[redacted]	9			10	
20-023	2/4/2020	[redacted]	2		2		
20-024	2/5/2020	[redacted] ave					1
20-025	2/10/2020	[redacted] Rd	1				
20-026	2/10/2020	[redacted] dr	1				
20-027	2/11/2020	[redacted] Trail					5
20-028	2/12/2020	[redacted] Trail					1
20-029	2/19/2020	[redacted] ave					1
20-030	2/24/2020	[redacted] Drive	1				
20-031	2/24/2020	[redacted] Lane		3			1
20-032	2/25/2020	[redacted] ave	1				
20-033	2/25/2020	[redacted] Trail	1		1		1
20-034	2/25/2020	On Pueblo, between Hopi and Bannock	12				
20-035	2/24/2020	[redacted] Lane					2
20-036	2/25/2020	[redacted] Way					3
20-037	3/3/2020		4				
20-038	2/27/2020	[redacted]					2
20-039	3/2/2020	[redacted] ave	2				
20-040	3/2/2020	[redacted] dr	2	2			
20-041	3/4/2020	[redacted]	2				
20-042	3/3/2020	[redacted]	3				
20-043	3/4/2020	[redacted] Trail		6	2		
20-044	3/11/2020	[redacted] Lane					3
20-045	3/11/2020						
20-046	3/12/2020	[redacted] ave	6		6		
20-047	3/17/2020	[redacted] Rod	1		1		
20-048	3/17/2020	[redacted] Dr	2				
20-049							
20-050	3/18/[redacted]	[redacted] dr					1
20-051		Burrtec	37	96			
20-052		[redacted] Dr					
20-053	3/26/2020	[redacted] Drive	1		1		
20-054	3/30/2020	[redacted] Trail				4	
20-055	4/13/2020	[redacted] ave	1				
20-056	4/14/2020	[redacted] Dr	13			15	
20-057	4/15/2020	[redacted] ave	4				
20-058	4/16/2020	[redacted] Ave	1				
20-059	4/28/2020	[redacted]	1				
20-060	5/4/2020	[redacted]					1
20-061	5/4/2020	[redacted] ave					2
20-062	5/5/2020	[redacted]	1				4
20-063	5/11/2020	[redacted]	2				1

Joshua Tree Permits

Case #	Received	Address	Killed	Relocated On-site	Relocated Off-site	Protected	Trimmed
20-064	5/12/2020	[redacted] Tr					3
20-065	5/14/2020	[redacted]			5		
20-066	5/18/2020	[redacted]	4	5			
20-067	5/20/2020	[redacted]					2
20-068	5/21/2020	[redacted]	2				
20-069	6/28/2020	[redacted] Drive	1				
20-070	5/28/2020	[redacted] hwy	2				
20-071	5/28/2020	[redacted] hwy	2				
20-072	6/1/2020	southeast corner of Pueblo trail and ballock trail	1				
20-075	6/1/2020	Northeast corner of Pueblo trail and Geronimo Tr	1				
20-076	6/1/2020	North side of Pueblo tr 100 ft east of Geronomo	1				
20-077	6/1/2020	North side of Pueblo Tr, 100 ft east of Deer Trail					1
20-078	6/1/2020	north side of Pueblo tr 100 ft east of Cervec Trai	1				
20-079	6/1/2020	[redacted] hwy			1		
20-080	6/1/2020	[redacted] ave			1		1
20-081	6/1/2020	south side of Alley Way Rabbit Trail, Palm ave	1				
20-082	6/1/2020	[redacted] Radbit Trail	3				
20-083	6/1/2020	North side of Alleyway Rabbit trail	1				
20-084	6/2/2020	[redacted] Dr		3			
20-085	6/2/2020	[redacted] ave	2				1
20-086	6/5/2020	south side of Yucca Trail, west of Warren Vista	1				
20-087	6/8/2020	North side Yucca Trail at Alaba ave	1				
20-088	6/3/2020	[redacted] Trail	1				
20-089	6/3/2020	[redacted] Trail	1				
20-090	6/3/2020	[redacted] Way					1
20-091	6/3/2020	[redacted] dr	1				
20-092	6/3/2020	north side of Pueblo Trail, west of Geronimo Trail	1				
20-093	6/3/2020	[redacted] ave	1				
20-094	6/4/2020	[redacted]	2				
20-095	6/8/2020	[redacted] way	5				
20-096	6/8/2020	[redacted] ave					4
20-097	6/8/2020	[redacted]	1				
20-098	6/8/2020	[redacted] Drive	2				
20-099	6/8/2020	Little League dr and Grand avenue	1				
20-100	6/8/2020	Little League and Grand ave	1				
20-101	6/8/2020	Little league and Grand	1				
20-102	6/8/2020	Little League and Grand	1				
20-103	6/9/2020	[redacted] ave	2				
20-104	6/10/2020	[redacted] Dri					
20-105	6/15/2020	[redacted] dr					2
20-106	6/16/2020	[redacted] trail	1				
20-107	6/18/2020	[redacted] Dr	4	1		2	
20-108	6/18/2020	[redacted] ave	3	6		6	
20-109	6/18/2020	[redacted] Dr	1				
20-110	6/18/2020	[redacted] Tr					1
20-111	6/23/2020	Onaga and Palm			3		
20-112	6/23/2020	Onaga Trail and Palm			1		
20-113	6/23/2020	Onaga and Palm			1		
20-114	6/23/2020	Yucca Trail and Palm			1		
20-115	6/23/2020	Onaga and Palm			2		
20-116	6/23/2020	Onaga Trail and Palm	3				
20-117	6/23/2020	Onaga and Palm			2		
20-118	6/28/2020	Onaga trail and Palm			1		
20-119	6/23/2020	Onaga trail and Palm	6				

Joshua Tree Permits

Case #	Received	Address	Killed	Relocated On-site	Relocated Off-site	Protected	Trimmed
20-120	6/23/2020	Onaga Trail and Palm			1		
20-121	6/23/2020	Onaga trail and Palm	10				
20-122	6/23/2020	Onaga Trail and Palm			2		
20-124	6/23/2020	Onaga Trail and Palm	1				
20-125	6/23/2020	Onaga Trail and Palm			1		
20-126	6/23/2020	Onaga Trail and Palm			1		
20-127	6/23/2020	Onaga Trail and Palm			1		
20-128	6/23/2020	Onaga trail and Palm			1		
20-129	6/23/2020	Onaga Trail and Palm			1		
20-130	6/23/2020	[redacted] tr			1		
20-131	6/24/2020	[redacted]					
20-132	6/29/2020	[redacted] Ct					1
20-133	6/29/2020	[redacted] Dr	1				
20-134	6/29/2020	[redacted] Dr	1				
20-135	7/2/2020	[redacted] trail	1				
20-136	7/6/2020	[redacted]	1				
20-137	7/6/2020	[redacted] trail	1		1		
20-138	7/6/2020	[redacted] Trail					14
20-139	7/7/2020	[redacted] ave					
20-140	7/7/2020	[redacted]rail	1				
20-141	7/7/2020	[redacted] rd	1				
20-142	7/7/2020	[redacted] Dr	1				
20-143	7/8/2020	[redacted]rail	1				
20-144	7/13/2020	[redacted] Tr					4
20-145	7/16/2020	[redacted] ave					2
20-146	7/21/2020	[redacted] hwy	1				
20-147	7/22/2020	[redacted] tr			5		
		Total:	**213**	**122**	**47**	**37**	**79**

August 6, 2020

Mr. Eric Sklar
President
California Fish and Game Commission
P.O. Box 944209
Sacramento, California 94244-2090
Via email: fgc@fgc.ca.gov

Re: Strong Support for Candidacy for Western Joshua Tree as Threatened under the CESA

Dear Mr. Sklar:
I am a retired biologist educator living in Twentynine Palms in the Mojave Desert. To reach my home I drive east through the Morongo Basin and the Joshua tree studded town of Yucca Valley and the unincorporated community of Joshua Tree before losing the elevation which supports their namesake. We are all gateway to Joshua Tree National Park with economies that thrive because of the tree and the Park which protects them. In 2019 over 3 million visitors from countries around the world came to gaze at this tree in its natural woodland environment. They provided $201 million to the gateway economies.

You would think that Yucca Valley, the western most portal to this wonderland would do everything possible to protect this cash cow. Not so. Faced with development they rely on the California Native Plants Act and local ordinances. None act as a bar to tree removal only requiring transplantation, donation or making available for adoption trees removed from construction sites. The requirements are not enforced.

The local Hi-Desert Water District prepared a Mitigated Negative Declaration (MND) for their 10-year construction project to install 64 miles of sewer pipeline with 1,300 manholes and 3 lift stations within roadways and easements outside the core contiguous area of Yucca Valley, i.e. in Joshua tree woodland. An unknown number of Joshua trees would be sacrificed.

The CDFW provided the following comments in response to the MND.

> CDFW would like to note the Fish and Game Commission has received a petition to list Western Joshua Tree (*Yucca brevifolia*) as a threatened species under CESA. A decision will be made in June 2020. CDFW recommends Hi-Desert Water District reviews the listing status prior to finalizing the MND as it may affect the legality of BIO-6. If the Project, including the Project construction or any Project-related activity during the life of the Project, results in take of CESA-listed species, CDFW recommends that the Project proponent seek appropriate authorization prior to Project implementation through an ITP.

Local activists, such as myself, request strongly that the Western Joshua tree be listed as threatened under CESA. Current regulatory mechanisms are not adequate. We need the listing to effectively use CEQA to protect the survival and reproduction of the western Joshua Tree under siege from climate change.

Thank you for your consideration of these comments.

Pat Flanagan

Pat Flanagan
[redacted]
Twentynine Palms, [redacted]

Sent: Thursday, June 4, 2020 12:29 PM
To: FGC <FGC@fgc.ca.gov>
Subject: Save the Joshua Trees.

To Whom It May Concern,

We are writing this letter to support listing Joshua Trees on the California Endangered Species List.

Being tax paying residents of Yucca Valley, what drew us to this high desert region (and literally millions of visitors who come yearly to the Joshua Tree National Park and to Yucca Valley as well) was and still it the beautiful and unique Joshua Trees. Never would we have thought that a group of 5 misguided city council members, who do not represent the greater community, oppose having the very trees which benefits and brings tourism to their city be opposed to the protection of these trees. However we are fully aware that their decision in this matter has to do with catering to developers who have long opposed the protection of these unique trees for their own greed. If you visit our city you will see empty lots of scaped land where once stood Joshua Trees illegally removed, many empty half developed projects all along the main road that never finished, and unfortunately present more blight then progress to our city. Unfortunately Yucca Valley City Council is known to it's residents as not representing its people but only their own personal interests which are shortsighted. The Joshua Trees are perhaps the only things that brings this community a sense of awe and beauty to this otherwise non descript desert region.

Being independent hospitality business owners in Yucca Valley, 100% of our guests come from all over this country and the world to the high desert specifically to see and be around these beautiful trees. They take years to mature, are fragile, and contribute to our ecosystems. Without their protection the town of Yucca Valley and neighboring towns would have nothing much to offer. We say with certainty that tourism would ebb and the effects of not protecting these trees would lead to their demise (which only purpose is to serve developers who most do not even reside in our communities) and would drastically change the entire landscape of our desert.

Please we implore you to support the listing of the Joshua Tree and oppose the City Council of Yucca Valley myopic and immediate for profit mind set to not list them. We hope that in good conscious in your decision making as protectors of the environment and this planet, you will not allow the greed of the Yucca Valley 5 City Council members to determine the faith and future of these magnificent and unique trees for the millions others who travel the world to experience them and for future generations.

With warm Regards,

Shirley Perl
Billy Shire

Subject: Western Joshua Tree Listing

7/30/2020

From: M Sims

CC: FGC <FGC@fgc.ca.gov>; Dibble, Chad@Wildlife <Chad.Dibble@wildlife.ca.gov>; Lehr, Stafford@Wildlife <Stafford.Lehr@wildlife.ca.gov>; Bogdan, Wendy@Wildlife <Wendy.Bogdan@wildlife.ca.gov>; Isabal.Baer@wildlife.ca.gov

I am writing to you to change the listing for the Western Joshua Tree to endangered. I support CESA protection.

If something isn't done soon future generations may not be able to enjoy a truly unique desert landscape that includes Joshua trees.

I live in Yucca Valley California and even though the city has restrictions and many rules in place to keep Joshua tree destruction from development to a minimum, the rules are rarely followed and even more rarely, enforced.

What typically happens is the land is clear cut of all desert vegetation with few exceptions.

Mike Sims
Yucca Valley, California

Who is Protecting the Joshua Trees?

6/24/20

From: Casey Kiernan

To: Dibble, Chad@Wildlife <Chad.Dibble@wildlife.ca.gov>; FGC <FGC@fgc.ca.gov>; Bogdan, Wendy@Wildlife <Wendy.Bogdan@wildlife.ca.gov>; Lehr, Stafford@Wildlife Stafford.Lehr@wildlife.ca.gov

Hello;

The Joshua Tree habitat is threatened by climate change, urban development and wildfires - but no one is charged with protecting them against these threats.

Those who opposed doing a study are clearly NOT interested in protecting the Joshua Trees. In fact, local communities are disincentivized to protecting the Joshua Trees - because they are driven by tax revenue.

It's shocking to see such opposition!!

Please help protect the Joshua Trees!

https://youtu.be/sSxBRvpAd9A

Thank you!

Casey Kiernan

I was born in California. I have lived in Joshua Tree for 5 years - and I have been coming to the park since the 1970's. I am a landscape photographer - I teach workshops in Joshua Tree and Death Valley National Parks.

From: Hyeonjin Park
Sent: Thursday, August 6, 2020 4:58 PM
To: FGC <FGC@fgc.ca.gov>
Subject: Re: Public Comment for 19-20 August CA FGC Meeting

To Whom It May Concern:

I am writing to you today to ask that you please vote YES to designate the western Joshua Tree as a candidate for formal protection under the California Endangered Species Act.

40 percent of this endemic species' habitat is on private land, has no other habitat on earth, and the area has an economic dependence on its scenic attributes that attract tourism as well as buyers to regional real estate markets. With this widespread decline, the *Yucca brevifolia*, otherwise known as the Joshua Tree, is in desperate need of added protection more than ever.

While I recently moved to Southern California for my graduate studies, I have visited Joshua Tree National Park (JTNP) on multiple occasions. Every visit, JTNP never failed to take my breath away. During the period of the federal government shutdown from December 2018 to January 2019, I was heartbroken and enraged to find out that the National Park was desecrated, with burn markings on and near historic petroglyphs and timeless rock formations; trash and litter scattered to the wind; and, worst of all, damaged and destroyed Joshua Trees. As it is, the park superintendent, Curt Sauer, has been quoted that it could take up to 300 years for wildlife to recover from the damages done in the span of a month. However, we must consider all of the existing threats that our world is currently facing, both natural and manmade: natural disasters such as wildfires and earthquakes; climate change; large-scale developments, and human traffic through this park— In far less than 300 years—perhaps even less than 50 years—the Joshua Tree could easily be extinct without protections under the California Endangered Species Act.

It is our responsibility—especially as main contributors to their endangerment—that we protect the Joshua Tree and, ultimately, the environment that depends on this species. They are vital to the lives of the yucca moth (*Tegeticula synthetica*), which are the only species of moth that can pollinate it. They are a vital part of the ecosystem to dozens of species including but not limited to rodents, birds of prey, reptiles, arachnids, and insects. From a human's perspective, we lose a cultural landmark; a valuable resource that was treasured by the Cahuilla and call it *hunuvat chiy'a* or *humwichawa*; and the opportunity for future generations to see an incredibly unique species to this region.

We must do everything we can to protect the Joshua Tree. I once again urge you to vote YES to advance the candidacy of this species as endangered and, ultimately, fall under the protection of the California Endangered Species Act.

Best wishes,

Hyeonjin Park, M.A.
Ph.D. Student, Musicology
UCLA Herb Alpert School of Music
Pronouns: they/them

President Eric Sklar
California Fish and Game Commission
P.O. Box 944209
Sacramento, CA 94244-2090

Submitted via email August 6, 2020
Letter supplementing comments of June 10, 2020

Re: Support for Western Joshua tree petition

Dear President Sklar,

Thank you for entertaining my perspectives in support of this petition. I'd also like to express my appreciation to Director Bonham for his June 25 invitation, urging primary stakeholders to explore existing pathways. Hopefully, the value of working in conjunction with the Department was recognized and meaningful long term policies are in the process of being formed. In a previous letter, I asserted that much of the controversy surrounding this petition might have been avoided through reasonable public education by local officials, and I continue to maintain this position. Protections do exist as claimed, but opaquely and only on paper. In daily practice, this confusion manifests as permission to disregard protections entirely.

I commented at the last meeting regarding the contractor who suggested killing a few trees with gasoline to insure land use entitlements. Reactions were strong, and included a call from the Third District office to name the individual. I declined. From this experience, I learned that people are generally unaware of the widespread nature of this mindset, and the role that do-or-die messaging plays in promoting extreme behavior. My spa vendor was asked by a customer if chlorine would work. Personally I find such techniques amoral. But the point of these anecdotes is not to vilify isolated individuals, who cannot be blamed for taking their cues from sanctioned activities. In a strictly collateral sense, the use chemicals to expedite the removal of individual specimens is less detrimental than the unchecked practice of scraping entire parcels as condoned under permits.

Local lack of a state supported conservation plan leaves room for the creation of a policy that centers around a reward system for voluntary conservation. This is far more manageable than the norm of inconsistently enforced, punitive ordinances. Using round numbers for simplicity, imagine that a parcel has ten Joshua trees, and the tree-related fees are determined to be $10,000. Fees could be held in escrow until project completion. Based on ten trees, for each of the reproduction age trees left undisturbed, an 6-8% credit is applied. For smaller, unbranched trees translocated under proper conditions through an adoption program, a 3% credit is applied (lower percentage since survival rates of transplanted trees are low: administer translocations through a state endorsed non-profit as is done in Arizona with Saguaro). Simple pre construction adjustments, such as driveway or septic placements, could positively impact species conservation while benefitting the developer's bottom line. I recently test drove the approach for a local development group (combined assets in excess of 50 income properties). Within our ranks, it was greeted as a win-win. There must be numerous incentivizing options that would support the legal intention of authorized take as truly incidental. Leadership that drafts a workable compromise policy would be held in esteem across their constituencies.

Messaging the loss of personal property rights predictably triggers hostility within rural communities. Exacerbating this atmosphere of conflict is AB235, deemed by the author as urgent for public peace: ironically, it inflames the very anxiety that it's proposing to quell, which was set in motion by the tone of jurisdictional messaging in the first place.

Clearly, this petition and the ambitions of AB235 are closely linked. As law, AB235 would force the Commission away from its role as a discrete wildlife and science based agency and transform it into an ineffectual Everything Burger Commission. The bill is fiscally irresponsible, proposing to flush away the spent resources of numerous candidacy processes by introducing irrelevant new considerations. But most tragic of all, as law AB235 would codify shoot-shovel practices. Driven by uncertainty over listing determinations, some will feel panicked or resentful, and be compelled to obliterate any evidence of imperiled species irregardless of need, thinking a candidacy year to be a last chance.

A several year long public process led up to Yucca Valley's Native Plant Ordinance, which was abruptly amended in a closed door town council session shortly before a large residential project broke ground and hundreds of mature trees were removed. In 2007, I signed onto an illusive San Bernadino County Joshua tree plant adoption list. Since I have ongoing habitat restorations at several properties and the adoption system does not seem to be functional, I've taken up a practice that I call "drive by gardening", which involves pulling over at the sight of a bulldozer. Translocations are an unsatisfactory last resort, but superior to the alternative of seeing trees disposed. Where my triage falls along the spectrum of legality is as unclear to me as the removals are to those clearing lots. Displacing natives solely for cosmetic landscaping purposes cannot be allowed, but these drive bys have resulted in rescuing *Y. brevifolia* from dump piles, dump trailers, and from the dump itself. Because trees must be moved quickly, there is never enough time to react properly with a hired tree spade: meanwhile, the only spade in the area has not been called upon to move a Joshua Tree in over two years. Of the more than two dozen *Y. brevifolias* that I've moved by different methods at different times, some trees have prevailed, but many have succumbed. These translocations have produced an incomplete but empirical understanding of likely conditions for success and failure, and I would welcome the opportunity to volunteer my field knowledge for incorporation into sensible ordinance guidelines.

Furthermore, I've scattered thousands of seeds into the nurse plants that make natural recruitment even the remotest of possibilities. I've installed seed in man made catchments that are tended and caged. Consistent with scientific studies, germination rates are high but only a handful persist to yearlings, and to date a mere four or five seed raised individuals show any assurances of maybe reaching reproduction age - and if they do, their flowering is a condition that I will not witness in my lifetime. First hand observation of low recruitment rates underlines the fact that every Joshua tree is the most unlikely of miracles, and the protection of existing trees is a serious affair. As a keystone species, they must be retained if we hold any desire to preserve an entire ecosystem on landscape scale.

And so I dumpster dive or scatter seeds, hoping that maybe *this one* survives past its first, third, fourth year, and improbably even persist to maturity. Gambling against unfavorable stochastic events and the whims of future land owners, I call representatives, read legal documents, and write letters to this Commission. At times it feels like the futile acts of a crazy person, knowing that somewhere nearby there's a decent probability that an entire tract of *Y. brevifolia,* representing thousands of years of collective growth, is being churned under on any given day.

Respectfully,

Miriam Seger
[redacted].
Joshua Tree, [redacted]

-seed collected in parking lots, trees found discarded, removed or in process of removal
-these photos are a sampling from 14 years of personal rescue and restoration efforts

Mr. Eric Sklar
President
California Fish and Wildlife Commission
P.O. Box 944209
Sacramento, CA 94244-2090

RE: Strong Support of CESA Candidacy for Western Joshua Tree

Submitted via email June 10, 2020

Dear President Sklar,

As a developer and conservationist with seven fi ure capital assets in California's high desert, my holdings consist of commercial, residential, and open land properties. I specific lly chose to invest in the Morongo Basin for the "intangible asset value" of its landscape and natural processes, and the erosion of these attributes negatively affects the worth of my portfolio. To describe my business model in biological terms, investments coupled with conservation are a lucrative form of obligate mutualism, and I'm part of a community of local businesspeople who benefi from this strategy.

SUPPORT FOR PETITION

Climate change abatement, conservation, and economic health are imperative partners for continued residency in desert extremes. Near term projections (decades not centuries) demand wildlife strategies that straddle the precariousness of such communities, the preservation of ecosystems that mitigate increased human presence, and the pressures on keystone species for ongoing habitation in an increasingly hot environment.

Representatives of my area have equated this listing petition with a mandated cessation of growth, and melodramatically as a trigger for economic devastation. Please note that we have had decades of business-as-usual development in spite of Agassiz's desert tortoise listings (CESA 1989/ESA 1990). To use the desert tortoise as an example, defi ed pathways for construction have long been approached as just one procedural step among many. Since tortoise and western Joshua tree habitat overlap, there is no reason to believe that listing would bring unfamiliar or insurmountable burdens to builders. Pathways allowing development will follow a new listing, and the process can be smooth so long as there is a will on the part of local representatives to balance the varied economic interests of their entire constituencies.

In a highly optimistic scenario, isolated individuals of *Yucca brevifolia* would develop adaptations that express some degree of resiliency to climate and precipitation changes. Since the necessity of gene fl w is a common denominator for the persistence of all species, genetic exchange is critical to the survival of *Yucca brevifolia*. With 40% of the population on private land, a critical but reasonable constraint should require that some trees remain in order to allow suffic ent connectivity for the obligate pollinator to distribute adaptive traits. A degree of understory vegetation should also remain for the possibility of recruitment. But here in the Morongo Basin, "scrape firs , plan later" blading is par for the course and removing all vegetation from entire tracts will have the eventual effect of fragmenting homogeneous populations, making recruitment and adaptation in these disturbed areas unlikely. It's understood by conservationists that trees will be removed for development regardless of listing status, but mitigation could conceptually boil down to three simple words: leave something behind.

SAN BERNADINO COUNTY SUPERVISORS

Since it has come to my attention that San Bernardino County Supervisors have been, to borrow the adjective from a staffer, “aggressively” lobbying the Commission against this petition, I’m compelled to provide my constituent perspective on their actions. Protections have fallen short of legal intent due to either jurisdictional indifference or avoidance and now offic als are appealing to the Commission with cries of foul. This petition has been called redundant because “protections already exist“ yet this conveniently ignores the fact that lack of adherence (by way of inaction) to legislation, ordinance, regulation, or Act represents non-compliance. While protections may be practiced in other *Yucca brevifolia* habitat areas, there is little evidence of recognition within the Morongo Basin with the exception of the very largest of projects that necessitate CEQA review.

Infl ted and wildly speculative estimates of listing related costs are being broadcast to the public, creating irrational fear. Constituents have been told that constraints will add $50,000 or more to the construction of a modest single family home (this has blown up by Facebook citizenry to $100,000). Individuals are down-streaming this with assertions that a homeowner’s right to trim a dangerous branch will require $10,000 and become a protracted bureaucratic affair. In talking points, using the provocative rallying cry of keeping the government “out of your backyards” at least one offic al is acting as public agitator - inherently contradictory to their role.

In reality, mechanisms for take of *Yucca brevifolia* are clearly offered within the petition, with latitude for local interpretation. Disregard for this is evidenced by a Supervisor quoted in print media as incorrectly saying, “Private and commercial property owners would be forbidden to remove any trees from their land.” Lastly, I must speak for the multitudes of constituents who do not accept that climate change is merely a futuristic apparition in a gazing ball, as one county Supervisor so nostalgically suggests in calling it a “prediction”.

STREAMLINING THE PROCESS: PROTECTIONS PLUS FEE REDUCTION

Regardless of spin doctoring by elected offic als, dealing with listing has the potential to become straightforward by removing conjecture via reasonable defi itions of constraints and fees under an area-specific and overdue Natural Community Conservation Plan (NCCP), and Habitat Conservation Plan (HCP). To return to earth and replace hyperbole with two actual numbers: tag costs for Joshua trees, as mandated by the Desert Native Plants Act, “must be a minimum of two dollars” and the development fee to cover all listed plant and animal species combined (specific lly per a region-wide Coachella Valley Conservation Plan, where property values are higher and therefore presumably fees) is about one thousand dollars/acre per single unit with numerous exemptions (as opposed to current local $6,000 and up fees for trees alone). Under an NCCP/HCP, further reductions in cost per parcel and expedited time frames can be attained by towns or counties seeking permits on behalf of individuals and landowners. Although this requires a bit of retooling for local jurisdictions, nearby communities offer examples of templates. Doing the right thing initially requires a bit more thought than doing your own thing, until in short order it becomes just the way that things are done better.

AFFORDABLE HOUSING

Some argue that encumbering Joshua tree removal denies a segment of the population from accessing housing. This fails on multiple social justice levels. If housing the disadvantaged is a genuine concern, it is absurd to think that a wildlife management agency could ever enact policies impactful as those which municipalities have left unexplored. The current developer

norm of scraped dirt construction for affordable housing presumes a chauvinistic attitude that only the affl ent can benefi from from green spaces, relegating those in need to unaesthetic and dusty habitation. Actually, in situ natives do not require removal/disposal expenses, subsequent replacement with nursery cultivars, irrigation hardware, and costly use of precious water resources. Selective grading minimizes dust and invasive plant potential, and desert plants are among the most extremely effic ent organisms of carbon sequestration. Because they are so long lived, the removal of individual mature plants could represent the release of over a century of stored carbon - further contributing to a damaging feedback loop. Increased constraints will serve to reinforce state action plans that recognize the poor as disproportionally affected by climate change and air quality. Furthermore, California's Accessory Dwelling Unit encouragements are a new tool for exploring affordable, small footprint homes, harmoniously sited in Joshua tree woodland with minimal disturbance.

OTHER COMMENTS

In reference to the document submitted by Concerned Citizen: since the Commission is previously aware of the differences between foraging patterns and seed dispersals of native herbivores vs. domestic livestock, the diffic It issues surrounding grazing, wild burro removal, complex debates over supplemental water for bighorns etc., I'm trusting that these and other simplifi d arguments will be dismissed without need for rebuttal.

CONCLUSION

Yearly, millions of domestic and international visitors are drawn to experience the Mojave Desert, and *Yucca brevifolia* is the identifying symbol for the specific ty of that beauty. From a marketing viewpoint, *Yucca brevifolia* is the preeminent icon of our landscape. From a scientific view, its role as a vulnerable keystone species makes the importance of CESA candidacy even more broadly signific nt.

I have faith that the Commission will support this consequential petition. I also look forward to working with local agencies on the implementation of a sensible plan to ensure the viability of our prize natural resource, and continuing to expand my livelihood as provided by the stunning Mojave Desert.

Respectfully,

Miriam Seger
[redacted]
Joshua Tree, CA., [redacted]
[redacted]
[redacted]

Sent: Monday, June 1, 2020 12:44 PM
To: FGC <FGC@fgc.ca.gov>
Cc: Tom O'Key
Subject: Petition to List the Western Joshua Tree

Dear Commissioners, and Department,

Please accept this email as my comment regarding the listing of the Western Joshua Tree for protection under the guidance of intelligent California Law.

Joshua Trees. We must protect them.

There's a special and unique kind of shadow that's cast by Joshua Trees. Most of them aren't known for having great robustness as provider's of shady repose. Rather, at a distance, some dozen or more, yards away, the tree poses as it presents its photogenic prowess; displaying an image that stirs desert magic into a city dwellers gaze. They are "art in abstraction", if nothing, else.

Once endeared, a Joshua Tree forest presses primordial juices forward. A Pavlovian response yields to innate reflexes of appreciation and attraction. The eyer sees incongruent forms, that lure and beckon investigation. The effervescent reaction of Mojave flora and landforms meet in harmony as they meld with the repertoire of desert voices, only heard as whispers in the hot, crisp, and arid Mojave breezes. This, reflecting only a hint of the majesty found in such forests.

Beyond human assertions, recognizing the spiritual and aesthetic merits of a pristine Joshua Tree forest, it's far more important to assess them as commodities unto themselves as habitat providers within their unique environment.

Here, in the Mojave, they stand as fragile hallmarks of ecological well-being. The trees are sentinels from an ancient past and seers of current conditions within changing climatic margins. They're thermometers that indicate states of wellness as measured in diversion from normal climatic conditions. Joshua Trees are alpha class representatives in crucial desert habitats.

They are extremely sensitive to climate conditions that trigger chain reactions that reverberate throughout their ecosystems.

The climate anomaly that occurred in the Morongo Basin, over the last two years, has upset normal routines with the local forest. Early Springtime weather sparked a record bloom within the forest at a time when the sole symbiotic partner to the trees was unprepared to meet in regular association, as anticipated.

The Yucca Moth, a species exclusively paired as the pollinator of the flowers of Yucca Brevifolia, Yucca Shidigra, and Yucca Brevifolia Jaegeriana, was not to be found. It was much too early in the season for the moths to respond as normal.

As the flowers presented an astounding sight, they soon wilted and shriveled to small, brown, benign seedpods; absent of fertilized seeds.

Months later, the moths hatched and came forth to find that they had no host and as such, no sustenance. In short order, they starved to death, missing the annual rendezvous nature had perpetuated over many thousands of years. The viable seed count in the bloom was devastated. The perpetuated successors for the next generation of moths was decimated, as well.

The extinction of the moth is inevitable if synchronization between the seasonally tied association is disturbed beyond balance. Without the moths there can be no seeds and without seeds, the climate will have claimed the destruction of two critical species, one plant and one animal.

This event is anecdotally obvious to a casual observer. Looking for the moths during the early bloom showed no moths to be available to pollinate the trees and follow up examination showed barren seed pods missing evidence of the moth's larval activity. This observation was visible throughout the forest in the Morongo Valley region, including the remnants of the ancient forest remaining in the Town of Yucca Valley where Minerva Hamilton Hoyt first saw and knew the intrinsic merits of defending the Joshua Trees. This, culminating in success as she influenced President Roosevelt in designating the National Monument named to honor this unique tree in the most ecologically diverse desert habitat on Earth.

I write this response and as a call for protection for the Joshua Trees. Ruthless acts of mass grading and commercial exploitation of Desert environments can be seen as, mostly, unnecessary. More so, the destruction of these forests is an act of poor planning where rubber stamped projects solely reflect a satellite view of the lazy land use planning, where an environmental landscape view is required.

My past efforts include nearly two decades of pursuing activities aimed to preserve desert environments.

I am known to many of you, who work for the Department, as well as to The Commission, as I spoke out in defense of Bobcats against commercial exploitation by the archaic practice of fur trapping. This, of course, all behind us in California, now. A very thankful and responsibly good mark on the scoresheet of great leadership!

Looking to the future and responding correctly to the need for sustainability, a work plan that follows a sensible direction is crucial. All steps forward must apply resolve for preservation and conservation. Repair and reconstruction must lead where waste is minimized and productivity is durable without negative impacts to the living environment.

At the end, I tried to save nearly five hundred Joshua Trees by relocating them before being destroyed in commercial development projects where the trees received no protection from the Town of Yucca Valley.

First, I relocated eighty trees from a bladed construction site for Copper Hills residential development. Then, I moved twenty eight trees from the local veterinary clinic expansion. Then, the biggest move came when I moved over three hundred trees from a bladed pristine desert plot of about a hundred acres where a new and unnecessary car dealership was built. Two years later, the dealer went bankrupt, took whatever could be taken, and left an abandoned facility. This, in view of previously available, disturbed, land at another abandoned car lot area only a couple of miles away. All, within the city limits of Yucca Valley.

Now, six years later, only eight of the trees I moved remain standing. The other four hundred plus trees have fallen and only provide a token habitat zone for night lizards and kangaroo mice. So, not a total loss. But, sad, all the same.

The trees don't transplant successfully often enough to simply apply the method as a solution. This is important as the idea that a relocation service won't know if a tree will survive until at least five years after replanting.

Trees have been seen to remain green and heathy looking for years, only to see it suddenly take a turn for the worse, seeing no root development had ever happened. The trees didn't know that they were already dead, from the start.

Even the required replanting of trees relocated around the project sites by the developers have a survival rate of less than fifty percent. Most have perished and non native, deciduous trees now spread falling leaves into an unfamiliar environment.

My efforts cost me somewhere around $40,000 that I paid in casual labor to dig and move the trees, including equipment rentals and supplies required to accomplish the task. At times, I had four helpers working hard for months, trying to outrun the bulldozers.

Besides the Joshua Trees, all of the flora and fauna were destroyed by the mass grading, which exceeded the necessary footprint of the various projects. Collateral destruction extended well beyond the limits of the development sites, showing me a general disregard on the part of those in charge of city oversight.

Now, the City of Yucca Valley espouses their virility as defender's of their namesake flora, but this is not true. A careful examination will prove blatent disregard for the mantra written by Minerva Hoyt. Her legacy is merely a logo and mascot without due respect for what that means. She would be first to condemn the actions of the past leadership of the Morongo Basin communities, as sad decisions can be found to be the model of business as usual, thanks to subversive planning by brutal self serving interests.

As renewable energy projects come to exploit desert resources, land use must reflect collateral costs when choice and cost benefit comparisons are considered. Destroyed Joshua Tree forests supplanted by temporary solar energy projects, as similar to Ivanpah and others, where examples currently show the waste and technical bungling of shortsighted debacles.

We cannot save our Planet by simply replacing Joshua Trees with solar farms. The California Desert cannot save the World from itself!

Real science will need immediate attention to set a course towards the most expedient solutions for climate management. The climate crisis demands focus and dedication to seeking and administrating only the best and most sustainable ideas.

Destruction of Joshua Trees without serious oversight will lend to further degradation of an already struggling variety of species associated intimately with Yucca. Brevifolia, and related kin. Joshua Trees are the hallmarks of healthy desert habitats.

Protecting Joshua Trees will force better technology to step forward. We must follow the best roads in building the future, not the least obstructive or most economical.

There's no time to follow bad ideas that can't solve our real problems. Destroying natural habitat is a waste when economics is the only measure assessing merit and value. We can't let the future down. We must protect and defend as much as we can.

Protect Our Joshua Trees! Please!

Thank you.

Sincerely,

Tom O'Key

-----Original Message-----
From: Mark Simmons
Sent: Saturday, May 30, 2020 12:08 PM
To: FGC <FGC@fgc.ca.gov>
Subject: Petition to List the Western Joshua Tree

Warning: This email originated from outside of CDFW and should be treated with extra caution.

To whom this may concern:

I'm a 34-year resident in The Town of Yucca Valley. I'm reaching out to the Department of Fish and Game to support putting the Joshua Tree, a native plant for centuries to this area, to be placed on the endangered species list.

For far too long now, builders, developers and realtors in this area to overlook the beauty and majesty of the Joshua Tree and have allowed the "clear cutting" of these trees all in the name of GREED! I'm aware that the town council has sent the DFG a letter stating that there are provisions in place that protect this species. However, they do not go far enough to fully protect them. Among the Joshua Trees that had to be removed in my neighborhood due to the sewer project, those trees which were replanted, have all died. The 200-year old Joshua Tree that was an iconic figure on my road was killed due to Sukit Construction's negligence, as they constantly sprayed water on it to keep our dirt road wet during the sewer line construction.

I respectfully ask the DFG to intercede and protect the existing Joshua Trees on its list of protective species before it's too late!

Thank you!

Sincerely,
Mark Simmons
[redacted]
Yucca Valley, [redacted]

From: Jiyeon Kim <
Sent: Wednesday, August 5, 2020 01:50 PM
To: FGC <FGC@fgc.ca.gov>
Subject: The Western Joshua Tree

To the members of the CA Fish and Game Commission:

I fully support the recommendations of the CA Department of Fish and Wildlife and would like to see a YES vote for the western Joshua tree to advance to candidacy status under the CESA.

Without the Joshua tree, this region will lose a defining aspect of its culture and history. Joshua trees do not grow anywhere else on Earth. It is unique to the Mojave Desert. As a longtime resident, I have noticed the steady decline of Joshua trees in my town and around the region. It has been disheartening to see a ubiquitous symbol of this region slowly die out the past decade. To CA, America, and the world, the Joshua tree is a living and present image of many organizations and businesses in the region. Without it, the Joshua tree will become a part of the past.

In addition to its cultural and historical significance, it requires state protection because it is under a barrage of threats, including climate change impacts (e.g. wildfire risk) and large-scale development projects. Not all Joshua trees are within National Park and National Monument boundaries. In fact, 40% of Joshua tree habitat is on private land, where it has only modest protection at best. While some protection is provided by local ordinances, these are inadequate to respond to the multitude of threats that could lead to its disappearance—not to mention the disappearance of animals that rely on the tree for protection and food.

The iconic presence of the Joshua Tree attracts people to visit, live, and work in the high desert. In 2019 alone, visitors to the National Park created an economic benefit of nearly $196 million both within the Park and its vicinity—that is almost double the expenditure in 2014. Furthermore, for the local communities adjacent to the Park, 1,823 jobs were related to visitation. Attracted by the area's scenic beauty and Joshua trees, the real estate market in the Joshua Tree region has steadily increased along with job opportunities. This is because incoming residents generally are not seeking a home in densely developed areas such as subdivision, but instead are looking for a more rural lifestyle, ideally in proximity to the National Park. It is important to emphasize that the presence of Joshua trees is an underlying factor in this growing attraction. Its protection will encourage responsible development, preventing urban sprawl and overcrowding, increase property values, and preserve the rural quality of life which attracts people to our area.

With the rapid growth of our communities and the dramatic increase in visitation at the National Park, new issues have come up as a byproduct (e.g. traffic). Of course these unintended consequences must be addressed over time along with the decline of Joshua trees. **We must start addressing these issues by listing the Joshua tree as a threatened or endangered species. Doing so will push local governments to develop a regional approach to conservation through a Natural Communities Conservation Plan. This plan will effectively help prevent sprawl and overdevelopment by focusing on the conversation of large undeveloped areas, while encouraging new development on vacant land in already developed areas.**

I hope you will take this into consideration. Thank you for your time.

Sincerely,
Jiyeon Kim

From: Ty Fredericks
Sent: Wednesday, August 5, 2020 06:10 PM
To: FGC <FGC@fgc.ca.gov>
Subject: Protect California's Western Joshua Trees

Warning: This email originated from outside of CDFW and should be treated with extra caution.

Dear California Fish and Game Commission,

I'm writing to urge you to protect western Joshua trees under the California Endangered Species Act.

As you know, they face multiple threats to their survival, including climate change, wildfire, drought, invasive species and habitat loss. Outside the national park, other federal lands that are home to Joshua trees are subject to poorly regulated activities that consume or degrade habitat, including offroad-vehicle use, cattle grazing, and large-scale energy projects/rights-of-way. While much of the western Joshua tree's range is on public lands, about 40% of its California range is still on private land, of which only a tiny fraction is protected from development. All this spells disaster if we don't act now.

We're in the middle of a climate and extinction crisis, and we simply can't afford to wait to protect species such as the western Joshua tree. Under current climate projections, they're likely to decline by upwards of 90% in the coming decades, while much of their habitat will be lost to development, absent strengthened protection under law. A California Endangered Species Act listing would support existing western Joshua tree populations, protect habitat, and mandate recovery actions for their survival.

I strongly urge the California Fish and Game Commission to accept the California Department of Fish and Wildlife's recommendation for advancing western Joshua trees to candidacy as a threatened species.

Please move forward quickly to protect western Joshua trees knowing you have my full support.

Sincerely,
Ty Fredericks
Glendale, CA 91201

From: Sarah Agnew <
Sent: Thursday, August 6, 2020 02:30 PM
To: FGC <FGC@fgc.ca.gov>
Subject: YES vote for advancement to candidacy status under CESA

Hello,

I am emailing to inform you that I support the recommendations of the California Department of Fish and Wildlife and would like to see a YES vote for advancement to candidacy status under CESA.
Here are is why…

- This important species is under a barrage of threats, including climate change impacts, wildfire risk, and large-scale development projects. Four published studies have concluded that without intervention, climate change alone creates a high risk of losing western Joshua tree habitat almost entirely.
- The presence of the western Joshua tree benefits our economy. Its iconic presence attracts people to visit, live and work in the high desert. Its protection will encourage responsible development, preventing urban sprawl and overcrowding, increase property values, and preserve the rural quality of life which attracts people to our area.
- While some protection is provided by local ordinances, these are inadequate to respond to the multitude of threats that could lead to its disappearance. Not all Joshua trees are within National Park and National Monument boundaries. In fact, 40% of Joshua tree habitat is on private land, where it has only modest protection at best.
- We are at a critical juncture for the western Joshua tree. A collection of scientific studies predict the widespread decline of this iconic endemic species.
- Joshua trees don't grow anywhere else on Earth. They attract visitors and new residents which, in turn, support our economy. In 2018, visitors to the National Park created an economic benefit of nearly $196 million both within the Park and its vicinity — that's almost double the expenditure in 2014. For the local communities adjacent to the Park, 1,823 jobs were related to visitation.
- Attracted by the area's scenic beauty and Joshua trees, the real estate market in the Joshua Tree region has steadily increased. New residents generally are not seeking a home in densely developed areas such as a subdivision, but instead are looking for a more rural lifestyle, ideally with proximity to the National Park, and Joshua trees are a very desirable feature.
- We recognize that the rapid growth of our communities and the dramatic increase in visitation at the National Park has resulted in its own issues such as traffic. These issues need to be addressed, but protection of the Joshua tree will help, not hurt our communities. Its listing will encourage local governments to develop a regional approach to conservation through a Natural Communities Conservation Plan. These plans focus on the conservation of large undeveloped areas, while encouraging new development on vacant land in already developed areas. This helps prevent sprawl and overdevelopment.

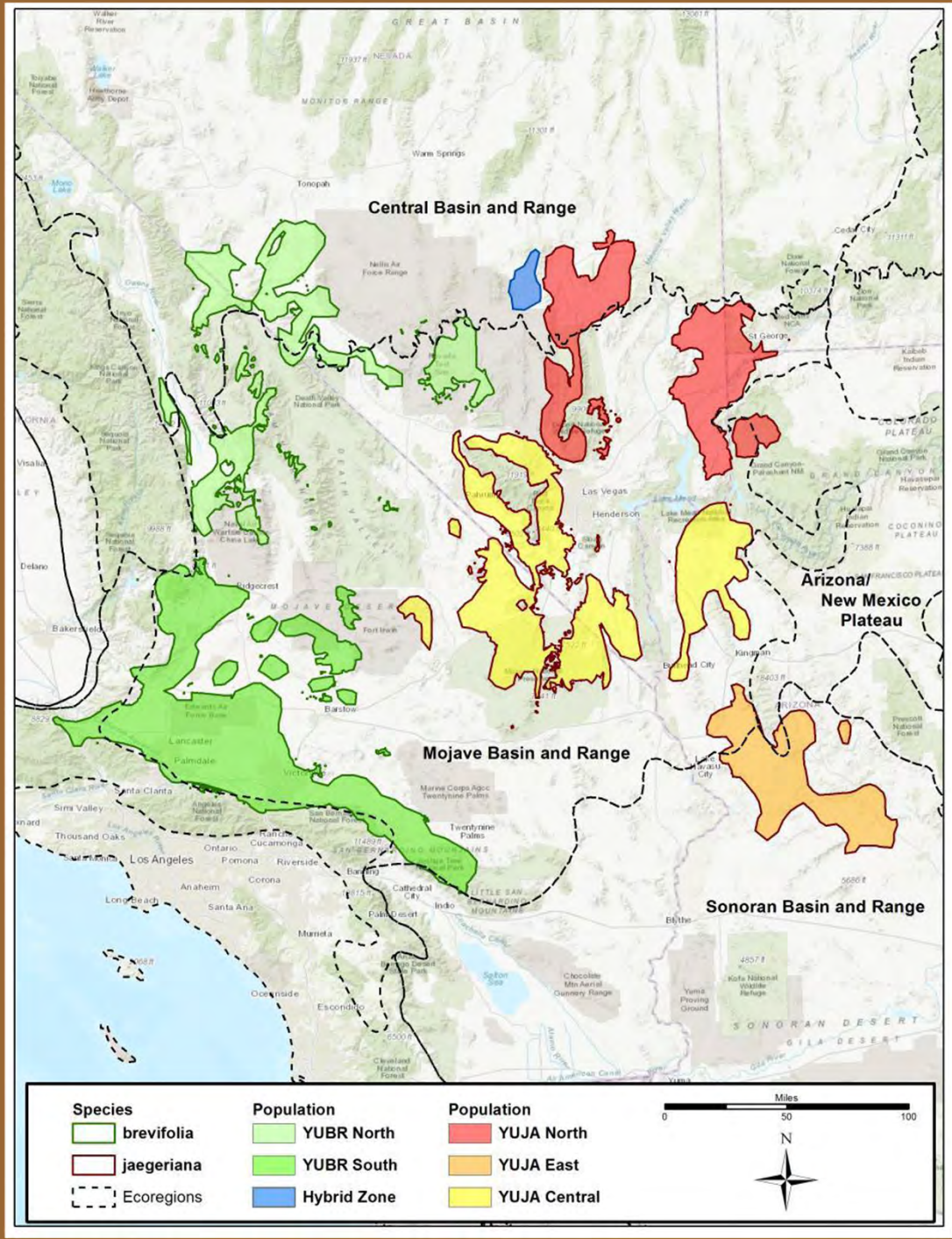
Thank you for taking the time to read

Best wishes,
Sarah Agnew

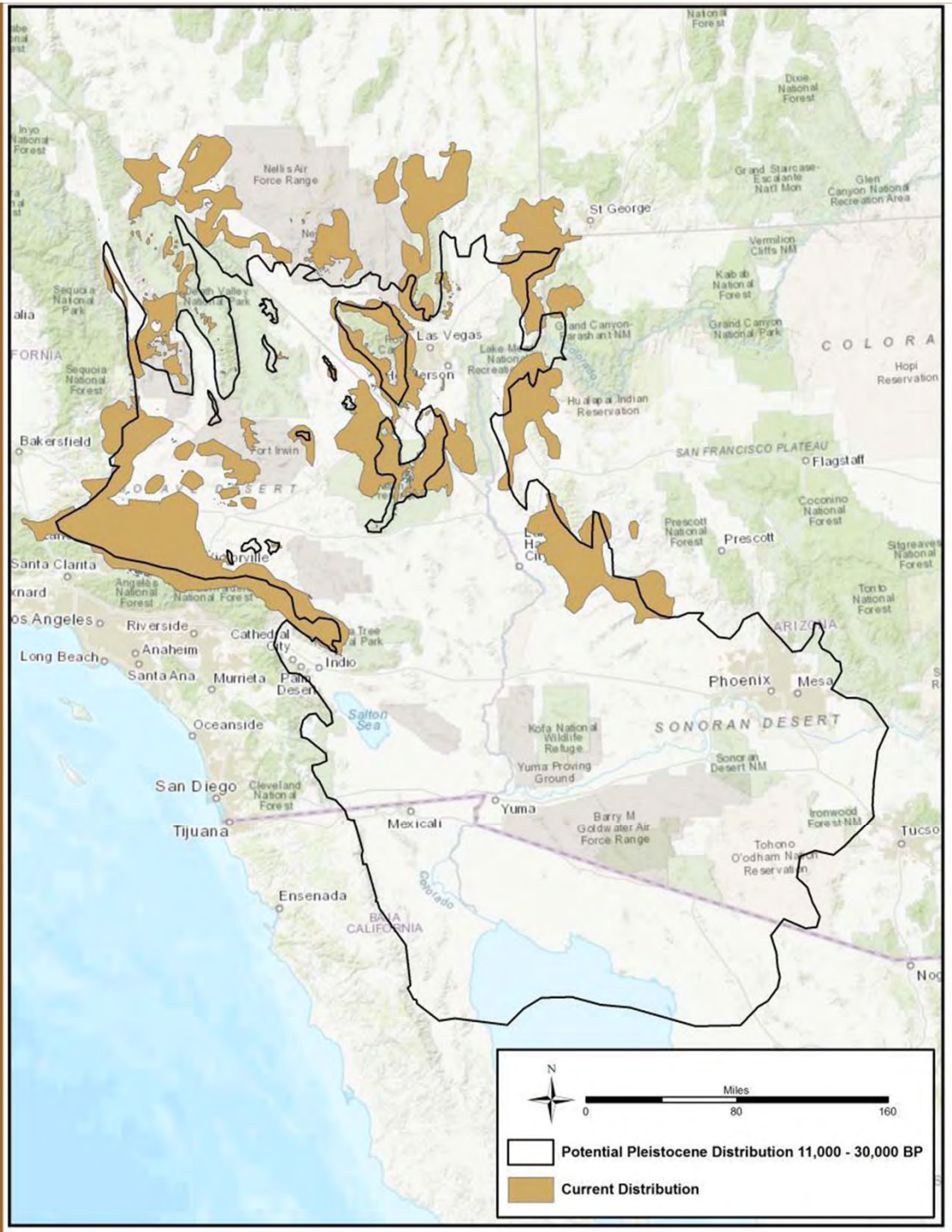
Western Joshua Trees and the California Endangered Species Act

Brendan Cummings
Center for Biological Diversity

August 2020


Central Basin and Range
Arizona/
New Mexico
Plateau
Mojave Basin and Range
Sonoran Basin and Range
Species
brevifolia
jaegeriana
Ecoregions
Population
YUBR North
YUBR South
Hybrid Zone
Population
YUJA North
YUJA East
YUJA Central
Miles
0
50
100
N

USFWS (2018)



Cole et al. (2011)

Threats to the Western Joshua Tree

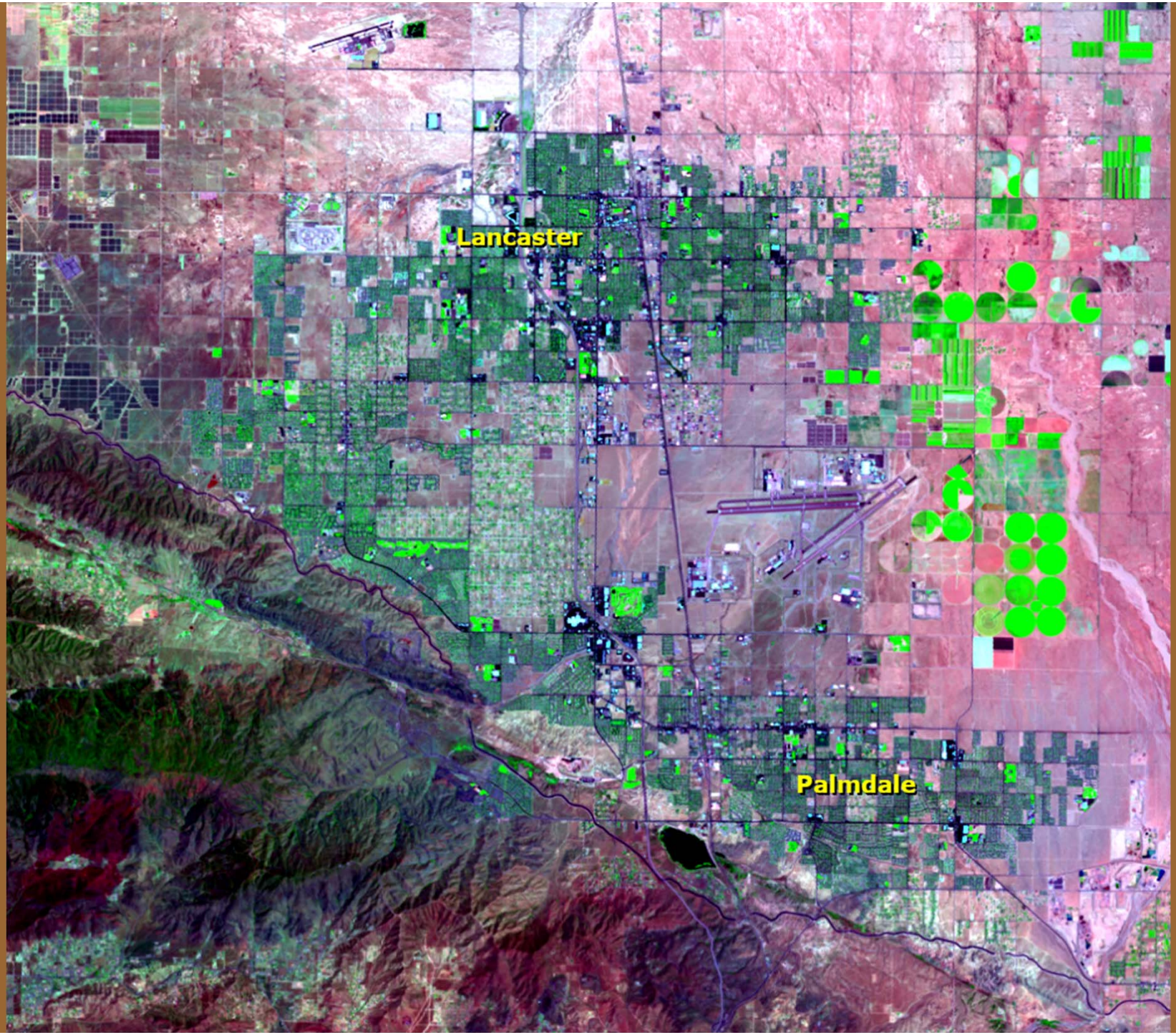
- Climate Change
- Fire/Invasive Grasses
- Development
- Vulnerable life history traits

Life History of the Western Joshua Tree

- Can live upwards of 300 years, but average life expectancy about 90 years
- Grows about 3cm a year on average, but highly variable
- At least 1m tall and 30+ years old before flowering (usually not till 2-3m tall)
- Flowers only in certain years
- Requires pollination by moths and seed dispersal by rodents
- Fewer than 1% of seeds produce seedlings
- Seedlings require shelter of host plant
- Juvenile mortality of over 80% over 22 years

“Recruitment of *Y. brevifolia* requires a convergence of events, including fertilization by unique pollinators, seed dispersal and caching by rodents, and seedling emergence from a transient seed bank triggered by isolated late-summer rainfall. Alignment of these convergent events likely results in successful establishment of new seedlings only a few times in a century.”

Esque et al. (2015)


Lancaster
Palmdale

Current “Protections” for the Western Joshua Tree

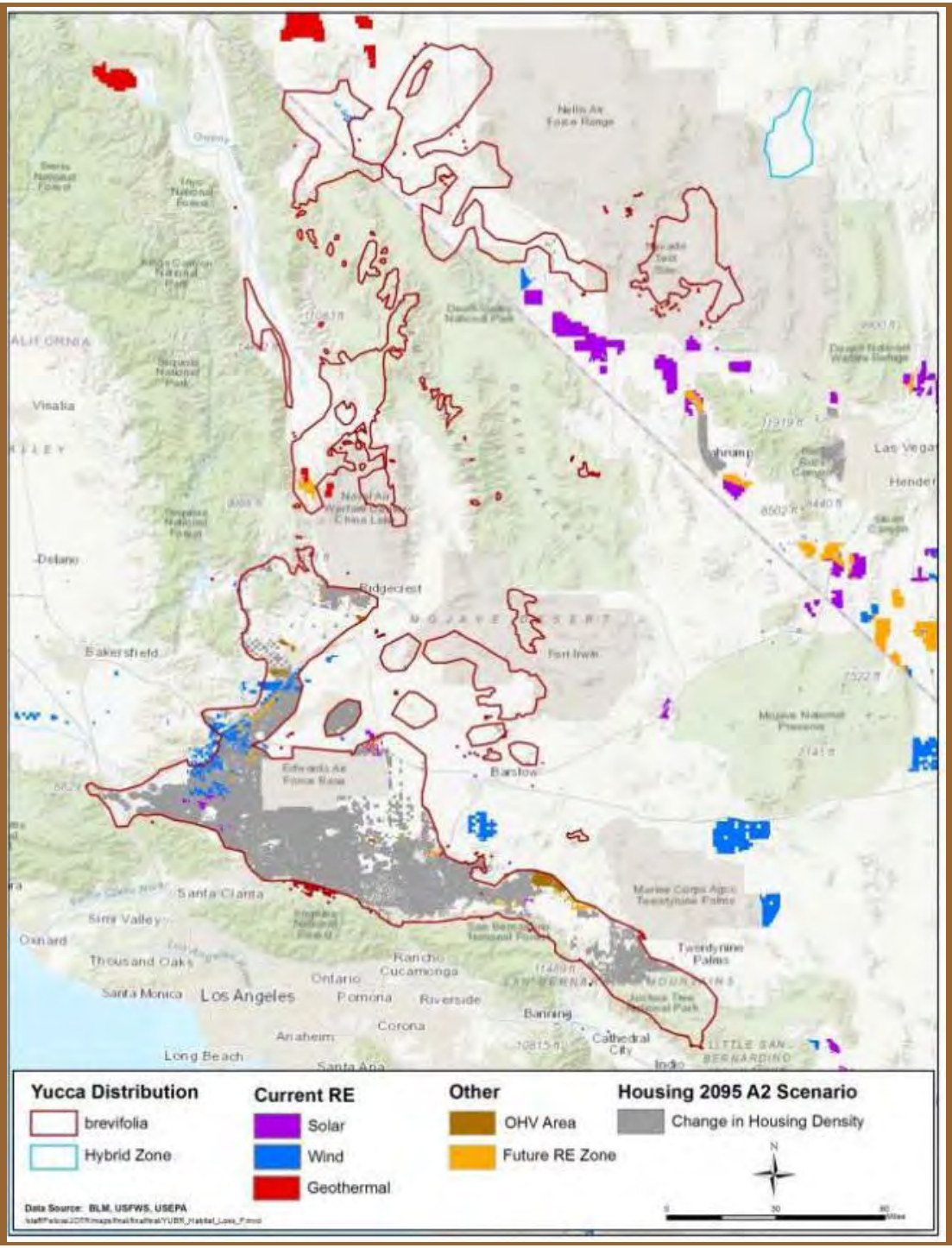
- About 40% of range on private land
- California Desert Native Plants Act
- Local Ordinances

California Fish and Game Commission
California Policy for Native Plants (Adopted 2015)

"The State's policies and practices regarding native plants are in need of review and updating. More than 30 years ago state law focused on transplantation as a means of mitigating for listed plant species, however experience and numerous studies document that such practices are largely ineffectual over time and often damaging to species or population survival."

Yucca Valley: A Typical Project

- 108 Joshua trees on project site
- 2 avoided
- 42 deemed transplantable
- Permit issued to transplant 23 to casino
- Remainder bulldozed or chainsawed


Yucca Distribution
brevifolia
Hybrid Zone
Current RE
Solar
Wind
Geothermal
Other
OHV Area
Future RE Zone
Housing 2095 A2 Scenario
Change in Housing Density
Data Source: BLM, USFWS, USEPA
Visalia
Delano
Bakersfield
Ridgecrest
Fort Irwin
Barstow
Las Vegas
Santa Clarita
Simi Valley
Oxnard
Thousand Oaks
Santa Monica
Los Angeles
Ontario
Rancho Cucamonga
Pomona
Riverside
Corona
Anaheim
Long Beach
Santa Ana
Banning
Cathedral City
Indio
Twentynine Palms

USFWS (2018)

ELSEVIER

Journal of Arid Environments 67 (2006) 148–164

Journal of Arid Environments

www.elsevier.com/locate/jaridenv

Spatial and temporal patterns of wildfires in the Mojave Desert, 1980–2004

M.L. Brooks*, J.R. Matchett

United States Department of the Interior, United States Geological Survey, Western Ecological Research Center, Las Vegas Field Station, 160 N. Stephanie, Henderson, NV 89074, USA

Received 28 June 2006; received in revised form 6 August 2006; accepted 30 August 2006

Abstract

Fire has been historically infrequent in the M
the invasion of non-native annual grasses is a
dramatic changes have occurred in middle elev
tridentata), Joshua tree (*Yucca brevifolia*), and/
of the fires occurred between 1980 and 2004. T
Mojave Desert to increased fire size following
related to the flush of non-native annual gr
continuous fuelbeds following years of high rai
at lower elevations, but the background cover
muting the effects of the ephemeral fuels. At el
size does not vary with rainfall, indicating that
suggest that an invasive plant/fire regime cycle i
low elevation shrublands of the Mojave Desert
Published by Elsevier Ltd.

Keywords: *Bromus*; Disturbance; Fire history; Grass/

1. Introduction

Deserts worldwide tend to experience les
productivity and limited production of fue

*Corresponding author. Tel.: +1 702 564 4615; fax
E-mail address: matt_brooks@usgs.gov (M.L. Br

0140-1963/$ - see front matter Published by Elsevier
doi:10.1016/j.jaridenv.2006.09.027

Journal of Applied Ecology 2003
40, 344–353

Effects of increased soil nitrogen on the dominance of alien annual plants in the Mojave Desert

MATTHEW L. BROOKS

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Summary

1. Deserts are one of the least invaded ecosystems by plants, possibly due to naturally low levels of soil nitrogen. Increased levels of soil nitrogen caused by atmospheric nitrogen deposition may increase the dominance of invasive alien plants and decrease the diversity of plant communities in desert regions, as it has in other ecosystems. Deserts
mall increases in soil nitrogen levels because
iomass is higher compared with most other

rogen will lead to increased dominance by
diversity was tested in field experiments
the in the Mojave Desert of western North

rts to soil nitrogen additions were measured
richness. Effects of nitrogen additions were
nfall, and annual plant productivity. The rate
ed rates of atmospheric nitrogen deposition
Desert (3·2 g N m^{-2} year^{-1}). The dominant
madritensis ssp. *rubens* and *Schismus* spp.
Erodium cicutarium.
ensity and biomass of alien annual plants
iomass and species richness of native species
productivity. The negative response of natives
ive stress for soil water and other nutrients
ens.
significant at both ends of a natural nutrient
tridentata canopies and in the interspaces
among individual alien species. The positive
in the beneath-canopy for *B. rubens* and in
arbata.
ts of soil nitrogen from atmospheric nitrogen
crease the dominance of alien annual plants
species in desert regions. Increased domin-
ersity of native annual plants, and increased
increase the frequency of fire.
be controlled by local land managers, the
effects on plant communities and ecosystem
may interact with land-use activities that can
ctions are currently unknown, and hinder the
and-use decisions related to nitrogen deposi-

f nitrogen deposition on invasive alien plants
re to locate new conservation areas, and in
ffects of new projects that would increase

ELSEVIER

Journal of Arid Environments 67 (2006) 100–124

Journal of Arid Environments

www.elsevier.com/locate/jaridenv

Dominance and environmental correlates of alien annual plants in the Mojave Desert, USA

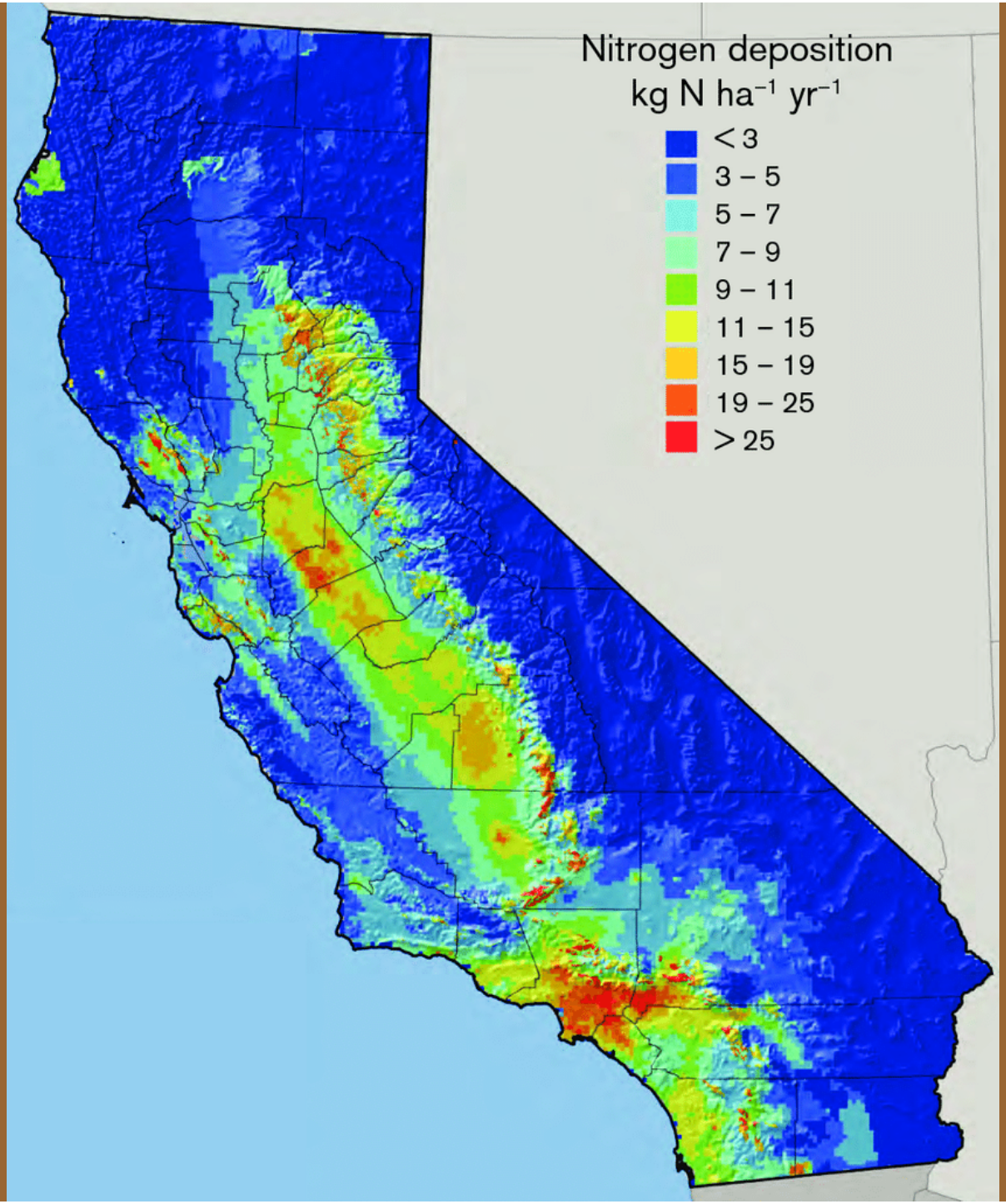
M.L. Brooks[a,*], K.H. Berry[b]

[a]*United States Department of the Interior, United States Geological Survey, Western Ecological Research Center, Las Vegas Field Station, 160 N. Stephanie, Henderson, Nevada 89074, USA*
[b]*Box Springs Field Station, 22835 Calle San Juan de Los Lagos, Moreno Valley, CA 92553, USA*

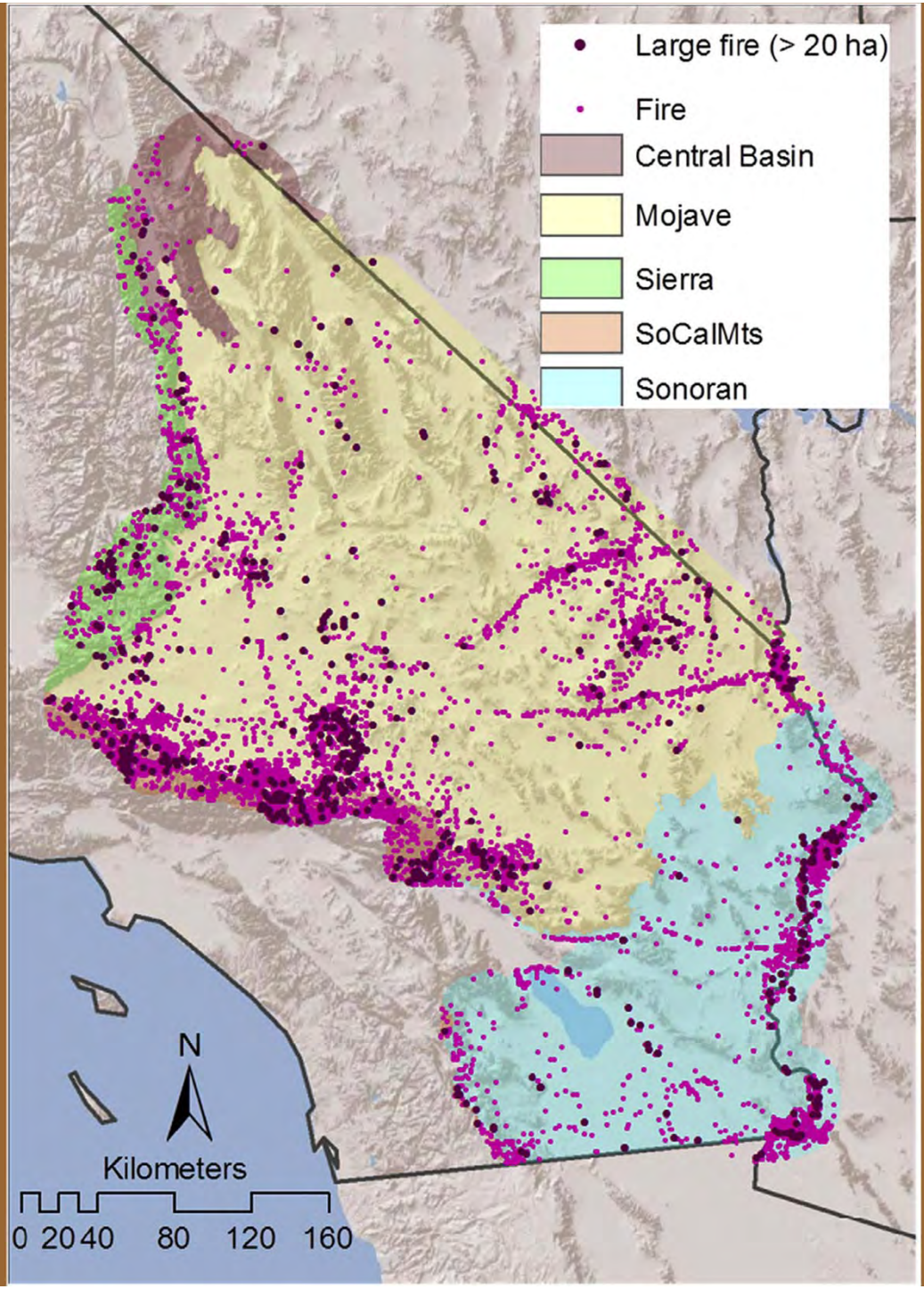
Received 13 November 2003; received in revised form 15 January 2004; accepted 20 July 2004
Available online 7 November 2006

Abstract

Land managers are concerned about the negative effects of alien annual plants on native plants, threatened and endangered species such as the desert tortoise (*Gopherus agassizii*), and ecosystem integrity in the Mojave Desert. Management of alien plants is hampered by a lack of information regarding the dominance and environmental correlates of these species. The results of this study indicate that alien plant species comprised a small fraction of the total annual plant flora, but most of the annual plant community biomass. When rainfall was high in 1995, aliens comprised 6% of the flora and 66% of the biomass. When rainfall was low in 1999, aliens comprised 27% of the flora and 91% of the biomass. *Bromus rubens*, *Schismus* spp. (*S. arabicus* and *S. barbatus*), and *Erodium*



Bytnerowicz et al. (2016)



Syphard et al. (2019)

Joshua Trees and Fire

"Yucca species such as Joshua tree and Mojave yucca (*Yucca schidigera*) often survive burning, but Joshua trees typically die within the first few years after fire due to drought and herbivory stress."

Brooks et al. (2018)

Joshua Trees and Fire

"Five years after the Juniper Fire Complex of May 1999, approximately 80% of burned *Y. brevifolia* died compared with 26% in adjacent unburned sites. This high postfire mortality of *Y. brevifolia* is consistent with other studies including 90% mortality six years after a 1978 fire in Lower Covington Flat at Joshua Tree National Park and **64 – 95% mortality** at sites censused 1 to 47yr after fires in Mojave and Sonoran deserts of California."

DeFalco et al. (2010)

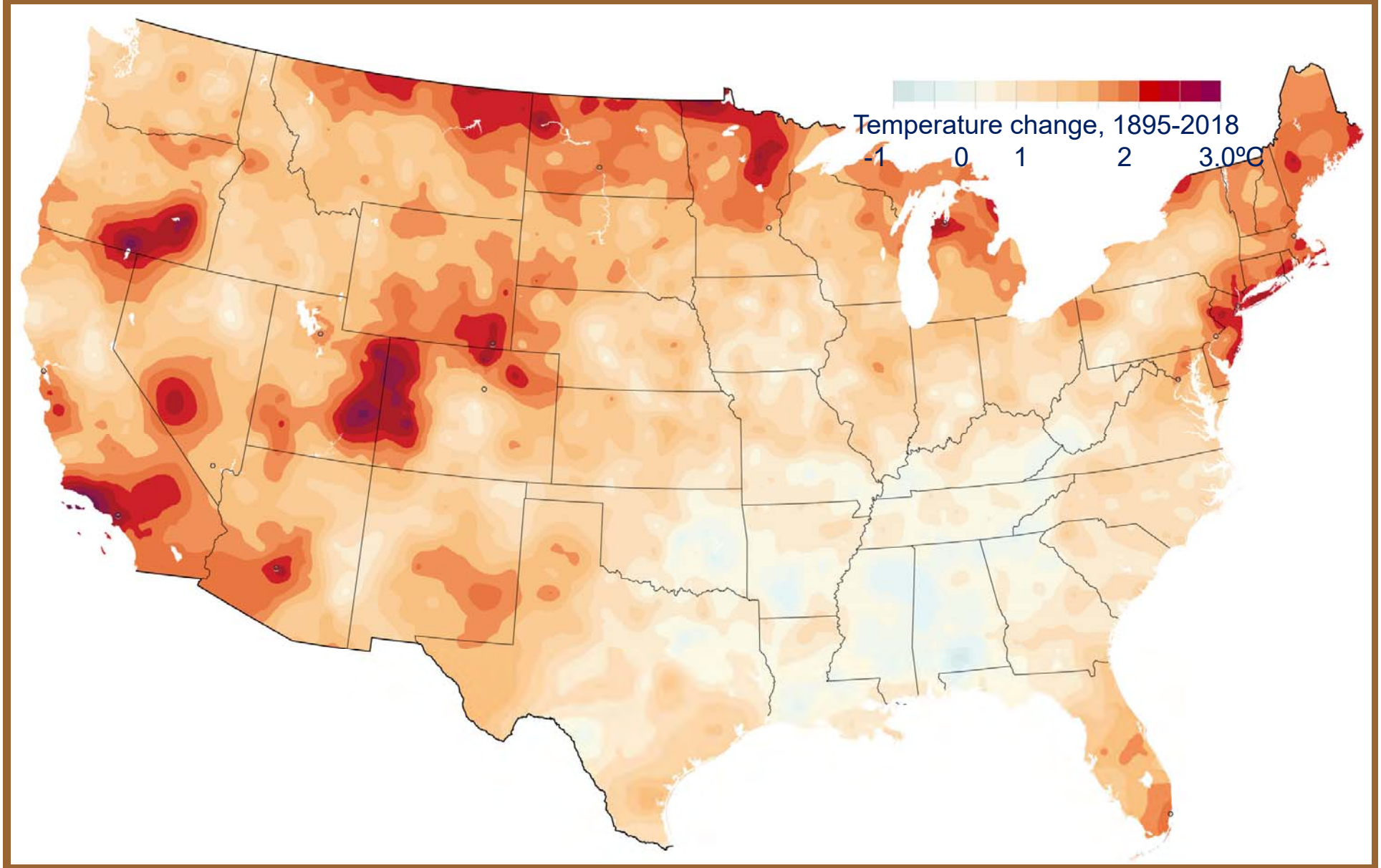
Joshua Trees and Fire

"The return of *Y. brevifolia* to prefire densities and demographic structure may take decades to centuries or be entirely unlikely, especially in light of potential changes to regional desert climate in combination with plant invasions and the potential for recurrence of subsequent fires."

Reynolds et al. (2012)

Climate Change in the Range of the Western Joshua Tree

- Average global temperature has already risen approximately 1°C over pre-industrial levels
- Counties with western Joshua trees have already experienced greater temperature increases than global average
  - Riverside: 1.8°C
  - San Bernardino: 1.9°C
  - Los Angeles: 2.3°C
  - Kern: 1.7°C
  - Inyo: 2.3°C



Mufson et al. 2019

Climate Change in the Mojave

- Daily maximum temperatures will increase by 5-6ºF [2.8-3.3ºC] by 2039, by 6-10ºF [3.3-5.6ºC] for 2040-2069, and 8-14ºF [4.4-7.8ºC] for 2070-2100

- By the end of the century, the hottest day of the year is projected to rise by at least 6ºF [3.3ºC], and up to 9ºF [5ºC]

- Extremely hot days, defined as temperatures >95ºF, averaged 90 per year in the Mojave during the 1981-2000 period, and will increase to up to 141 days by the end of the century

Hopkins (2018)

Climate Change in the Range of the Western Joshua Tree

- Precipitation will increase in interannual variability, with reductions in minimum annual precipitation of up to 50% and increases in maximum annual precipitation of 40-65% by the end of the century
- There will be more extreme and prolonged droughts
- An overall increase in winter precipitation will foster more growth of invasive grasses, leading to more frequent and more intense fire

Ecological Applications, 21(1), 2011, pp. 137–149
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Past and ongoing shifts in Joshua tree distribution support future modeled range contraction

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[2]*Merriam-Powell Center for Environmental Research, Northern Arizona University, P.O. Box 4071, Flagstaff, Arizona 86011 USA*
[3]*NOAA Earth Systems Research Laboratory, 325 Broadway, Boulder, Colorado 80305 USA*
[4]*Institute of the Environment, University of Arizona, Tucson, Arizona 85719 USA*
[5]*Lawrence Livermore National Laboratory and University of California, Merced, California 94550 USA*
[6]*USDA Forest Service, Rocky Mountain Research Station, Missoula, Montana 59808 USA*

Abstract. The future distribution of the Joshua tree (*Yucca brevifolia*) is projected by combining a geostatistical analysis of 20th-century climates over its current range, future modeled climates, and paleoecological data showing its response to a past similar climate change. As climate rapidly warmed ~11 700 years ago, the range of Joshua tree contracted, leaving only the populations near what had been its northernmost limit. Its ability to spread northward into new suitable habitats after this time may have been inhibited by the somewhat

esa ECOSPHERE

Congruence between future distribution models and empirical data for an iconic species at Joshua Tree National Park

Lynn C. Sweet,[1,†] Tyler Green,[2] James G. C. Heintz,[1] Neil Frakes,[3] Nicolas Graver,[2] Jeff S. Rangitsch,[2] Jane E. Rodgers,[3] Scott Heacock,[1] and Cameron W. Barrows[1]

[1]*Center for Conservation Biology, University of California, Riverside, 75-080 Frank Sinatra Drive, Palm Desert, California 92211 USA*
[2]*Great Basin Institute, Reno, Nevada 89511 USA*
[3]*Joshua Tree National Park, Twentynine Palms, California 92277 USA*

Citation: Sweet, L. C., T. Green, J. G. C. Heintz, N. Frakes, N. Graver, J. S. Rangitsch, J
C. W. Barrows. 2019. Congruence between future distribution models and empirical data
Tree National Park. Ecosphere 10(6):e02763. 10.1002/ecs2.2763

Abstract. U.S. national parks protect a natural heritage of global significan
those in the arid southwest, are threatened by climate change. Identifying c
national parks using not only statistical models, but also validating predictio
should provide focus for managers in their stewardship of parks' biological re
rounding Joshua Tree National Park (JTNP), which straddles the Colorado and
California, previous research has predicted the widespread demise of its na
Joshua tree (*Yucca brevifolia*) due to climate change. In order to assess whethe
Joshua trees in the future at JTNP, we employed both field measurements and
current distribution point data together with historic climate data, to match co
Joshua trees established, in order to predict the distribution of continuously suit
the end-of-century. While the high and moderate mitigation could result in refu
and 14% of the original area within JTNP, respectively, the business-as-usual sc
complete elimination of Joshua trees from the park. In order to validate model
community scientists, we measured the demographic patterns of Joshua tree sta
vations within JTNP. Recruitment within stands shows a strong concordance wit
high-recruiting stands were within or closer to modeled refugia and in areas wit
icit, higher precipitation, and lower maximum temperature than low-recruiti
most importantly indicate the importance of regional to global mitigation strat
as reflected in the difference between maintenance of refugia vs. an almost c
species from the park by the end-of-century. This also underscores the need to
support refugia from multiple management threats. Rather than an ominou
climate refugia provide land stewards with targets for focusing protective m
biodiversity places to weather the future.

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Context-dependent mutualisms in the Joshua tree–yucca moth system shift along a climate gradient

Jennifer Harrower† and Gregory S. Gilbert

Department of Environmental Studies, University of California Santa Cruz, 1156 High Street, Santa Cruz, California 95064 USA

Citation: Harrower, J. and G. S. Gilbert. 2018. Context-dependent mutualisms in the Joshua tree–yucca moth system shift along a climate gradient. Ecosphere 9(9):e02439. 10.1002/ecs2.2439

Abstract. Changing climate patterns can affect the geographic distribution of species through effects on species interactions. Iconic Joshua trees are limited to a narrow range of climate conditions, and climate
pected to shift suitable habitat to higher elevations and latitudes than their current geographic
. As such, the survival of the species requires colonization of new habitats. However, Joshua
n obligate mutualistic relationship with yucca moths that pollinate the flowers but whose off-
consume a portion of the developing seeds. It is not known whether the yucca moths will
chrony with Joshua trees, or how changing environmental conditions may affect the net bene-
s of the yucca moth–Joshua tree interaction. To evaluate the spectrum of conditional outcomes
ction, we examined a range of performance measures and abiotic factors across the elevation
pans the distribution of Joshua trees in Joshua Tree National Park. We found a strong concor-
een tree size, moth and tree abundance, and reproductive success, with peak performance of
rs at intermediate elevation. Within sites, larger trees produced more flowers, attracted more
and had greater seed set. We found that the conditional outcomes of the interaction varied pre-
ng the gradient: Seed set, as well as seed predation, was greatest at intermediate elevations
and pollinators were both at high abundance. At range margins, the proportion of infertile
sed, possibly because low pollinator abundance led to pollen limitation. The reproductive suc-
a trees is tightly linked to pollinator abundance, and the conditional outcomes (magnitude of
enefit) of the mutualism change depending on where it occurs on the elevation gradient.

Biological Conservation 152 (2012) 29–36

Contents lists available at SciVerse ScienceDirect

Biological Conservation

journal homepage: www.elsevier.com/locate/biocon

Modeling impacts of climate change on Joshua trees at their southern boundary: How scale impacts predictions

Cameron W. Barrows*, Michelle L. Murphy-Mariscal

Center for Conservation Biology, University of California, Riverside, CA 92521-0334, USA

ARTICLE INFO

Article history:
Received 17 December 2011
Received in revised form 22 March 2012
Accepted 24 March 2012
Available online 23 June 2012

Keywords:

ABSTRACT

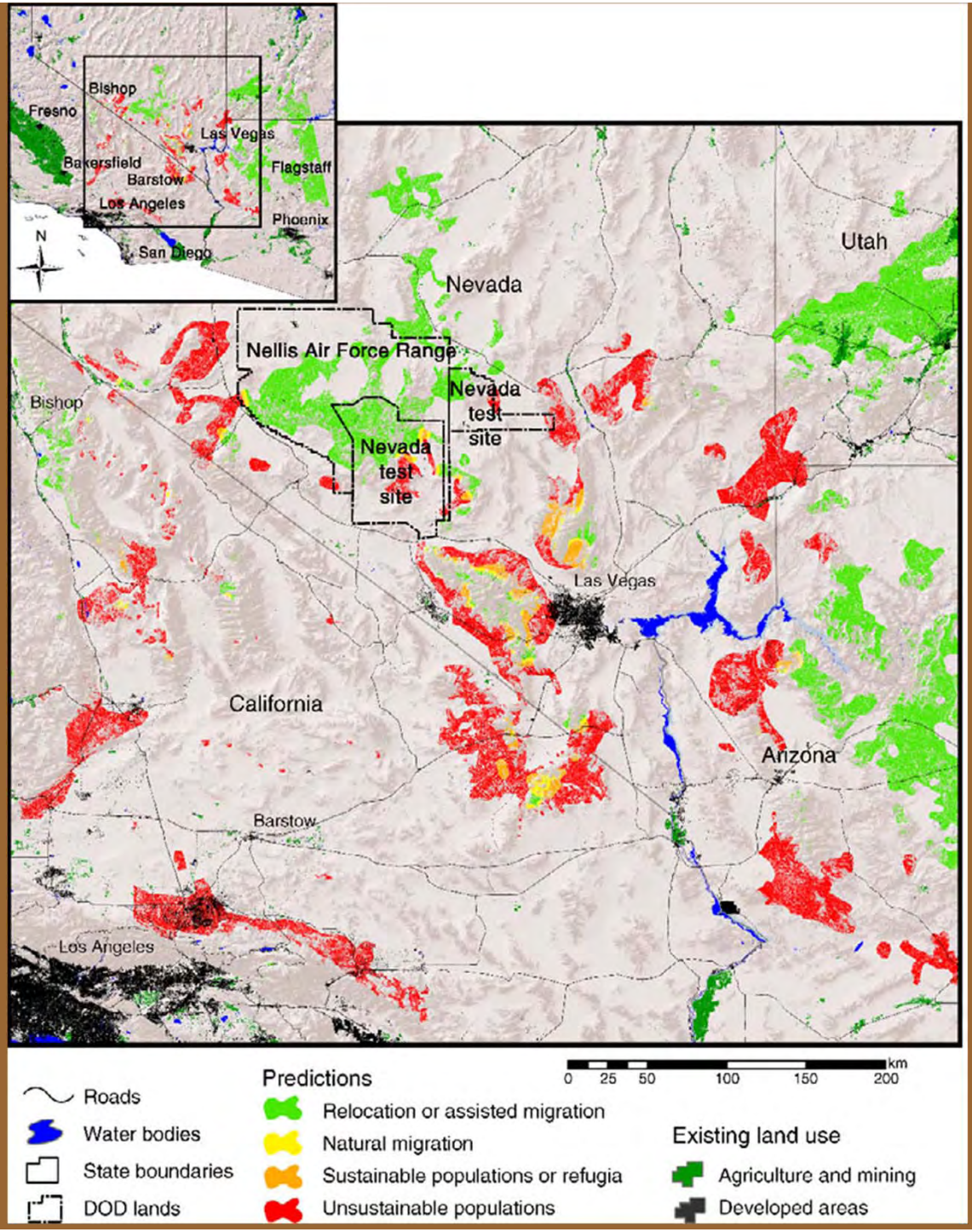
Predicting ecological responses to a changing climate is becoming a critical tool to inform natural resource management efforts. Within Joshua Tree National Park (JTNP), Joshua trees (*Yucca brevifolia*) reach their southern-most distribution. Previous research modeling distributional shifts of Joshua trees in response to climate change have been conducted at large regional scales, predicting widespread extirpation of Joshua trees from their current southern and central distribution. Here we employed the Mahalanobis D^2 statistic and constructed a finer-scale model of the Joshua tree's current distribution within and surrounding JTNP, and then assessed their sensitivity to a gradient of climate change scenar-

Climate Change Impacts on the Western Joshua Tree

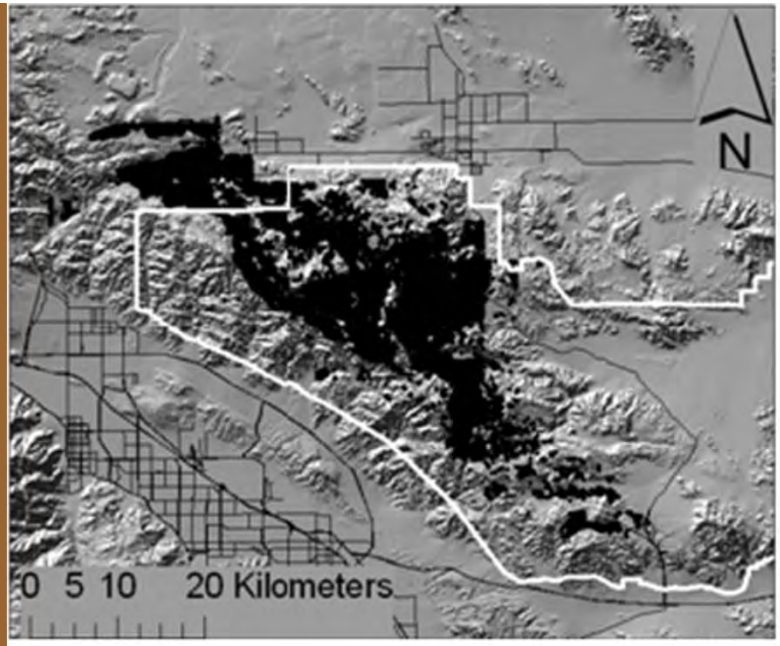
- Cole et al. (2011): Applying predicted changes from climate models shows a severe (~90%) decline in the area of suitable climates for Joshua trees by 2070 to 2099, as the southern and western parts of its range becomes climatically unsuitable.

- Barrows and Murphy-Mariscal (2012): Increasing mean maximum summer temperatures upwards by 1ºC, 2ºC, and then 3ºC resulted in modeled reductions in the extent of suitable habitat for Joshua trees of 30-35%, 66-78% and 90-98% respectively, depending upon the precipitation variables used.

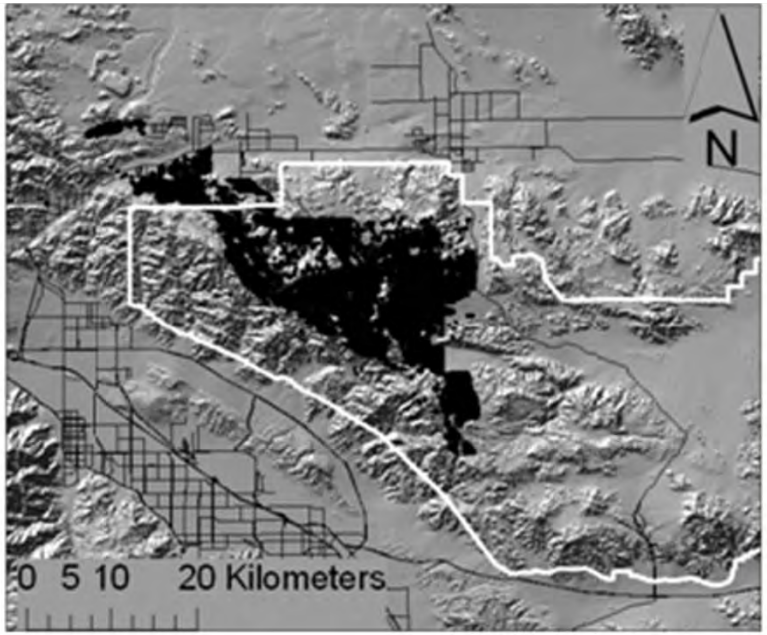
- Sweet et al. (2019): Sought to identify the existence and extent of potential climate refugia within Joshua Tree National Park. Under the most optimistic scenario 18.6% of current occupied areas remained as refugia. However, under the scenario closest to current emissions trajectories, suitable habitat was almost completely eliminated, with only 15 ha, or 0.02% remaining as refugia.



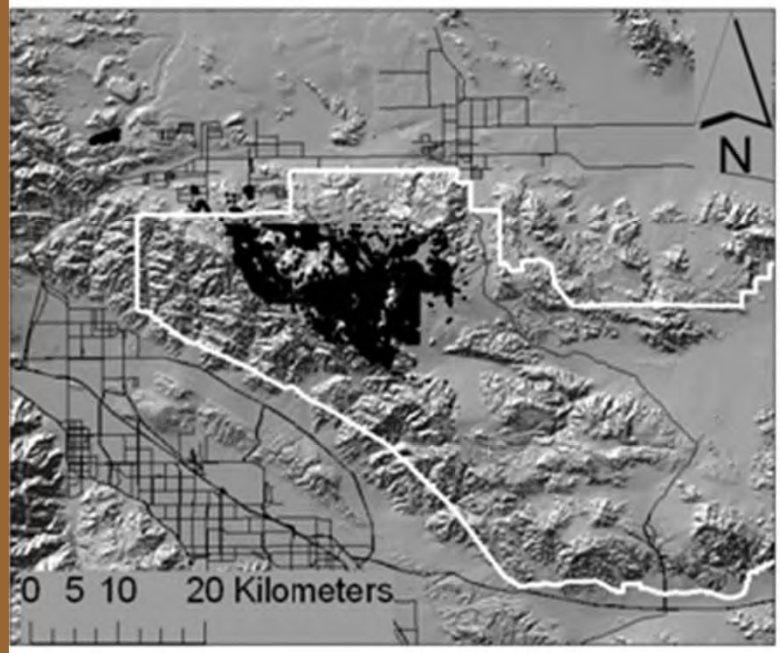
Cole et al. (2011)



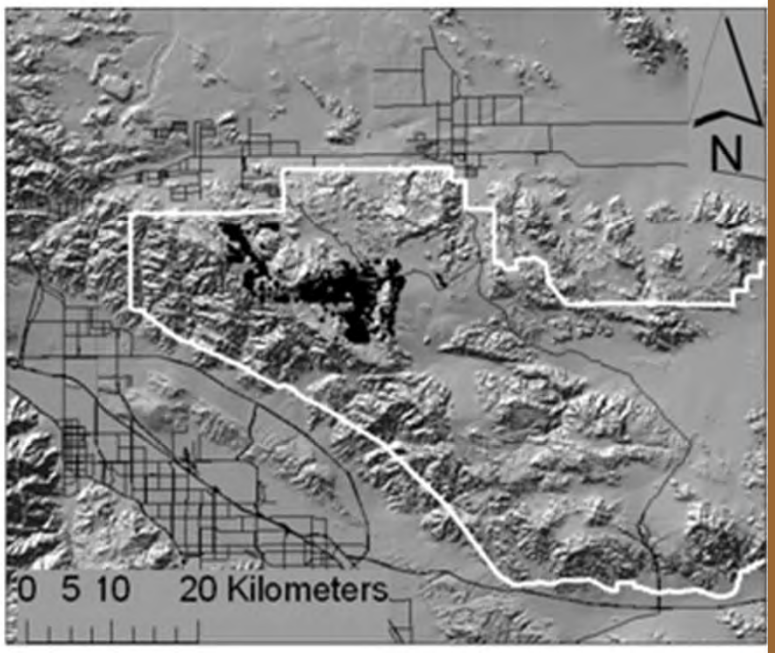
Current niche model



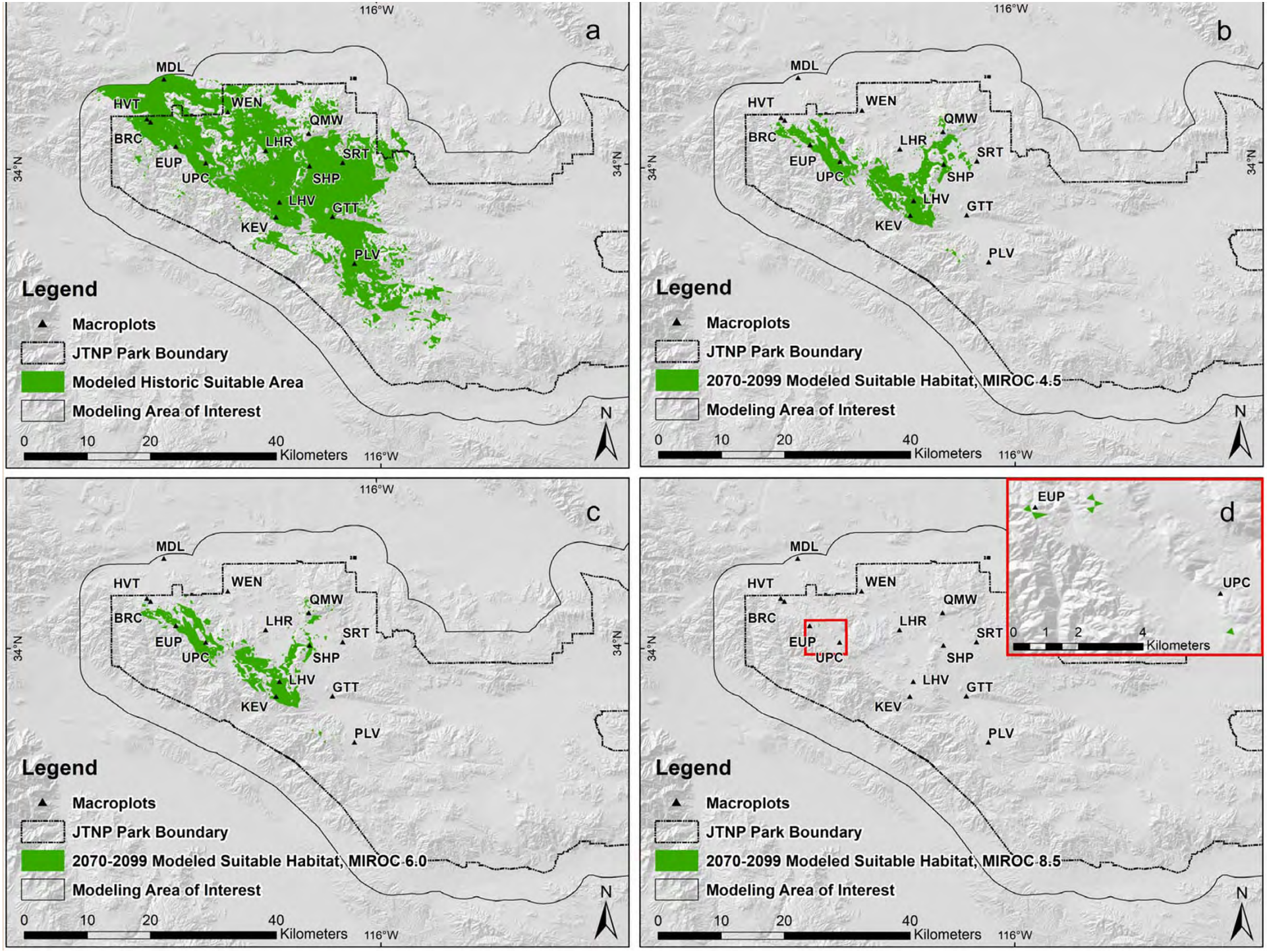
+1°C niche model



+2°C niche model

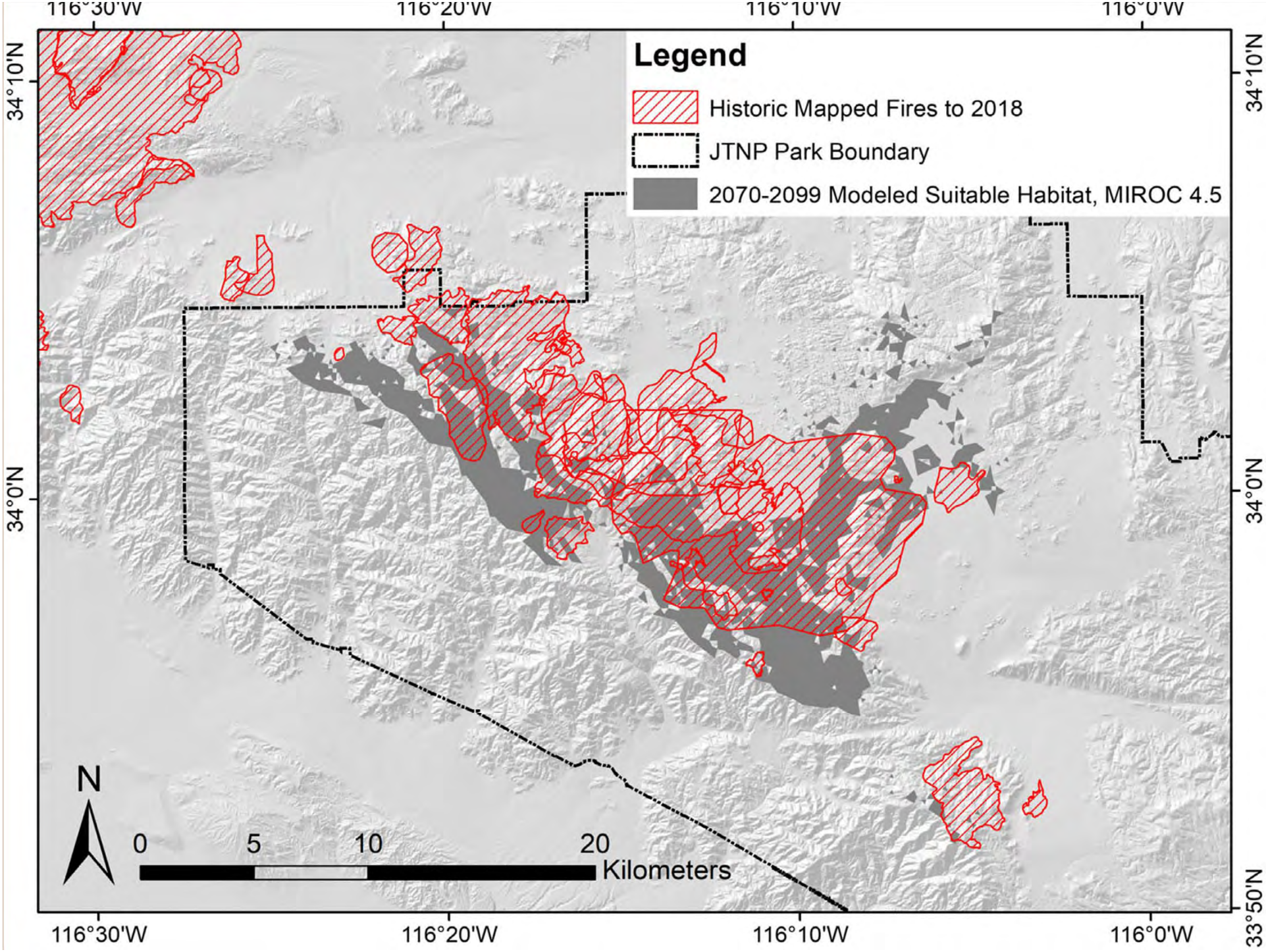


+3°C niche model


a
116°W
34°N
MDL
HVT
WEN
QMW
BRC
LHR
SRT
EUP
UPC
SHP
LHV
GTT
KEV
PLV
Legend
Macroplots
JTNP Park Boundary
Modeled Historic Suitable Area
Modeling Area of Interest
0 10 20 40 Kilometers
N
b
2070-2099 Modeled Suitable Habitat, MIROC 4.5
c
2070-2099 Modeled Suitable Habitat, MIROC 6.0
d
2070-2099 Modeled Suitable Habitat, MIROC 8.5
0 1 2 4 Kilometers

“The areas mapped as Joshua tree refugia, which are found at higher elevation wetter areas, also tend to have the highest covers of invasive annual grasses.”

Sweet et al. (2019)


Legend
Historic Mapped Fires to 2018
JTNP Park Boundary
2070-2099 Modeled Suitable Habitat, MIROC 4.5
116°30'W
116°20'W
116°10'W
116°0'W
34°10'N
34°0'N
33°50'N
N
0
5
10
20
Kilometers

Atmospheric Concentration of Carbon Dioxide

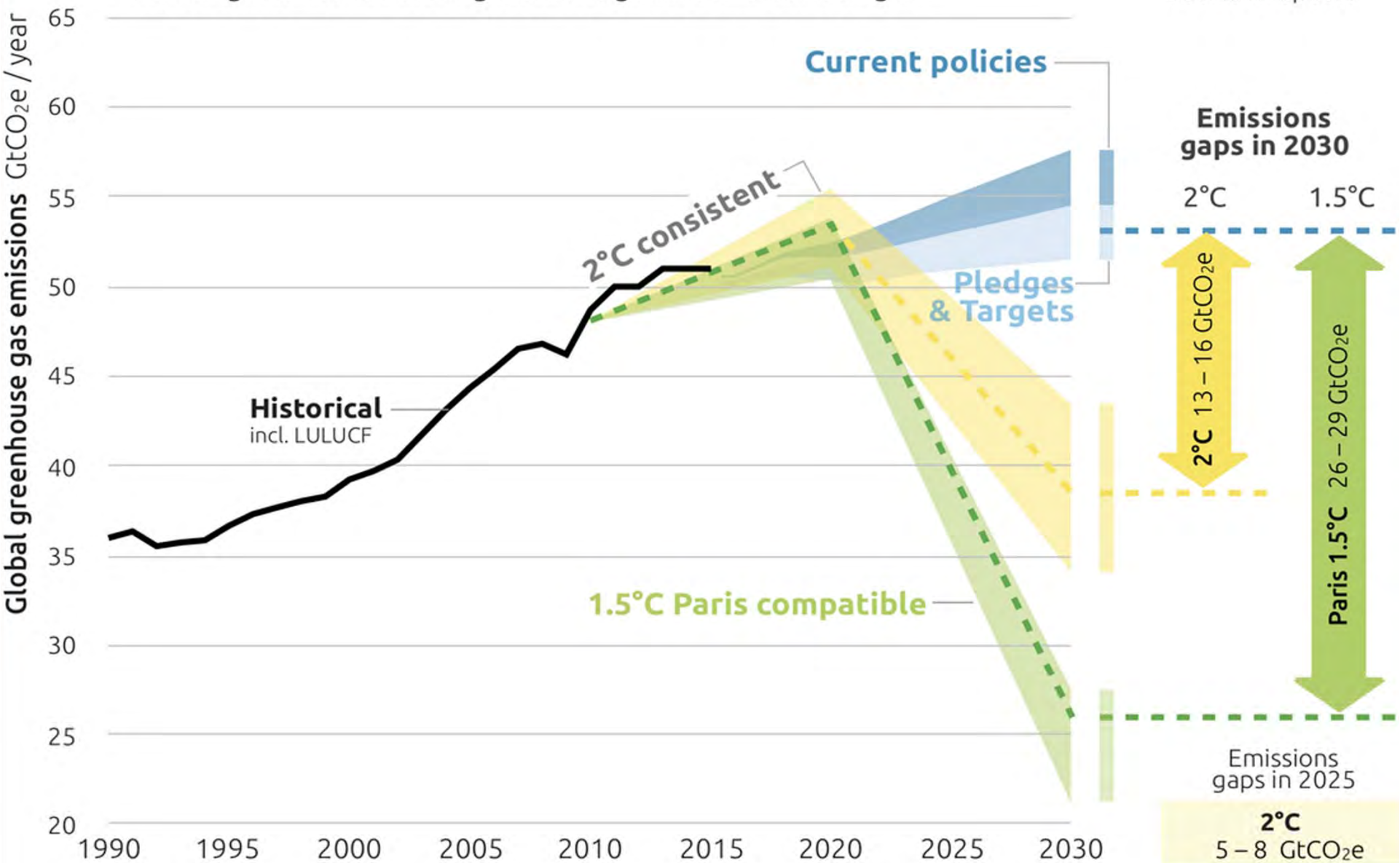
Jul. 28, 2020	**413.73 ppm**
Jul. 28, 2019	**409.23 ppm**
1 Year Change	4.50 ppm (1.10%)

2030 EMISSIONS GAPS

CAT projections and resulting emissions gaps in meeting the 1.5°C Paris Agreement goal vs 2°C Cancún goal

Climate Action Tracker

Dec 2019 update



The "gap" range results only from uncertainties in the pledge projections.
Gaps are calculated against the mean of the benchmark emissions for 1.5°C and 2°C.

Is the Western Joshua Tree a Threatened Species?

Under the California Endangered Species Act (CESA) a "**threatened** species" is "a native species or subspecies of a … 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 . . . ." Cal. Fish & Game Code § 2067.

What are the Consequences of CESA Protection?

- CESA contains both affirmative mandates and prohibitions.
- CESA declares that "it is the policy of the state to conserve, protect, restore, and enhance any endangered species or any threatened species and its habitat and that it is the intent of the Legislature, consistent with conserving the species, to acquire lands for habitat for these species."
- Conservation mandate applies to all state agencies (e.g. State Parks, Caltrans, the CEC and CPUC), all of whom would have to take conservation of the Joshua tree into consideration when approving projects.
- Under CESA, DFW would be tasked with preparing a recovery plan for the species that lays out the measures necessary to conserve the species. The recovery plan serves as a guide for other state agencies to follow in meeting CESA's conservation mandate.

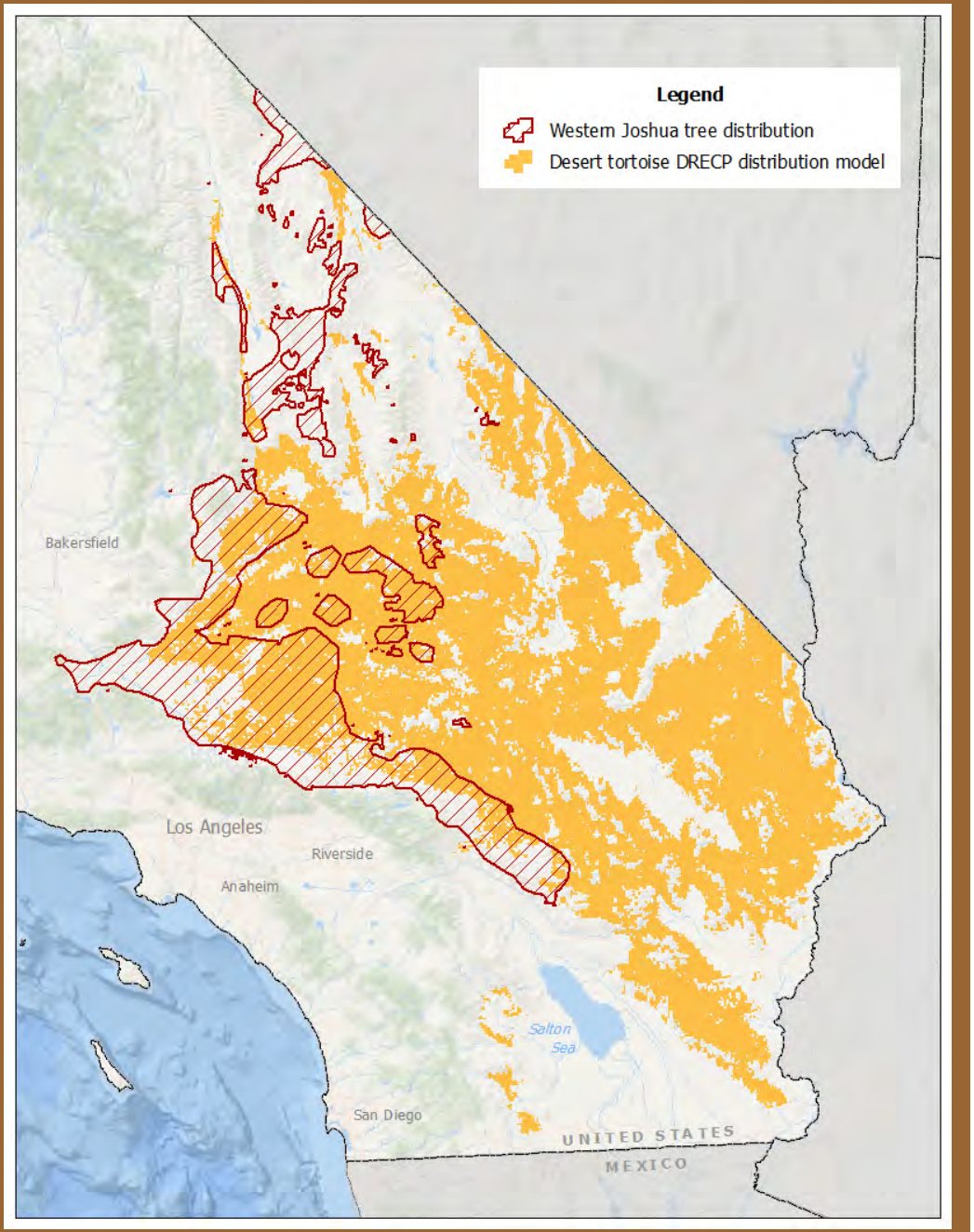
What are the Consequences of CESA Protection?

- CESA contains prohibitions applicable to agencies, including local jurisdictions such as counties and towns.
  - Agencies cannot approve projects that would jeopardize a listed species or destroy or adversely modify essential habitat. Such analysis is focused on population level impacts rather than on impacts to individual members of a listed species.
- CESA has prohibitions that apply to private entities and individuals, who are not allowed to import, export, take, possess, purchase, or sell a listed species absent a permit or authorization.
  - The term “take” means to hunt, pursue, catch, capture, or kill. Most relevant to Joshua trees, this means that an action likely to kill a Joshua tree would be prohibited without a permit or other authorization.

What are the Consequences of CESA Protection?

- There are several exceptions to CESA's prohibitions.
- Individuals and other entities may be authorized via permits or memorandums of understanding to import, export, take or possess a listed species for scientific, educational or management purposes.
  - Under one of these exceptions, an entity could be authorized to, for example, collect seeds and grow Joshua trees for restoration efforts.
- Take of a listed species may also be authorized if the take is incidental to an otherwise lawful activity.
  - Such a permit requires that impacts to the species be minimized and fully mitigated.
  - An incidental take permit can be sought at any scale, ranging from an individual property owner who wishes to build on their land, a larger development project such as a shopping mall or energy project, to an entire city or county.
  - The cost, timeframe and amount of mitigation required to acquire an incidental take permit varies commensurate with the scale of the project.
  - An incidental take permit can be for a single species, or for multiple listed species.

Because the western Joshua tree shares much of its range with the desert tortoise, which is also protected as threatened, many projects that would require an incidental take permit for the Joshua tree would likely also already require a permit for the desert tortoise.



What are the Consequences of CESA Protection?

- Take of a listed species can also be authorized at a regional scale through a Natural Communities Conservation Plan (NCCP).
- An NCCP requires landscape scale conservation but also authorizes take of all covered species in the plan area.
- An individual landowner in an area covered by an NCCP does not have to individually apply for a take permit if their proposed activities are consistent with the NCCP.
- There are 14 approved NCCPs in California, including in San Diego, Orange and Riverside counties.
- San Bernardino and other counties and local jurisdictions in the Mojave Desert have never managed to successfully develop an NCCP despite the listing of the desert tortoise 30 years ago.
- The Town of Apple Valley is, at present, alone among desert communities in proactively seeking to develop an NCCP.

Recommended Recovery Actions for the Western Joshua Tree

1. The governor declares a climate emergency and takes all necessary action to set California on a path to full decarbonization of our economy by no later than 2045 (e.g. banning the sale of new fossil fuel vehicles by 2030 and requiring the generation of all electricity from carbon-free sources by 2030).

2. DFW prepares a recovery plan for *Y. brevifolia* pursuant to Cal. Fish & Game Code § 2079.1.

3. DFW works with local jurisdictions to develop NCCPs that protect from development all high-density Joshua tree habitat remaining on private lands.

4. The California Department of Parks and Recreation develops and implements management plans (including fire management plans) focused on Joshua tree protection for relevant state park units (Red Rock Canyon, Eastern Kern County Onyx Ranch SVRA, Saddleback, Arthur B. Ripley Desert Woodland and Antelope Valley California Poppy Reserve).

5. The California Department of Parks and Recreation seeks to acquire habitat to expand and connect existing state parks for protection and restoration of Joshua tree habitat.

Recommended Recovery Actions for the Western Joshua Tree

6. DFW expands its cooperative work with relevant federal agencies (NPS, DoD, BLM, USFWS) to better protect Joshua trees on federal land.

7. DFW works with the University of California, California Invasive Plants Council and other institutions and agencies to develop effective measures to control the spread of invasive grasses in *Y. brevifolia* habitat.

8. DFW works with CAL-FIRE to develop protocols for fire suppression activities within the range of *Y. brevifolia* that maximize protection of the species, while minimizing ground disturbance that may foster the spread of non-native grasses and other invasive species.

9. DFW works with relevant entities to establish and maintain a seed bank of *Y. brevifolia* collected throughout the range of the species to ensure protection of its genetic diversity.

10. DFW works with relevant entities to identify potential sites for assisted migration and develop protocols for carrying out such activities.

Contacts

- Center for Biological Diversity: www.biologicaldiversity.org
- Brendan Cummings: bcummings@biologicaldiversity.org

Tracking Number: (_2020-008_)

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: Thomas Wheeler
Address: 145 G St., Ste. A, Arcata, CA 95521
Telephone number: (707) 822-7711
Email address: tom@wildcalifornia.org

2. Rulemaking Authority (Required) - Reference to the statutory or constitutional authority of the Commission to take the action requested: Government Code § 11342.545; Fish and Game Code §§ 200, 332, 339

3. Overview (Required) - Summarize the proposed changes to regulations:

14 Cal. Code Regs. § 364.2

All elk hunting, excluding hunting conducted pursuant to a depredation permit issued by the California Department of Fish and Wildlife, in the Northwestern Elk Hunt Area is indefinitely suspended.

Alternatively, the same effect of the proposed regulation could be achieved by reducing the tags issued under 14 Cal. Code Regs §§ 364, 364.1 to zero.

4. Rationale (Required) - Describe the problem and the reason for the proposed change:

In early April 2020, the California Department of Fish and Wildlife discovered the presence of a novel disease, treponema-associated hoof disease, affecting the hooves of Roosevelt elk in Del Norte County. Shortly thereafter, on April 16, 2020, the California Fish and Game Commission approved new hunting regulations providing for tag numbers for elk in California. Unfortunately, the discovery of the disease was not disclosed to the Commission. Until the Department and Commission have the opportunity to consider the ramifications of the disease (including the cumulative effects of the disease together with approved hunting), ways to minimize the spread of the disease and measures to mitigate the harm to infected individuals and herds, it is necessary to rein back elk hunting in the Northwest Elk Hunt Area. The proposed rule would institute a temporary

moratorium on hunting elk within the infected area thereby providing time for the Department to issue a containment and management strategy. The proposed rule, as written, would continue to allow hunting pursued under a depredation permit issued by the Department.

As explained below, the disease may cause population declines in affected herds and the effects of the disease were never studied by the Commission before making its decision, in the mandated Elk Management Plan, or in the environmental impact documents prepared for the Commission.

TAHD May Affect Elk Populations

Research concerning the effects of the disease on local herd populations is scant. Existing information does raise a logical conclusion that the disease may affect herd populations by reducing the fitness of elk.

In an infected herd near Mount St. Helens, populations have declined by approximately 30-35% over a four-year period (2009-2013). (McCorquodale et al. 2014.) It is unclear what role the disease may have played in this decline because this period coincided with an effort to reduce the population of elk through increased hunting and severe weather in winter 2012. While researchers were unable to untangle the role of the disease in the population decline, the authors did note that the "seemingly logical assumption that some additional mortality risk is likely associated with advanced disease." (McCorquodale et al. 2014.)

Additional research from Washington State is ongoing and a final reported is anticipated in 2020. A preliminary report on findings, Hoenes et al. (2018), expresses why TAHD has the potential to inflict population-level impacts:

> It is reasonable to assume that elk with advanced stages of TAHD have a decreased probability of survival because their infirmities may predispose them to predation, harvest, severe weather events, or other types of disease (Bender et al. 2008). For example, mule deer with chronic wasting disease (CWD), prior to developing obvious clinical signs, have been shown to be more vulnerable to predation (Miller et al. 2008, Krumm et al. 2009), vehicle collisions (Krumm et al. 2005), and possibly harvest (Conner et al. 2000). This is an important consideration because the growth rate of large ungulate populations, such as elk, is highly sensitive to changes in adult female survival (Nelson and Peek 1982, Eberhardt 2002) and strongly correlated with the production and survival of juveniles (Gaillard et al. 2000; see also Smith and Anderson 1998, Raithel et al. 2007). When adult female and juvenile survival are concurrently reduced, populations would be expected to decline (Gaillard et al. 2000; see also Bender et al. 2007, McCorquodale et al. 2014). Consequently, if TAHD reduces the survival of adult females and calves, it has the potential to have a negative effect on the population dynamics of impacted elk herds.

Preliminary results also raise concerns, although the author notes it is too soon to make any definitive statement about the effect of the disease. Among the preliminary conclusions:

> Elk affected by TAHD have had lower levels of condition in December, lower pregnancy rates, lower lactation rates, and lower annual survival rates. Our estimates of IFBF in December indicate elk in the Mount St. Helens elk herd area continue to experience strong nutritional limitations during late-summer and autumn, regardless of disease status. Irrespective of proximate cause, 0.88 of the mortalities we have documented for elk affected by TAHD, have

included animals that had bone marrow content levels indicative of a severe negative energy balance. (Hoenes et al., 2018.)

The Commission was Unable to Consider the TAHD During its April Deliberations

Although the disease was discovered in early April 2020, the Commission was seemingly not informed about its discovery before the April 16, 2020 meeting where the Department approved new elk tag quotas for the coming year. EPIC has an outstanding Public Records Act request with the Department to ascertain what was known and by whom by the date of this meeting.

Environmental advocates raised their alarm at the May 14, 2020 teleconference and the May 14, 2020 Wildlife Resources meeting. At these meetings, the Department expressed that the disease was a concern and that they were in talks with sister agencies in Oregon and Washington about the disease. Furthermore, at the meeting, the Department promised to produce a specific plan to address TAHD. This plan has not yet been issued.

The Statewide Elk Management Plan Does Not Consider TAHD

As directed by the California legislature, elk within the state are to be managed by a "statewide elk management plan." Fish and Game Code § 3952. This plan is directed to consider, inter alia, "[m]ajor factors affecting elk within the state," including disease. The current elk management plan, published by the Department in 2018, does not consider TAHD.

Environmental Impact Analysis Did Not Consider TAHD

Because the issue of TAHD was unknown to the Commission at the time, the environmental documents necessary for compliance with the California Environmental Quality Act failed to consider the direct and cumulative impacts of TAHD on the species. Without study, it is unknown what the impacts of the disease, together with other stressors, such as hunting, will be on the species.

Northcoast Elk are Irreplaceable

Northcoast Roosevelt elk are irreplaceable between these elk have not undergone hybridization with other elk subspecies. Although Roosevelt elk exist across four U.S. states (Alaska, California, Oregon, and Washington), the Northcoast population is perhaps the only that has not experienced recent hybridization with other sympatric elk species. (Meredith et al., 2007.) In other words, the Northcoast Roosevelt elk possess unique genetics and represent a "pure" Roosevelt elk without the effects of crossbreeding. For this reason, Meredith et al. (2007) has proposed that these elk constitute an "evolutionarily significant unit." Population declines in herds of this region are therefore significant in a manner that similar declines in other areas would not be.

SECTION II: Optional Information

5. Date of Petition: June 10, 2020

6. Category of Proposed Change

☐ Sport Fishing
☐ Commercial Fishing
X 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.
X Add New Title 14 Section(s): 364.2
☐ 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 Click here to enter text.
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: This petition is in response to a novel threat to Roosevelt elk in the Northwest Elk Management Area. Accordingly, we file this petition as an emergency petition and ask for the rule to come into effect immediately.

10. Supporting documentation: Identify and attach to the petition any information supporting the proposal including data, reports and other documents:

Attached to this petition are the following publications concerning TAHD in Roosevelt elk:

Hoenes, B., George, B., Holman, E. and Stephens, N. 2018. Assessing the potential effects of treponeme associated hoof disease (TAHD) on elk population dynamics in Southwest Washington. Washington Department of Fish and Wildlife, Olympia, Washington USA.

McCorquodale, S. M., P. J. Miller, S. M. Bergh and E. W. Holman. 2014. Mount St. Helens elk population assessment: 2009-2013. Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Meredith, E., Rodzen, J., Banks, J., Schaefer, R., Ernest, H., Famula, T., May, B. 2007. Microsatellite Analysis of Three Subspecies of Elk (*Cervus elaphus*) in California, *Journal of Mammalogy*, Volume 88, Issue 3, Pages 801–808, https://doi.org/10.1644/06-MAMM-A-014R.1

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:

Fiscal impacts of the proposed regulation are unknown.

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: Click here to enter text.

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

Journal of Mammalogy, 88(3):801–808, 2007

MICROSATELLITE ANALYSIS OF THREE SUBSPECIES OF ELK (*CERVUS ELAPHUS*) IN CALIFORNIA

E. P. Meredith, J. A. Rodzen,* J. D. Banks, R. Schaefer, H. B. Ernest, T. R. Famula, and B. P. May

California Department of Fish and Game, Wildlife Forensics Laboratory, 1701 Nimbus Road, Suite D, Rancho Cordova, CA 95670, USA (EPM, JAR, JDB, RS)
Wildlife and Ecology Unit, Veterinary Genetics Laboratory, University of California Davis, One Shields Avenue, Davis, CA 95616, USA (HBE)
Department of Animal Science, University of California Davis, One Shields Avenue, Davis, CA 95616, USA (EPM, TRF, BPM)

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A total of 676 elk (*Cervus elaphus*) were genotyped at 16 tetranucleotide microsatellite loci to evaluate genetic differences among 3 subspecies of elk in California: tule (*C. e. nannodes*), Roosevelt (*C. e. roosevelti*), and Rocky Mountain (*C. e. nelsoni*) elk. Of the 13 populations analyzed, 5 represented tule elk herds, 3 were Roosevelt elk, 2 were Rocky Mountain elk, and 3 were of uncertain taxonomic status. Overall, populations averaged between 7 and 8 alleles per locus, with observed heterozygosity values ranging from 0.33 to 0.58 per population. Tule elk, which experienced a severe bottleneck in the 1870s, had consistently less genetic diversity than the other subspecies. All 3 subspecies were significantly differentiated, with the greatest genetic distance seen between the tule and Roosevelt subspecies. Assignment of individuals to subspecies using microsatellite data was nearly 100% accurate. Despite the past population bottleneck, significant differences were found among the tule elk herds. Assignment testing of elk from Modoc, Siskiyou, and Shasta counties to determine subspecific status of individuals suggested that these populations contained both Roosevelt and Rocky Mountain elk and their hybrids, indicating that these elk subspecies interbreed where subspecies coexist.

Key words: California, *Cervus elaphus*, elk, genetics, hybrid, microsatellite, population

Elk (*Cervus elaphus*) herds that roamed a large portion of North America have been reduced in both area and number due to hunting pressure and loss of habitat. Although management strategies have aimed to reintroduce elk to some of their original range, these programs are not without potential genetic consequence. Genetic bottlenecks and founder effects are of great concern, and exacerbated by harem mating structure and high variability in male reproductive success (Clutton-Brock 1989).

California contains 3 of the described subspecies of free-ranging elk: tule elk (*C. e. nannodes*; historic resident of oak woodlands and grasslands), Roosevelt elk (*C. e. roosevelti*; northwestern coastal area), and Rocky Mountain (*C. e. nelsoni*; occupying the extreme northeastern corner of California, including Modoc County) elk. The remaining extant subspecies, Manitoban elk (*C. e. manitobensis*), occurs east of the Rocky Mountains in the northern plains states and into central Canada but does not inhabit California. Although each subspecies naturally occurs in different locations within California, there are potential geographic regions of overlap between Roosevelt and Rocky Mountain elk, allowing for the possibility of hybrid zones.

Tule elk residing in the Central Valley and oak woodlands of the foothills of California were almost eliminated after the gold rush of 1849 (McCullough et al. 1996). Historically estimated at more than 500,000 animals, tule elk were compromised by extreme hunting pressure and conversion of grass and woodland habitat into farming and agricultural operations. In 1873, when tule elk were thought to be extinct, protection was granted by the state of California (McCullough 1969; McCullough et al. 1996). Although exact numbers vary, it is believed that at least a single breeding pair of tule elk was found and protected in the southern San Joaquin Valley in Kern County, California, in 1874. Those remaining elk are believed to be the ancestors of extant tule elk populations in California (McCullough 1969; McCullough et al. 1996).

Roosevelt elk inhabit their historical range in the northwestern coastal mountain ranges of California (O'Gara 2002), mainly Humboldt and Del Norte counties. Only elk inhabiting these 2 counties are categorized as Roosevelt elk by the Boone

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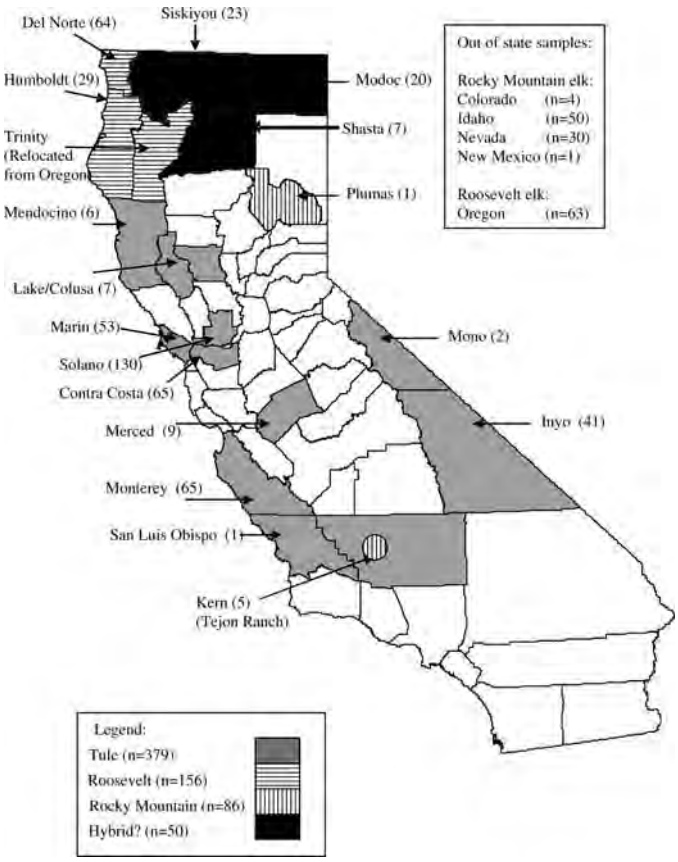

Fig. 1.—Map depicting number of individuals sampled at each herd location given by county name. Gray shaded areas represent counties that contain herds of tule elk, horizontal lines indicate counties with herds of Roosevelt elk, vertical lines indicate counties with herds of supposed Rocky Mountain elk, and diagonal lines indicate potential hybrid zones of Roosevelt and Rocky Mountain elk.

and Crockett Club (Missoula, Montana) for trophy-hunting purposes (Reneau and Reneau 1993). Discrimination of distinct herds of Roosevelt elk is difficult because of the dense forest habitat. Examination of satellite tracking data indicates restricted movement of animals and the possibility of distinct herds (R. Schaefer, in litt.).

Examination of satellite data (R. Schaefer, in litt.) provides evidence that Rocky Mountain Elk of northeastern California may migrate between Modoc County and Oregon, Idaho, and Nevada. Circa 1913, approximately 50 Rocky Mountain elk from Montana were introduced into Shasta County, California (R. Schaefer, in litt.).

Shasta, Siskiyou, and Modoc counties in northern California are considered to be potential hybrid zones for Roosevelt and Rocky Mountain elk by California Department of Fish and Game wildlife managers. For the purpose of our study, the term ''hybrid'' refers to an intraspecific cross. Interstate 5, a major north–south highway in Washington, Oregon, and California, has been used as an arbitrary management boundary for subspecies delineation: elk occurring west of Interstate 5 have been designated Roosevelt and those to the east of Interstate 5 as Rocky Mountain elk. Lone elk are known to wander and travel great distances (>150 miles—R. Schaefer, in litt.), and crossing the unfenced Interstate 5 is likely, as inferred by presence of road-killed elk (R. Schaefer, in litt.). Because Roosevelt and Rocky Mountain trophy elk are recorded separately by hunting organizations, determination of the genetic lineage of animals in these areas will benefit trophy hunters and wildlife managers.

Subspecific status of North American elk has been hotly debated (see O'Gara [2002] for discussion of the taxonomy of North American elk). Overlap of morphological differences among tule, Roosevelt, and Rocky Mountain subspecies demands that other discriminating criteria, such as molecular genetic analyses, are used to address taxonomic status. Tule elk are considered the smallest subspecies of North American elk (Merriam 1905) and are typified by having lower body masses, lighter pelage, and the longest toothrows of any North American subspecies. Roosevelt elk reportedly have the largest body mass and display different antler and jaw morphologies from the others (McCullough 1969; O'Gara 2002). Of the 3 subspecies, Rocky Mountain elk typically have the largest antlers (Reneau and Reneau 1993).

Evidence derived from mitochondrial DNA indicates that tule elk are more closely related to Rocky Mountain than Roosevelt elk, and supports the subspecific status of these 3 categories of elk (Polziehn et al. 1998, 2000; Polziehn and Strobeck 1998, 2002). Using microsatellite data, Williams et al. (2004) showed that tule elk display reduced genetic variation relative to Rocky Mountain and Manitoban elk; however, small sample size prevented robust tests of genetic differentiation among populations of tule elk.

The primary goal of our study was to measure the degree of nuclear genetic differentiation between tule, Roosevelt, and Rocky Mountain elk and evaluate whether the populations of elk in California warrant status as evolutionarily significant units. Given that Roosevelt and Rocky Mountain elk are sympatric in California, yet recorded separately for trophy records, wildlife managers will benefit from genetic information that identifies subspecies composition, particularly in potential hybrid zones. Genetic discriminators will allow identification of subspecies in trophy animals, hair samples from field sampling efforts, and forensic samples. Toward these objectives, we used 2 population assignment programs, WHICHRUN (Banks and Eichert 2000) and STRUCTURE 2.1 (Pritchard et al. 2000), to test the accuracy of assignment to subspecies from multilocus genotype data. Lastly, we assessed the risks and degree of inbreeding faced by herds of tule elk and make recommendations for monitoring and managing these herds.

Materials and Methods

Sample collection and DNA isolation.—A total of 676 elk were analyzed in this study (Fig. 1). The majority of the samples were from a large tissue archive maintained by the California Department of Fish and Game's Wildlife Forensic Laboratory (Rancho Cordova, California). Tissue and blood samples were collected from road-killed animals or animals legally taken at scheduled hunts and elk relocations throughout

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California from 1997 through 2003. Samples were shipped frozen on ice to the Wildlife Forensic Laboratory and maintained at −20°C until DNA extraction.

Tule elk from 8 herds were sampled, including 2 of the original 3 surviving herds established in the 1930s: the Owens Valley herd (Inyo County) and the Cache Creek herd (Colusa and Lake counties). The remaining 6 herds of tule elk sampled were created by later translocations; however, all herds of tule elk are descendants from 1 original remnant population.

Samples of Rocky Mountain elk collected from Nevada and Idaho served as reference samples for comparison to Rocky Mountain elk in California. Five Rocky Mountain elk originally translocated from Wyoming to Tejon Ranch in Kern County, California, were sampled. Roosevelt elk from Jewell, Oregon, and translocated to Trinity County, California, between 1988 and 1995 were examined. The Nevada Department of Wildlife supplied muscle tissue samples of 30 Rocky Mountain elk, and the Idaho Department of Fish and Game provided 49 diluted DNA extracts (10 ng/μl) and 1 muscle tissue sample.

The DNA was isolated from all tissue and blood samples using Qiagen QIAmp tissue isolation kits and procedures (Qiagen, Chatsworth, California). After extraction, DNA was quantified using a Molecular Dynamics model 595 Fluorimager (Molecular Dynamics, Sunnyvale, California) using human DNA reference standards of known concentration. DNA from extracted tissue samples was diluted to a concentration of 10 ng/μl; blood extracts were not diluted.

Microsatellite analysis.—Multiplex polymerase chain reaction was used to amplify 16 tetranucleotide microsatellite markers developed specifically for elk or mule deer (*Odocoileus hemionus*; see Table 1 for references). All loci used were developed from enriched libraries by GIS Inc. (Chatsworth, California). These primers were selected based upon their highly repeatable polymerase chain reaction products and variability within and among the 3 subspecies of elk described herein.

Forward primers were fluorescently labeled with 6FAM, VIC, or NED (Applied Biosystems, Foster City, California) and the reverse primer had a 5′-GTTTCTT-3′ extension added to the 5′ end to reduce split peaks and drive the reaction to the "plus A" band (Brownstein et al. 1996). Polymerase chain reaction fragments were detected using a BaseStation DNA Fragment Analyser (MJ Research, Inc., Waltham, Massachusetts).

Each amplification cocktail included up to 20 ng of template DNA, 1X PCR buffer (Applied Biosystems), 2.4 μl of multiplex specific primer concentrations (see below), 0.2 mM of each deoxynucleoside triphosphate, 2 mM $MgCl_2$, and 0.2 U (Multiplex D, A, and E) or 0.25 U (Multiplex N) Amplitaq (Applied Biosystems) and double-distilled H_2O to total 20 μl per reaction. Polymerase chain reaction primer concentrations are indicated in Table 1. Reactions containing at least 5 ng/μl DNA were run on a PTC-100 thermalcycler (MJ Research, Inc.) with the following amplification parameters: 94°C for 3 min, followed by 26 cycles of 94°C for 30 s, 58°C for 30 s, 72°C for 40 s, a final extension at 72°C for 20 min, and a final hold at 10°C. All blood samples and tissue samples containing less than 5 ng/μl DNA were amplified for 30 cycles. One microliter of polymerase chain reaction product was then added to 4 μl of loading buffer (double-distilled H_2O, formamide, blue dextran, Genescan 400HD ROX [Applied Biosystems], and Genescan 500 ROX [Applied Biosystems] mixed in a ratio of 220 μl : 155.2 μl : 51.7 μl : 12 μl : 12 μl). Polymerase chain reaction products were separated using a denaturing 5.5% acrylamide gel (Long Ranger Gel Solution, Cambrex Bio Science Rockland Inc., Rockland, Maine). Gel data analysis and allele sizing were performed using Cartographer (MJ Research, Inc.).

Table 1.—Summary of loci examined in this study. This table shows in which multiplex each locus was amplified, polymerase chain reaction (PCR) primer concentration (each primer), 5′ fluorescent dye label used, number of alleles, heterozygosity values observed (H_O), and the reference in which the original primer sequences can be found. Note that all the reverse primers were modified with a 5′-GTTTCTT sequence to reduce split peaks and encourage the formation of "+A" bands during polymerase chain reaction. References: 1 = Jones et al. (2002); 2 = Meredith et al. (2005); 3 = Jones et al. (2000).

Locus	Multiplex	PCR concentration (μM)	5′ dye label	No. alleles	Size range (base pairs)	H_O	Reference
T108	D	0.100	6Fam	8	136–181	0.540	1
T26	D	0.483	6Fam	12	328–398	0.565	1
T172	D	0.017	Vic	7	174–198	0.450	1
T501	D	0.600	Ned	9	252–290	0.576	1
T268	N	0.092	6Fam	6	228–256	0.437	1
T156	N	0.062	Vic	15	143–249	0.545	1
T507	N	0.062	Ned	11	148–202	0.390	1
C273	N	0.985	6Fam	8	132–166	0.553	2 and 3
T193	A	0.706	6Fam	10	184–220	0.599	1
C217	A	0.212	Vic	2	185–193	0.415	1
T123	A	0.282	Ned	4	155–186	0.399	1
C180	E	0.048	6Fam	4	156–168	0.507	2
T107	E	0.144	Vic	4	242–265	0.326	2
C229	E	0.144	6Fam	5	299–319	0.363	2
C143	E	0.240	Ned	4	166–178	0.492	2
C01	E	0.624	Ned	5	342–358	0.433	2

Statistical methods.—Genotypic data were collected on all 676 samples. However, only those counties or states (Idaho, Nevada, and Oregon) with at least 20 animals ($n = 632$) were used in frequency-based analyses, specifically the calculation of F-statistics and log-likelihood statistics of population differentiation. Because the alleles were not sequenced to determine the actual number of tetranucleotide repeat units, statistical models conforming to the infinite alleles model were used.

Allele frequencies, unique alleles, and observed and expected heterozygosities within counties or states ("populations") with a minimum of 20 individuals and within each of the 3 subspecies were calculated using GENEPOP on the Web (http://www.biomed.curtin.edu.au/genepop—Raymond and Rousset 1995). For frequency-based analyses, the populations of Roosevelt elk used were from Humboldt and Del Norte counties (California) and Jewell, Oregon; the populations of Rocky Mountain elk used were from Nevada and Idaho. Deviations from linkage equilibrium between all pairs of loci

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across all populations and conformation to Hardy–Weinberg equilibrium on a locus-by-locus basis within populations also were tested using GENEPOP. The *P*-value for a significant deviation from Hardy–Weinberg equilibrium using the exact test (Guo and Thompson 1992) was adjusted from 0.05 to 0.00027 using a Bonferroni adjustment for 186 tests of the same hypothesis (16 loci by 12 populations with 6 loci being monomorphic in a population). A Bonferroni-adjusted *P*-value of 0.0014 was used to assess significance for multiple tests of deviation from Hardy–Weinberg equilibrium at the subspecies level (3 subspecies and 16 loci).

Quantitative measures of population differentiation (F_{ST}) and inbreeding (F_{IS}) were made among subspecies and among populations within subspecies using the software package FSTAT (FSTAT, a program to estimate and test gene diversities and fixation indices, version 2.9.3, J. Goudet, 2001; http://www.unil.ch/izea/softwares/fstat.html) as described in Weir and Cockerham (1984) after Bonferroni-adjusted pairwise significance levels. Samples from Modoc, Shasta, and Siskiyou counties were not used in the comparisons of subspecies populations because the taxonomy of elk from these 3 counties was uncertain.

Analysis of molecular variance (AMOVA; ARLEQUIN—Schneider et al. 2000) was used to evaluate the degree of population differentiation based on the relative number of repeats. Genotypic data were analyzed using subspecies, populations within subspecies, and individuals within populations as sources of variation.

The measure of genetic distance among 12 of the county or state sampling groups was Nei's standard distance (Ds—Nei 1972), calculated in PHYLIP, version 3.5c (Felsenstein 1993) using GENDIST. The neighbor-joining method was used in NEIGHBOR (PHYLIP, version 3.5c—Felsenstein 1993).

Animals were assigned to subspecies using genotypic data and 2 population assignment software packages, WHICHRUN (Banks and Eichert 2000) and STRUCTURE 2.1 (Pritchard et al. 2000), to test accuracy of assigning to presumptive subspecies. Elk from the hybrid zones were excluded because of the confounding effects of uncertain lineage. A baseline genotype data file was constructed using known reference animals, including 367 tule elk, 156 Roosevelt elk, and 80 Rocky Mountain elk. The tule elk baseline reference samples consisted of animals from Contra Costa County ($n = 65$), Inyo County ($n = 41$), Lake County ($n = 5$), Marin County ($n = 53$), Monterey County ($n = 65$), and Solano County ($n = 130$). Roosevelt elk baseline samples included Del Norte County ($n = 64$), Humboldt County ($n = 29$), and Oregon ($n = 63$). Rocky Mountain elk baseline samples included elk from the states of Idaho ($n = 50$) and Nevada ($n = 30$).

In WHICHRUN, the probability of a given sample belonging to a "critical population" was generated by a likelihood ratio log of odds score of the probabilities of the 1st and 2nd most probable population assignment given that sample's genotype. The baseline data file of the 603 samples was jackknifed, a log of odds score was generated for the most probable population assignment, and each sample was assigned to that subspecies with log of odds score of ≥ 1.0.

WHICHRUN was then used to assign individual elk from Modoc, Siskiyou, and Shasta counties to Rocky Mountain or Roosevelt subspecies with log of odds score of ≥ 1.0. Five elk from the Tejon Ranch (Kern County) and 6 elk from Mendocino County also were analyzed for subspecies verification. The 6 elk from Mendocino County were collected in 2 different locations. An individual was assumed to be a possible hybrid if the log of odds score for both Roosevelt and Rocky Mountain was ≤ 1.0. The same analysis parameters were used for assignment testing of baseline data and for animals of unknown ancestry.

The baseline genetic data also were tested for assignment accuracy using the program STRUCTURE using 100,000 rounds of iteration after a 10,000-round burn-in. The STRUCTURE genetic analysis program also was used to test assignment of reference elk and samples from Modoc, Siskiyou, and Shasta counties. STRUCTURE was used to estimate the number of lineages that comprise the counties or states without using a priori population information. The number of populations (K) was evaluated for 1–20 populations. Most likely number of populations was determined by $\Delta(K)$ as described in Evanno et al. (2005).

Elk were classified as potential hybrids if the most probable subspecies was <10 times more likely than the 2nd most probable subspecies, indicative of past introgression. This is mathematically equivalent to the log of odds score threshold of 1.0 used in WHICHRUN for subspecies assignment.

Results

Measures of genetic diversity.—Within the 676 samples, loci possessed from 2 alleles (locus C217) to 15 (locus T156; average = 7.3) with observed heterozygosity values ranging from 0.33 (locus T107) to 0.60 (locus T193). F_{IS} estimated for the 5 herds of tule elk analyzed ranged from -0.038 (Contra Costa County) to 0.079 (Inyo County). Tule elk displayed the lowest allelic diversity and showed no more than 5 alleles at each locus (average number of alleles = 3.2), with several loci being monomorphic in some of the tule elk herds. Rocky Mountain elk averaged 6.8 alleles per locus and Roosevelt elk were intermediate with an average of 5.2.

The 16 loci did not show departures from Hardy–Weinberg equilibrium within analyzed counties or states after a Bonferroni correction. However, when data were pooled by subspecies, several loci departed from Hardy–Weinberg equilibrium. No loci deviated significantly from Hardy–Weinberg equilibrium in the 80 samples of Rocky Mountain elk, 6 loci deviated from Hardy–Weinberg equilibrium within the samples of tule elk, and 1 locus deviated significantly from Hardy–Weinberg equilibrium within the samples of Roosevelt elk.

Relationships among subspecies and populations (Table 2).—There were significant differences in allele frequencies among populations of tule elk. Exact tests of population differentiation yielded a *P*-value of <0.0002 and significance at all pairwise comparisons of the tule elk herds (1% level after Bonferroni corrections). The overall value of F_{ST} for the 5 populations of tule elk was 0.11.

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TABLE 2.—Genetic distances among the 3 subspecies of elk (*Cervus elaphus*) in California and their populations. Data are presented for both the population and subspecific levels of comparison. Nei's standard genetic distance values are above the diagonal and F_{ST} values are below. Significance levels for pairwise tests are: *** $P = 0.001$, ** $P = 0.01$, and * $P = 0.05$ after a Bonferroni correction. The Oregon samples were collected from animals released into California from Oregon. Sample sizes for each population or herd are given in Fig. 1.

	Tule elk herds					Roosevelt elk populations			Rocky Mountain elk populations		Subspecies		
	Contra Costa	Inyo	Marin	Monterey	Solano	Del Norte	Humboldt	Oregon	Idaho	Nevada	Tule	Roosevelt	Rocky Mountain
Tule													
Contra Costa	—	0.03	0.12	0.03	0.07	0.49	0.64	0.42	0.46	0.62			
Inyo	0.06**	—	0.11	0.02	0.08	0.54	0.74	0.50	0.47	0.63			
Marin	0.19**	0.14**	—	0.10	0.08	0.42	0.61	0.34	0.37	0.45			
Monterey	0.07**	0.03**	0.13**	—	0.06	0.55	0.71	0.45	0.45	0.56			
Solano	0.12**	0.12**	0.10**	0.10**	—	0.41	0.59	0.39	0.39	0.53			
Roosevelt													
Del Norte	0.37**	0.33**	0.25**	0.34**	0.29**	—	0.18	0.09	0.31	0.53			
Humboldt	0.47**	0.42**	0.34**	0.42**	0.37**	0.12*	—	0.25	0.47	0.61			
Oregon	0.40**	0.37**	0.27**	0.37**	0.31**	0.06*	0.16*	—	0.17	0.31			
Rocky Mountain													
Idaho	0.33**	0.28**	0.21**	0.28**	0.27**	0.14**	0.19**	0.13**	—	0.09			
Nevada	0.38**	0.33**	0.25**	0.33**	0.31**	0.20**	0.24**	0.18**	0.03*	—			
Subspecies													
Tule											—	0.55	0.48
Roosevelt											0.30*	—	0.31
Rocky Mountain											0.28*	0.14*	—

Exact tests of population differentiation, as measured by allele frequencies, were highly significant ($P < 0.0002$) among populations of Roosevelt elk (Oregon and Humboldt and Del Norte counties) and among populations of Rocky Mountain elk (Nevada and Idaho). F_{ST} values among populations of Roosevelt elk ($F_{ST} = 0.096$) and between populations of Rocky Mountain elk ($F_{ST} = 0.03$) were less than those observed among herds of tule elk. Individual populations of Roosevelt and Rocky Mountain elk showed significant differentiation at the 5% nominal level after Bonferroni corrections.

Data from the 3 subspecies were analyzed as a whole and tested for population differentiation using subspecies as the source of variation (Table 2). A highly significant Exact test ($P < 0.0002$) suggested that there were greater differences in allele frequencies among the 3 subspecies than among populations or herds within any of the 3 subspecies. Pairwise tests of differentiation between the 3 subspecies were all significant at the 5% nominal level of significance after a Bonferroni correction. The AMOVA results (Table 3) indicated that the subspecies are well differentiated.

STRUCTURE yielded results, both in terms of K populations and $\Delta(K)$, that suggested the sampled elk are from 2 "populations": tule and Roosevelt–Rocky Mountain elk lineages. Although the likelihood values for $K = 1$–20 populations approached a maximum at $K = 3$ populations, the $\Delta(K)$ values spiked at $K = 2$ populations.

Subspecies clustered distinctly, with 100% bootstrap support between tule elk and the other 2 subspecies (Fig. 2). The node separating the 2 Rocky Mountain elk populations (Idaho and Nevada) from the other subspecies populations had a 94% level of bootstrap support.

Assignment testing.—All of the 367 samples presumptively categorized by wildlife managers as tule elk assigned correctly using both WHICHRUN and STRUCTURE (Table 4). STRUCTURE was slightly more accurate in assigning reference elk to their presumptive subspecies, although both programs yielded a very high success rate of correct assignment. Population assignment of Roosevelt and Rocky Mountain elk had a small error rate (<5%), which varied by analysis program. One presumptive Roosevelt elk collected from eastern Oregon (Bend, Oregon) was assigned to the Rocky Mountain subspecies with >3.0 log of odds score.

Assignment testing of individual elk using both STRUCTRE and WHICHRUN (Table 5) revealed that Modoc, Shasta, and Siskiyou counties were inhabited by Rocky Mountain, Roosevelt, and hybrid elk. The same individuals were identified as hybrids by both programs. The 5 individuals from the Tejon Ranch in Kern County were correctly assigned as Rocky Mountain elk. The 6 elk from Mendocino County consisted of 2 Roosevelt elk and 4 tule elk.

TABLE 3.—Analysis of molecular variance of 3 subspecies of elk (*Cervus elaphus*) in California using subspecies, populations within subspecies, and individuals as sources of variation. Samples were collected from 1997 through 2003.

Source of variation	*d.f.*	Sum of squares	Variance components	Percentage of variation (%)
Among subspecies	2	905.12	1.253 Va	24.18
Among populations within subspecies	7	319.94	0.3631 Vb	7.00
Within populations	1,170	4,174.93	3.568 Vc	68.81
Total	1,179	5,399.99	5.185	

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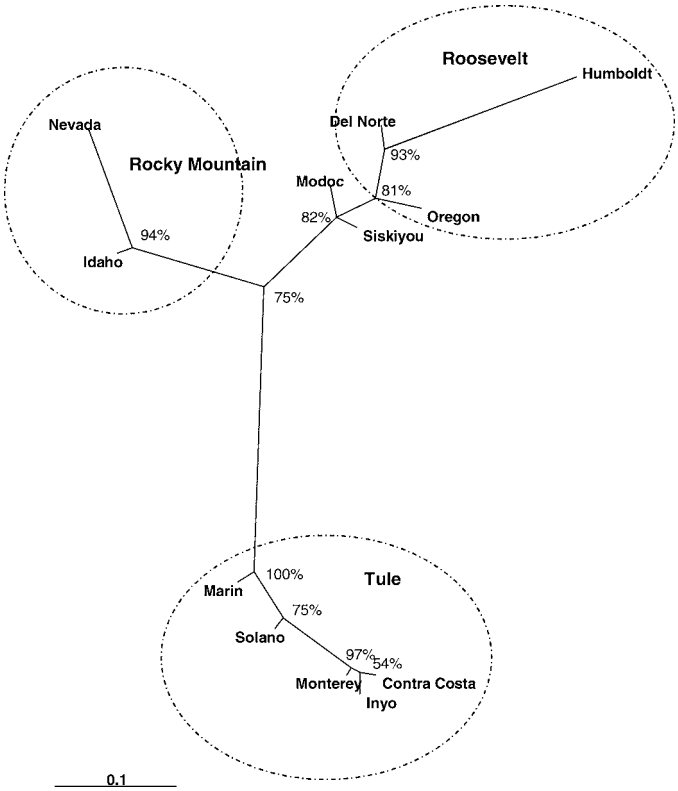

Fig. 2.—Unrooted tree of Nei's standard genetic distance after bootstrapping the data 1,000 times. The bootstrap level of support (out of 1,000) is indicated at each node. Included are all populations of elk with at least 20 samples.

Discussion

Tule elk have much reduced microsatellite variation compared to the Roosevelt and Rocky Mountain elk subspecies, as expected given the severe population bottleneck in the late 1800s. The low level of genetic variability in the tule elk was likely due to the low numbers of founders rather than insufficient sampling, because sampling collections were well distributed among herds. Thus, the molecular genetic uniqueness of the tule elk resulted from lack of genetic variation, not from novel genetic variability.

Tule elk may have been reduced to 1 breeding pair in 1874 (McCullough et al. 1996). Barring a mutation event or experimental error, the presence of 5 alleles at 1 locus requires that the tule elk subspecies was reduced to no fewer than 1 female and 2 males, or vice versa. Allele frequencies varied significantly among the herds of tule elk. The results also suggest that the herds in Contra Costa, Inyo, and Monterey counties were more closely related than the other 2 herds of tule elk; the Marin herd was the most distantly related. This also was reflected in the phylogenetic results (Fig. 2) and follows logically from historical information on relocations (McCullough et al. 1996). Because all tule elk originated from the same herd, founder effects and genetic drift likely caused the herds to diverge genetically in spite of relocation efforts.

Although tule elk do not currently display the effects of reduced fitness, such as low reproductive output and morphological deformities, the individual herds are definitely at risk if they remain genetically isolated. However, reduced genetic variation at neutral loci does not necessarily indicate a lack of adaptability (Hedrick 1999, 2001) and would not warrant intentional crossbreeding with Roosevelt or Rocky Mountain elk.

We propose the following management recommendations for tule elk given the genetic data and their life-history characteristics. Management of tule herds should continue to involve the movement of animals, preferably mature females, between the tule herds. Adult female elk would be much more likely to contribute genetically because of the harem mating structure, because an introduced male elk would likely have to establish dominance before breeding. Translocating elk among Inyo, Contra Costa, and Monterey counties should not negatively impact genetic diversity of these 3 herds, because they are closely related.

Periodic monitoring of the physical health and genetics of the tule herds is required in order to detect a rise in frequency of deleterious inherited phenotypes, reduced fitness, and other effects of inbreeding. Although the 6 elk samples from Mendocino County were either pure tule or pure Roosevelt and did not indicate crossbreeding, the elk in the Mendocino and Lake county areas should be monitored for hybridization. The tule and Roosevelt elk sampled were from 2 differ-

Table 4.—Assignment test results for 3 subspecies of elk (*Cervus elaphus*) in California using programs WHICHRUN and STRUCTURE 2.1. The numbers of correct assignments are on the diagonal and incorrect assignment counts are off the diagonal for each program.

Software	Subspecies	*n*	Tule	Roosevelt	Rocky Mtn.
WHICHRUN	Tule	367	367	—	—
	Roosevelt	156	—	151	5
	Rocky Mountain	80	—	1	79
STRUCTURE 2.1	Tule	367	367	—	—
	Roosevelt	156	—	154	1
	Rocky Mountain	80	—	—	80

Table 5.—Assignment tests of elk from Modoc, Siskiyou, Shasta, and Kern counties, California, using programs WHICHRUN and STRUCTURE. Animals are noted as potential hybrids using WHICHRUN when the log of odds score of assignment was less than 1.0, and when the probability of assignment was less than 10 times the 2nd most probable subspecies using STRUCTURE.

	County			
Program	Modoc ($n = 20$)	Siskiyou ($n = 23$)	Shasta ($n = 7$)	Kern ($n = 5$)
WHICHRUN				
Roosevelt	9	15	1	0
Rocky Mountain	10	2	5	5
Hybrid	1	5	1	0
STRUCTURE 2.1				
Roosevelt	9	15	1	0
Rocky Mountain	10	2	5	5
Hybrid	1	5	1	0

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ent locations and did not occur sympatrically. Tule elk in Mendocino County have recently been detected in close proximity to Roosevelt elk (R. Schaefer, in litt.). Introgression of Roosevelt elk into these tule herds should prohibit their use for future transplants.

The reproductive strategy of elk makes this species vulnerable to the loss of genetic diversity. Williams et al. (2002, 2004) applied theory and computer simulation to conclude that elk in small isolated herds tend to lose genetic variation and heterozygosity. The effect of small population size is magnified by the highly polygynous nature of elk, and even brief bottlenecks can have a large effect on the number of alleles and heterozygosity of species with this mating system.

The effects of a small population size on a mammal are well illustrated by research on Florida panthers (*Puma concolor coryi*). Hedrick (2001) suggested that populations that remain small over a long time period would incur a large genetic load from fixation of many deleterious alleles of small effect, as seen in the Florida panther. Even with an effective population size of 30–50, this subspecies of panther so rapidly accumulated deleterious alleles through drift and inbreeding that it was in serious danger of extinction (Hedrick 1995).

Population assignment for individual reference elk with known source populations using multilocus genotype data was concordant with source population records because of highly significant differences in allele frequencies observed between the subspecies. Two population assignment software programs, WHICHRUN and STRUCTURE, yielded nearly identical assignment accuracies. This high degree of accuracy is important from a forensic standpoint because tule elk are a heavily managed subspecies within California; recaptured escapees from game refuges and evidence from suspected cases of tule elk poaching now can be reliably identified to subspecies.

Elk present in the northern California counties of Modoc, Siskiyou, and Shasta are genetically Roosevelt elk, Rocky Mountain elk, or hybrids of these 2 subspecies. Thus, trophy elk taken by sportsmen from these counties cannot be reliably assigned to subspecies in the absence of molecular genetic information. The unique genetic character of Roosevelt elk from California merits careful monitoring of translocations of elk if new animals are moved into the existing herds in Humboldt and Del Norte counties from areas containing elk of mixed ancestry.

Our analyses lend strong support to previously published work suggesting that tule, Roosevelt, and Rocky Mountain elk should be designated as discrete subspecies (Polziehn et al. 1998, 2000; Polziehn and Strobeck 1998, 2002) and as evolutionarily significant units. Values of F_{ST} and log-likelihood values for tests of population differentiation were highly significant. AMOVA results indicated that the subspecies are well differentiated and gene flow has likely occurred among populations within the subspecies.

The criteria used for determining which populations comprise an evolutionarily significant unit have been the topic of considerable debate (i.e., Crandall et al. 2000; Fraser and Bernatchez 2001; Moritz 1994, 2002). We incorporated criteria from these studies and propose evolutionarily significant units for elk in California. Tule elk displayed highly significant differences in nuclear allele frequencies relative to other elk populations, consistent with the criteria of Waples (1991) and Moritz (1994, 2002). Given its unique ecological niche, evolutionarily significant unit status is warranted under the ''ecological exchangeability'' concept of Crandall et al. (2000).

We propose evolutionarily significant unit status for Roosevelt elk of the north coast of California (Humboldt and Del Norte counties). Again, significant genetic divergence was observed between this group and the other sampled populations. Because Roosevelt elk from the Olympic Peninsula in Washington State may have some Rocky Mountain introgression (Polziehn and Strobeck 2002), care (and perhaps genetic testing) is essential before translocating elk from the Olympic Peninsular to augment Roosevelt elk in other regions, including California.

Rocky Mountain elk are the least populous elk in California, although they exist in great numbers in the mountains of the western United States. They are genetically distinct from both the Roosevelt and tule elk and inhabit environments where the tule elk are absent. The only pure population of Rocky Mountain elk within California identified from this study occurs at Tejon Ranch (Kern County). These animals originally were imported from Yellowstone National Park, Wyoming. California Department of Fish and Game managers had expressed concern that these animals had bred with tule elk at 1 point in time; this concern appears unfounded. Rocky Mountain elk and tule elk are held at 2 physically separated ranches in Kern County. Although Rocky Mountain elk are sympatric with Roosevelt elk in northern California, their range extends beyond that of Roosevelt elk east into the Rocky Mountains. Elk taken from the counties containing hybrids should be genetically tested on an individual basis to determine the subspecies of their source. Polziehn et al. (2000) documented that population subdivision and restricted gene flow occurs in herds of Rocky Mountain elk, many of which were relocated or reintroduced. Considering that this subspecies covers a large geographic area, future studies covering larger geographic areas are likely to identify additional Rocky Mountain elk evolutionarily significant units.

To date, our study is the most comprehensive population genetic analysis of the 3 subspecies of elk inhabiting California and should provide valuable information for elk managers and wildlife law enforcement. Future conservation efforts should focus on ensuring connectivity between herds or populations within each evolutionarily significant unit to ensure that adaptive genetic variation is maintained in a large population and not removed by genetic drift or fixed by inbreeding in small isolated populations. Current population management efforts focus primarily on the protected tule elk, maintained as several distinct, isolated herds across the state. We recommend the continued translocation of tule elk between the herds in order to maintain the genetic diversity of the tule subspecies and avoid the potential inbreeding that can occur in small polygynous herds.

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Acknowledgments

We thank California Department of Fish and Game wardens and biologists. Additionally, we appreciate the assistance of K. Rudolph (Idaho Deparment of Fish and Game), J. Dayton and B. Gonzales (California Department of Fish and Game) for acquisition of additional samples, and R. Callas (California Department of Fish and Game) for helpful information regarding Roosevelt and Rocky Mountain elk of California. The California Deer Association, the Rocky Mountain Elk Foundation, the Sacramento Safari Club, and the Mule Deer Foundation provided additional financial support for this research and the ongoing genetics research conducted by the Wildlife Forensic Laboratory of the California Department of Fish and Game. We also thank R. K. Wayne (University of California, Los Angeles) and anonymous reviewers for their many helpful comments. In memory of K. Levine, whose years of dedication to the Wildlife Forensic Laboratory ended far too early.

Literature Cited

Banks, M. A., and W. Eichert. 2000. WHICHRUN (version 3.2): a computer program for population assignment of individuals based on multilocus genotype data. Journal of Heredity 91:87–89.

Brownstein, M. J., J. D. Carpten, and J. R. Smith. 1996. Modulation of non-templated nucleotide addition by Taq DNA polymerase: primer modifications that facilitate genotyping. BioTechniques 20:1004–1010.

Clutton-Brock, T. H. 1989. Mammalian mating systems. Proceedings of the Royal Society of London, B. Biological Sciences 236:339–372.

Crandall, K. A., O. R. P. Bininda-Emonds, G. M. Mace, and R. K. Wayne. 2000. Considering evolutionary processes in conservation biology: returning to the original meaning of ''evolutionarily significant units.'' Trends in Ecology and Evolution 15:290–295.

Evanno, G., S. Regnaut, and J. Goudet. 2005. Detecting the number of clusters of individuals using the software STRUCTURE: a simulation study. Molecular Ecology 14:2611–2620.

Felsenstein, J. 1993. PHYLIP (phylogeny inference package). Version 3.5c manual. Distributed by the author, Department of Genetics, University of Washington, Seattle.

Fraser, D. J., and L. Bernatchez. 2001. Adaptive evolutionary conservation: towards a unified concept for defining conservation units. Molecular Ecology 10:2741–2752.

Guo, S., and E. Thompson. 1992. Performing the exact test of Hardy–Weinberg proportion for multiple alleles. Biometrics 48:361–372.

Hedrick, P. W. 1995. Gene flow and genetic restoration: the Florida panther as a case study. Conservation Biology 9:996–1007.

Hedrick, P. W. 1999. Perspective: highly variable loci and their interpretation in evolution and conservation. Evolution 53:313–318.

Hedrick, P. W. 2001. Conservation genetics: where are we now? Trends in Ecology and Evolution 16:629–636.

Jones, K. C., K. F. Levine, and J. D. Banks. 2000. DNA-based genetic markers in black-tailed and mule deer for forensic applications. California Fish and Game 86:115–126.

Jones, K. C., K. F. Levine, and J. D. Banks. 2002. Characterization of eleven polymorphic tetranucleotide microsatellites for forensic application in California elk (*Cervus elaphus*). Molecular Ecology Notes 2:425–427.

McCullough, D. R. 1969. The tule elk: its history, behavior, and ecology. University of California Publications in Zoology 88:1–209.

McCullough, D. R., J. K. Fischer, and J. D. Ballou. 1996. From bottleneck to metapopulation: recovery of the tule elk in California. Pp. 375–403 in Metapopulations and wildlife conservation (D. R. McCullough, ed.). Island Press, Covelo, California.

Meredith, E. P., J. A. Rodzen, K. F. Levine, and J. D. Banks. 2005. Characterization of an additional 14 microsatellite loci in California Elk (*Cervus elaphus*) for use in forensic and population applications. Conservation Genetics 6:151–153.

Merriam, C. H. 1905. A new elk from California, *Cervus nannodes*. Proceedings from the Biological Society (Washington) 18:23–25.

Moritz, C. 1994. Defining ''evolutionarily significant units'' for conservation. Trends in Ecology and Evolution 9:373–375.

Moritz, C. 2002. Strategies to protect biological diversity and the processes that sustain it. Systematic Biology 51:238–254.

Nei, M. 1972. Genetic distance between populations. American Naturalist 106:283–292.

O'Gara, B. W. 2002. Taxonomy. Pp. 3–67 in Elk of North America: ecology and management (D. Toweill and J. Thomas, eds.). Smithsonian Institution Press, Washington, D.C.

Polziehn, R. O., J. Hamr, F. F. Mallory, and C. Strobeck. 1998. Phylogenetic analysis of North American wapiti (*Cervus elaphus*) subspecies. Canadian Journal of Zoology 76:998–1010.

Polziehn, R. O., J. Hamr, F. F. Mallory, and C. Strobeck. 2000. Microsatellite analysis of North American wapiti (*Cervus elaphus*) populations. Molecular Ecology 9:1561–1576.

Polziehn, R. O., and C. Strobeck. 1998. Phylogeny of wapiti, red deer, sika deer, and other North American cervids as determined from mitochondrial DNA. Molecular Phylogenetics and Evolution 10:249–258.

Polziehn, R. O., and C. Strobeck. 2002. A phylogenetic comparison of red deer and wapiti using mitochondrial DNA. Molecular Phylogenetics and Evolution 22:342–356.

Pritchard, J. K., M. Stephens, and P. Donnelly. 2000. Inference of population structure from multilocus genotype data. Genetics 155:945–959.

Raymond, M., and F. Rousset. 1995. GENEPOP (version 1.2): population genetics software for exact tests and ecumenicism. Journal of Heredity 86:248–249.

Reneau, J., and S. C. Reneau. 1993. Records of North American big game. Boone and Crockett Club, Missoula, Montana.

Schneider, S., D. Roessli, and L. Excoffier. 2000. Arlequin version 2.000: a software for population genetics data analysis. Genetics and Biometry Laboratory, University of Geneva, Geneva, Switzerland.

Waples, R. S. 1991. Pacific salmon, *Oncorynchus* spp., and the definition of ''species'' under the endangered species act. Marine Fisheries Review 53:11–22.

Weir, B. S., and C. C. Cockerham. 1984. Estimating *F*-statistics for the analysis of population structure. Evolution 38:1358–1370.

Williams, C. L., B. Lundrigan, and O. E. Rhodes. 2004. Microsatellite variation in tule elk. Journal of Wildlife Management 68:109–119.

Williams, C. L., T. L. Serfass, R. Cogan, and O. E. Rhodes. 2002. Microsatellite variation in the reintroduced Pennsylvania elk herd. Molecular Ecology 11:1299–1310.

Submitted 13 January 2006. Accepted 27 November 2006.

Associate Editors were Jesús E. Maldonado and Robert D. Bradley.

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Mount St. Helens Elk Population Assessment: 2009-2013

March 2014

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Washington Department of Fish and Wildlife

Mount St. Helens Elk Population Assessment:

2009-2013

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March 2014

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This Program Receives Federal Aid in Wildlife Restoration, Project W-96-R, Game Surveys.

This report should be cited as: McCorquodale, S. M., P. J. Miller, S. M. Bergh and E. W. Holman. 2014. Mount St. Helens elk population assessment: 2009-2013. Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Table of Contents

LIST OF TABLES ii
LIST OF FIGURES iv
EXECUTIVE SUMMARY viii
INTRODUCTION 1
STUDY AREA AND BACKGROUND 3
Elk Habitat 10
Overwinter Elk Mortality 12
Elk Population Management 14
METHODS 16
Marking and Handling 16
Body Condition and Reproduction 17
Sightability-Correction Modeling 18
Mark-Resight 23
Recruitment and Population Growth Rate 25
Survival 26
Elk Hoof Disease 27
Environmental and Temporal Effects 28
RESULTS 30
Capture and Marking 30
Late-Winter Condition and Fertility 32
Fall Body Condition 35
Sightability Modeling 38
Mark-Resight 49
Rate of Increase and Method Contrast 60
Recruitment 62
Survival 64
Hoof Disease Observations 69
Environmental Effects 70
DISCUSSION 75
MANAGEMENT IMPLICATIONS 95
ACKNOWLEDGMENTS 96
LITERATURE CITED 98

List of Tables

Table 1.
Summary of univariate association of independent variable levels and sightability of elk groups during helicopter surveys, Mount St. Helens, 2009-2011 39
Table 2.
Results of univariate significance tests (logistic regression) for predictor variables potentially affecting sightability of elk groups during spring helicopter surveys, Mount St. Helens, 2009-2011. Bold text delineates predictors significantly related to group sightability 40
Table 3.
Model selection results for models predicting the sightability of elk groups from a helicopter, Mount St. Helens Elk Herd Area, 2009-2011 41
Table 4.
Parameter estimates (β_i and standard errors = SE) for the fitted sightability models from Table 3, Mount St. Helens Elk Herd, 2009-2011 42
Table 5.
Model selection results for LNME mark-resight estimates of total number of elk in the 5-GMU study area, 2009-2012, Mount St. Helens, WA 50
Table 6.
Model selection results for LNME mark-resight estimates of total number of cow elk and branch-antlered bull elk in the 5-GMU study area, 2009-2012, Mount St. Helens, WA 52
Table 7.
Estimated detection rates for radiomarked elk from the fully parameterized, sex-specific LNME mark-resight model, 2009-2012, Mount St. Helens, WA 55
Table 8.
Model selection results for LNME mark-resight estimates of group-specific cow elk (5 groups = GMU) and branch-antlered bull elk (2 groups = mudflow and non-mudflow bulls), 2009-2012, Mount St. Helens, WA 56
Table 9.
Estimated detection rates for radiomarked elk from the best-supported, group-specific LNME mark-resight model, 2009-2012, Mount St. Helens, WA 57
Table 10.
Estimated group-specific, exponential rate of increase (r), Mount St. Helens, WA; sightability model estimates (2009-2013); LNME mark-resight estimates (2009-2012) 60
Table 11.
Model selection results for radiomarked elk survival, Mount St. Helens, 2009-2013 66

Table 12.
Model-averaged annual survival estimates (S-hat) and associated unconditional 95% confidence intervals for radiomarked Mount St. Helens elk for 4 survival years using the model and Akaike model weights from Table 11. All estimates are for radiomarked adult cow elk, unless specified otherwise 68
Table 13.
Fates of elk with any visible hoof issue at capture among those elk radiomarked 2009-2012, Mount St. Helens, WA 70

List of Figures

Figure 1.
Map of the Mount St. Helens elk herd area (yellow outline) and the core study area (green shaded, with GMU numbers) 4
Figure 2.
Winter snowfall was common in the study area and often persisted for several months in the higher elevation portions of the elk range each year 7
Figure 3.
Cumulative daily snow depth (by month) for water years 2008-2013, from the Spirit Lake (upper panel; elevation = 1,067 m) and Pepper Creek (lower panel; elevation = 648 m) SNOTEL sites. A water year spans October 1-September 30, and is labeled by the calendar year in which it ends. 8
Figure 4.
Cumulative spring-summer precipitation measured at the Spirit Lake SNOTEL site (elevation = 1,067 m), 2007-2012..... 9
Figure 5.
Infrared satellite images of the Mount St. Helens vicinity early post-eruption (top image, 1980) and nearly 30 years post-eruption (bottom image, 2009). In these images, vegetated areas (e.g., forest, grassland, vegetated clearcuts) are red/pink, and bare ground, ash, mudflow, etc. are gray/brown (images courtesy of NASA's Earth Observatory Program) 11
Figure 6.
Typical corporately managed elk habitat mosaic within the core study area (GMU 550 [left] and GMU 556 [right]..... 12
Figure 7.
Number of current year overwinter elk mortalities tallied during the annual mortality survey on the Mount St. Helens Wildlife Area, April 1999-2013..... 13
Figure 8.
Numbers of antlerless elk permits issued, 2004-2012, for GMUs 520, 522, 524, 550, and 556, collectively 15
Figure 9.
Numbers of antlerless elk killed, 2004-2012, in GMUs 520, 522, 524, 550, and 556, collectively..... 15
Figure 10.
Elk organs from hunter-harvested cow elk used to estimate fall body fat (%IFBF) for Mount St. Helens elk, 2009-2011 (left to right: pericardium, heart, kidneys)..... 18
Figure 11.
Initial delineation of counting units used for spring helicopter surveys and sightability modeling, 2009-2013, Mount St. Helens elk herd study area 19
Figure 12.
Bull elk group sighted during one of the helicopter surveys; yellow arrow indicates position of a radiomarked bull in the group 21

Figure 13.
Distribution of ages for cow elk captured and radiomarked, February 2009-2012, Mount St. Helens, WA 21
Figure 14.
Distribution of ages for bull elk captured and radiomarked, February 2009-2012, Mount St. Helens, WA 31
Figure 15.
Boxplots of age-specific mass for cow elk captured and radiomarked, February 2009-2012, Mount St. Helens, WA. Colored boxes represent the middle 50% of estimates within each age-class and heavy horizontal lines represent median values. Only a single estimated mass was available for cows aged 13, 15, and 16 31
Figure 16.
Boxplots for ingesta-free body fat (%IFBF) by lactation status for cow elk captured and radiomarked, February 2009-2012, Mount St. Helens, WA. Colored boxes represent the middle 50% of estimates and heavy horizontal lines represent median values 33
Figure 17.
Boxplots for ingesta-free body fat (%IFBF) by pregnancy status for cow elk captured and radiomarked, February 2009-2012, Mount St. Helens, WA. Colored boxes represent the middle 50% of estimates and heavy horizontal lines represent median values 34
Figure 18.
Plot of marginal means for %IFBF by GMU, controlling for pregnancy and lactation status, Mount St. Helens cow elk, 2009-2012 35
Figure 19.
Frequency histogram (and normal curve) for fall IFBF estimates from hunter-killed cow elk, Mount St. Helens, WA, 2009-2011 36
Figure 20.
Boxplots for fall %IFBF from hunter-killed elk across subareas (1 = GMU 522, 2 = GMUs 520, 524, 550, 556, 3 = GMU 560, 4 = Columbia Gorge GMUs) by lactation status, Mount St. Helens, WA, 2009-2011 37
Figure 21.
Sightability model estimates (± 95% CI) for total elk and total cow elk abundance in the study area, Mount St. Helens, 2009-2013 43
Figure 22.
Sightability model estimates for total elk abundance (± 95% CI) in GMU 520, Mount St. Helens, 2009-2013 44
Figure 23.
Sightability model estimates for total elk abundance (± 95% CI) in GMU 522, Mount St. Helens, 2009-2013 44
Figure 24.
Sightability model estimates for total elk abundance (± 95% CI) in GMU 524, Mount St. Helens, 2009-2013 45

Figure 25.
Sightability model estimates for total elk abundance (± 95% CI) in GMU 550, Mount St. Helens, 2009-2013 45
Figure 26.
Sightability model estimates for total elk abundance (± 95% CI) in GMU 556, Mount St. Helens, 2009-2013 46
Figure 27.
Sightability model estimates for cow elk abundance (± 95% CI) in GMU 520, Mount St. Helens, 2009-2013 47
Figure 28.
Sightability model estimates for cow elk abundance (± 95% CI) in GMU 522, Mount St. Helens, 2009-2013 47
Figure 29.
Sightability model estimates for cow elk abundance (± 95% CI) in GMU 524, Mount St. Helens, 2009-2013 48
Figure 30.
Sightability model estimates for cow elk abundance (± 95% CI) in GMU 550, Mount St. Helens, 2009-2013 48
Figure 31.
Sightability model estimates for cow elk abundance (± 95% CI) in GMU 556, Mount St. Helens, 2009-2013 49
Figure 32.
Mark-resight estimates (2009-2012 = LNME; 2013 = Lincoln-Petersen) for total elk (± 95% CI) in the 5-GMU study area, 2009-2013, Mount St. Helens, WA 51
Figure 33.
Mark-resight estimates (2009-2012 = LNME; 2013 = Lincoln-Petersen) for total cow elk (± 95% CI) in the 5-GMU study area, 2009-2013, Mount St. Helens, WA 53
Figure 34.
Mark-resight estimates (2009-2012 = LNME; 2013 = Lincoln-Petersen) for total branch-antlered bull elk (± 95% CI) in the 5-GMU study area, 2009-2013, Mount St. Helens, WA 54
Figure 35.
LNME Mark-resight estimates, 2009-2012, for total cow elk (± 95% CI) in GMUs 520 and 550 (top panel); 522 and 524 (bottom panel), Mount St. Helens, WA 58
Figure 36.
LNME Mark-resight estimates, 2009-2012, for total cow elk (± 95% CI) in GMU 556, Mount St. Helens, WA 59
Figure 37.
LNME Mark-resight estimates, 2009-2012, for total branch-antlered bull elk (± 95% CI), Mount St. Helens, WA 59
Figure 38.
Correlation between Sightability Model (SM) estimates and LNME mark-resight estimates for cow elk abundance, 2009-2012 (panels are, top to bottom: for first survey replicate SM estimate, second survey SM estimate, and the means of the 2 annual SM estimates) 61

Figure 39.
Elk calf-cow spring ratio estimates (plus 95% CI), 2009-2013, for the 5-GMU survey area, from aerial surveys, Mount St. Helens, WA 62
Figure 40.
GMU-specific elk calf-cow spring ratio estimates (plus 95% CI), 2009-2013, from aerial surveys, Mount St. Helens, WA..... 63
Figure 41.
GMU-specific elk calf-cow spring ratio index (observed ratio adjusted for fall antlerless harvest), 2009-2013, Mount St. Helens, WA 64
Figure 42.
Total radiomarked elk deaths by cause, Mount St. Helens, WA, survival years 2009-2012. Sample size of collared elk at risk at the beginning of each survival year is shown at the top of the panel..... 65
Figure 43.
Linear fits of indexed spring calf-cow ratio to late summer-fall precipitation metrics, Mount St. Helens elk herd, 2009-2013 72
Figure 44.
Non-linear fit of a spring overwinter mortality index to Z-scores for late winter snow water equivalents (SWE) measured at Spirit Lake, 2008-2013..... 73
Figure 45.
Linear fit of spring calf recruitment and overwinter mortality tallies to a combined index of current winter and previous late summer-fall weather severity. Marker colors: green = mild winter following normal summer; blue = normal winter and summer; yellow = normal winter and wet summer; purple = severe winter and normal summer; red = severe winter and droughty summer..... 74

EXECUTIVE SUMMARY

In 2009, we initiated a study of the Mount St. Helens elk population to better quantify elk abundance, develop a practical and defensible population monitoring approach, and document recent trends in elk condition, productivity, and survival. During 2009-2012, we captured and radiomarked 150 unique elk aged ≥ 1-yr-old (110 F: 40 M) by helicopter darting in a 5-Game Management Unit (GMU) study area (GMUs 520, 522, 524, 550, and 556) in the core of the Mount St. Helens elk herd area. Among the issues motivating our work were episodic high overwinter elk mortality, recent evidence of sub-par condition among elk translocated to the North Cascades in 2003 and 2005, and apparent elk herbivory impacts on plant communities in the vicinity of Mount St. Helens. In response to these issues and concurrent with the initiation of our work, antlerless elk harvesting was liberalized across several GMUs to reduce local elk densities.

Using ultrasound examination and body condition scoring we estimated mean ingesta free body fat (IFBF) for elk we live captured in February, 2009-2012, was 5.64% (95% CI = 5.08-6.21) for non-lactaters and 3.26% (95% CI = 2.34-4.18) for lactaters. These levels suggest food limitation. We found that GMU, lactation status, and pregnancy status affected IFBF, but year did not. Overall, 73 of 109 cow elk (67%) we examined for pregnancy via ultrasound were pregnant. Pregnant elk had higher IFBF than did non-pregnant elk. We also used organ samples from 364 hunter-harvested cow elk to estimate fall (Nov) IFBF for elk in the Mount St. Helens herd, 2009-2011. We detected effects of geographic subarea and lactation status on IFBF, but not effects attributable to year or cow age. IFBF was higher for cow elk harvested in GMU 560 and Columbia Gorge GMUs than from the managed forest portion of our 5-GMU study area. We estimated mean IFBF during the fall at 12.51% for non-lactaters and 10.84% for lactaters, controlling for other factors.

We collected data during intensive late winter helicopter surveys (2 complete survey replicates yearly 2009-2012, 1 survey in 2013) over the 5-GMU study area. We used data from Mar-Apr flights, 2006-2007 to fit logistic regression models to predict the sightability of elk groups based on group and environmental covariates. Several covariates influenced sightability in univariate logistic regression models. We then used multi-model inference and an information-theoretic criterion (AIC_c) to compare several alternative multivariate models of varying complexity; our results indicated the best multivariate model predicted sightability of elk groups based on: 1) transformed (log_2) group size, and 2) forest canopy cover (%). Predicted sightability increased with increasing group size and with decreasing cover.

We also used the logit-normal mixed effects (LNME) mark-resight model to generate estimates (2009-2012) of total elk population size and the sizes of the cow and branch-antlered bull subpopulations at a variety of spatial scales. We explored 11 LNME models to estimate total population size, 10 models to estimate total subpopulation sizes for cow elk and branch-antlered bulls, and 15 models to estimate GMU-specific estimates of cow elk abundance. We also used the Lincoln-Petersen model to generate mark-resight estimates for total population size and total cow elk subpopulation size for 2013 using data from the single survey conducted that year. We again used multi-model inference and AIC_c to evaluate the evidence in our data for the various models in our LNME model sets.

Sightability model estimates appeared to underestimate true abundance, relative to LNME estimates. This result is common and relates to how the 2 types of models account for undetected elk. Mark-resight models are virtually always more effective at accounting for such animals. However, trend estimates from the 2 modeling approaches were relatively congruent and time-specific estimates from both approaches were highly correlated, suggesting that sightability model estimates, although biased low, provided a useful and consistent abundance

index. The application of a sightability modeling approach is a much more practical strategy, relative to mark-resight, for large-geographic-scale monitoring such as is needed for elk at Mount St. Helens.

Sightability model and LNME mark-resight estimates, 2009-2013, suggested a decline in overall elk abundance and cow elk abundance; bull abundance estimates indicated a relatively stable bull population. We found evidence of strong spatial variation in the decline in overall elk abundance and cow elk abundance. Estimates indicated substantial a reduction in elk abundance in GMUs 520, 524, and 550. We did not detect any decline in GMU 522 elk abundance, nor in GMU 556 abundance; however, estimated elk abundance in GMU 556 during the last survey year that we report on, spring 2013, was the lowest we recorded across the 5 years of data from GMU 556. Across our individual counting units, the units the furthest west showed the most consistent and dramatic declines in raw elk counts; units further east in the same GMUs produced more stable counts.

For virtually every geographic scale of abundance estimates for total elk and total cow elk, the 2013 point estimate was the lowest estimate obtained 2009-2013, except for GMU 522 estimates. For total elk and total cow elk across the 4-GMU landscape (excluding GMU 522), 2013 estimated abundance was on the order of 30-35% lower than the 2009 estimates. GMU-specific sightability model estimates of total elk and total cow elk abundance were on the order of 60-70% lower in 2013 than in 2009 for GMUs 520 and 550, were ~40-60% lower for GMU 524, and were ~20-25% lower for GMU 556.

We also used radiomarked elk to estimate survival rates and explore possible sources of variation in survival. We explored 15 survival models with known-fate modeling using AIC_c and model weights to draw conclusions about Mount St. Helens elk survival during 2009-2013 (4 survival years). The best model had a common cow survival parameter for GMUs 520, 522, 524, and 556 that was constant during 2009-2011, a common cow survival parameter for all GMUs

during the last survival year (2012-2013), a unique survival parameter for GMU 550 cows during 2009-2011, and constant bull survival across years. Bull elk survival was estimated to be 0.56 (95% CI = 0.43-0.68). Annual cow survival was estimated to be 0.85 (95% CI = 0.78-0.91) during 2009-2011 in GMUs 520, 522, 524, and 556. During the same years, cow survival was estimated at 0.64 (95% CI = 0.48-0.78) in GMU 550. Cow survival in the final survival year (2012-2013) was estimated to be 0.52 (95% CI = 0.38-0.65) across all 5 GMUs. Low survival of radiomarked elk, 2012-2013, corresponded to a fairly high number of unmarked, winter-killed elk (n= 71) tallied during the annual mortality survey on the mudflow. During the previous 3 years, the annual winter mortality survey yielded tallies ranging 2-46 elk.

Spring calf recruitment varied considerably during 2009-2013. Calf:cow ratios exceeded 35:100 during 2010 and 2011. Calf recruitment was lower in the spring of 2009 and much lower in 2012, 2013. Overall, observed estimates were in the 25-30:100 range for the study area and in the 25-35:100 range for most GMU-specific estimates. After attempting to correct the observed ratios for fall removals of antlerless elk via hunter harvest, calf recruitment was indexed mostly in the high teens to 100 cows range for 2012, 2013 and in the 20-30-ish calves per 100 cows in 2009. Indexed recruitment in spring 2013 was the lowest—compared to other study years—for almost all GMUs. Depressed calf recruitment in the spring of 2013 corresponded to high mortality among radiomarked elk that same year, high observed overwinter mortality of unmarked elk, and elk abundance estimates that were also low.

Spring calf recruitment, 2009-2013, was strongly related to late summer-fall precipitation metrics (r^2 = 0.91-0.96); calf recruitment was higher in years with significant late summer-fall moisture, presumably because of enhanced forage production/quality during the time when calf elk are becoming increasingly dependent on foraging. Overwinter elk mortality, as indexed by the annual mortality survey on the mudflow, was strongly related (r^2 = 0.90) to a metric

reflecting daily snowpack during mid-to-late winter; in years with substantial late winter snowpack, overwinter mortality was higher than in years with milder winter conditions.

Collectively, our estimates of elk condition, productivity, and survival indicated fairly strong food limitation in this population that may have been a function of elk density. Attempts to reduce the elk population via liberalized hunter harvest beginning in 2007 were apparently successful, based on our estimates of elk abundance. However, links between weather covariates and recruitment and survival, coupled with a substantive overwinter mortality event, 2012-2013, suggest that reducing the elk density has not eliminated the risks of overwinter mortality, at least in the short-term. It is likely that plant community responses to lower elk herbivory are still evolving and benefits likely will take some time to be fully realized. We discuss the implications of both density-dependent and density-independent influences on elk demography and management in the Mount St. Helens elk herd. Our work did not address issues surrounding elk hoof disease, as these issues were beyond our research scope. The role of hoof disease in elk population processes at Mount St. Helens remains unclear, as does the degree that the condition's presence will complicate meeting management objectives.

INTRODUCTION

The Mount St. Helens elk herd is the largest of 10 formally recognized elk herds in Washington (Washington Department of Fish and Wildlife 2008). The herd occupies a large and diverse area of lowland and mid-elevation forest, interspersed with floodplains and valley bottoms in the southwestern part of the state. The herd name derives from the presence of the Mount St. Helens volcano, located near the center of the herd area. The volcanic eruption on May 18, 1980 devastated a large area occupied by elk, killing most elk in this impacted zone. Subsequently, as habitat recovery and restoration occurred, elk recolonized most of the area affected by the eruption (Merrill et al. 1987). This elk herd provides considerable elk-centered recreation, including elk hunting and wildlife-viewing. Because of the herd's history, because of the tourist appeal of the volcano, and because the herd area is bordered by developed corridors with sizable metropolitan populations, the Mount St. Helens elk herd is a high profile herd, featured often in local news media.

Over approximately the last 3 decades, elk habitat in areas affected by the 1980 eruption has evolved considerably, and the landscape carrying capacity for elk has been dynamic. Forage availability for elk appears to have peaked in the mid-to-late 1980s when early seral habitat was abundant and began to decline rapidly about the late 1990s as closed canopy forest conditions advanced. As habitat changed,

indications that the elk herd was becoming increasingly food-limited became evident. Among the most dramatic indicators of the change in elk habitat quality, was the appearance of substantial episodic winter mortality events that began in the late 1990s and widespread evidence of strong herbivory effects on plant communities used by elk. The winter mortality events were most apparent on the floodplain of the North Fork of the Toutle River, an area that remains substantially impacted by the 1980 volcanic lahar.

For elk management to be appropriately responsive to dynamics in the availability and quality of elk habitat requires: defensible information on elk abundance, a fundamental understanding of basic elk vital rates (*i.e*., mortality and productivity) and how these are affected by habitat dynamics, and how systematic changes in habitat structure and composition affect the spatial and temporal availability of elk habitat components, especially forage. Historically, surveys of elk at Mount St. Helens were focused on generating ratio data (calves:100 cows and bulls:100 cows) to monitor juvenile recruitment and bull harvest effects. Previous efforts to use these data to model elk abundance were largely unsuccessful (Miller and McCorquodale 2006). Data on Mount St. Helens elk vital rates are available from the recolonization phase dating to the 1980s (Merrill et al. 1987), but more recent estimates of elk vital rates were lacking as of the mid-2000s. In light of these data limitations, we undertook a study in 2009 to: *1) develop a practical approach to monitoring Mount St. Helens' elk abundance; 2) generate defensible estimates (or indices) of recent and current elk abundance; and 3) evaluate physical condition and vital rates of a representative sample of elk from the population*.

Our efforts focused on a subarea of the core herd range where habitat dynamics have been the most dramatic in the last 3 decades and where periodic overwinter elk mortality has been prevalent. Our work did not directly focus on documenting habitat conditions, forage availability, or herbivory because concurrent work by the Weyerhaeuser Company, researchers with the National Council for Air and Stream Improvement, and a graduate student at the University of Alberta were concurrently researching these issues.

STUDY AREA AND BACKGROUND

The Mount St. Helens elk herd area covers much of southwest Washington, east of Interstate 5 (Fig. 1), and during our work, consisted of 14 Game Management Units (GMUs) defining 5 Population Management Units (PMUs). This large area (≈ 4,710 mi^2) extends north to south from almost south Puget Sound to the Columbia River Gorge and west to east from I-5 to US Highway 97 (more than 40 miles east of the Cascade Crest). The scale of the defined herd area made it impractical to serve as a formal study area, so we selected a 5 GMU core area as our study area; the GMUs we selected were: Winston (GMU 520), Loowit (GMU 522), Margaret (GMU 524), Coweeman (GMU 550), and Toutle (GMU 556) (Fig. 1). These GMUs represent a large swath of the herd's core range, including an extensive area of industrial and state-

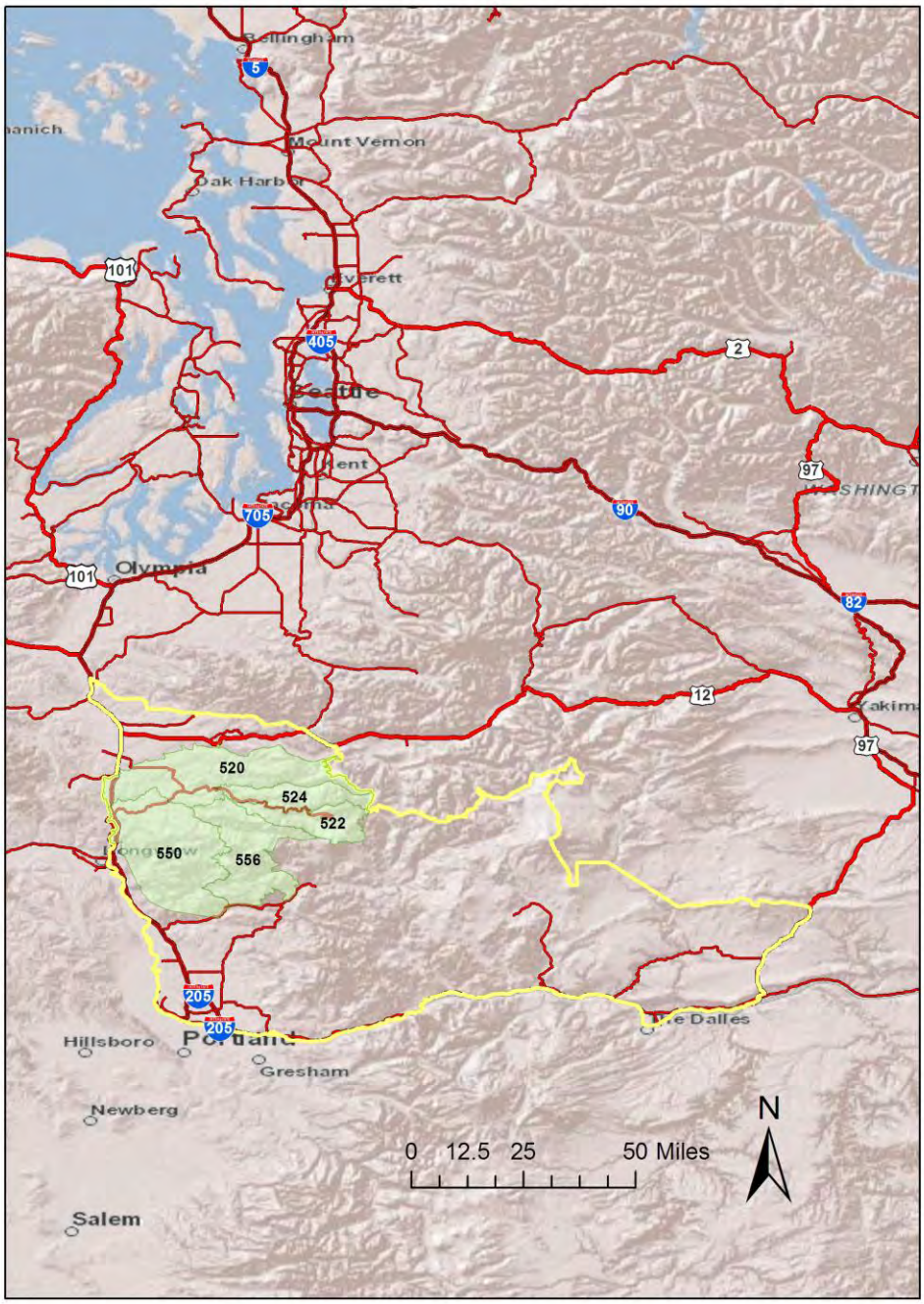

Figure 1. Map of the Mount St. Helens elk herd area (yellow outline) and the core study area (green shaded, with GMU numbers).

managed forest, as well as that part of the landscape still impacted by the 1980 eruption of the volcano (North Fork of the Toutle River and the Mount St. Helens National Volcanic Monument). This area has historically supported the highest elk density, much of the historic recreational elk hunting, and includes the area presenting the most complex management challenges (*e.g.*, hunter access, elk effects on industrial forestry and plant succession, and episodic winter elk mortality on the mudflow). The exception to this spatial extent for our work was for fall sampling of organs from hunter-killed elk (see Methods below); we solicited and analyzed organ samples from additional GMUs within the herd area boundary (*i.e.*, the Columbia Gorge and Cascade GMUs).

Physiographically, most of the herd area is within the Southern Washington Cascade Province, except for the western-most portion, which is within the Puget Trough Province (Franklin and Dyrness 1973). Elevations within the study area ranged from approximately 6 meters above mean sea level (AMSL) to 2,535 meters AMSL at the crest of the volcano. The western portion of the study area consisted of relatively flat and gently rolling terrain, whereas steep, rugged topography characterized the eastern portion. Historically, the area was covered by dense coniferous forests, but urban, suburban, and agricultural development has converted much of the lowland area into a relatively open landscape. Most of the upland foothills and mountainous terrain remain dominated by coniferous forest, much of it managed for commercial timber products. Three major forest zones occur in the study area: the western hemlock (*Tsuga heterophylla*), Pacific silver fir (*Abies amabilis*), and mountain hemlock (*Tsuga mertensiana*) zones (Franklin and Dyrness 1973). Douglas-fir (*Pseudotsuga menziesii*) is a naturally occurring co-dominant tree in the western hemlock zone, and is typically promoted in second growth forests because of the high commercial value of this fast-growing conifer. Timber harvest on industrial lands and some state lands has historically been by clearcutting. Forest management has produced a distinctive and extensive mosaic of recent clearcuts and second growth stands of various ages.

The Mount St. Helens elk herd area was dramatically transformed by the May 18, 1980 volcanic eruption that impacted 600 km^2 of the area north, northeast, and northwest of the crater. The eruption killed an extensive area of conifer forest and

resulted in extensive (c. 4 billion board feet) blow-down (Frenzen and Crisafulli 1990, Franklin et al. 1995). Ash, debris, and/or mudflow covered much of the blast zone initially, but vegetative recovery in less-impacted areas proceeded rapidly. However, natural recovery has been slow and incomplete in areas nearest the crater and along the North Fork of the Toutle River (Wood and Del Moral 1988, Del Moral and Wood 1988, Del Moral and Wood 1993, Del Moral 1998, Lawrence and Ripple 2000). The principal industrial forest landowner, Weyerhaeuser, was substantially impacted by the eruption due to widespread loss of high value timber. Subsequently, the company invested extensively in salvage logging and reforestation to restore its lands to production.

In the nearly 30 years between the eruption in 1980 and the beginning of our study in 2009, much of the impacted landscape has returned to the typical appearance of a western Washington managed forest landscape, with little evidence of the 1980 cataclysm. Much of this recovery was promoted by active forest management (Franklin et al. 1995). However, dramatic evidence of the eruption is still visible on the highly erosive North Fork of the Toutle River, where a large matrix of rock, gravel, and ash covers much of the floodplain, with patchy “islands” of meadow-like prairie and stands of pioneering red alder (*Alnus rubra*) interspersed. The headwaters of the North Fork, the pumice plain, and the flanks of the crater have remained largely untouched by post-eruption management and still bear evidence of the devastation that occurred in 1980. This area has been allowed to recover under natural processes, and in 1982, 445 km^2 were federally designated as the Mount St. Helens National Volcanic Monument, which is administered by the U. S. Forest Service. Some limited recreation occurs within the monument, but the natural character of the area is emphasized and protected as a management priority.

The climate of the study area is Pacific maritime, with cool, wet winters and relatively dry summers. Annual precipitation has typically ranged 160-400 cm (63-157 inches) in recent decades, with most of the annual precipitation falling between October and April. Winter snowfall is common, varies considerably across years, and at higher elevations persists for much of the winter (Fig. 2). During and just previous to our study,

cumulative daily snow depth at the Spirit Lake SNOTEL site (1,067 meters; USDA Natural Resources Conservation Service) was greatest for December 2007 and December 2012, intermediate in December 2008 and 2010, and lowest in December 2009 and December 2011 (Fig. 3). By March, cumulative daily snow depth was greatest in 2008, intermediate in 2009, 2011, 2012, and 2013, and lowest in 2010. Winter 2009-2010 was very snow-free compared to the other winters at the Spirit Lake site (Fig. 3). At a lower elevation (648 m) SNOTEL site (Pepper Creek) just south of the study area, cumulative daily snow depth in December was greatest in December 2007 and 2008, intermediate in December 2010 and 2012, and lowest in December 2009 and 2011 (Fig. 3). By March, cumulative daily snow depth at this lower site was greatest in 2008, slightly lower in 2009, intermediate in 2011, 2012, and 2013, and lowest in 2010 (Fig. 3). At the Pepper Creek SNOTEL site, the winter of 2009-2010 had little accumulated snow, whereas the winter of 2007-2008 was severe relative to snowfall.

Figure 2. Winter snowfall was common in the study area and often persisted for several months in the higher elevation portions of the elk range each year.

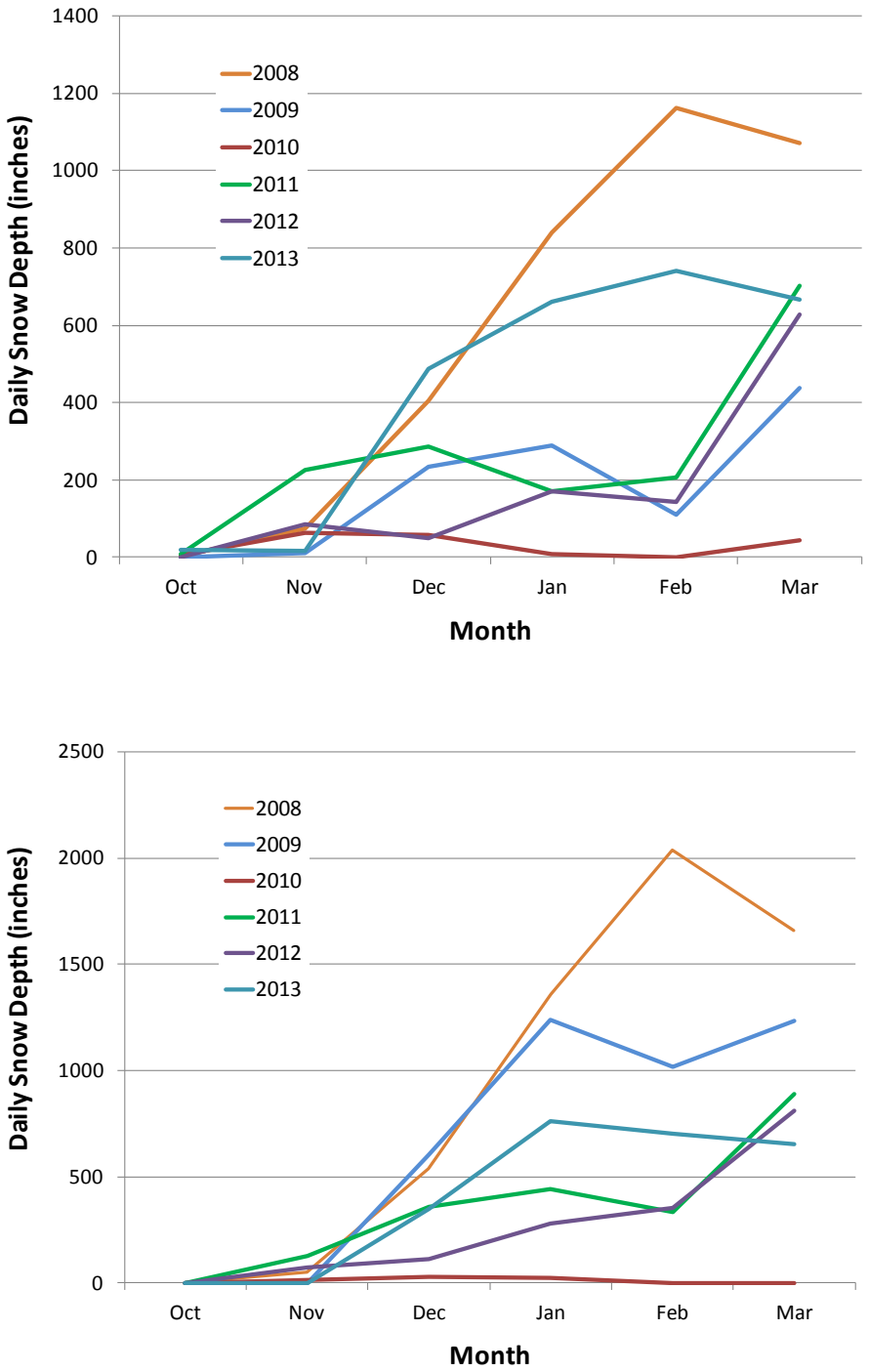

Figure 3. Cumulative daily snow depth (by month) for water years 2008-2013, from the Spirit Lake (upper panel; elevation = 1,067 m) and Pepper Creek (lower panel; elevation = 648 m) SNOTEL sites. A water year spans October 1 – September 30, and is labeled by the calendar year in which it ends.

Spring/summer/early fall precipitation, measured at the Spirit Lake SNOTEL site, was greatest in 2010 and 2012, lowest in 2007 (just prior to our study), and intermediate in all other years (Fig. 4). Early fall precipitation occurred in most years, but was largely absent in 2012 and minimal in 2011 (Fig. 4). Not only was 2010 the wettest summer, it was also the wettest fall, evidenced by the slope of the late August to mid-September cumulative precipitation line (Fig. 4).

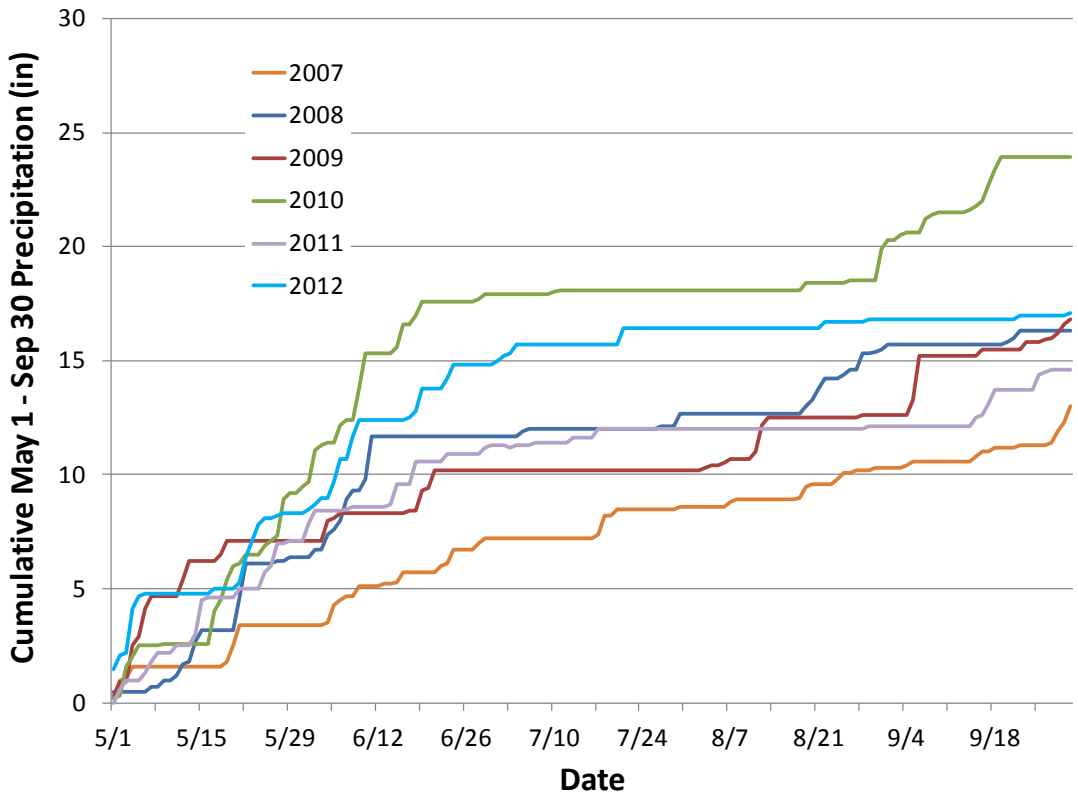

Figure 4. Cumulative spring-summer precipitation measured at the Spirit Lake SNOTEL site (elevation = 1,067 m), 2007-2012.

Land ownership in the Mount St. Helens elk herd area is relatively evenly split between public and private ownership (Miller and McCorquodale 2006). Much of the forested eastern portion of the area is federally managed as part of the Gifford Pinchot National Forest and includes several formally designated wilderness areas. WDFW and

the Washington Department of Natural Resources (WDNR) also own and manage lands within the herd area. Large tracts of industrial forest dominate the western portion of the herd area occupied by elk; the Weyerhaeuser Company manages the largest area of corporate forest. The developed portions of the landscape (*e.g.*, valley floodplains, populated corridors along Interstate 5 and the Columbia Gorge, agricultural lands) are also in private ownership. Our core study area mostly encompassed corporate forest land, but included small tracts of WDFW and WDNR lands, as well as very small parcels of other private land. The only federal land within our core study area was the Mount St. Helens National Volcanic Monument tract.

Elk Habitat

Prior to the 1980 eruption, elk habitat in the western half of the Mount St. Helens elk herd area was typical of western Washington elk habitat. Early seral habitat, preferred by foraging elk, was maintained principally by clearcut logging on private, state, and federal forests (Witmer et al. 1985). Forest management created a diverse mosaic of stand ages that served to maintain quality elk habitat at both small and large scales throughout this region (Starkey et al. 1982, Witmer et al. 1985, Jenkins and Starkey 1996). Simulation modeling suggested forage availability for elk likely peaked in the 1960s region-wide and declined through the 1970s and 1980s based on forest harvest patterns (Jenkins and Starkey 1996), but forage availability for elk at the end of this time series was still likely higher than it had been in the first half of the 20th century.

The volcanic eruption altered the habitat mosaic for elk by killing vegetation in virtually all stands, regardless of age, and across habitats in about 600 km^2 of southwest Washington (Fig. 5). As previously described, in the 30 years between the eruption and the beginning of our study, the managed forest mosaic was largely recreated on the landscape (Fig. 5), albeit with a truncated distribution of stand ages in the original blast zone.

The regional dynamics of elk habitat values have also been strongly affected by forest management policy across ownerships in recent decades. An emphasis on conservation of older forest conditions on federal lands led to a dramatic decline in timber harvesting about 1991 on national forests in western Washington and Oregon,

with a resultant decline in the availability of early seral stands important to elk on federal forests (Hett et al. 1978, Salwasser et al. 1993, Adams and Latta 2007). Since that time, the creation and maintenance of early seral elk habitat at larger scales has been largely limited to privately owned forests of the region (Adams and Latta 2007) (Fig. 6).

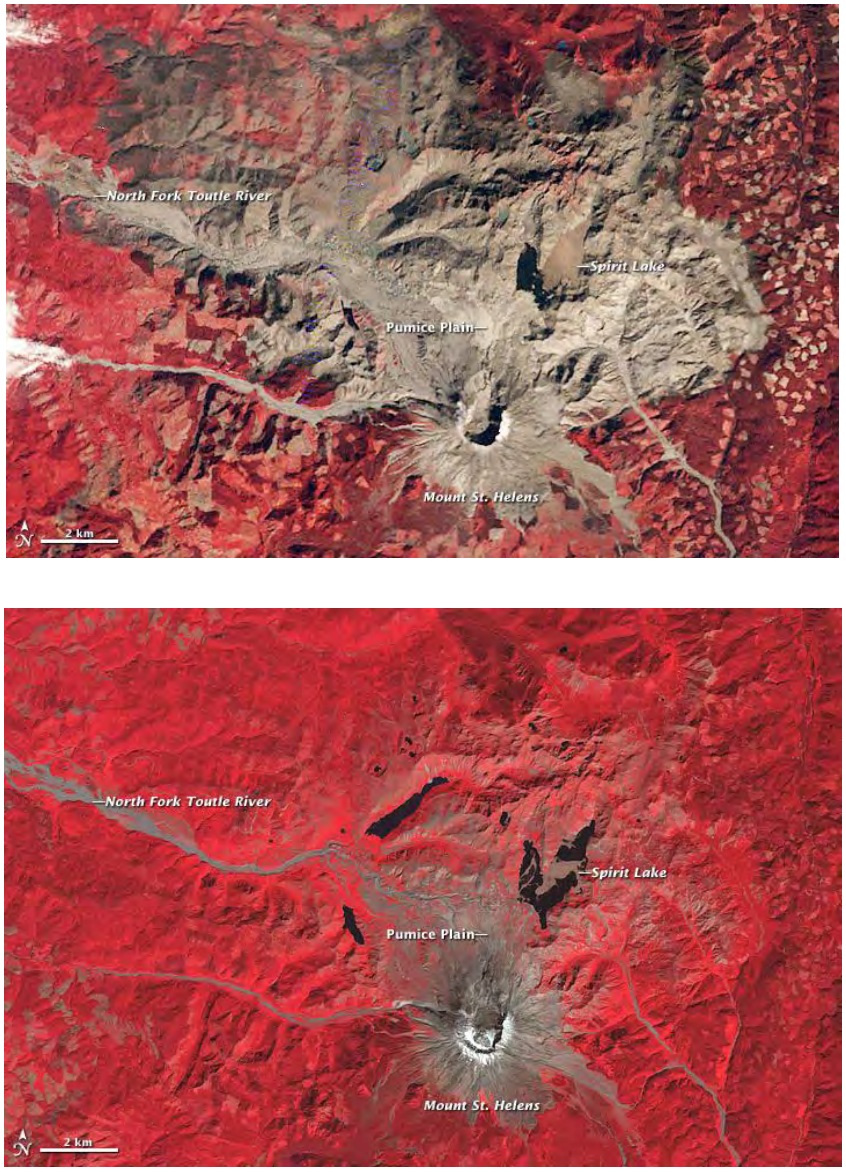

Figure 5. Infrared satellite images of the Mount St. Helens vicinity early post-eruption (top image, 1980), and nearly 30 years post-eruption (bottom image, 2009). In these images, vegetated areas (*e.g.*, forest, grassland, vegetated clearcuts) are red/pink, and bare ground, ash, mudflow, etc. are gray/brown (images courtesy of NASA's Earth Observatory Program).

Figure 6. Typical corporately managed elk habitat mosaic within the core study area (GMU 550 [left] and GMU 556 [right]).

Overwinter Elk Mortality

Since the spring of 1999, the Washington Department of Fish and Wildlife has conducted a winter elk mortality survey on about 4 km^2 of the floodplain of the North Fork of the Toutle River where substantial overwinter mortality has been periodically observed. This survey is conducted about late April each year and consists of a team of approximately 30-40 WDFW staff and volunteers walking transects through the entire sampling area, which consists mostly of the WDFW-owned Mount St. Helens Wildlife Area. The survey is used to provide an *index* of annual overwinter elk mortality, not an *estimate* of total overwinter mortality, given the limited spatial extent of the survey. During the survey, elk mortalities observed are examined for approximate death timing (recent [days old] vs. older [weeks to months old]), a femur is sectioned to document bone marrow condition (white and firm, red and runny, or desiccated), and GPS coordinates are taken to geospatially reference the site. The cumulative GPS dataset, as well as the presence or absence of cut femurs, is used to discriminate current year mortalities from those dating to a previous year.

The numbers of winterkilled elk observed during the annual transect survey has varied considerably across years (0-158) (Fig. 7). The highest count (*n* = 158) occurred at the end of the winter prior to our study (April 2008). During our study, winterkilled elk were detected each year; very few mortalities (*n* = 2) were tallied in spring 2010, but numerous dead elk were detected in most other years. In 2013, the 71 winterkilled elk detected was the third highest count observed since the surveys began in 1999.

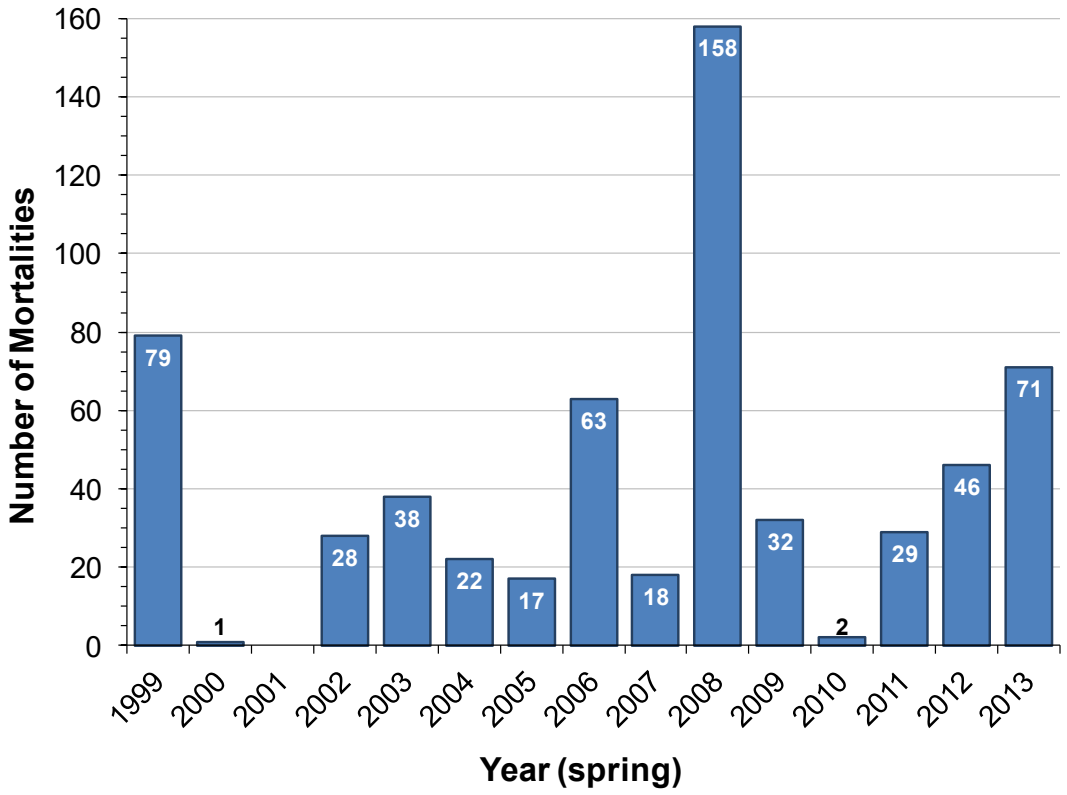

Figure 7. Number of current year overwinter elk mortalities tallied during the annual mortality survey on the Mount St. Helens Wildlife Area, April 1999-2013.

Elk Population Management

The management history for the Mount St. Helens elk herd has been documented in detail in the Mount St. Helens Elk Herd Plan (Miller and McCorquodale 2006), including season structures, season lengths, and hunter participation levels, by GMU, in recent decades. As is typical in elk management, most recreational hunting opportunity has historically been supported by bull elk general seasons in the Mount St. Helens elk herd area. A variety of season structures have been used to manage the general bull harvest, including any bull seasons, spike-only seasons, and ≥ 3-point seasons, across years and across GMUs. To support a diversity of hunting experiences, some GMUs in the Mount St. Helens herd area have been periodically designated as permit-only elk units with no general season elk hunting.

During our study, general bull seasons (≥ 3-point) were in place in GMUs 520 and 550. Permit only seasons governed bull elk hunting in GMUs 522, 524, and 556. Also during our study, all antlerless elk hunting was by permit only seasons across our study area GMUs, except that general antlerless elk seasons for archery hunters existed in GMUs 520 and 550. Density manipulation in elk populations is typically accomplished by varying the numbers of antlerless elk permits to achieve a desired cow elk harvest. During the period from the post-eruption, elk recolonization through the mid-2000s, antlerless elk hunting in the core GMUs of the Mount St. Helens herd was managed fairly conservatively to promote population stability and/or growth, outside of areas where elk damage issues existed. In response to the overwinter elk mortality issue, however, antlerless elk permits were liberalized in 2007, and even further liberalized in 2011 (Fig. 8), to reduce the local elk density and bring it into better balance with available habitat in the herd's core GMUs (Miller and McCorquodale 2006). The liberalization of antlerless elk permitting, 2007-2012, yielded the intended increase in antlerless elk harvest (Fig. 9). Qualitatively, the elk antlerless harvest, 2004-2012, has the same step-like appearance as the antlerless elk permit levels did during the same timeframe (Figs. 8, 9), with increased harvest of antlerless elk occurring each time permit levels increased.

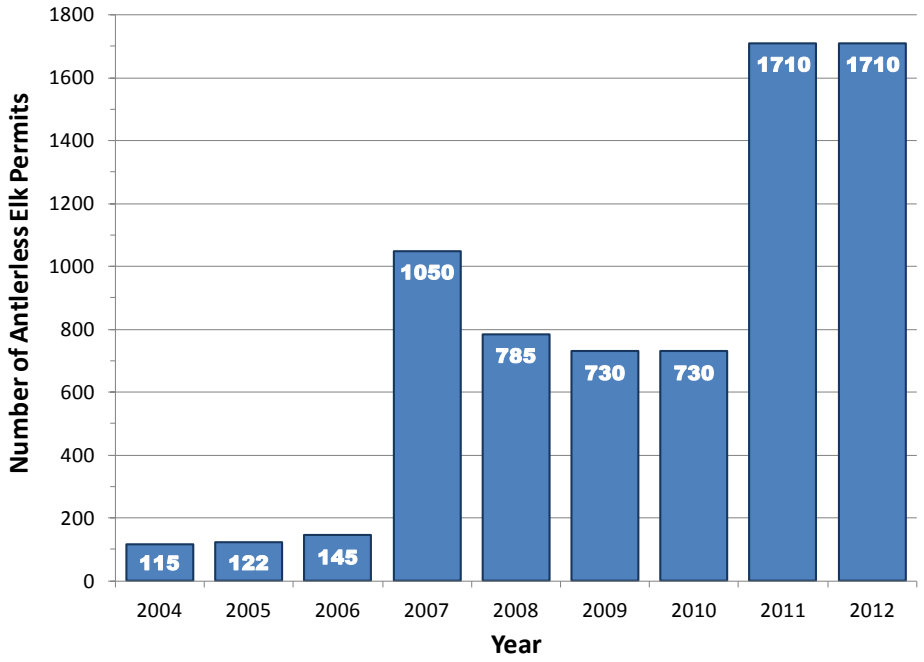

Figure 8. Numbers of antlerless elk permits issued, 2004-2012, for GMUs 520, 522, 524, 550, and 556, collectively.

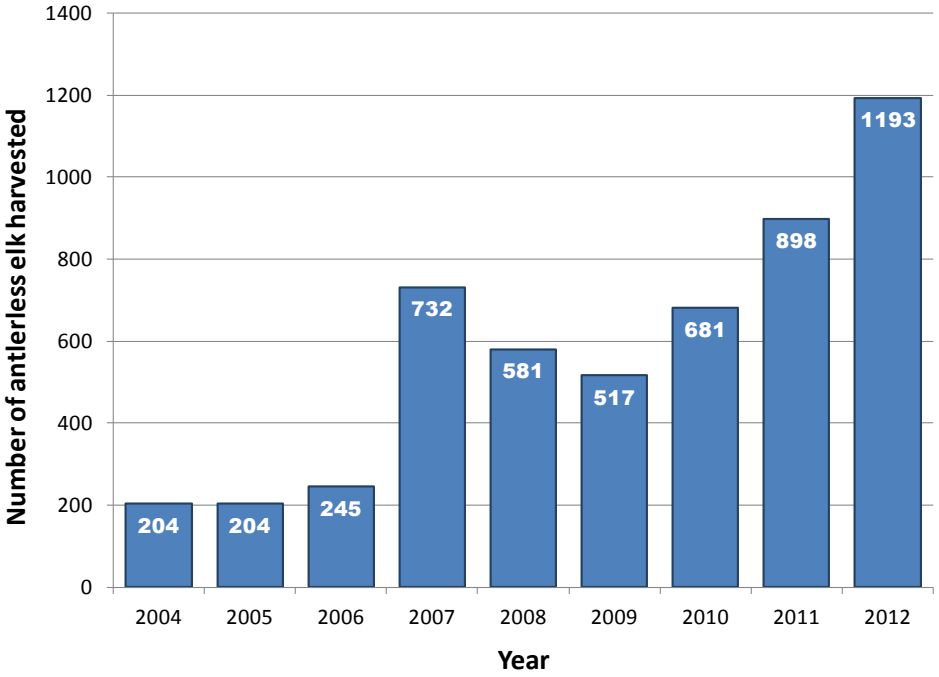

Figure 9. Numbers of antlerless elk killed, 2004-2012, in GMUs 520, 522, 524, 550, and 556, collectively.

METHODS

Marking and Handling

We captured adult and yearling cow elk and branch-antlered bull elk by darting them with a carfentanil citrate / xylazine hydrochloride mixture from a Bell 206 Jet Ranger helicopter. Captures occurred in February each year, 2009-2012. We ear-tagged elk we captured with colored and numbered plastic livestock tags. We fit most elk with 148-150 MHz, Very High Frequency (VHF) radiocollars (Telonics [Mesa, Arizona, USA]), but some received GPS-equipped radiocollars (Telonics or Lotek [Newmarket, Ontario, Canada]). All radiocollars had motion detectors that served as mortality beacons. We extracted a single vestigial upper canine from each elk to estimate age via cementum annuli analysis (Matson's Lab, Milltown, MT, USA), and we gave each elk a short-acting, prophylactic injection of penicillin, banamine, and an anti-clostridial to reduce risks of post-capture complications, such as dart wound infections. We also measured each elk's chest girth with a flexible tape measure to later estimate body mass. After handling, we reawakened immobilized elk via injections of the narcotic reversal, naltrexone hydrochloride and the xylazine reversal, yohimbine

hydrochloride. After we administered reversal drugs, elk were generally alert and ambulatory within 1-7 minutes.

Body Condition and Reproduction

We estimated late winter (mid-February) ingesta-free body fat (IFBF) percentage from data we collected for adult cow elk during each capture event. We collected data and generated IFBF estimates following Cook et al. (2010). The basic data were: 1) body mass (kg; estimated via chest girth), 2) maximum subcutaneous rump fat depth (cm; measured using a portable ultrasound unit), and 3) a palpated body condition score (BCS = 0-5) measured at the rump (*i.e.*, prominence of sacral ridge and prominence of the sacro-sciatic ligament) (Cook et al. 2010). We also determined pregnancy status for each captured cow elk via ultrasound and visually examined and palpated each elk's udder to verify their lactation status: non-lactater (dry), true lactater (milk), or post-lactater (clear fluid).

We also quantified yearling and adult cow elk body condition during fall, 2009-2011, using modified Kistner subset scoring (Kistner et al. 1980, Cook et al. 2001*b*) applied to internal organs collected from hunter-killed elk. We visually scored (*i.e.*, 1-20) the extent of organ fat deposition associated with the heart, pericardium, and kidneys (Fig. 10) using standardized reference photos and calculated an estimated IFBF for each sampled cow elk using the equations of Cook et al. (2001*b*). We solicited these organs from antlerless-elk permit holders each year via mail requests and field contacts; hunters were asked to deposit organ samples at several collection stations we established each fall across our study area. Hunters were also asked to submit 2 middle incisors from their harvested elk for age determination via cementum annuli examination (Matson's Lab, Milltown, MT); they were also asked to report observed lactation status (*i.e.*, udder was dry, had milk, or had clear fluid). Organ samples were frozen promptly after field retrieval for subsequent scoring each winter at the Cowlitz Wildlife Area Headquarters. Scoring was done each year on a single day using a team-scoring approach to maximize scoring consistency within and across years.

Figure 10. Elk organs from hunter-harvested cow elk used to estimate fall body fat (%IFBF) for Mount St. Helens elk, 2009-2011 (left to right: pericardium, heart, kidneys).

Sightability-Correction Modeling

We developed and evaluated sightability correction models for late winter-early spring helicopter surveys in our 5-GMU core study area by collecting data from sighted and unsighted groups of radiomarked elk, Mar-Apr 2009-2011. We initially delineated 19 sampling units that were 16.8-62.7 (mean = 31.0) km^2 (Fig. 11). We selected sampling unit sizes such that a unit could generally be flown without having to refuel the helicopter, except for the mudflow unit (GMU 522). Two units never contained a radiomarked elk and also yielded very few unmarked elk observations, so we rarely flew these units because of a low benefit-to-cost ratio. For all other units, we flew each twice per winter during weeklong survey periods that were separated by 1-2 weeks, providing spatial and temporal replication.

We verified the distribution of radiomarked elk among our sampling units prior to a survey by flying just off the perimeter of each unit with the telemetry-equipped survey helicopter, being careful to not gain specific information about the location of elk within the units. Crews conducted initial visual surveys and telemetry-assisted follow-up in each sampling unit from a *Bell 206 Jet Ranger* helicopter. The crew of the survey helicopter generally had information on the distribution of radiomarked elk among counting units, but did not know the exact locations of these elk. We flew adjacent units consecutively where movement of elk across sampling unit boundaries was anticipated, based on previous telemetry data. The helicopter crew consisted of the pilot and 3

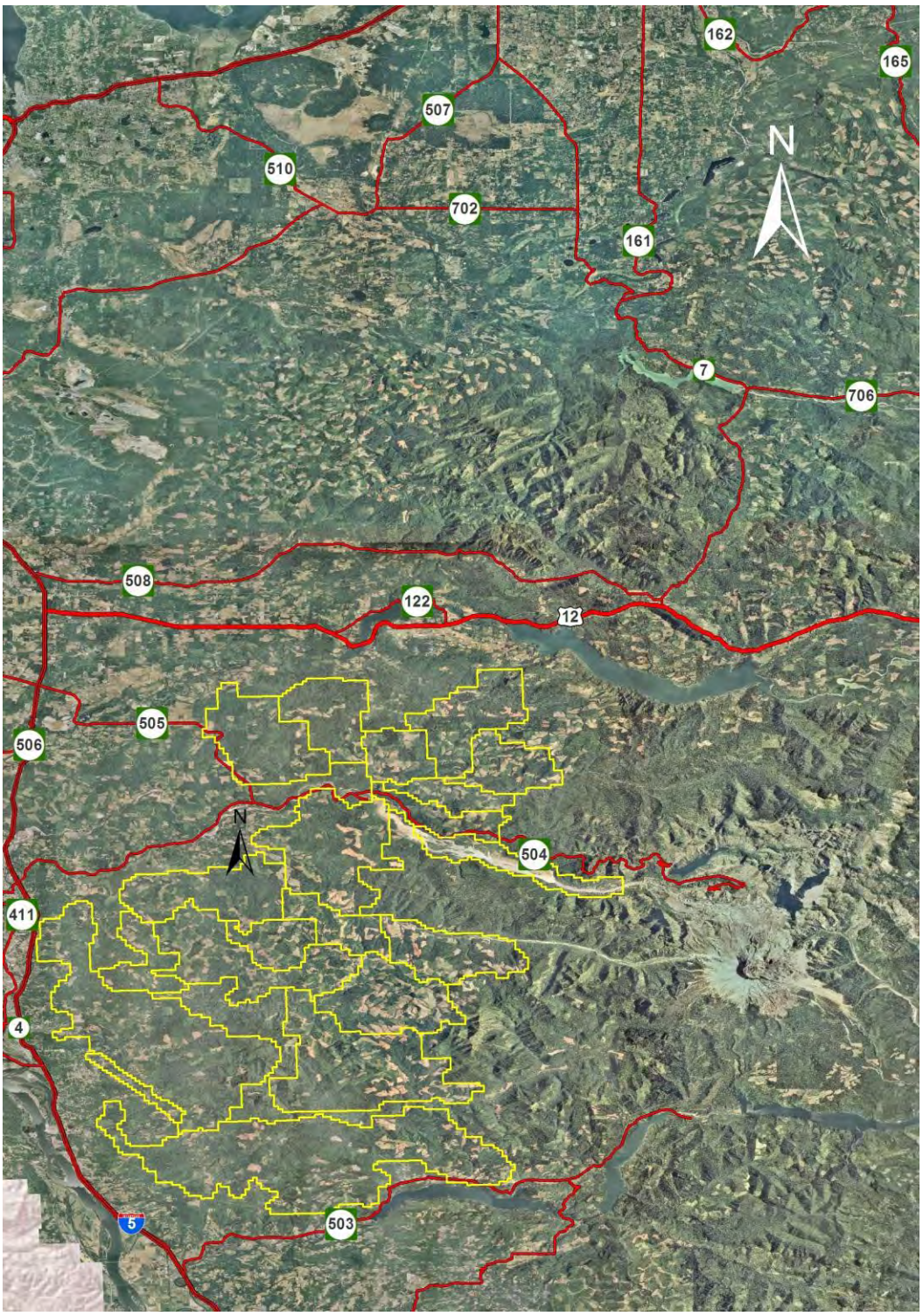

Figure 11. Initial delineation of counting units used for spring helicopter surveys and sightability modeling, 2009-2013, Mount St. Helens elk herd study area.

observers. The primary observer sat abreast the pilot and also recorded data; the 2 additional observers sat abreast, in the back seat of the aircraft. One backseat observer assisted in navigation and maintaining flight line protocols by following a GPS track log on a laptop computer. The helicopter was equipped with a single, forward-looking VHF telemetry antenna and a receiver that allowed radiomarked elk to be relocated and/or identified when needed during the data collection flights, as described below.

We conducted visual surveys of the counting units initially with the helicopter's telemetry system inactivated. We surveyed the counting units at an altitude of 40-70 m above-ground-level (AGL), flying at 80-120 km/hr. Because of the extensive size of the defined survey area, it was impractical to systematically survey the entire area with evenly spaced flight transects, as is typical for sightability surveys (Samuel et al. 1987, McCorquodale et al. 2013). Because a substantial part of the survey area was typified by habitat with predictably low elk sightability (*e.g.*, high canopy closure regeneration stands and older conifer forest), our approach focused on flying a high proportion of the landscape where elk detection probabilities would be expected to be modest to high (*e.g.*, clearcuts, young regeneration stands, leafless alder stands). In this way, we maximized efficiency by flying where we had some real chance of seeing elk and avoiding areas where sighting elk was very unlikely. This strategy was based on a fundamental goal of maximizing our ability to count as many elk as possible in the survey area, within the constraints of available time and financial resources.

The helicopter crew scanned for elk groups out of both sides of the helicopter. When a crewmember sighted an elk group, the pilot deviated from the flight line and circled the group while the crew collected the following covariate data: group size (GRP), activity of the first elk sighted (ACT: bedded, standing, or moving), percent canopy closure characterizing the area immediately around the group (CAN), percent snow cover (SNOW), cover type (COV) as a categorical variable (opening, clearcut, regenerating conifer stand, alder, conifer forest, or mixed hardwood/conifer forest), and lighting (LIGHT: flat vs. bright). The crew had graphical depictions of various canopy

closure settings available for reference. We recorded CAN and SNOW as quantitative covariates, in increments of 5%. We also recorded GPS waypoints for all elk groups.

Crews also scrutinized sighted groups for the presence of radiomarked elk (Fig. 12) and recorded the composition of the groups (*i.e.*, the numbers of adult cows, calves, yearling bulls, subadult bulls [raghorns = 2-3 yr-olds], and mature bulls [robust antlers ≥4 yr-olds]). If radiomarked elk were sighted in a group, the telemetry system was activated, and the crew identified all radiomarked elk present. We took digital photos of larger groups (≥ 30 elk) and later verified group size and composition from these photos. After we collected data for each sighted group, we deactivated the telemetry system if it had been used to identify collared elk, the pilot repositioned the helicopter back onto the original flight line, and we resumed the survey protocol.

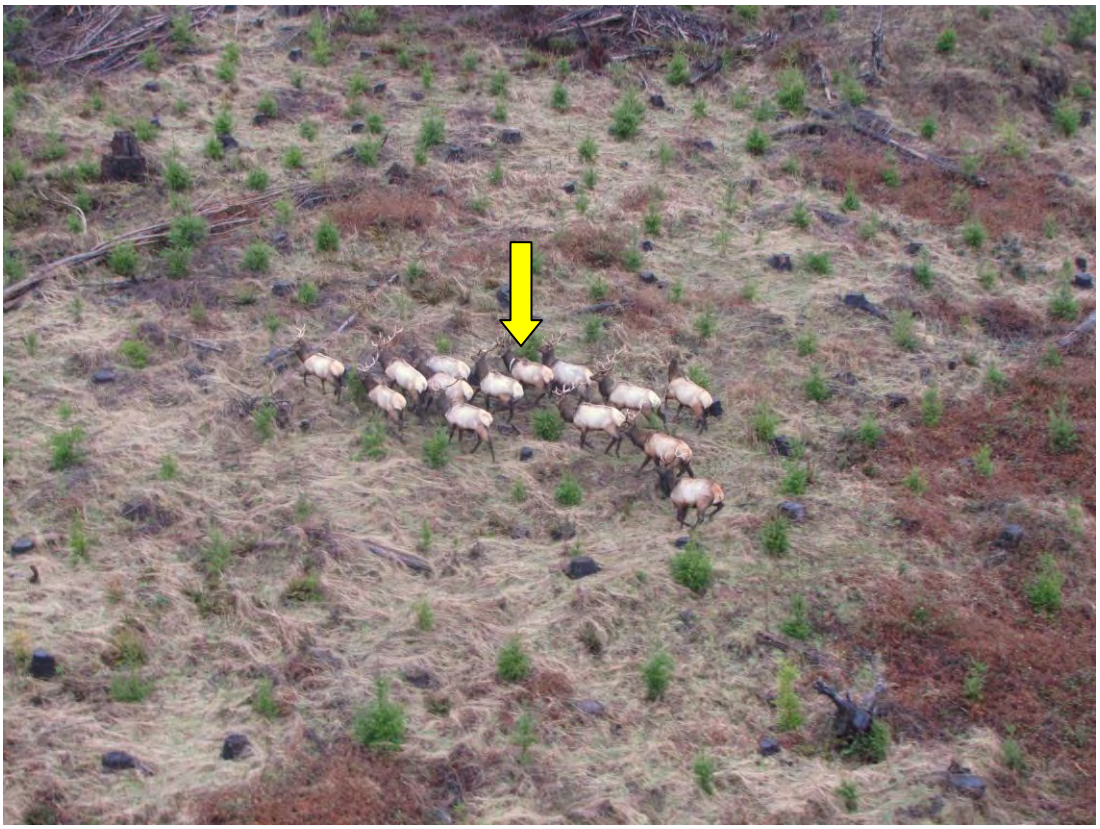

Figure 12. Bull elk group sighted during one of the helicopter surveys; yellow arrow indicates position of a radiomarked bull in the group.

When we had finished surveying a counting unit and had collected data for all sighted groups, we reactivated the telemetry system aboard the helicopter to facilitate locating elk groups containing radiomarked elk that we had missed during the visual survey. We located all missed radiomarked elk precisely via telemetry and collected the same data for these groups that we had collected for sighted groups. When these missed groups were located in heavy cover, the pilot homed to the radio signal and maneuvered the aircraft in low concentric circles over the radiomarked elk's location while the crew carefully watched for elk movement. Often, the pilot was able to haze these groups into sparser cover where the crew could enumerate and classify them. Sometimes, groups in the heaviest cover could not be completely counted or estimated with confidence, and these instances resulted in *missing data* for the GRP covariate. We also recorded GPS waypoints for all groups that had been missed, but were subsequently located via telemetry.

We modeled the sighting process as a binary response (*i.e.*, 1 = sighted group, 0 = missed group) using logistic regression (Hosmer and Lemeshow 1989), employing group and environmental covariates as potential predictor variables. Modeling was based only on radiomarked groups (*i.e.*, we recorded data from sighted groups that did not contain radiomarked elk, but did not use those data to model sightability). For groups that had missing values for the GRP covariate, we substituted the median group size from all groups we had confidently counted, but limited the data to groups missed in forested habitats (elk groups on the mudflow tended to be larger than groups observed in forested uplands). We also evaluated a transformed GRP covariate (LG2GRP = $\log_2$[GRP]) because we thought it was more reasonable for the effect (*i.e.*, odds ratio) of group size to be constant as group size doubled rather than as it increased by 1 elk across an array of group sizes. For modeling sightability, we also derived a covariate reflecting the dominant gender of the group (SEX). We initially used univariate logistic regression (*i.e.*, models with only an intercept and a single predictor variable) to identify which predictors were systematically related to the sighting trial outcome (sighted vs. missed). We also tested for collinearity among predictors. We then brought forward those predictor variables that were related to sightability and

conceptualized several alternative models of varying complexity reflecting logical combinations of covariates potentially affecting the sightability of elk groups during helicopter surveys. Where collinearity existed among covariates, we selected one covariate for inclusion in the multivariable models. We used Akaike's Information Criterion, adjusted for small samples (AIC_c) to assess model support and used model averaging to derive final coefficient estimates and their unconditional standard errors (Burnham and Anderson 2002).

In the spring of 2012 and again in 2013 we flew our surveys as we had done during 2009-2011, except that we ceased to relocate missed radiomarked elk, and we flew only 1 survey session in 2013; therefore, we did not use data from sighted groups in 2012 and 2013 as sightability modeling data because it was inappropriate to include data that could only come from sighted groups. We subsequently used the data collected for sighted groups only for all years, 2009-2013, to generate estimates of population size using the best-supported sightability model. These data included the data used to develop the sightability model (*i.e.*, 2009-2011) and non-model-building data (*i.e.*, 2012-2013). We derived abundance estimates and their 95% confidence intervals using the R (R Core Development Team 2008) package *Sightability Model*, following Fieberg (2012). We generated estimates of total elk abundance from each survey replicate, as well as separate estimates for adult cow abundance. We generated these estimates for both the full 5-GMU landscape and for each of the 5 GMUs separately. To estimate abundance, we used only data from the survey units we flew on every survey replicate (*i.e.*, we omitted data from the 2 units described above that were flown only occasionally).

Mark-Resight

Among available mark-resight estimators that are robust to heterogeneity of resighting probabilities across individuals within resighting occasions, we chose the maximum-likelihood based *logit-normal mixed effects* (LNME) model (McClintock et al. 2008). The likelihood for the LNME model formally estimated population size (N_j); it also generated MLEs for detection probability (p_{ij}) and the variance (σ_j^2) of a random

individual heterogeneity effect, where the subscript *j* refers to primary occasions (year) and *i* to secondary occasions (survey) within a primary occasion (McClintock et al. 2008). In the absence of individual heterogeneity, the parameter p_{ij} is interpreted as the overall mean detection probability, but when heterogeneity > 0, overall mean detection probability is estimated under the LNME model as the derived parameter μ (McClintock 2008), which we report. The parameter μ is derived as a function of p_{ij}, σ_j^2, and ε_{ij} (number of marked animal encounters, where identity was not determined).

We implemented the LNME model in Program MARK (White and Burnham 1999), which allowed us to compare alternative model parameterizations that embodied hypotheses about sources of variability affecting LNME abundance estimates (McCorquodale et al. 2013). We coded 3 separate encounter history datasets for the LNME analysis: the first dataset was coded with a single marked animal group (*i.e.*, marked cows and bulls were pooled), the second dataset was coded such that marked cows and marked branch-antlered bulls were different groups, and the third dataset was coded with 7 groups: cow elk according to which of the 5 GMUs they occupied and bull elk relative to whether they occupied the mudflow or forested upland units. The single marked group dataset facilitated estimating total elk abundance, the 2-group dataset supported formal estimates of the subpopulations of the total number of adult cows and total number of branch-antlered bulls, and the 7-group dataset supported estimating GMU-specific abundance of cow elk and setting-specific abundance of branch-antlered bulls (mudflow vs. managed forest).

We developed a candidate model set for each analysis that consisted of 11 models for the 1-group dataset, 10 models for the 2-group dataset, and 15 models for the 7-group dataset. Alternative model parameterizations reflected different model constraints on detection probabilities and individual heterogeneity effects. Our models included possible temporal effects that we believed might be logically related to our survey results. For the recapture (resighting) probability (p_i), we contemplated models with no temporal variation (.), models wherein the first and second survey sessions across years were represented by a unique recapture probabilities, and models where we assumed various year-specific effects on recapture probabilities. These temporal

effects models were based on potential influences of winter severity on detectability and on our experiences that generally suggested that detectability of elk was better the later into the spring that we flew. We used Akaike's Information Criterion, adjusted for small samples (AIC_c) and Akaike model weights (w_i) to make inference about the best supported models among our candidate models (Burnham and Anderson 2002), and we averaged across models to derive final abundance estimates.

The data collection described in the methodology for sightability-correction modeling (above) provided the essential data for our mark-resight analyses. The necessary data elements included the enumeration and sex/age classification of all elk within groups encountered during the visual portion of the experimental helicopter surveys and an accounting of the distribution of radiomarked elk among these groups (including identity of radiomarked elk). Our mark-resight analyses were based on 2 replicated surveys of the core study area each winter.

We compared sightability model estimates to LNME mark-resight estimates by estimating Pearson's product-moment correlation coefficient using GMU-specific annual abundance estimates from both approaches for adult cows.

Recruitment and Population Growth Rate

We assessed annual calf recruitment at the approximate end-of-winter by estimating the ratio of calves to 100 cows, a standard metric for juvenile recruitment. At the study area and GMU scales, we estimated the annual ratios and associated confidence intervals for years with 2 replicate surveys following Skalski et al. (2005) for sampling with replacement and following Skalski et al. (2005) for 2013 data (1 survey) for sampling without replacement. Fall antlerless elk harvest will affect calf:cow ratios estimated the following spring because animals have potentially been removed from both the numerator (calves) and denominator (cows). This is expected to be particularly problematic under liberal antlerless harvest, as was occurring during our study. Typically, most antlerless elk harvest consists of yearling and older cows (WDFW, unpublished data), and under this scenario, spring calf:cow ratios would tend towards overestimation, relative to the actual ratios that would be observed in the absence of harvest. We attempted to adjust our spring calf:cow ratios to account for this using

estimated annual antlerless elk harvest and estimates of the ratio of calves to older elk in the harvest from hunter survey data. We consider the subsequent adjusted ratios as indices of spring calf:cow ratios rather than as formal estimates given compounded sampling error from each component (*i.e.*, observed ratio, estimated harvest, estimated age-class distribution in the harvest).

We estimated the exponential population growth rate (r) as the slope of a weighted regression of the natural log transformed population estimates over years for both sightability model and LNME abundance estimates. We used the delta method (Casella and Berger 2002) to obtain the variance-covariance matrix of $\ln(N)$ from the variance-covariance matrix of (N). For LNME estimates, we obtained the variance-covariance matrix of abundance estimates from Program MARK (White and Burnham 1999). For the sightability model, because we obtained each estimate from independent data, all covariance terms were 0. We used function glm() in R (R Core Development Team 2008) to fit the weighted regression and used the inverse of the variance-covariance matrix of $\ln(N)$ as the weight-matrix. We constructed confidence intervals for r using the standard error for the slope from the weighted regression, assuming asymptotic normality.

Survival

We estimated annual survival rates for radiomarked elk during 2009-2010, 2010-2011, 2011-2012, and 2012-2013 (*i.e.*, 4 survival years) using maximum-likelihood methods by invoking known fate models in Program MARK (White and Burnham 1999). For this analysis we coded encounter history data using 6 groupings: 5 GMU-specific groups for adult cows and a single pooled branch-antlered bull group. We estimated annual survival for a survival year defined as May 1-Apr 30 and estimated confidence intervals for annual survival using profile likelihoods. By using 15 alternative model parameterizations, we tested several hypotheses about Mount St. Helens elk survival during 2009-2012. Models varied in complexity from a simple 2 parameter model (survival differed only by sex, with no temporal or spatial variation) to a 24 parameter model (survival differed across groups and years). We compared models using

Akaike's Information Criterion, adjusted for small sample sizes (AIC_c) (Burnham and Anderson 2002).

We attempted to account for radiomarked elk mortalities by cause. Outside of the winter-spring season, when we conducted most of our annual population assessment fieldwork, our monitoring of radiomarked elk was infrequent, so sometimes we could not assign a definitive cause of death. We were, however, confident that we could reasonably discriminate most natural mortalities from hunting-related mortalities, based on timing of death, evidence at carcasses we located, or other corroborating evidence (*e.g.*, a cleanly cut collar with no carcass). A majority of the hunting-related mortalities were reported to us by hunters, according to directions embossed on one side of the ear tag each elk received when it was originally captured.

Elk Hoof Disease

During the late 1990s, elk in southwest Washington with an apparent hoof affliction were first reported. Initial reports came from lowland valleys where pastureland interfaced with more traditional elk habitat. These reports, ranging from limping elk to elk with elongated hoof sheaths and/or ulcerated hooves, were sporadically received over the next several years. At the time our study began, the condition was known to exist in segments of the Mount St. Helens elk herd, but appeared to be limited to the west-most portion of the herd area. Our research scope did not formally include evaluating the spatial extent, morbidity, or population dynamics implications of this condition. During our elk capture operations we attempted to avoid capturing elk that were clearly sick or injured, as these animals typically would have elevated risk of capture-related complications. However, during the course of our work we inadvertently captured a few elk with varying degrees of hoof disease; this occurred when the affliction was not obvious as the elk ran from the pursuing helicopter. We did radiocollar such elk, and they provided some limited information on near-term fates of elk with hoof disease. The sample size of radiomarked elk with hoof disease was not sufficient, however, to formally assess any contribution to annual mortality risk for elk, specific to hoof disease, nor would these elk be considered a random sample of affected elk.

Concurrent with the latter portion of our study, investigations were initiated to identify the etiology and better define the epidemiology of this condition. This work is being conducted by veterinary pathologists at several veterinary colleges around the world, in consult with the Washington Department of Fish and Wildlife's staff veterinarian. Results from the veterinary investigations are beyond the scope of this report and will be published elsewhere.

Environmental and Temporal Effects

In addition to the analytic methods previously described, we explored a variety of temporal (year), spatial (GMU or subareas), and weather variables for their effects on responses such as IFBF, pregnancy, recruitment, indexed overwinter mortality, etc. We used general linear models (GLM) when the potential predictor variables were categorical (*e.g.*, year, GMUs, subareas) and/or the response was nominal (*e.g.*, pregnant vs. non-pregnant), and we used ordinary least squares (OLS) regression when responses and potential predictors were interval data. We also estimated the product-moment correlation coefficient to evaluate collinearity between pairs of quantitative variables (*e.g.*, annual recruitment and overwinter mortality indices).

To explore the potential effects of weather on calf recruitment and overwinter mortality, we used SNOTEL data from the Spirit Lake SNOTEL site as potential predictors and the annual calf recruitment index and overwinter mortality index as responses. From the SNOTEL data, we calculated: 1) total late summer/ early fall (Aug 1- Sep 30) precipitation, 2) total early summer (May 1 – July 31) precipitation, 3) total lactation season (May 1 – Sep 30) precipitation, 4) the linear slope (OLS) of accumulated late summer/early fall (Aug 1 – Sep 30) precipitation, 5) accumulated snow water equivalents (SWE) for early winter (Dec 1 – Jan 31), 6) SWE for late winter (Feb 1 – Mar 31), and 7) SWE for the full winter (Nov 1 – Mar 31). We used SWE to index winter severity because SNOTEL data on daily snow depth were not routinely collected at any SNOTEL site near our study area until shortly prior to our study, preventing us from characterizing longer-term winter severity. We calculated standard normal deviates (Z_i) for each weather metric, where $Z_i = X_i - \mu / \sigma$, and X_i = the observed value for year i, μ = the 1990-2005 mean for that metric, and σ = the standard deviation

(1990-2005) for that metric. This transformed observed annual weather metrics during our study into the number of standard deviations (+/-) relative to the long-term mean for a given metric. For example, a positive Z value for early summer precipitation would indicate a wetter than normal early summer and a negative Z value would indicate a drier than normal early summer. Spring-summer-fall drought was indicated by negative Z values, and severe winters were indicated by positive Z values. Our hypotheses were that spring calf recruitment would be potentially positively influenced by wet summer-fall weather in the birth year and/or potentially negatively influenced by higher winter severity in the calves' first winter. We hypothesized overwinter mortality would be higher in springs following droughty summer-falls and/or severe winters. To explore the cumulative effect of poor late summer-fall conditions combined with a subsequent harsh (snowy) winter, we changed the sign of the summer-fall precipitation Z-scores and then summed the summer-fall precipitation and winter SWE Z-scores. We did this so that for both seasonal weather severity indices, a positive Z-score reflected increased weather severity (relative to elk energy budgets) and negative Z-scores for weather severity reflected good environmental conditions for elk.

RESULTS

Capture and Marking

We captured 150 unique elk (110 F: 40 M) during 154 mid-winter capture events, 2009-2012. The ages of cow elk we captured ranged 1-16 years, with most cows in the prime-age class (ages 2-11 years) (Fig. 13). The ages of branch-antlered bull elk we captured ranged 2-9 years (Fig. 14). The median estimated age, based on cementum annuli, for both captured cows and captured bulls was 5 yrs. Yearling cows were very likely under-represented in our captured elk sample (relative to the population) due to size selection intended to prevent darting very large calves (*i.e*., the sizes of very large calves and very small yearlings potentially overlapped). No elk died during handling; 1 cow elk died within a few days of capture, possibly due to post-capture complications.

We captured 26, 18, 12, 36, and 22 cows and 12, 11, 8, 5, and 4 branch-antlered bulls across GMUs 520, 522, 524, 550, and 556, respectively. Across years, 2009-2012, we captured and radiomarked 44, 27, 21, and 22 cow elk and 11, 11, 10, and 8 branch-antlered bulls, respectively. Effort across years maintained relatively consistent radiomarked elk sample sizes, 2009-2012, in the face of annual attrition due to mortalities and collar malfunction.

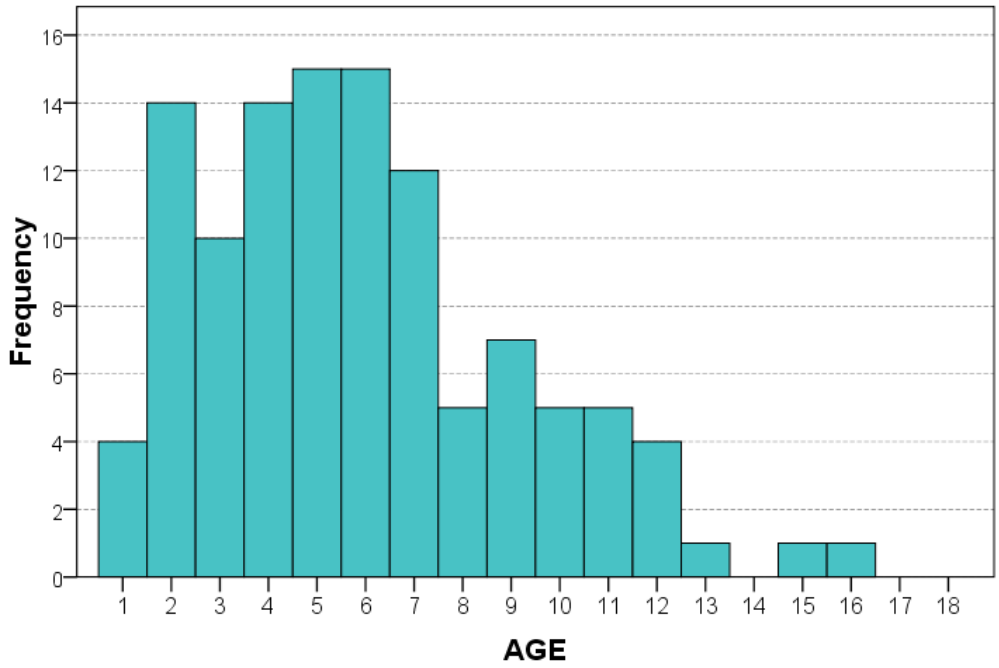

Figure 13. Distribution of ages for cow elk captured and radiomarked, Feb 2009-2012, Mount St. Helens, Washington.

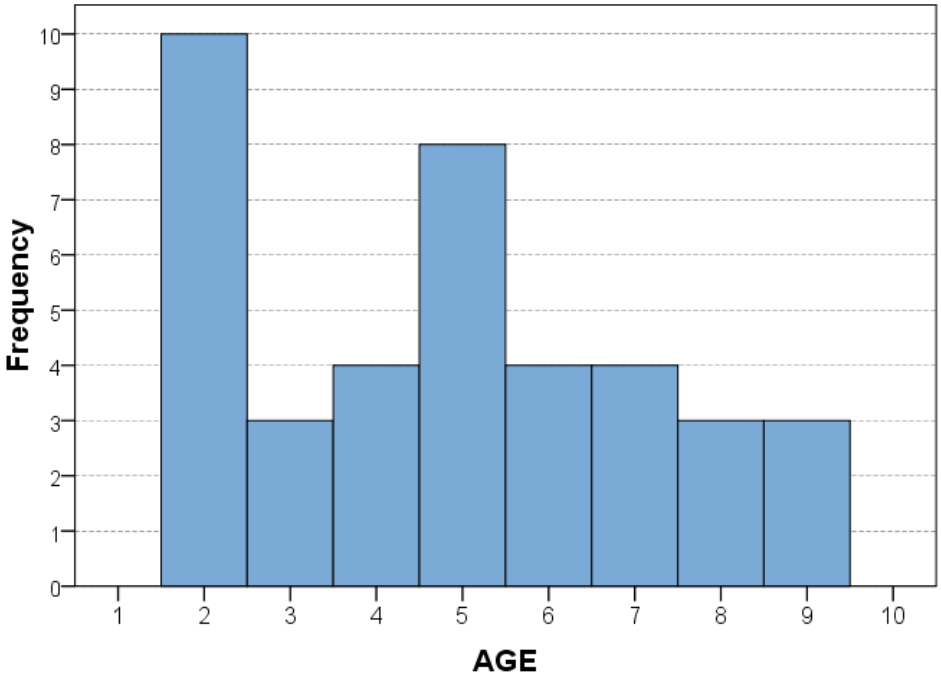

Figure 14. Distribution of ages for bull elk captured and radiomarked, Feb 2009-2012, Mount St. Helens, Washington.

Late-Winter Condition and Fertility

The mean body mass for cow elk handled in February was 218.2 kg (481.1 lbs) (95% CI = 214.9-221.4 kg; 473.9-488.2 lbs). For branch-antlered bulls, mean body mass was 246.3 kg (543.1 lbs) (95% CI = 239.7-253.0 kg; 528.5-557.9 lbs). Cow body mass generally increased with age until about age 5 (Fig. 15). Although body mass among cows we handled was highest at about age 10, age-specific estimates were based on small samples after about age 7. The heaviest cow we handled was 253.7 kg (559.4 lbs) and the heaviest bull was 287.01 kg (632.8 lbs). The numbers of branch-antlered bull elk we handled were insufficient to support inference about the mass vs. age relationship for bulls.

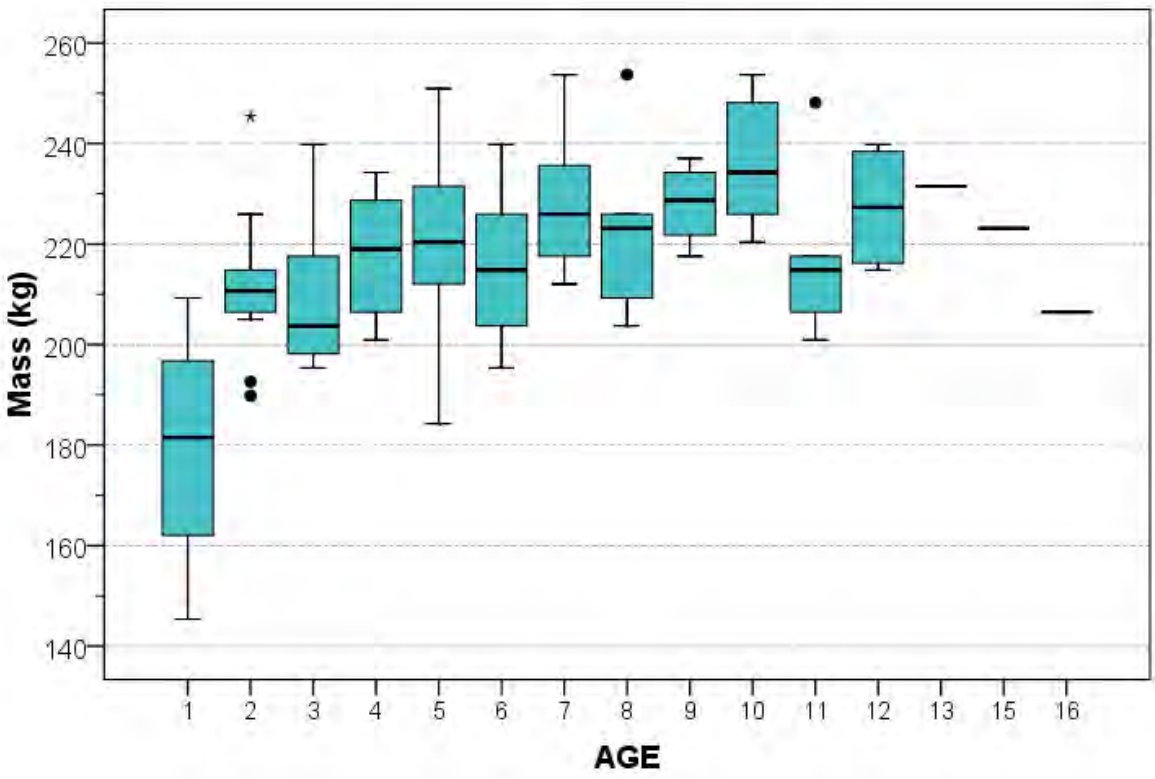

Figure 15. Boxplots of age-specific mass for cow elk captured and radiomarked, Feb 2009-2012, Mount St. Helens, Washington. Colored boxes represent the middle 50% of estimates within each age-class, and heavy horizontal lines represent median values. Only a single estimated mass was available for cows aged 13, 15, and 16.

Using a general linear model with fixed effects for year, GMU, pregnancy status, and lactation status, we did not detect any systematic effect of year (*P* = 0.32) on winter body fat (IFBF) for adult (≥2 yr-old) cow elk. GMU, lactation, and pregnancy did affect IFBF (*P* = 0.02, 0.07, 0.005, respectively). Lactaters were consistently leaner than non-lactating elk across years (Fig 16). Pregnant elk were fatter than non-pregnant elk (Fig. 17). Pooling years and GMUs, mean IFBF in February was 5.64% (95% CI = 5.08-6.21%) for non-lactating cow elk and was 3.26% (95% CI = 2.34-4.18%) for elk with evidence of late season lactation. Similarly, means for non-pregnant and pregnant adult cows were 3.38% (95% CI = 2.56-4.20) and 5.95% (95% CI = 5.38-6.52) IFBF.

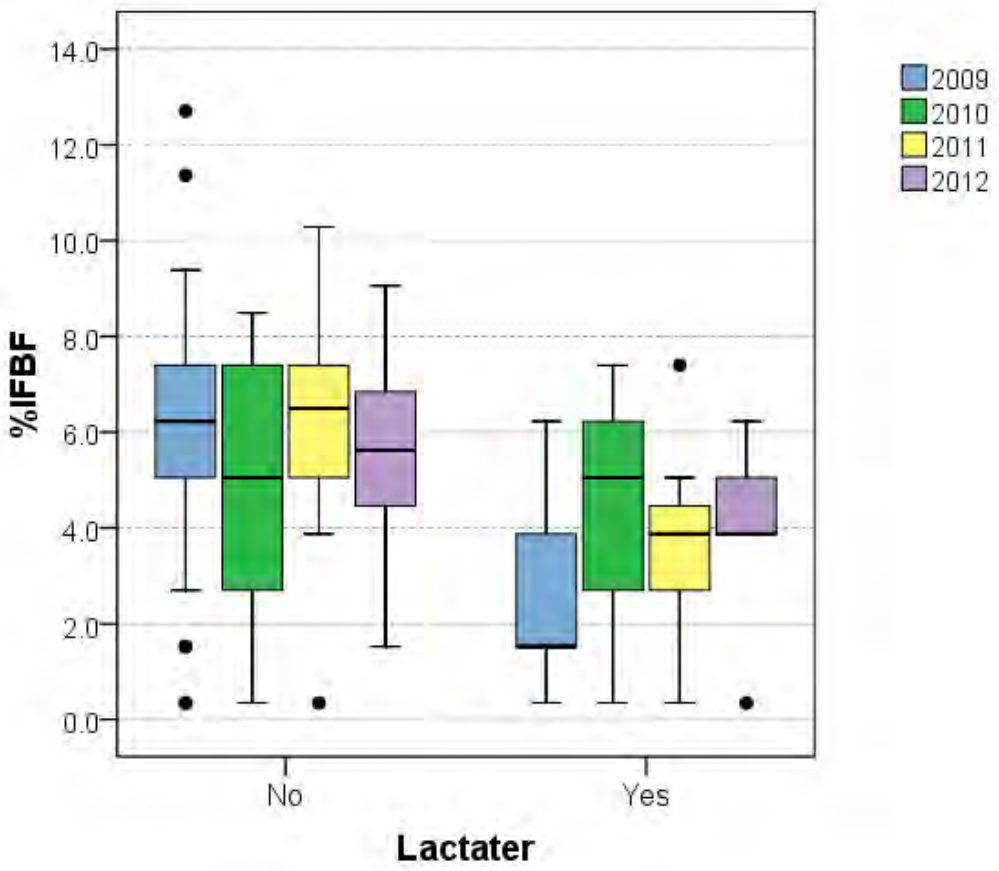

Figure 16. Boxplots for ingesta-free body fat (%IFBF) by lactation status for cow elk captured and radiomarked, Feb 2009-2012, Mount St. Helens, Washington. Colored boxes represent the middle 50% of estimates, and heavy horizontal lines represent median values.

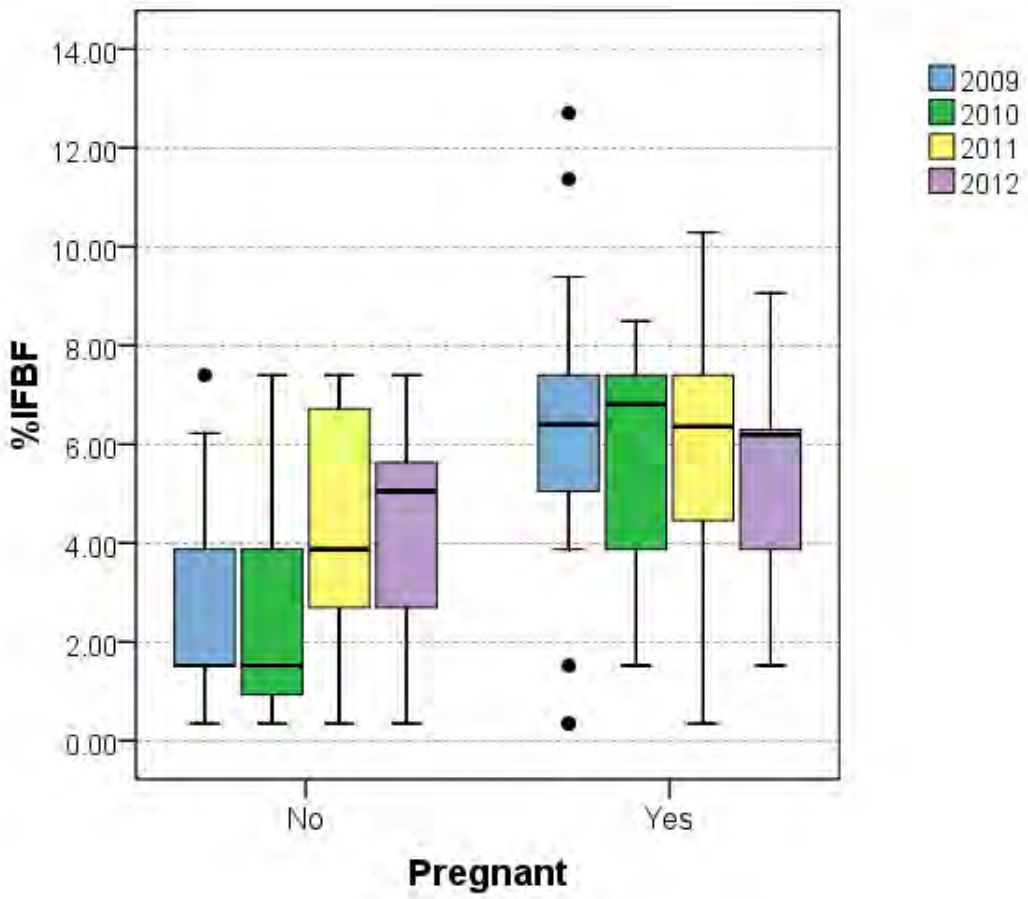

Figure 17. Boxplots for ingesta-free body fat (%IFBF) by pregnancy status for cow elk captured and radiomarked, Feb 2009-2012, Mount St. Helens, Washington. Colored boxes represent the middle 50% of estimates, and heavy horizontal lines represent median values.

Using a general linear model to control for the fixed effects of lactation and pregnancy status, which both were related to IFBF (see above), we found some differences among GMUs in mid-winter IFBF for adult (≥ 2 yr-old) cow elk that we handled, 2009-2012. Using $P \leq 0.05$ as the significance level, GMU 522 cow elk had higher IFBF levels than cow elk captured in GMUs 520 and 550 (Fig. 18); other GMU contrasts were not significantly different ($P > 0.05$).

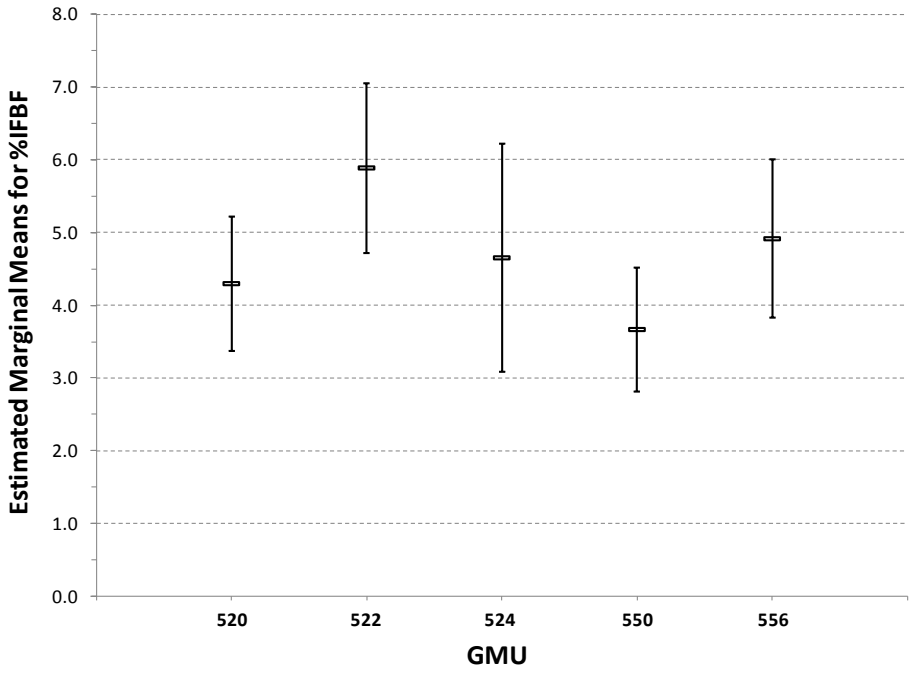

Figure 18. Plot of marginal means for %IFBF by GMU, controlling for pregnancy and lactation status, Mount St. Helens cow elk, 2009-2012.

Overall, 73 of 109 (67%) adult (≥ 2-yr-old) cow elk we handled in mid-winter, 2009-2012 were pregnant on ultrasound examination; none of 4 yearling cows were pregnant. We had limited data for very old cows, but among 3 cows older than 12 years, 2 (66.7%) were pregnant. Of 73 cows aged 4-10 years, 52 (71.2%) were pregnant in February. Across GMUs, the observed pregnancy rate among adult cows was 42.3% (*n* = 26) in GMU 520, 83.3% (*n* = 18) in GMU 522, 90.0% (*n* = 10) in GMU 524, 71.4% (*n* = 35) in GMU 550, and 65.0% (*n* = 20) in GMU 556. As above, there was a statistical association between cow elk condition and pregnancy; pregnant elk were fatter than non-pregnant elk. We did not detect an effect of year on pregnancy status. Evidence of recent lactation for cows handled in February was rare (4 of 73 pregnant cows; 3.5%).

Fall Body Condition

We collected hunter-contributed organ samples from 423 harvested elk during 2009-2011. These samples ranged from a single contributed organ (*e.g.*, a heart) to all

of the requested organs (*i.e.*, heart, pericardium, kidneys). Among the 423 samples, there were 226 complete organ sets. Overall, we received 360 heart, 285 pericardium, and 347 kidney samples. Cook et al. (2001*b*) identified Kistner subset scores based on the full organ sample complement as excellent predictors of IFBF; they also explored various 2- and 1-organ subsets for their predictive utility relative to IFBF (R. Cook, personal communication). IFBF was clearly related to all 2 organ component pairs (*e.g.*, heart-pericardium, heart-kidney; $r^2 > 0.90$). Relationships of single organ scores to IFBF were less consistent ($r^2 = 0.64$, 0.82, and 0.88 for the heart pericardium, and kidneys respectively). We subsequently estimated IFBF using the full organ subsets and all 2-organ subsets available (2-organ predictive equations supplied by R. Cook). This allowed us to derive 364 usable estimates of fall IFBF for hunter-killed cow elk within the Mount St. Helens herd area, 2009-2011. Because yearling cow elk tend to be consistently lean (WDFW, unpublished data), we based further analyses on 323 fall IFBF estimates from cow elk older than 1 yr-old. Generally, the data were approximately normally distributed, with a few more very lean animals than expected (Fig. 19). IFBF estimates ranged 0.30-19.8% for cow elk older than yearlings.

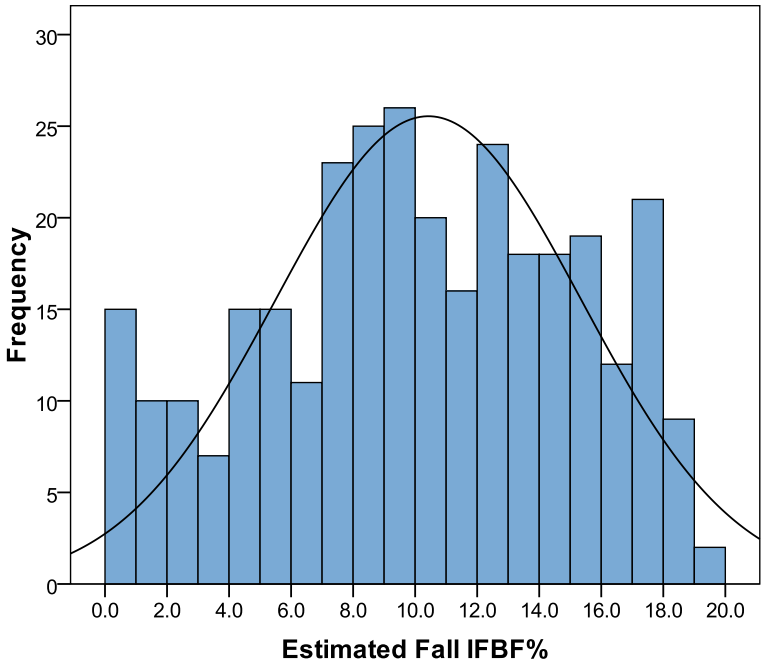

Figure 19. Frequency histogram (and normal curve) for fall IFBF estimates from hunter-killed cow elk, Mount St. Helens, WA, 2009-2011.

Sample sizes among some GMUs were small, so to explore potential spatial variation among fall IFBF estimates, we grouped the data into subareas (1 = the N. Fork of the Toutle River mudflow; 2 = the managed forest landscape of the core study area [GMUs 520, 524, 550, 556]; 3 = GMU 560; 4 = the Columbia Gorge GMUs). In a general linear model with fixed effects for year, subarea, and lactation status, and with cow age as a covariate, there were significant ($P \leq 0.05$) effects of subarea and lactation on IFBF; year and cow age did not affect IFBF. The marginal means by lactation status, controlling for other factors, were 12.51% IFBF for non-lactaters and 10.84% for lactaters. In the subarea contrasts, IFBF for cows from subarea 2 was lower (marginal mean = 9.20%) than for subarea 3 (marginal mean = 13.07%) and for subarea 4 (marginal mean = 12.38%) cows (Fig. 20). Estimates for mudflow cows (marginal mean = 12.07%) were qualitatively similar to estimates for subarea 3 and 4 cows and different than for subarea 2 cows, but because few mudflow cows were sampled (n = 9) the pair-wise contrasts involving mudflow cows were nonsignificant.

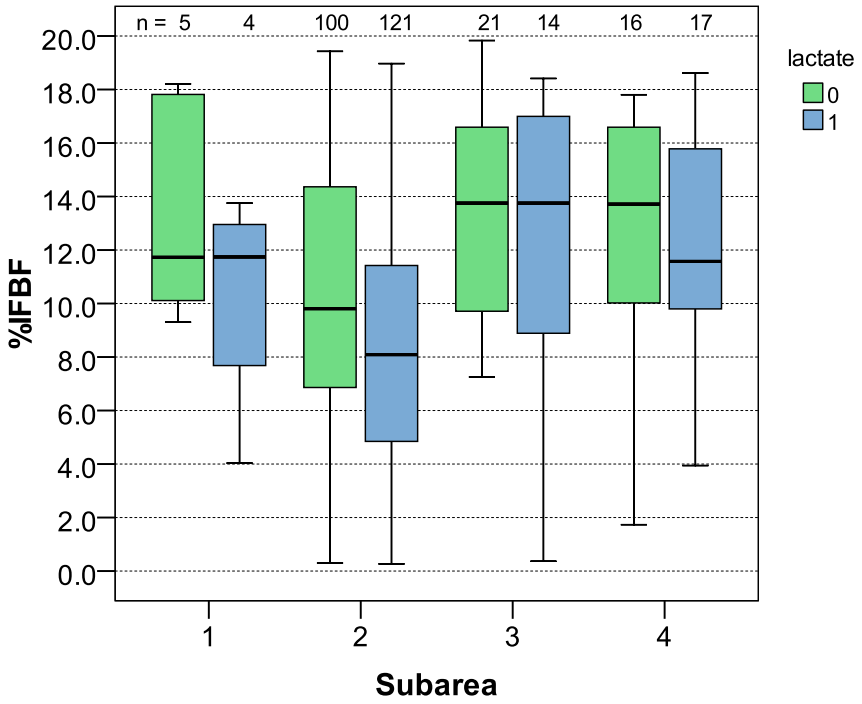

Figure 20. Boxplots for fall %IFBF from hunter-killed elk across subareas (1 = GMU 522, 2 = GMUs 520, 524, 550, 556, 3 = GMU 560, 4 = Columbia Gorge GMUs) by lactation status, Mount St. Helens, WA, 2009-2011.

Sightability Modeling

We collected sighting trial data for 331 groups containing at least 1 radiomarked elk during 2009-2011. Overall, we saw 174 groups (52.6%) without aid of telemetry and missed 157 groups (47.4%) that we later located via telemetry. We saw a higher proportion of radiomarked cow groups (146 of 261 groups; 55.9%) than of radiomarked bull groups (28 of 70 groups; 40.0%; Table 1). Elk were more easily seen when in larger groups, when active, and when in open (*i.e.*, low canopy cover) cover types (Table 1). Relative snow cover and light conditions, as we measured them, did not seem to systematically affect elk sightability on this landscape.

The covariates CAN, GRP, LG2GRP, and SEX were all related to the probability that an elk group was sighted in univariate tests (Table 2). Because one of the outcomes (*i.e.*, sighted or missed) was not observed for at least 1 level of the categorical covariates ACT and COV, MLEs did not exist for these covariates. We recoded ACT into a new covariate (ACT2) with 2 levels: 0 = bedded; 1 = active, and we recoded COV into a new covariate (COV2) with 4 levels: 1 = clearcut; 2 = regeneration stand, conifer, or alder; 3 = meadow, wetland, field, or mudflow. These new covariates were related to the probability that an elk group was sighted (Table 2).

Preliminary modeling indicated that LG2GRP was a better predictor of sightability than was the untransformed GRP covariate, so we subsequently used LG2GRP in all multivariate models. An analysis of variance (ANOVA) suggested that the covariate CAN (% canopy) was collinear with the recoded cover type covariate (COV2) (r^2 = 0.51), so we chose to use only the CAN covariate in subsequent multivariate logistic models. In a large number of cases where we missed a group and subsequently located it via telemetry we could not confidently determine the group's initial activity level, which resulted in a large number of missing values for ACT2. We were not comfortable attempting to impute data for all of these missing values, and to preclude eliminating a large number of cases from our multivariable models because of the missing activity data, we elected to drop the activity covariate from further consideration.

Table 1. Summary of univariate association of independent variable levels and sightability of elk groups during helicopter surveys, Mount St. Helens, 2009-2011.

Variable	Total Groups	Groups Seen	%Seen
Canopy (%)			
0-15	116	111	95.7
20-35	43	37	86.0
40-55	32	20	62.5
60-75	36	6	16.7
>75	101	0	0.0
Snow (%)			
< 50	278	150	54.0
≥ 50	50	24	48.0
Group Size			
1-2	68	21	30.9
3-4	20	13	65.0
5-6	23	15	65.2
7-8	28	19	67.9
9-10	81	15	18.5
>10	98	91	92.9
Group Type			
cow-calf	261	146	55.9
bull	70	28	22.0
Activity			
bedded	60	23	38.3
standing	150	142	94.7
moving	9	9	100.0
Cover Type			
clear cut	69	67	97.1
regeneration	91	52	57.1
conifer	67	2	3.0
alder	24	18	75.0
field/meadow/wetland	34	32	94.1
river or road	2	2	100.0
Light			
bright	55	31	56.4
flat	273	143	52.4

Table 2. Results of univariate significance tests (logistic regression) for predictor variables potentially affecting sightability of elk groups during spring helicopter surveys, Mount St. Helens, 2009-2011. Bold text delineates predictors significantly related to group sightability.

Variable	X^2	*P*-value
CAN	**296.44**	**<0.001**
SNOW	0.52	0.471
GRP	**62.28**	**<0.001**
LG2GRP	**40.69**	**<0.001**
SEX	**5.64**	**0.018**
ACT	***	***
ACT2	**79.16**	**<0.001**
COV	***	***
COV2	**131.67**	**<0.001**
LIGHT	0.29	0.589

*** model did not converge; MLE does not exist.

Among our candidate sightability models, 2 models accounted for 98% of the available model weight (Table 3). The best model had 3 predictor variables (LG2GRP, CAN, and SEX) and an intercept. The next best model, which was 1.70 AIC_c units from the best model, was similar except that it lacked the SEX variable. All of the remaining models were at least 7.36 AIC_c units from the best-supported model. Simple (*i.e.*, 1 predictor variable) models that predicted sightability based on group size (LG2GRP), canopy closure (CAN), or sex (SEX) alone had little support. The sign for the SEX

covariate differed between the single variable model (*i.e.*, SEX was the only predictor) and the best multivariable model, the β_i for SEX was erratic across models and was poorly estimated (*i.e.*, large SE) (Table 4), the sign for SEX in the best multivariable model was illogical, and the Wald statistic for SEX in the best multivariable model was marginally nonsignificant (P = 0.06). Collectively, these results made us skeptical of inclusion of SEX in the multivariable context. So, we subsequently selected the second best model in Table 3 as our best model. This model predicted larger elk groups were more likely to be seen, as were elk in more open habitat (Table 4). This model fit the data (Hosmer-Lemeshow statistic = 9.26; P = 0.32) and correctly classified 91.4% of the model building observations; 163 of 179 groups predicted to be seen were seen (91.0% correct), and 125 or 136 groups predicted to be missed were missed (91.9% correct).

Table 3. Model selection results for models predicting the sightability of elk groups from a helicopter, Mount St. Helens Elk Herd Area, 2009-2011.

Model	K[a]	-2*LL*	AIC_c	ΔAIC_c[b]	w_i[c]
LG2GRP, CAN, SEX	4	145.59	153.72	0.00	0.69
LG2GRP, CAN	3	149.34	155.42	1.70	0.29
CAN	2	157.04	161.08	7.36	0.02
CAN, SEX	3	157.01	163.09	9.37	0.006
LG2GRP	2	397.32	401.35	247.63	0.00
LG2GRP, SEX	3	396.41	402.49	248.77	0.00
SEX	2	452.35	456.39	302.67	0.00

[a]Number of unique parameters in model$_i$.
[b]Difference in AIC_c units between model$_i$ and the best model.
[c]Relative model weight in model$_i$.

Table 4. Parameter estimates (β_i and standard errors = SE) for the fitted sightability models from Table 3, Mount St. Helens Elk Herd, 2009-2011.

Model	LG2GRP	SE(LG2GRP)	CAN	SE(CAN)	SEX	SE(SEX)
LG2GRP, CAN, SEX	0.63	0.20	-0.09	0.010	1.24	0.65
LG2GRP, CAN	0.42	0.17	-0.09	0.009	–	–
CAN	–	–	-0.09	0.009	–	–
CAN, SEX	–	–	-0.09	0.009	0.09	0.53
LG2GRP	0.54	0.09	–	–	–	–
LG2GRP, SEX	0.60	0.12	–	–	0.34	0.36
SEX	–	–	–	–	-0.64	0.27

Fitting the 2-predictor multivariable model with effects of group size and canopy on predicted sightabilities yielded the following model:

$$y = 2.85 + 0.42(\text{LG2GRP}) - 0.09(\text{CAN})$$

Sightability-corrected estimates of total elk abundance and total cow elk abundance (2 estimates per year from replicated surveys), derived from the above sightability model, indicated relatively stable to slightly increasing numbers of elk within our 5-GMU study area from 2009 to 2011 and a subsequent substantial decline during 2012-2013 (Fig. 21). Peak point estimates for total elk and total cow elk were 5,132 elk and 2,803 cow elk in the spring of 2011; minimum point estimates were 2,717 elk and 1,608 cow elk in the spring of 2013.

GMU-specific estimates for total elk abundance, 2009-2013 (Figs. 22-26), indicated a relatively steady decline in elk abundance in GMUs 520 and 550, a modest decline in GMU 524, an initial increase followed by a substantial decline in GMU 556, and initially increasing then stabilizing numbers of elk in GMU 522.

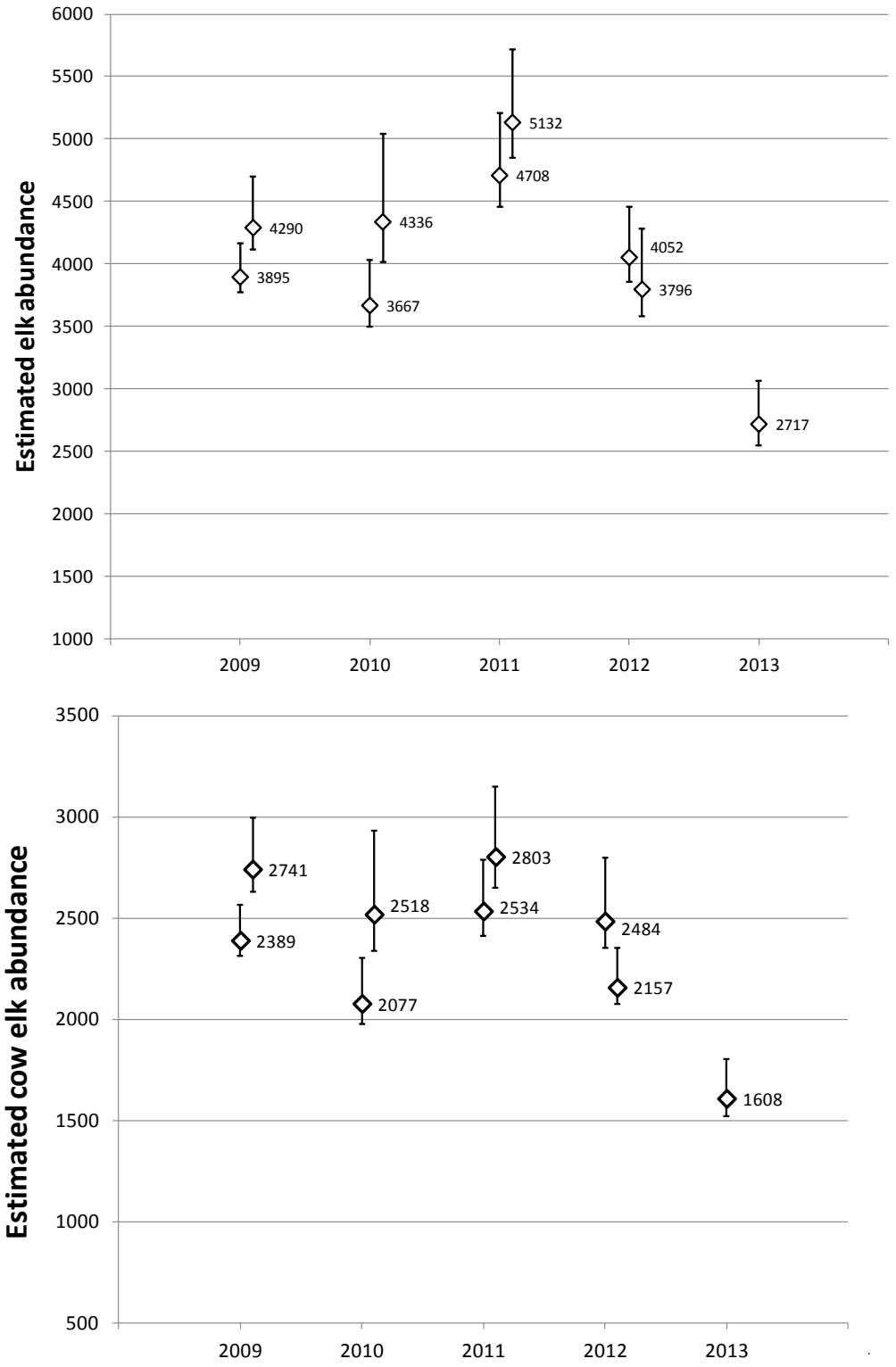

Figure 21. Sightability model estimates (± 95% CI) for total elk and total cow elk abundance in the study area, Mount St. Helens, 2009-2013.

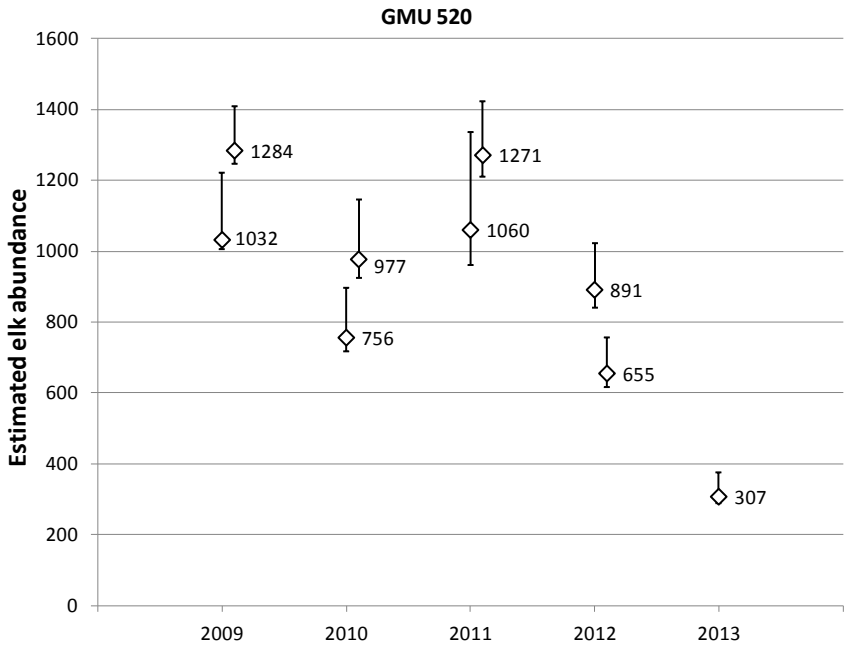

Figure 22. Sightability model estimates for total elk abundance (± 95% CI) in GMU 520, Mount St. Helens, 2009-2013.

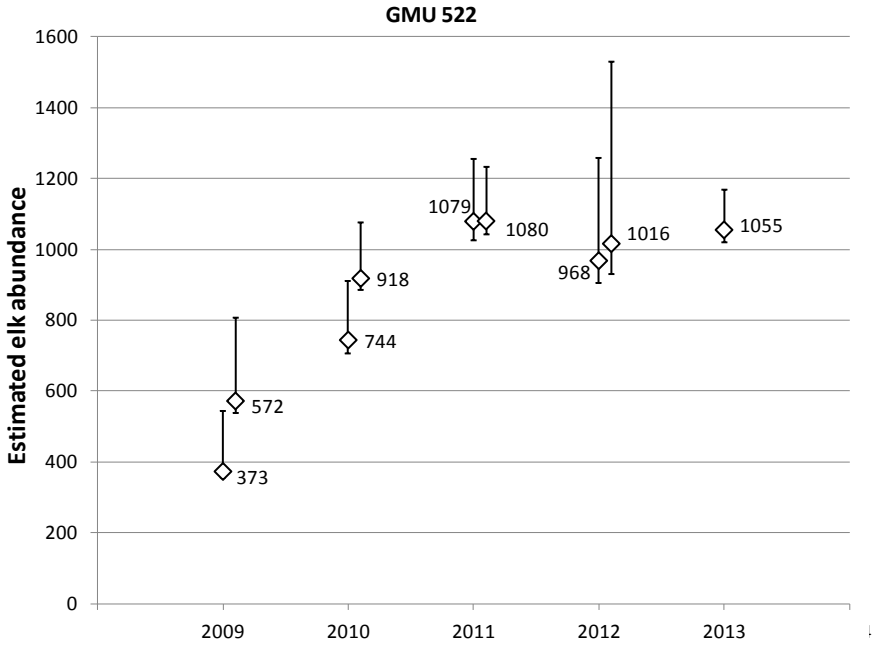

Figure 23. Sightability model estimates for total elk abundance (± 95% CI) in GMU 522, Mount St. Helens, 2009-2013.

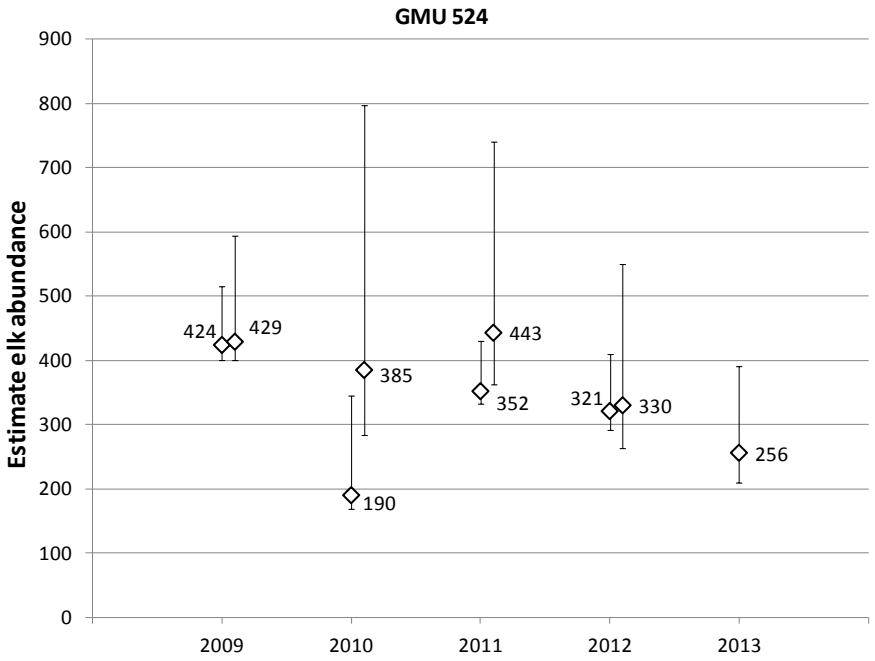

Figure 24. Sightability model estimates for total elk abundance (± 95% CI) in GMU 524, Mount St. Helens, 2009-2013.

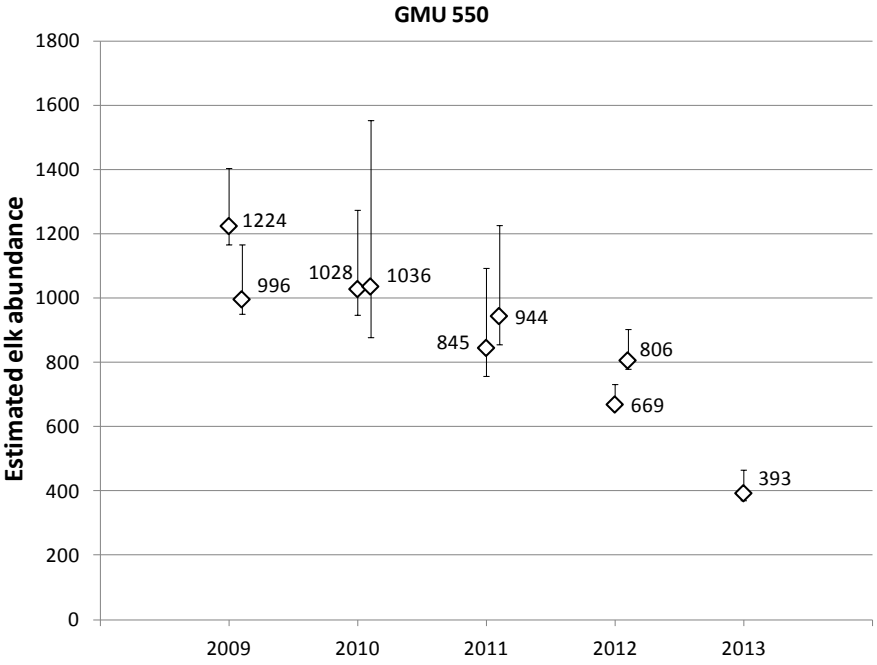

Figure 25. Sightability model estimates for total elk abundance (± 95% CI) in GMU 550, Mount St. Helens, 2009-2013.

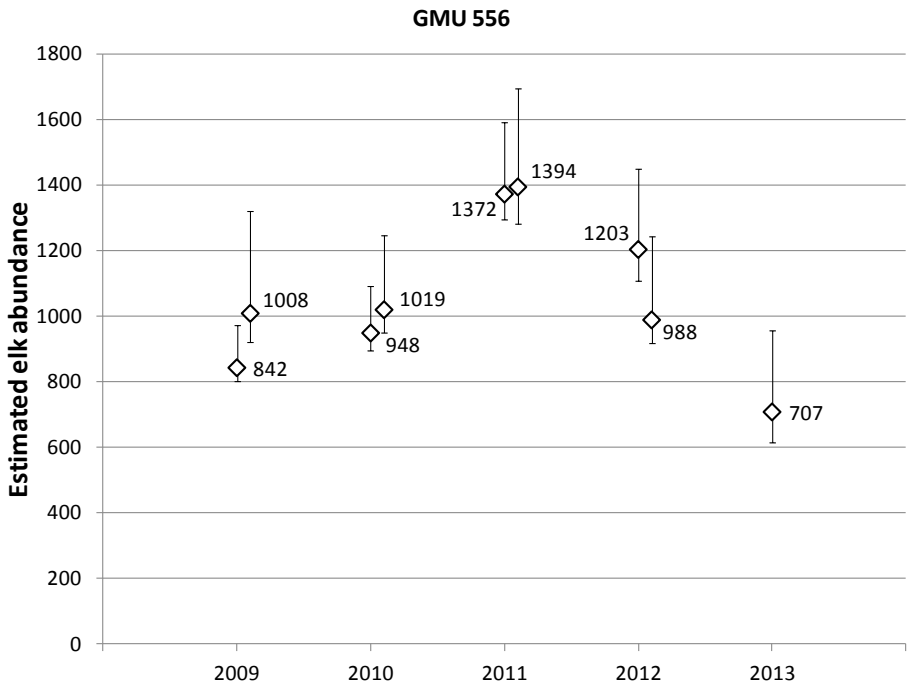

Figure 26. Sightability model estimates for total elk abundance (± 95% CI) in GMU 556, Mount St. Helens, 2009-2013.

GMU-specific estimates for total cow elk abundance, 2006-2013 (Figs. 27-31), also indicated a steady decline in the number of cow elk in GMUs 520 and 550, a modest decline in GMU 524, a slight increase followed by a decrease in GMU 556, and a relatively steady increase in cow numbers in GMU 522.

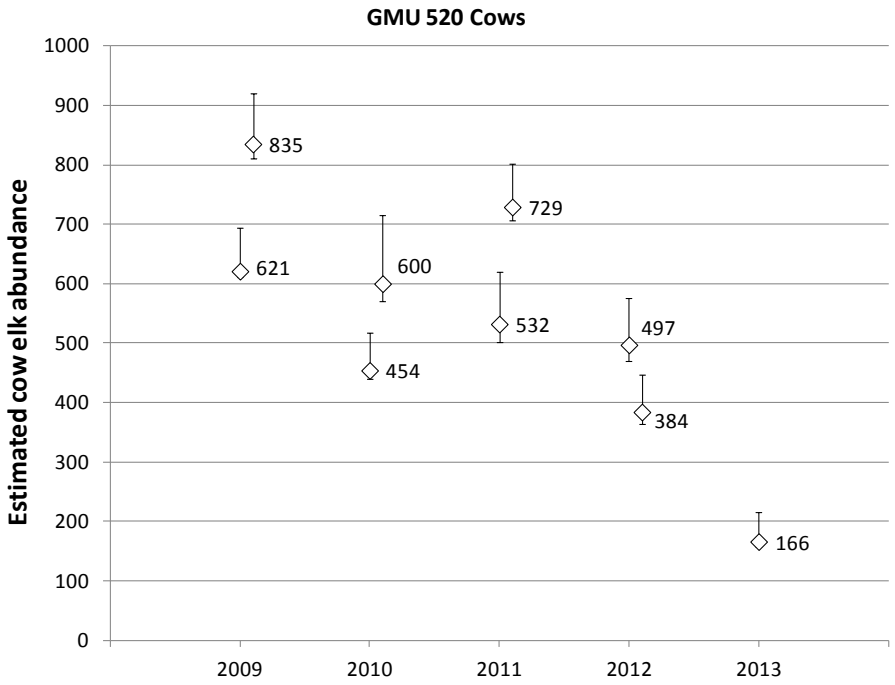

Figure 27. Sightability model estimates for cow elk abundance (± 95% CI) in GMU 520, Mount St. Helens, 2009-2013.

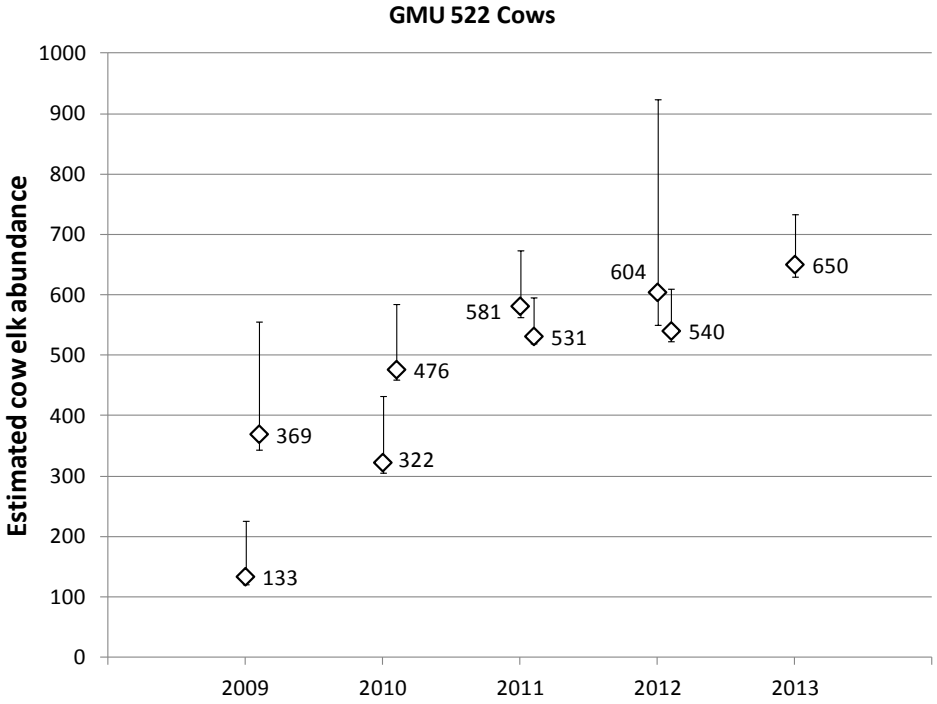

Figure 28. Sightability model estimates for cow elk abundance (± 95% CI) in GMU 522, Mount St. Helens, 2009-2013.

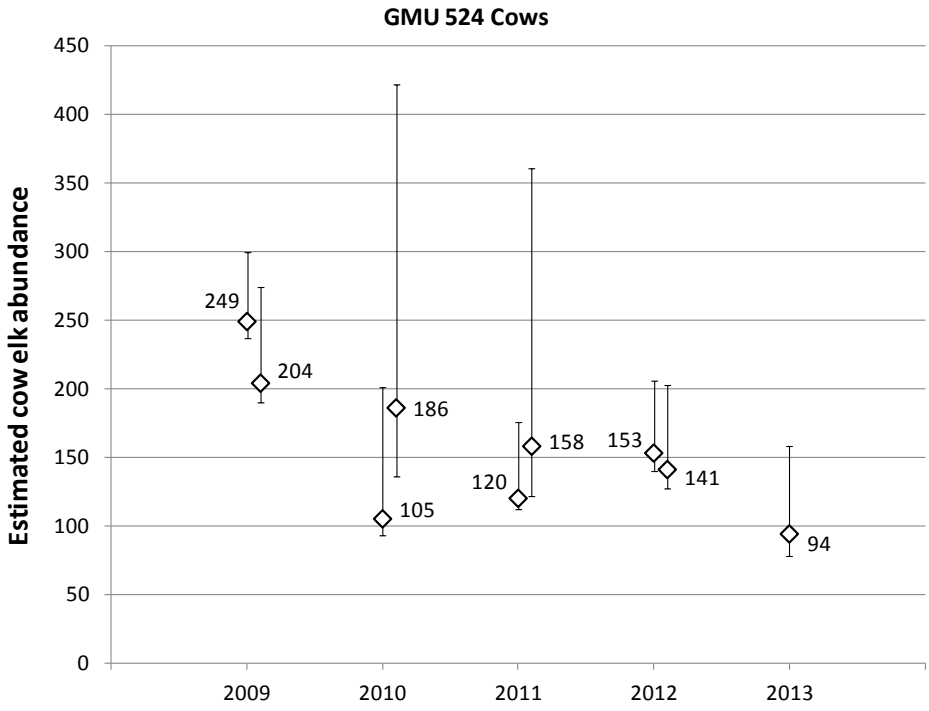

Figure 29. Sightability model estimates for cow elk abundance (± 95% CI) in GMU 524, Mount St. Helens, 2009-2013.

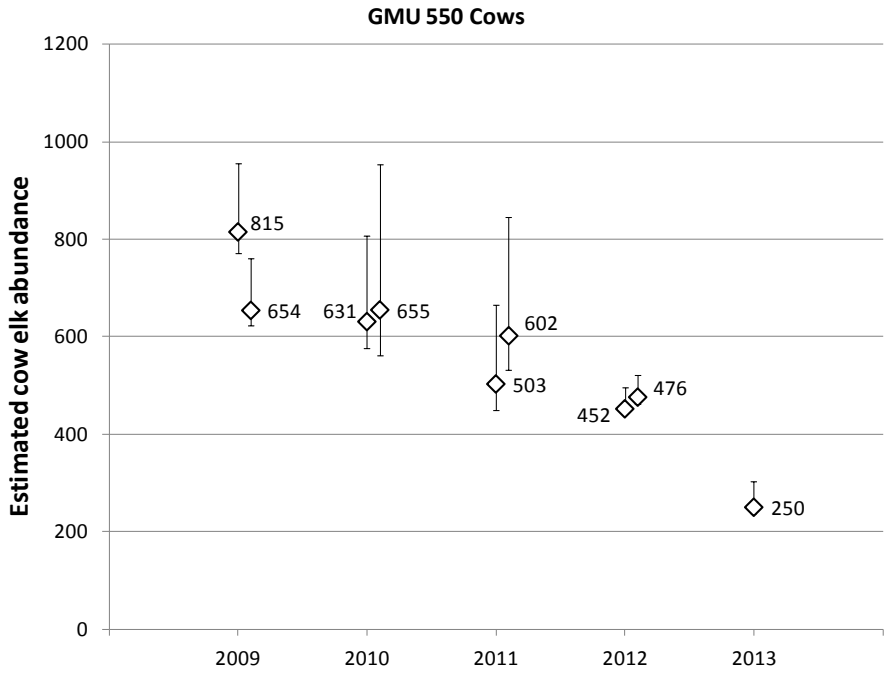

Figure 30. Sightability model estimates for cow elk abundance (± 95% CI) in GMU 550, Mount St. Helens, 2009-2013.

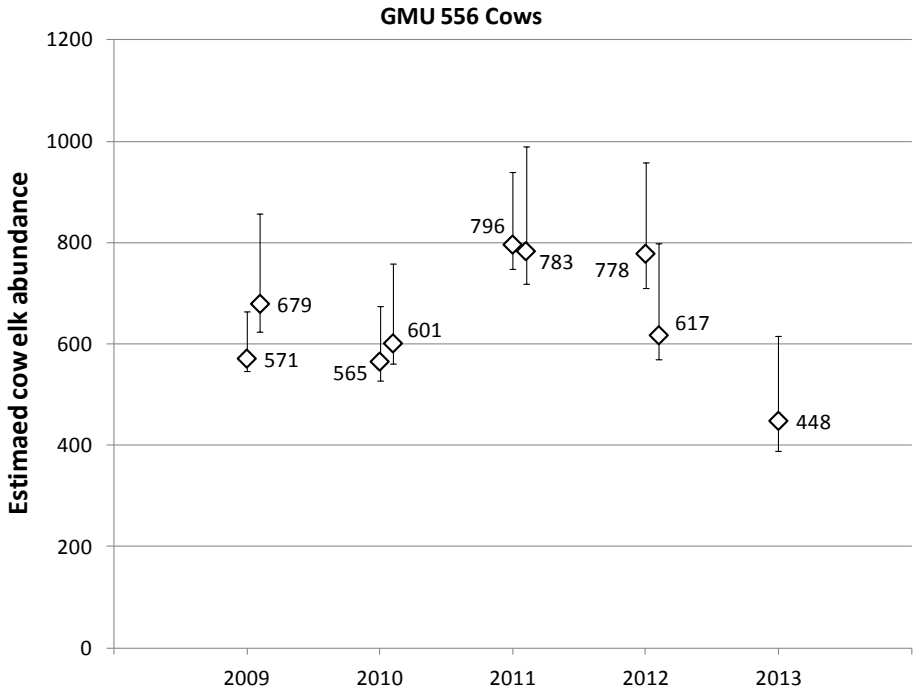

Figure 31. Sightability model estimates for cow elk abundance (± 95% CI) in GMU 556, Mount St. Helens, 2009-2013.

Mark-Resight

As per the Methods section (above), we generated mark-resight estimates 2009-2012 using the LNME model, a multi-sampling-occasion model, and using the Lincoln-Petersen (LP) model for 2013 (1 sampling occasion). Across the 11 LNME models for total elk in the area surveyed twice each year, 2009-2012, the best supported model had a constant detection parameter (p_i), 2 unique heterogeneity parameters (σ_i) (where 2009=2011 and 2010=2012), and annual variation in estimated total elk (Table 5). Two other models were within 2 AIC_c units of the best model. The second best-supported model had 2 unique detection parameters (1 for 2012 and 1 for all other years), a constant heterogeneity parameter, and annual variation in estimated total elk (Table 5). The last model within 2 AIC_c units of the best model was the simplest model, with a single estimated detection parameter across all sessions, a constant heterogeneity

estimate, and annual variation in estimated total elk (Table 5). The remaining models had limited support.

Table 5. Model selection results for LNME mark-resight estimates of total number of elk in the 5-GMU study area, 2009-2012, Mount St. Helens, WA.

Model[a]	K[b]	AIC_c[c]	ΔAIC_c[d]	w_i[e]	Dev[f]
p(.),σ^2(2009=2011≠2010=2012),N(yr)	7	829.28	0.00	0.32	814.88
p(2012≠else),σ^2(.),N(yr)	7	830.35	1.07	0.19	815.95
p(.),σ^2(.),N(yr)	6	830.72	1.43	0.16	818.41
p(2011≠else),σ^2(.),N(yr)	7	832.12	2.84	0.08	817.72
p(2009≠else),σ^2(.),N(yr)	7	832.50	3.22	0.06	818.10
p(sess1≠sess2),σ^2(.),N(yr)	7	832.52	3.23	0.06	818.11
p(.),σ^2(yr),N(yr)	9	833.35	4.06	0.04	814.70
p(2010≠else),σ^2(.),N(yr)	7	833.71	4.43	0.04	819.31
p(yr),σ^2(.),N(yr)	9	834.46	5.18	0.02	815.81
p(sess1≠sess2[g]),σ^2(yr),N(yr)	10	835.19	5.90	0.02	814.39
p(full),σ^2(yr),N(yr)	16	842.89	13.61	<0.001	808.87

[a] model structure (p = detection probability; σ^2 = heterogeneity parameter; N = abundance estimate).
[b] number of unique model parameters.
[c] Akaike's Information Criterion, adjusted for small samples.
[d] difference in AIC_c units between $model_i$ and the best model.
[e] Akaike model weight.
[f] model deviance.
[g] detection probability varied between first and second surveys, but no annual effect.

Model-averaged estimates of total elk abundance in the area we surveyed each year with replicated surveys, based on the LNME model weights in Table 5, suggested a modest decline in total elk during 2009-2012; using the LP estimate from the same area in 2013 suggested an overall substantial decline in total elk, 2009-2013 (Fig. 32).

Actual estimates ranged from a high of 8,238 elk in 2011 to a low of 4,987 in 2013. Estimates generally depicted a consistent pattern, except that the 2011 estimate was substantially higher than the estimates for the previous 2 years. We discuss possible explanations for this in the Discussion section, but note here that the 2009-2010 winter was by far the mildest winter of the study; the high estimate for the spring of 2011 occurred 1 year after the mild winter. The models in Table 5 and the estimates derived from those models in Fig. 32 also did not allow detection rates of cows and bulls to be sex-specific.

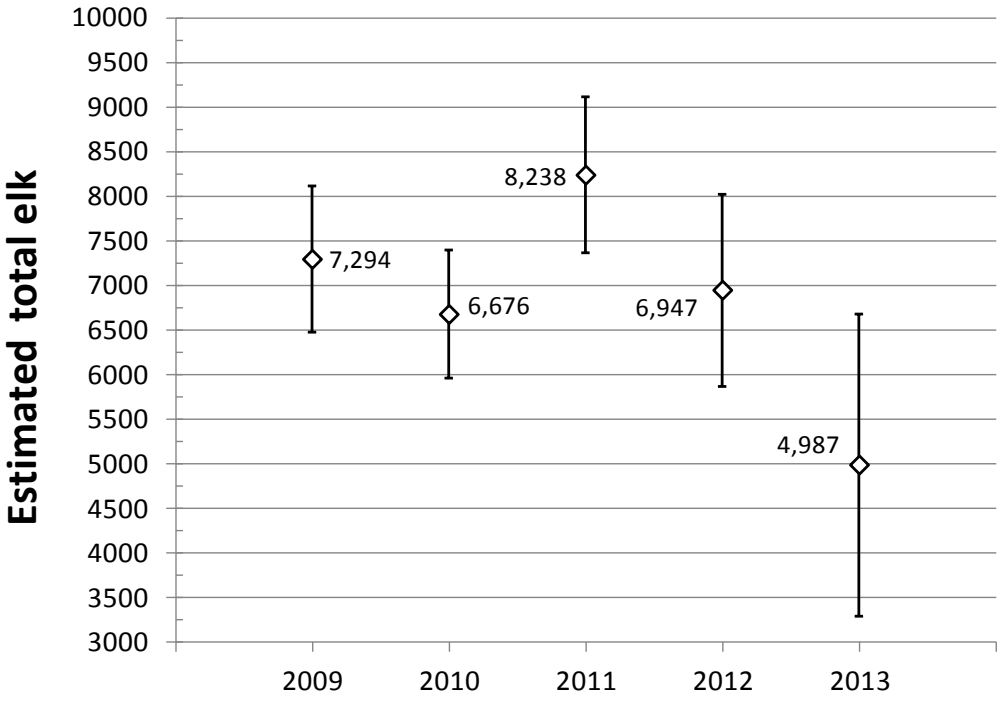

Figure 32. Mark-resight estimates (2009-2012 = LNME; 2013 = Lincoln-Petersen) for total elk (± 95% CI) in the 5-GMU study area, 2009-2013, Mount St. Helens, WA.

Among the 10 LNME models we evaluated for estimating the total number of cow elk and the total number of branch-antlered bull elk in the area we surveyed twice each year, 2009-2012, only 2 models were well-supported. Collectively, these 2 models

accounted for 99% of the available model weight. The best model had 12 unique parameters: 2 year-invariant, but sex-specific detection parameters, 2 year-invariant, but sex-specific heterogeneity parameters, and sex and year-specific estimates of abundance (Table 6). The next best model was 0.81 AIC*c* units from the best model and differed from the best model only in that it had a single unique detection parameter that was equal for both sexes (Table 6). The remaining models in the candidate model set, including those with the least and most unique parameters were not supported.

Table 6. Model selection results for LNME mark-resight estimates of total number of cow elk and branch-antlered bull elk in the 5-GMU study area, 2009-2012, Mount St. Helens, WA.

Model[a]	k[b]	AIC_c[c]	ΔAIC_c[d]	w_i[e]	Dev[f]
p(sex),σ^2(sex),N(sex × yr)	12	869.31	0.00	0.59	844.19
p(.),σ^2(sex),N(sex × yr)	11	870.11	0.81	0.40	847.17
p(sex × yr),σ^2(sex),N(sex × yr)	18	877.22	7.91	0.01	838.71
p(yr),σ^2(sex × yr),N(sex × yr)	24	885.94	16.63	<0.001	833.43
p(sex × yr),σ^2(sex × yr),N(sex × yr)	32	901.08	31.77	0.00	828.89
p(sex),σ^2(sex),N($F_{1=2\neq3\neq4}$[g], M[.])	8	980.79	111.48	0.00	964.28
p(.),σ^2(sex),N($F_{1=2=3\neq4}$, M[.])	7	1000.94	131.63	0.00	986.54
p(sex),σ^2(sex),N(sex)	6	1022.40	153.09	0.00	1010.10
p(sex),σ^2(sex),N($F_{1=2\neq3=4}$, M[.])	7	1023.15	153.84	0.00	1008.75
p(.),σ^2(.),N(sex × yr)	10	3596.29	2726.90	0.00	3575.51

[a] model structure (p = detection probability; σ^2 = heterogeneity parameter; N = abundance estimate).
[b] number of unique model parameters.
[c] Akaike's Information Criterion, adjusted for small samples.
[d] difference in AIC_c units between $model_i$ and the best model.
[e] Akaike model weight.
[f] model deviance.
[g] cow elk abundance constrained [number subscripts 1-4 = spring 2009-2012].

Model-averaged estimates of total cow elk abundance in the area we surveyed each year with replicated surveys, based on the LNME model weights in Table 6, suggested a pattern similar to the pattern for the total elk abundance estimates, 2009-2012 (Fig. 33). The LNME estimates for total cows declined from spring 2009 to spring 2010, increased again in spring 2011, and declined in spring 2012. Estimates ranged from a high of 4,444 cows in 2011 to a low of 3,758 cows in 2010. Including the LP estimate from the 2013 mark-resight survey, the overall pattern indicated a decline in the number of cow elk, 2009-2013 (Fig. 33). The LNME estimates for total branch-antlered bull abundance, 2009-2012, and the 2013 LP estimate for branch-antlered bull abundance in the area we surveyed each year suggested a relatively stable branch-antlered bull subpopulation, 2009-2013 (Fig. 34). Estimated bull numbers ranged from 647 (2009) to 797 (2013); confidence intervals for the 2013 cow and bull estimates were broad.

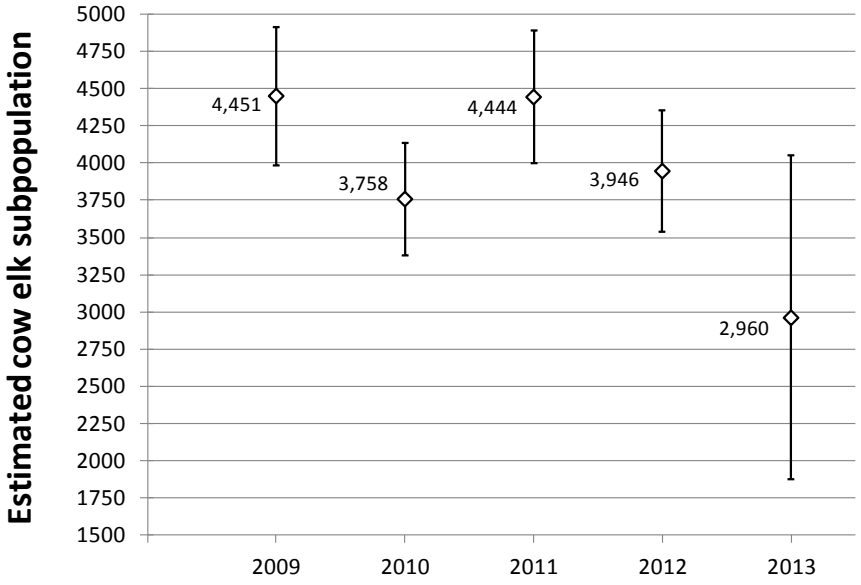

Figure 33. Mark-resight estimates (2009-2012 = LNME; 2013 = Lincoln-Petersen) for total cow elk (± 95% CI) in the 5-GMU study area, 2009-2013, Mount St. Helens, WA.

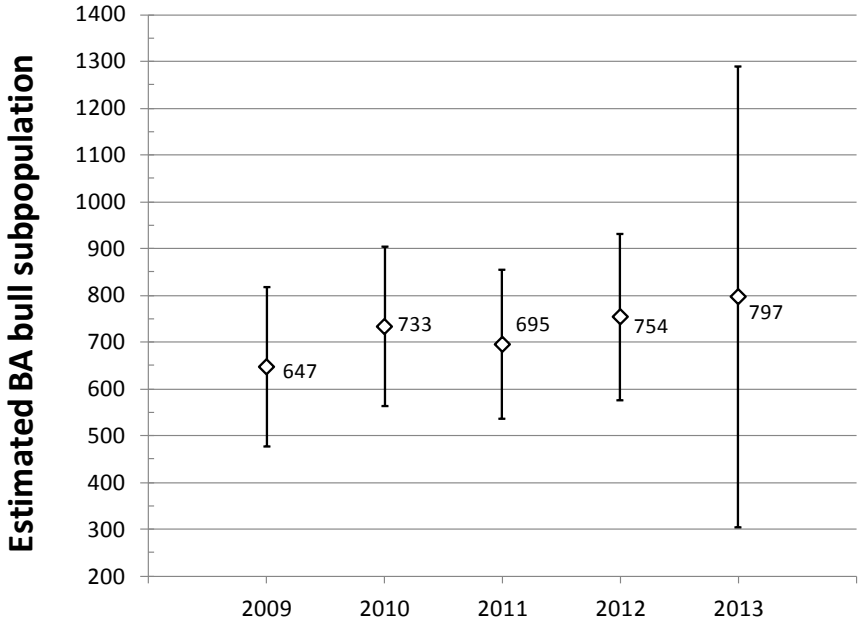

Figure 34. Mark-resight estimates (2009-2012 = LNME; 2013 = Lincoln-Petersen) for total branch-antlered bull elk (± 95% CI) in the 5-GMU study area, 2009-2013, Mount St. Helens, WA.

Detection rates for radiomarked elk, estimated as the derived parameter μ under the fully parameterized, sex-specific, LNME model (Table 6) were generally higher for radiomarked cows than for bulls (Table 7). Estimated detection for cows ranged 0.43-0.64 across surveys; 6 of 8 estimated detection rates for radiomarked cow elk were >0.50. Estimated detection for bulls ranged 0.28-0.56 across surveys; only 3 of 8 detection rate estimates for radiomarked bulls exceeded 0.50. Under the best sex-specific model, which had a single detection rate parameter for cows and a single parameter for bulls, μ = 0.54 (95% CI = 0.49-0.59) for radiomarked cows and μ = 0.44 (95% CI = 0.36-0.54) for radiomarked bulls.

Table 7. Estimated detection rates for radiomarked elk from the fully parameterized, sex-specific LNME mark-resight model, 2009-2012, Mount St. Helens, WA.

Year	Session	Sex	Estimated detection (μ_i)	95% CI_{low}	95% CI_{high}
2009	1	F	0.64	0.48	0.77
2009	2	F	0.56	0.41	0.71
2010	1	F	0.56	0.42	0.68
2010	2	F	0.52	0.39	0.65
2011	1	F	0.49	0.38	0.61
2011	2	F	0.60	0.48	0.71
2012	1	F	0.52	0.39	0.64
2012	2	F	0.43	0.32	0.56
2009	1	M	0.38	0.15	0.68
2009	2	M	0.28	0.09	0.60
2010	1	M	0.51	0.26	0.75
2010	2	M	0.44	0.21	0.69
2011	1	M	0.56	0.34	0.75
2011	2	M	0.51	0.30	0.71
2012	1	M	0.39	0.20	0.63
2012	2	M	0.39	0.20	0.63

Among the 15 models in the candidate model set for data coded to 7 groups (GMU-specific cows, branch-antlered bulls in GMU 522, branch-antlered bulls in the other 4 GMUs), 2 models garnered >80% of the model weight (Table 8). The best model had 4 detection parameters (*i.e.*, cows in GMU 522, all other cows, bulls in GMU 522, and bulls in all other GMUs), a single heterogeneity parameter that applied to all groups across all years, and group and sex-specific abundance parameters. The second best model was similar, except that heterogeneity was modeled as sex-specific (Table 8). All the remaining models were at least 3.52 AIC_c units from the best-supported model.

Table 8. Model selection results for LNME mark-resight estimates of group-specific cow elk (5 groups = GMU) and branch-antlered bull elk (2 groups = mudflow and non-mudflow bulls), 2009-2012, Mount St. Helens, WA.

Model[a]	K[b]	AIC_c[c]	ΔAIC_c[d]	w_i[e]	Dev[f]
pF(522[g]), *pM*(grp), σ^2(.),*N*(grp × yr)	33	1041.28	0.00	0.58	967.18
pF(522), *pM*(grp), σ^2(sex),*N*(grp × yr)	34	1043.10	1.82	0.23	966.48
pF(.), *pM*(grp), σ^2(.),*N*(grp × yr)	32	1044.80	3.52	0.10	973.20
pF(.), *pM*(grp), σ^2(sex),*N*(grp × yr)	33	1046.45	5.18	0.04	972.35
pF(grp), *pM*(grp), σ^2(sex),*N*(grp × yr)	37	1047.24	5.97	0.03	962.94
pF(522), *pM*(grp), σ^2(.),*N*(grp × yr, M'[h])	30	1048.31	7.03	0.02	981.66
pF(.), *pM*(grp), σ^2(.),*N*(grp × yr, M')	29	1051.76	10.48	0.003	987.56
pF(522), *pM*(.), σ^2(sex),*N*(grp × yr)	33	1055.57	14.30	<0.001	981.47
pF(.), *pM*(.), σ^2(sex),*N*(grp × yr)	32	1058.94	17.67	<0.001	987.35
pF(522), *pM*(grp), σ^2(sex),*N*(grp × yr, F'[i])	31	1127.33	86.06	0.000	1058.22
pF(.), *pM*(grp), σ^2(sex),*N*(grp × yr, F')	30	1135.67	94.39	0.000	1069.03
pF(522), *pM*(grp), σ^2(.),*N*(grp × yr, F''[j])	27	1262.98	221.70	0.000	1203.63
pF(.), *pM*(grp), σ^2(.),*N*(grp × yr, F'')	26	1278.86	237.58	0.000	1221.92
pF(522), *pM*(grp), σ^2(.),*N*(grp)	12	1898.10	856.82	0.000	1873.05
pF(.), *pM*(grp), σ^2(.),*N*(grp)	11	1904.74	863.47	0.000	1881.86

[a] model structure (*pF* = cow detection probability; *pM* = bull detection probability; σ^2 = heterogeneity parameter; *N* = abundance estimate).

[b] number of unique model parameters.

[c] Akaike's Information Criterion, adjusted for small samples.

[d] difference in AIC_c units between $model_i$ and the best model.

[e] Akaike model weight.

[f] model deviance.

[g] unique cow detection parameter for GMU 522 cows.

[h] abundance for non-GMU 522 bulls constant across years.

[i] abundance for GMU 556 cows constant across years.

[j] abundance for GMU 556 and GMU 524 cows constant across years.

Model-averaged LNME estimates of cow elk abundance in the area we surveyed each year with replicated surveys, based on the model weights in Table 8, suggested a substantial decline in GMU 520 and 550 during 2009-2012 (Figure 35). In GMU 520, point estimates indicated a decline of more than 40% between spring 2009 and spring 2012. In GMU 550, the indicated decline over the same period was about 1/3. During 2009-2012, cow elk abundance estimates in GMU 522 (the mudflow) increased, then stabilized (Fig. 35). In GMU 524, cow elk abundance estimates declined substantially between spring 2009 and spring 2010, and then became relatively stable (Fig. 35). Model-averaged LNME estimates for GMU 556 followed the same qualitative pattern as we had seen for total elk and total cow elk (Figs. 32, 33); estimates declined from 2009 to 2010, increased in 2011, and declined again in 2012 (Fig. 36). Overall, in GMU 556, estimated cow elk abundance was slightly higher in the last spring we conducted replicated surveys (2012) than it had been in the first 2 springs of our work (2009, 2010). We did not attempt to generate Lincoln-Petersen estimates of abundance at the GMU scale for the single 2013 survey because the numbers of marked elk per GMU were too small by spring 2013 to justify this approach.

Under the best LNME model derived for the 7-group dataset, the derived detection rate estimates (μ_i) for radiomarked elk were higher for both cow elk and for branch-antlered bull elk in GMU 522 (and the other portions of the North Fork of the Toutle R. mudflow) than for the rest of the study area (Table 9). Estimated detectability for bulls in the managed forest was relatively low and less than half that of mudflow bulls. LNME estimates for bull abundance were relatively stable 2009-2012 for both mudflow bulls and the forested subarea bulls (Fig. 37).

Table 9. Estimated detection rates for radiomarked elk from the best-supported, group-specific LNME mark-resight model, 2009-2012, Mount St. Helens, WA.

Group	Estimated detection (μ_i)	95% CI_{low}	95% CI_{high}
Cows (GMU≠522)	0.52	0.46	0.57
Cows (GMU=522)	0.67	0.56	0.77
BA bulls (GMU≠522)	0.33	0.24	0.44
BA bulls (GMU=522)	0.71	0.55	0.84

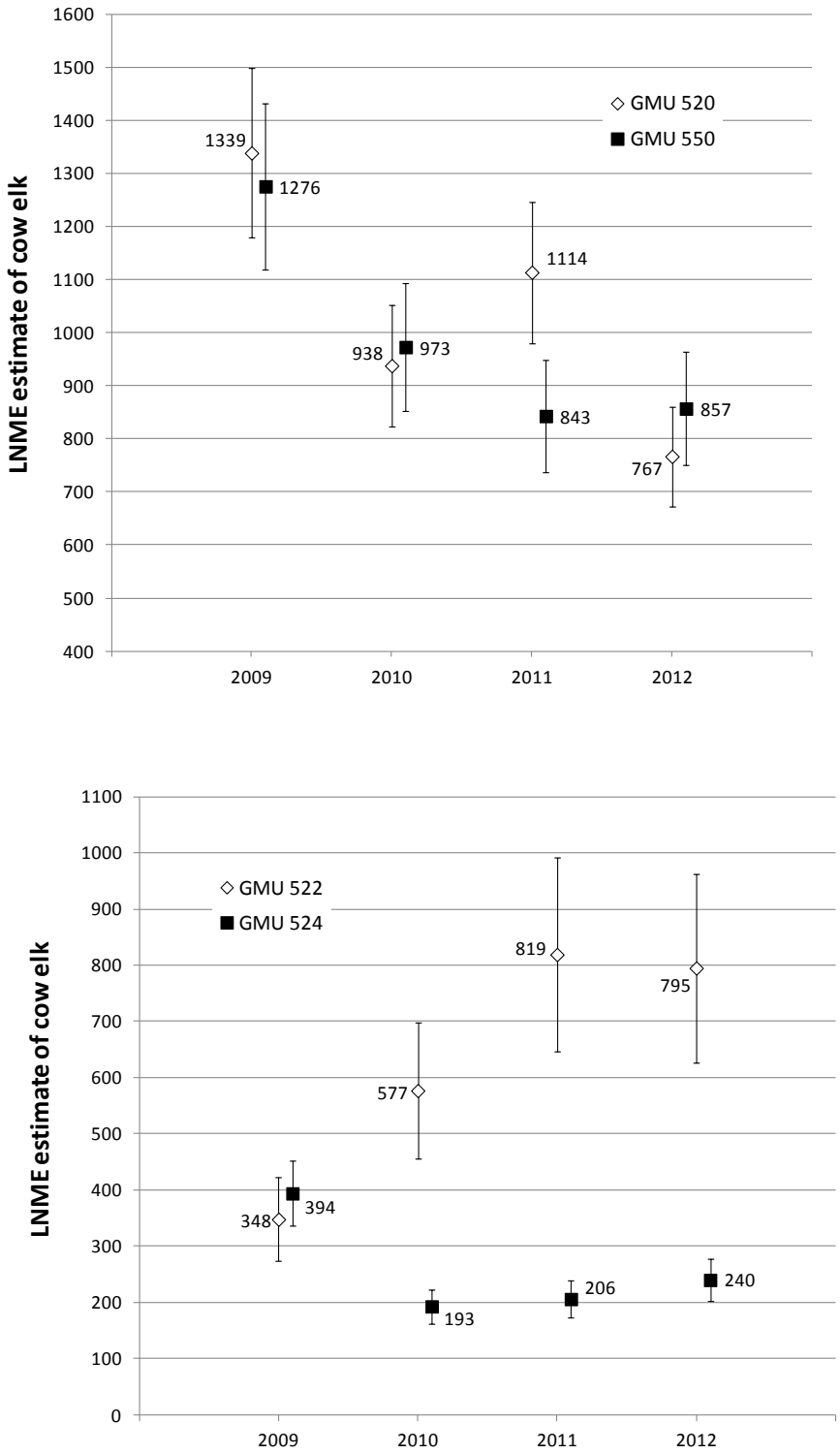

Figure 35. LNME Mark-resight estimates, 2009-2012, for total cow elk (± 95% CI) in GMUs 520 and 550 (top panel); 522 and 524 (bottom panel), Mount St. Helens, WA.

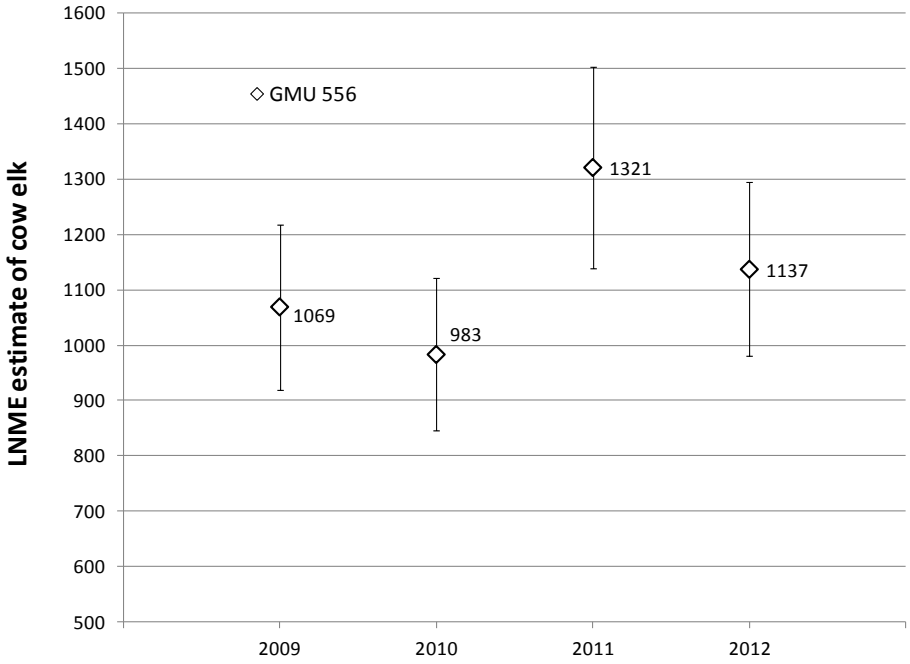

Figure 36. LNME Mark-resight estimates, 2009-2012, for total cow elk (± 95% CI) in GMU 556, Mount St. Helens, WA.

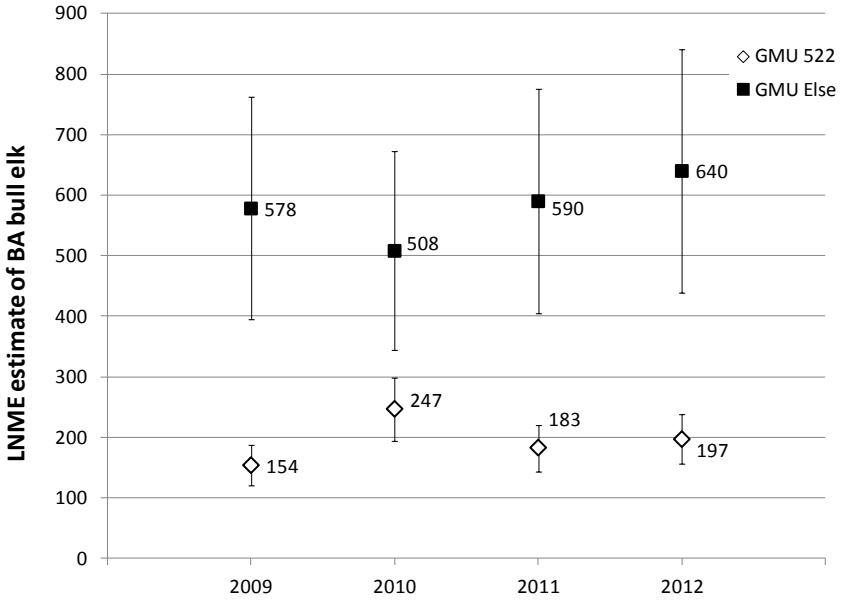

Figure 37. LNME Mark-resight estimates, 2009-2012, for total branch-antlered bull elk (± 95% CI), Mount St. Helens, WA.

Rate of Increase and Method Contrast

The series of annual estimates indicated a slight decline (negative rate of increase) for total elk abundance and total cow elk abundance using sightability model estimates, 2009-2013 (Table 10). By GMU, cow elk numbers declined substantially (≈ -20%) in GMUs 520, 524, and 550 using sightability model estimates. Cow elk abundance increased in GMU 522 and appeared relatively stable in GMU 556 using the sightability model estimates. For the mark-resight estimates, 2009-2012, total elk abundance trend was relatively flat and slightly negative for all cow elk (Table 10). For GMU 520, 524, and 550 cow elk, the mark-resight estimates indicated a substantive decline (≈-15%); the trend for GMU 522 mark-resight cow estimates was substantially positive and for GMU 556 cows was modestly positive (Table 10).

Table 10. Estimated group-specific, exponential rate of increase (r), Mount St. Helens, WA. Sightability model estimates (2009-2013); LNME mark-resight estimates (2009-2012).

Abundance	r	95% CI_{low}	95% CI_{high}
Sightability model			
All elk	-0.04	-0.13	0.04
All cow elk	-0.06	-0.13	0.01
GMU 520 cows	-0.21	-0.36	-0.05
GMU 522 cows	0.19	0.06	0.33
GMU 524 cows	-0.18	-0.28	-0.08
GMU 550 cows	-0.20	-0.27	-0.12
GMU 556 cows	0.01	-0.09	0.11
LNME mark-resight			
All elk	0.01	-0.09	0.12
All cow elk	-0.02	-0.11	0.07
All cow elk (2009-2013)	-0.08	-0.21	0.06
GMU 520 cows	-0.15	-0.30	-0.001
GMU 522 cows	0.28	0.11	0.45
GMU 524 cows	-0.15	-0.43	0.14
GMU 550 cows	-0.13	-0.22	-0.05
GMU 556 cows	0.05	-0.07	0.16

The mark-resight estimates for GMU-specific cow abundance across years, 2009-2012, were highly correlated (Pearson's $r \geq 0.94$; $P < 0.001$) with sightability model estimates (from first and second session replicates, and means of the 2) (Fig. 38).

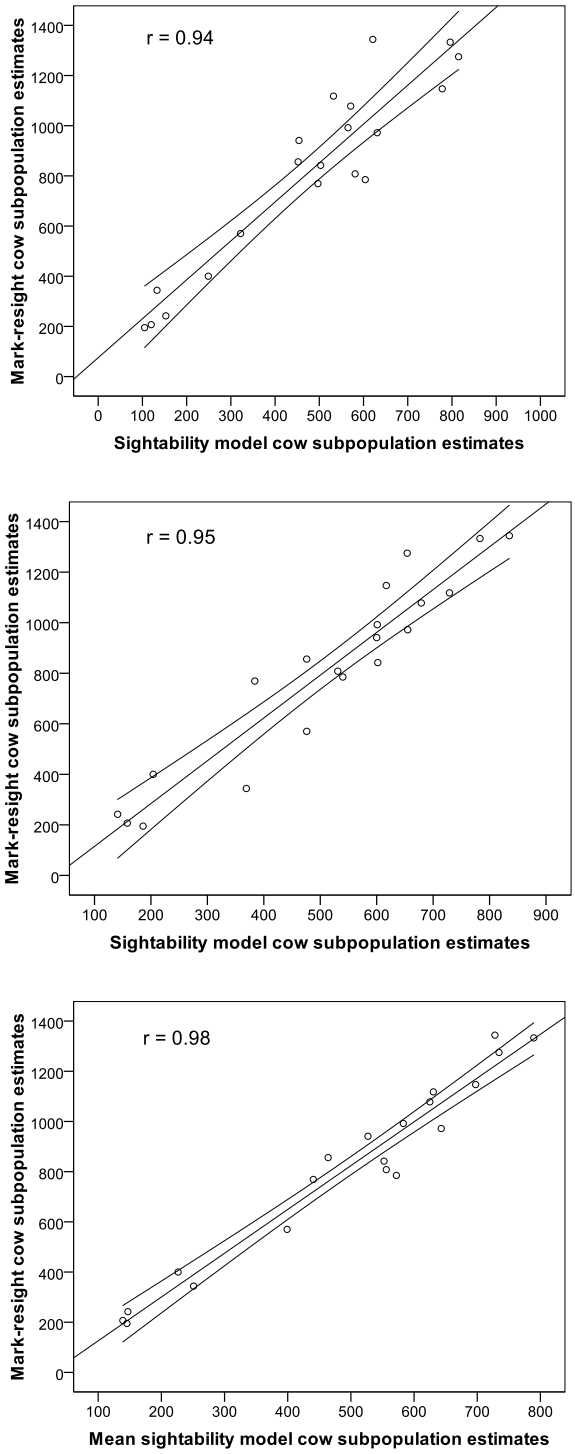

Figure 38. Correlation between Sightability Model (SM) estimates and LNME mark-resight estimates for cow elk abundance, 2009-2012 (panels are, top to bottom: for first survey replicate SM estimate, second survey SM estimate, and the means of the 2 annual SM estimates).

Recruitment

Annual observed spring calf recruitment across the entire 5-GMU study area varied considerably during 2009-2013, with estimates exceeding 40 calves per 100 cows in 2010 and 2011 and an estimate < 25 calves per 100 cows in 2013 (Fig. 39).

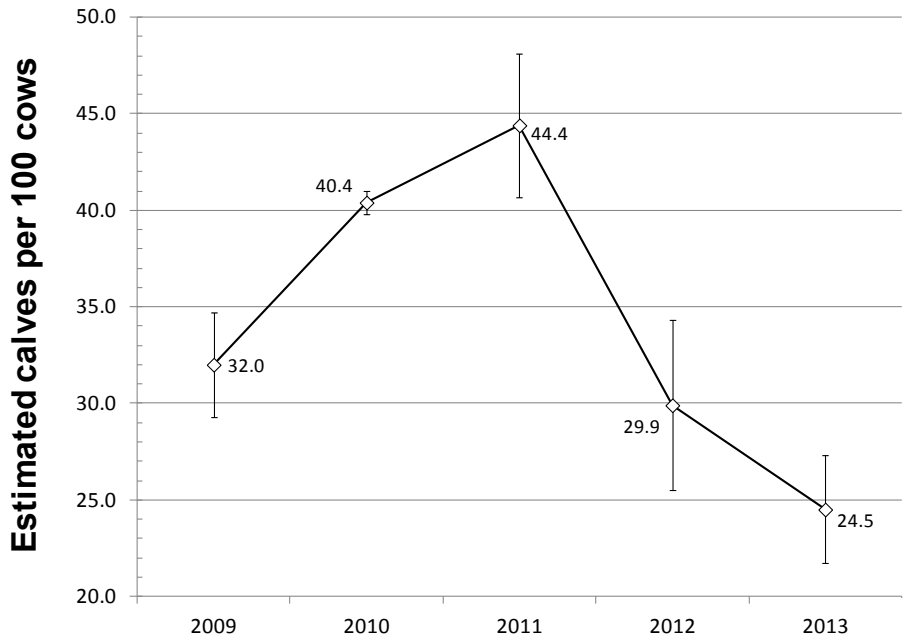

Figure 39. Elk calf-cow spring ratio estimates (plus 95% CI), 2009-2013, for the 5-GMU survey area, from aerial surveys, Mount St. Helens, WA.

In most of the 5 GMUs, the observed pattern was qualitatively similar to the landscape-level pattern. In 2011, the highest calf ratio estimates across the time series occurred in GMUs 520, 522, 524, and 550 (Fig. 40). The highest estimate in GMU 556 occurred in 2010. In all GMUs except 520, the observed ratios were relatively high in 2010 and 2011 and relatively low in 2009, 2012, and 2013 (Fig. 40). After adjusting the observed GMU-specific spring calf ratios for antlerless elk harvest the previous fall, the derived calf recruitment indices followed a relatively consistent pattern across all 5 GMUs (Fig. 41). Adjusting for antlerless harvest mostly had the effect of aligning the GMU 520 pattern to those of the other 4 GMUs, and aligning the indices for 2012 and 2013 across GMUs.

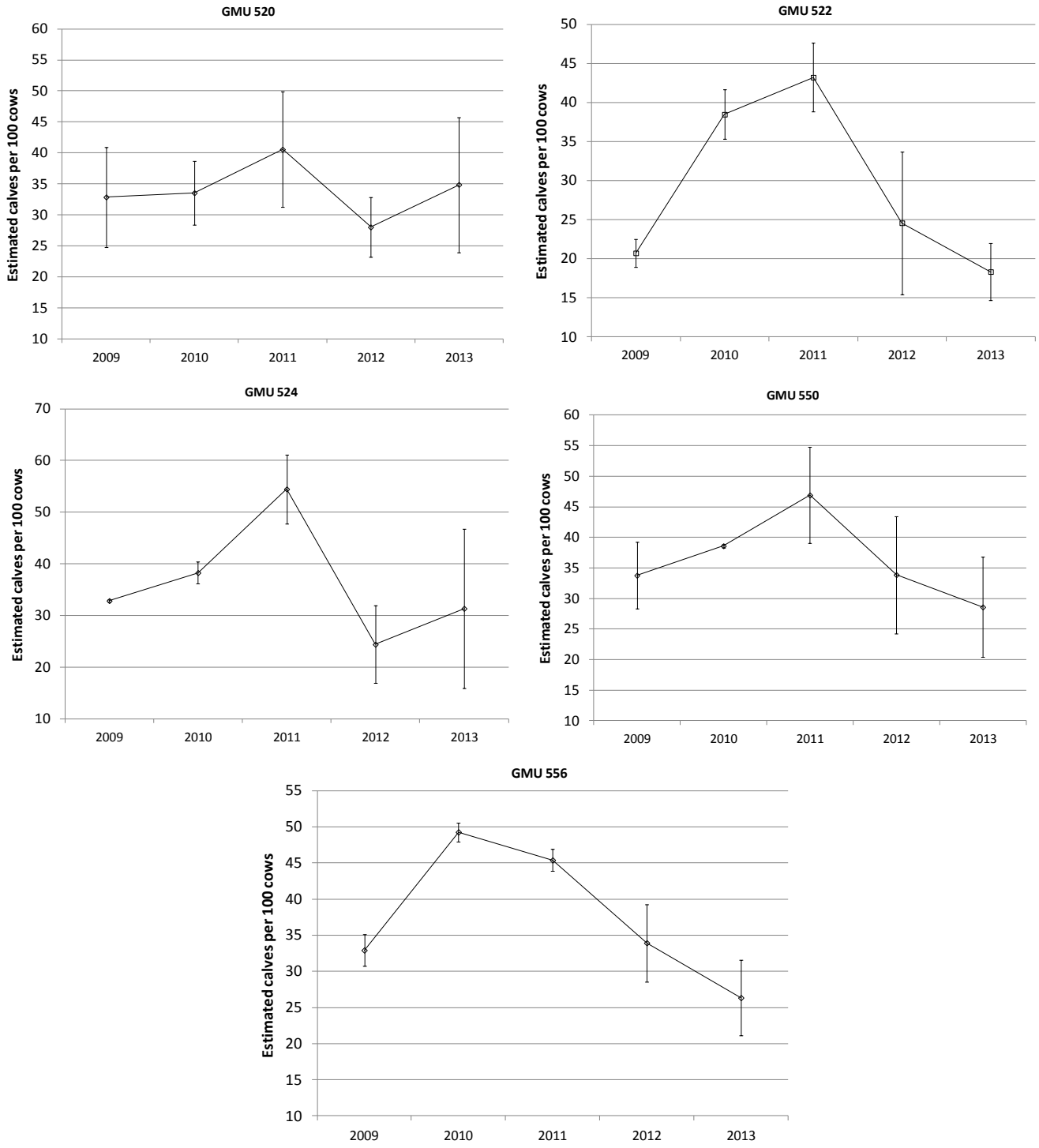

Figure 40. GMU-specific elk calf-cow spring ratio estimates (plus 95% CI), 2009-2013, from aerial surveys, Mount St. Helens, WA.

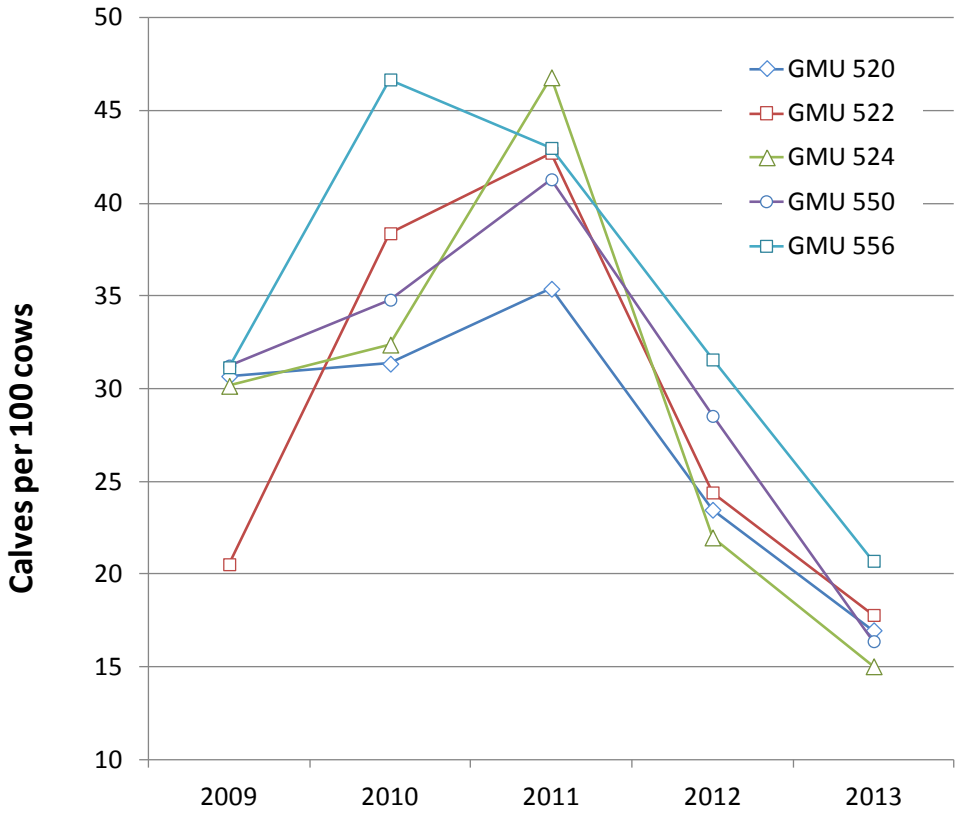

Figure 41. GMU-specific elk calf-cow spring ratio index (observed ratio adjusted for fall antlerless harvest), 2009-2013, Mount St. Helens, WA.

Survival

Over the course of the study, the sample sizes of elk at risk were relatively similar during the last 3 survival years; the sample of radiomarked elk was smaller in the first survival year in our analysis. We documented the deaths of 79 radiomarked elk (Fig. 42). Deaths per year ranged from 14 (2009-2010) to 31 (2012-2013). The numbers of elk killed by hunters were relatively stable (*n* = 9-13) across years, but the number of elk dying of natural causes was much higher in the last year of the study than in the first 3 years (Fig. 42). The results suggested that the final survival year (2012-2013) was typified by a particularly high loss of radiomarked elk, relative to other years. The

natural mortalities during 2012-2013 were spread across all 5 GMUs (*i.e.*, were not limited to mudflow elk).

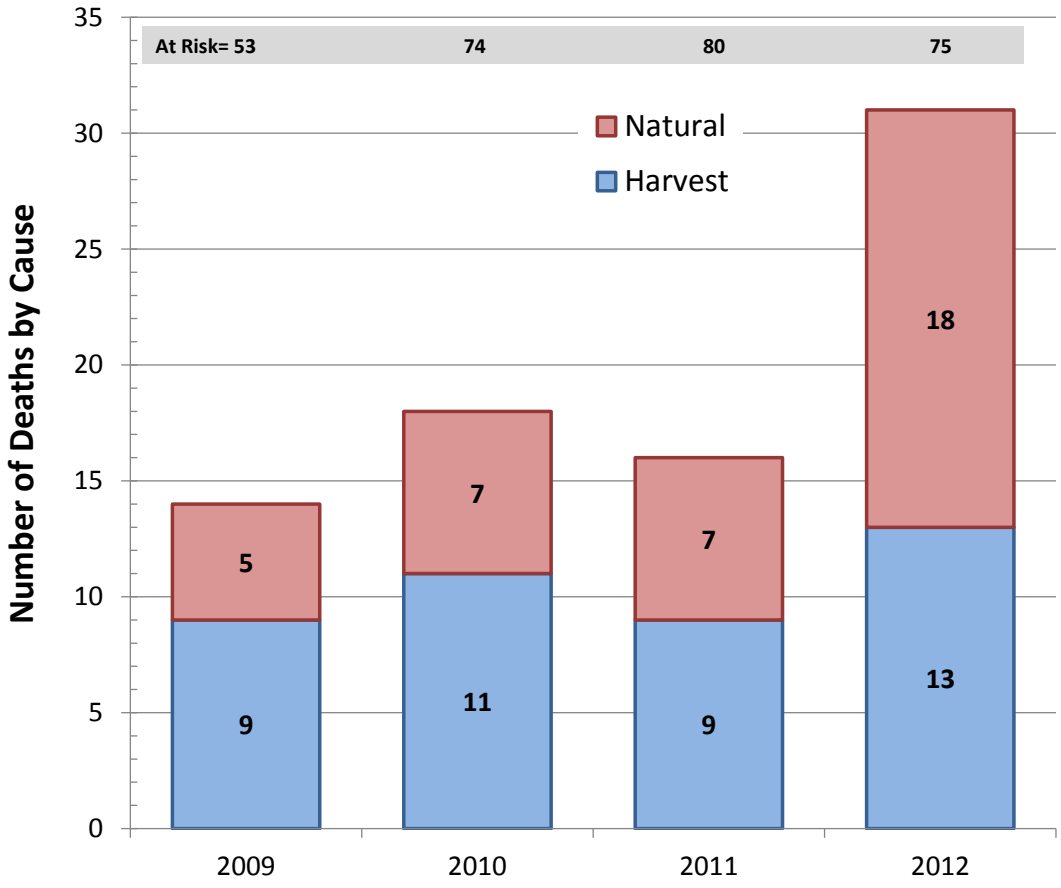

Figure 42. Total radiomarked elk deaths by cause, Mount St. Helens, Washington, survival years 2009-2012. Sample size of collared elk at risk at the beginning of each survival year is shown at the top of the panel.

Among the candidate models in our survival model set, 2 models accounted for 68% of the available model weight; the best model accounted for 50% of the weight and the next best model garnered 18% of the model weight (Table 11). The best model had a common cow survival parameter for GMUs 520, 522, 524, and 556 that was constant during 2009-2011, a common cow survival parameter for all GMUs during the last survival year (2012), a unique survival parameter for GMU 550 cows during 2009-2011, and constant bull survival across years. The second-best model differed only in that it

had a unique 2012 survival parameter for GMU 550 cows. All of the remaining models were at least 2.88 AIC*c* units from the best supported model and were not competitive with the best-supported model.

Table 11. Model selection results for radiomarked elk survival, Mount St. Helens, 2009-2013.

Model	k^a	ΔAIC_c^b	w_i^c	Deviance
Ad F (year,GMU $model_1^d$), Ad M (.)	4	0.00	0.50	26.63
Ad F (year,GMU $model_2^e$), Ad M (.)	5	2.07	0.18	26.61
Ad F (year,GMU $model_3^f$), Ad M (.)	7	2.88	0.12	23.22
Ad F (year,GMU $model_2$), Ad M (2012≠else)	6	4.10	0.06	26.55
Ad F (year,GMU $model_3$), Ad M (2012≠else)	8	4.95	0.04	23.16
Ad F (2012≠else), Ad M (.)	3	4.96	0.04	33.66
Ad F (year,GMU $model_4^g$), Ad M (.)	5	6.02	0.02	30.57
Ad F (2012≠else), Ad M (2012≠else)	4	6.96	0.02	33.59
Ad F (year,GMU $model_5^h$), Ad M (.)	4	7.01	0.01	33.64
Ad F (year,GMU $model_6^i$), Ad M (.)	5	8.21	0.01	32.76
Ad F (year), Ad M (year)	8	13.80	0.001	32.01
Ad F (year,GMU $model_7^j$), Ad M (.)	5	14.87	<0.001	39.42
Ad F (.), Ad M (.)	2	17.65	<0.001	48.39
Ad F (GMU), Ad M (.)	6	20.65	<0.001	43.10
Ad F (year,GMU), Ad M (year)	24	27.32	<0.001	08.96

[a]Number of unique parameters in model.

[b]AIC_c difference between best model and $model_i$.

[c]Akaike model weight.

[d]GMU_{all} 2012≠$GMU_{520,522,524,556}$ 2009-2011≠GMU_{550} 2009-2011.

[e]GMU_{550} 2012≠GMU_{else} 2012≠$GMU_{520,522,524,556}$ 2009-2011≠GMU_{550} 2009-2011.

[f]GMU_{550} 2009≠2012≠2010=2011≠GMU_{else} 2009≠2012≠2010=2011.

[g]GMU_{520} 2012≠GMU_{else} 2012≠$GMU_{522,524,550,556}$ 2009-2011≠GMU_{520} 2009-2011.

[h]GMU_{550} 2012≠GMU_{else} 2012≠GMU_{all} 2009-2011.

[i]$GMU_{520,550}$ 2012≠ GMU_{else} 2012≠$GMU_{520,550}$ 2009-2011≠GMU_{else} 2009-2011.

[j]GMU_{550} 2011=2012≠ GMU_{else} 2011=2012≠GMU_{550} 2009-2011≠GMU_{else} 2009-2011.

Model-averaged annual survival estimates were modest (0.84-0.86) for adult cows in GMUs 520, 522, 524, and 556 for the 3 survival years beginning in 2009-2011 (Table 12). Estimated cow survival was substantially lower (0.52) across those GMUs in the survival year beginning in 2012, and was relatively low (0.51- 0.66) in all 4 years for GMU 550 cows (Table 12). Estimated annual survival for branch-antlered bulls was 0.55-0.56 across years. Most survival estimates were relatively precise, but estimated cow survival for the last survival year and estimates across years for GMU 550 cows had relatively wide confidence intervals. Under the best supported model from Table 11, annual cow survival was estimated to be 0.85 (95% CI = 0.78-0.91) during 2009-2011 in GMUs 520, 522, 524, and 556. During the same years, cow survival was estimated at 0.64 (95% CI = 0.48-0.78) in GMU 550. Under the best model, cow survival in the final survival year (2012-2013) was estimated to be 0.52 (95% CI = 0.38-0.65) across all 5 GMUs. Branch-antlered bull survival under the best model was estimated to be 0.56 (95% CI = 0.43-0.67) across years.

Table 12. Model-averaged annual survival estimates (*S*-hat) and associated unconditional 95% confidence intervals for radiomarked Mount St. Helens elk for 4 survival years using the models and Akaike model weights from Table 11. All estimates are for radiomarked adult cow elk, unless specified otherwise.

Year	GMU	*S*-hat	95% CI for *S*-hat
2009	520	0.86	0.73-0.93
2010	520	0.84	0.75-0.91
2011	520	0.84	0.75-0.91
2012	520	0.52	0.38-0.66
2009	522	0.86	0.73-0.93
2010	522	0.84	0.75-0.90
2011	522	0.84	0.75-0.90
2012	522	0.52	0.38-0.66
2009	524	0.86	0.73-0.93
2010	524	0.84	0.75-0.90
2011	524	0.84	0.75-0.90
2012	524	0.52	0.38-0.66
2009	550	0.64	0.41-0.82
2010	550	0.66	0.47-0.82
2011	550	0.66	0.47-0.82
2012	550	0.51	0.28-0.74
2009	556	0.86	0.73-0.93
2010	556	0.84	0.75-0.90
2011	556	0.84	0.75-0.90
2012	556	0.52	0.38-0.66
2009	BA bulls[a]	0.56	0.43-0.68
2010	BA bulls	0.56	0.43-0.68
2011	BA bulls	0.56	0.43-0.68
2012	BA bulls	0.55	0.41-0.69

[a] Branch-antlered bulls.

Hoof Disease Observations

Although elk hoof disease remains an extremely important management issue in southwest Washington, our study's scope did not include evaluating the condition's etiology, prevalence, or distribution. As described in the Methods section, the elk marking and monitoring design also was not intended to quantify the condition's specific effects on elk population dynamics nor its long-term implications for elk management. Limited information, however, was obtained regarding the short-term fates of elk that had various presentations of hoof pathology when we captured them for radiomarking (inadvertently). During 2009-2012, we handled 16 elk with some hoof irregularity (Table 13). The hoof issues we observed ranged from minor overgrowth of the keratinized portion of the hoof (often colloquially called "elf slipper" or "scissor hooves") to substantial ulceration (typically between the toes). Most of the elk we handled with hoof issues did not die in the very near-term, typically surviving for at least a year or more; several survived for the duration of the study or the duration of the time we were able to monitor their fates (*i.e*., until collar drop for GPS-instrumented elk) (Table 13).

Because of increasing concerns about the prevalence of hoof disease during the latter portion of our study and because we detected a substantial number of previously unreported mortalities of radiomarked elk just prior to our last surveys associated with this study (spring 2013), we attempted to locate the carcasses of all radiomarked elk transmitting mortality signals as of April 2013, following our survey flights. Of the 19 elk transmitting mortality signals, 1 was located at a residence (*i.e*., unreported harvest) and 6 had been dead too long to reliably determine cause of death (*e.g*., could not rule out wounding loss from fall 2012 hunting seasons). Of the remaining 12, a minimum of 9 showed physical evidence of malnutrition, and malnutrition was suspected as the cause of death for the other 3 based on time-of-death and location; 3 of the 9 elk known to have succumbed to malnutrition had moderate-to-severe hoof disease (2 had 2 foot involvement, 1 had a single affected hoof), and 2 had a minor hoof deformity on 1 foot. Thus, among the mortalities of radiomarked elk we investigated in April 2013, most appeared to be linked to malnutrition. A small number of these instances may have

involved hoof disease as a contributing factor, but most apparently were unrelated to any hoof affliction.

Table 13. Fates of elk with any visible hoof issue at capture among those elk radiomarked 2009-2012, Mount St. Helens, WA.

Marked	Condition	Fate
Feb 2009	Moderate hoof disease	Hunter-kill fall 2009
Feb 2009	Moderate hoof disease	Survived winter ‘09-‘10; dead by spring 2011
Feb 2009	Scissor hooves	Survived until winter ’12-‘13
Feb 2009	Scissor hooves	Contact lost winter ’11-’12; alive until then
Feb 2009	Scissor hooves	Still alive as of spring 2013
Feb 2009	Scissor hooves	Hunter-kill fall 2009
Feb 2009	Scissor hoof	Hunter-kill fall 2009
Feb 2009	Clubbed hoof	Hunter-kill fall 2009
Feb 2009	Scissor hoof	Hunter-kill fall 2010
Feb 2011	Moderate hoof disease	Alive at GPS collar drop May 2012
Feb 2011	Moderate hoof disease	Alive at GPS collar drop May 2012
Feb 2011	Moderate hoof disease	Alive at GPS collar drop May 2012
Feb 2012	Severe hoof disease	Still alive as of spring 2013
Feb 2012	Moderate hoof disease	Still alive as of spring 2013
Feb 2012	Moderate hoof disease	Still alive as of spring 2013
Feb 2012	Severe hoof disease	Survived winter ’11-’12; missing by spring 2013

Environmental Effects

Among potential response variables, we found significant correlations between observed calf ratio and the harvest-corrected calf ratio index (r = 0.99, P = 0.001), between the overwinter mortality index and both the observed calf ratio (r = -0.81, P = 0.10) and the calf ratio index (r = -0.82, P = 0.09), and between fall IFBF estimated from harvested cow elk organ sets and both the observed calf ratio (r = 1.0, P = 0.001) and the calf ratio index (r = 1.0, P = 0.03). We did not find significant correlations between

the overwinter mortality index and either fall IFBF from the organ sets (r = -0.60, P = 0.59) or mid-winter IFBF estimated for live-captured elk (r = 0.62, P = 0.38); mid-winter IFBF for live elk was also not correlated with observed calf ratios (r = -0.03, P = 0.97), the corrected calf ratio index (r = 0.03, P = 0.98), or the fall IFBF estimates from harvested elk organs (r = 0.25, P = 0.84). Among these response variables, the organ-based fall estimates of IFBF represented only 3 data years, so the correlations involving those data derived from only 3 bivariate data points.

Live elk IFBF estimates were not significantly correlated with any of the spring-summer-fall precipitation metrics (r = -0.35-0.68, P = 0.33-0.96). Live elk IFBF, was also not correlated with early winter SWEs (r = 0.80, P = 0.20) and the sign of this nonsignificant correlation coefficient for the relationship was nonsensical (*i.e.*, as early winter snowfall increased, mid-winter body fat estimates increased). Based on only 3 data points (*i.e.*, years), fall IFBF derived from harvested elk organ sets was correlated with the slope of a fitted regression line to late summer-fall precipitation (r = 1.0, P = 0.07, and the sign of the relationship was sensible), but was not significantly correlated with early summer precipitation (r = 0.62, P = 0.58), total late summer-fall precipitation (r = 0.90, P = 0.29), or total spring-summer-fall precipitation (r = 0.85, P = 0.35).

The observed calf ratios and the calf recruitment indices were strongly related to late summer-fall precipitation; annual calf recruitment was higher in springs with greater precipitation (and the rate of daily precipitation accumulation) occurring during the previous late summer and early fall (Fig. 43). More than 90% of the variation in the annual calf recruitment indices was explained by the late summer-fall precipitation metrics. The spring calf recruitment metrics were not correlated with early summer precipitation (r = 0.21-0.25, P = 0.69-0.74) or with total spring-summer-fall precipitation (r = 0.65-0.69, P = 0.20-0.23). Likewise, calf recruitment was weakly correlated with SWEs for the early winter (r = -0.33 to -0.37, P = 0.54-0.59), late winter (r = -0.37 to -0.43, P = 0.47-0.54), and full winter periods (r = -0.33 to -0.38, P = 0.52-0.59).

The overwinter mortality index was poorly correlated with the previous early summer (r = -0.49, P = 0.33), late-summer fall (r = -0.30, P = 0.57) and total spring-summer-fall precipitation (r = -0.53, P = 0.28). Overwinter mortality was, however,

correlated with late winter and full winter SWEs (r = 0.87, 0.81; P = 0.02, 0.05). Overwinter mortality was not as strongly correlated with early winter SWEs (r = 0.66, P = 0.16). Overwinter mortality appeared to be related (P = 0.03) to late winter snowfall nonlinearly (Fig. 44), although a linear fit was also significant (r^2 = 0.86, P = 0.008).

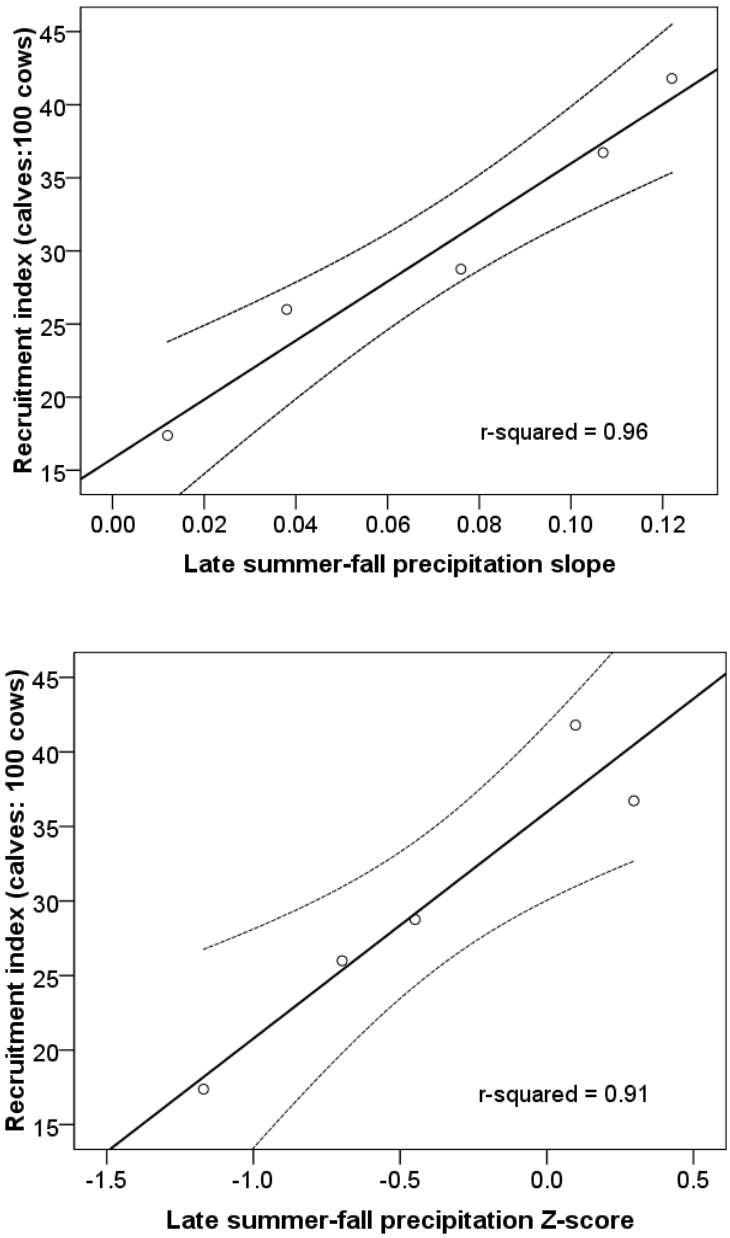

Figure 43. Linear fits of indexed spring calf-cow ratio to late summer-fall precipitation metrics, Mount St. Helens elk herd, 2009-2013.

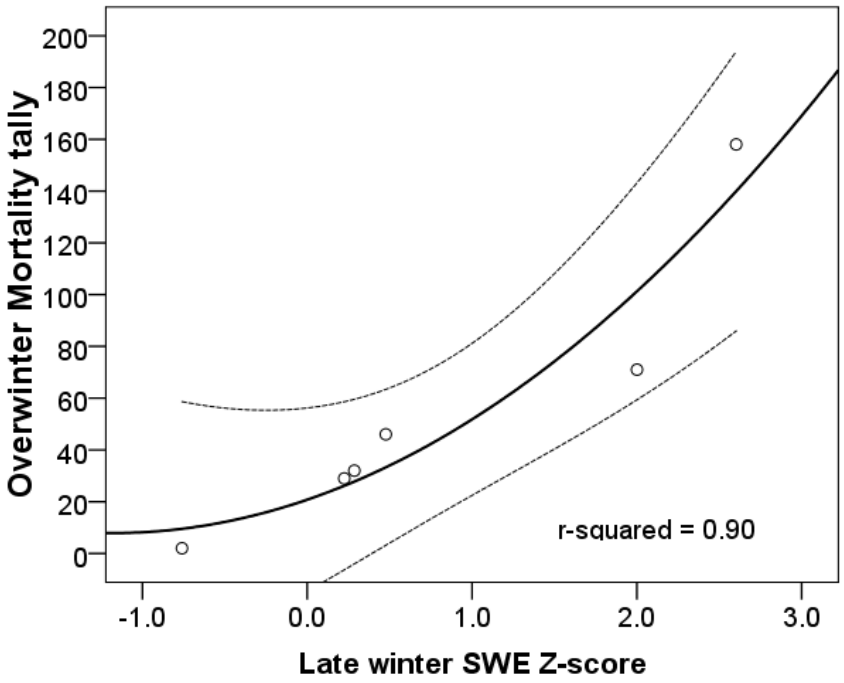

Figure 44. Non-linear fit of a spring overwinter mortality index to Z-scores for late winter snow water equivalents (SWE) measured at Spirit Lake, 2008-2013.

Combining the Z-scores for winter and previous late summer-fall weather severity *(i.e.*, relative winter snowfall and late summer-fall droughtiness) into a cumulative weather severity index did not improve the fit (*i.e.*, did not increase the r^2) to spring calf recruitment or overwinter mortality indexed in the spring (Fig. 45). Assuming the linear model, the residuals for the calf ratio index in 2011 and the mortality indices in 2008 and 2013 were larger than expected (Fig. 45). Because spring calf:cow ratios were unavailable prior to survey modifications made under this study, no data were available prior to the spring of 2009. The overwinter mortality survey predated our study, so an additional year of data (*i.e.*, spring 2008) was available for overwinter mortality relative to calf recruitment (Fig. 45).

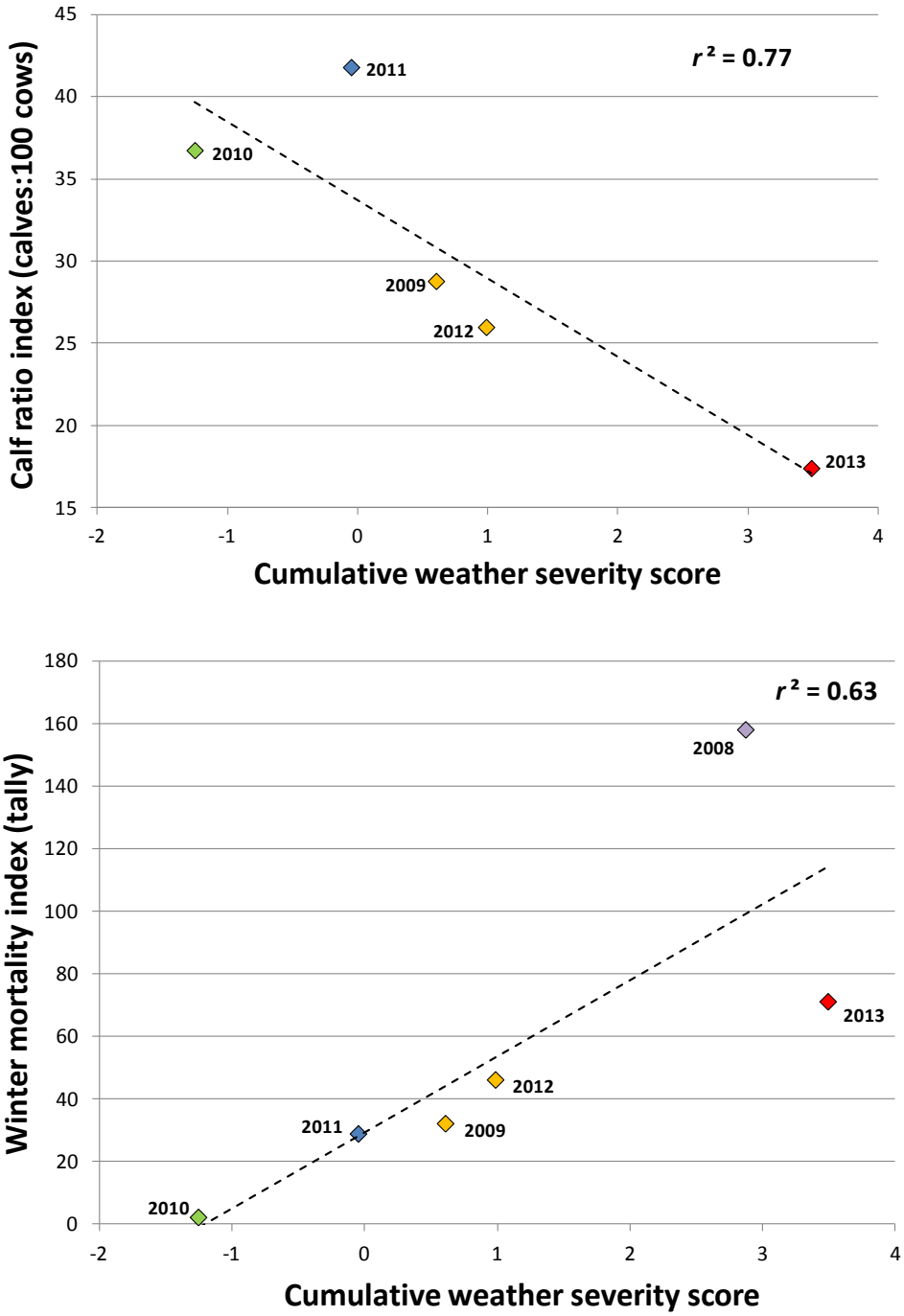

Figure 45. Linear fit of spring calf recruitment and overwinter mortality tallies to a combined index of current winter and previous late summer-fall weather severity. Marker colors: green = mild winter following normal summer; blue = normal winter and summer; yellow = normal winter and wet summer; purple = severe winter and normal summer; red = severe winter and droughty summer.

DISCUSSION

Our work was initially motivated by a need to better quantify elk abundance and demographics in the Mount St. Helens elk herd. Prior to our work, abundance estimates were attempted using the Sex-Age-Kill (SAK) model, a population reconstruction approach originally derived for white-tailed deer (*Odocoileus virginianus*) monitoring in the upper mid-west decades ago. The SAK model employs harvest data and additional demographic information (*e.g.*, sex and age ratios) to reconstruct pre-harvest population size (Bender and Spencer 1999). Unfortunately, model outputs are very sensitive to assumption violations and parameter inputs that are rarely estimated well (*e.g.*, the bull harvest mortality rate), often resulting in erratic performance and poor precision in the final abundance estimates (Millspaugh et al. 2009). Attempts to use the SAK model to estimate elk abundance at Mount St. Helens frequently produced biologically implausible results, and its use was eventually abandoned. (P. Miller, WDFW, personal communication).

As we initiated our work, it was apparent that the scale of the herd area made it infeasible to attempt to estimate total elk population size for the herd. Because these elk share a contiguous distribution with other elk in southwest Washington (*e.g.*, Willapa Hills and South Rainier elk), the absence of a clearly defined biological population also rendered estimating total population size for the Mount St. Helens elk herd an indefensible goal. Therefore, we selected a 5-GMU subarea as our focal study area, with the intent of deriving estimates of population size or relative population size (*i.e.*, an index) for this area. The 5-GMU study area represented an important core area for the Mount St. Helens elk herd that geographically captured most of the important elk management challenges for this herd (*e.g.*, overwinter mortality, potentially excessive elk density, elk herbivory impacts, hoof disease). Despite that our study area was a limited subarea of the overall herd range, it was still a very large area that presented substantial challenges for quantifying elk abundance and for developing a long-term monitoring strategy.

In selecting a limited core subarea of the overall herd range, we recognized that estimates across years would be subject not only to demographic processes (*i.e.*,

natality and survival), but also movement (see Kendall 1999). Elk that were alive and present outside of our surveyed area in one year, might well be within the surveyed area boundary on a different year (see also Gould et al. 2005). Given that we surveyed elk each year in late winter / early spring, we expected movement to potentially influence our sampling year-to-year to some degree based on winter severity. This potentially added additional complexity to making inference about elk population trend, but alternatives were untenable. However, we believe the relatively large size of the area we sampled each winter reduced the effects of year-to-year movement and distribution on abundance inference, but did not eliminate these effects (see more on this below).

It was impractical, both fiscally and from the perspective of getting enough consecutive flyable weather days, to survey the entire study area with tightly spaced linear transects to obtain full, uniform coverage. Such an approach would have wasted a lot of resources flying large, heavily forested tracts where elk would be almost impossible to detect and where elk densities would be predictably very low (Starkey at al. 1982, Witmer et al. 1985, Jenkins and Starkey 1996). So, we adopted an approach wherein we attempted to fly most of the winter-occupied habitat with predictably moderate to high elk use and where elk would be at least modestly detectable. The use of an in-flight computer-based mapping system that allowed us to keep track of where we had flown and where the targeted habitat patches (*e.g.*, clearcuts, meadows/wetlands, young second-growth, hardwood stands) were located allowed us to effectively move through our counting units with good coverage of areas that met our criteria. Clearly, we missed elk that were in densely forested conifer stands, but such stands far from more open habitat with high elk forage values were presumed to harbor low numbers of elk. Conifer stands that were in close proximity to more open habitats would also hide elk, but our assumption was that these elk regularly used nearby openings for foraging (confirmed by our radio-tracking data; see also Hanley 1983); on any given set of flights, these elk were assumed to have real, non-zero probabilities of being detectable in the open habitat components adjacent to the heavier cover patches.

We explored monitoring approaches that were oriented towards large extent surveys (*i.e*., data-based) rather than modeling approaches with less emphasis on actual field sampling (see Schwarz and Seber 1999 for a good general discussion of alternative designs). Both approaches we used—sightability-correction modeling and mark-resight—assumed elk groups often had detection rates <1.0. Imperfect detectability is common in aerial surveys of wildlife, including those of elk (Caughley 1974, Bartmann et al. 1986, Pollock and Kendall 1987, Samuel et al. 1987, Steinhorst and Samuel 1989, Gould et al. 2005, Barker 2008). Ignoring detectability predictably leads to biased estimates of abundance and other demographics, and good population monitoring programs must address the detection problem (Gardner and Mangel 1996, Pollock et al. 2002, Barker 2008, Tracey et al. 2008). Both sightability-correction and mark-resight models (an adaptation of mark-recapture methods; see White et al. 1982, Pollock et al. 1990) have been used previously in conjunction with aerial surveys of large ungulates (Samuel and Pollock 1981, Bartmann et al. 1987, Bear et al. 1989, Neal et al. 1993, Bowden and Kufeld 1995, Bleich et al. 2001, White and Shenk 2001, McCorquodale et al. 2013).

Regression-based sightability correction models are appealing because they require marked animals only during model development and usually require only slight modifications to data collection methods used in traditional composition surveys. The sightability correction model we derived is structurally similar to several other previously published models for elk (Samuel et al. 1987, Anderson et al. 1998, McCorquodale 2001, Gilbert and Moeller 2008, Jarding 2010, McCorquodale et al. 2013), wherein group size positively affected detectability of elk groups and canopy cover negatively influenced detectability. These are intuitive effects and suggest elk groups are missed more often when they are small and/or are shielded from view by trees and other concealing vegetation. Previous work in western Washington indicated that sightability model estimates were substantially lower than LNME mark-resight estimates (McCorquodale et al. 2013), and we had the same result at Mount St. Helens. Underestimation seems to be a predictable result with sightability models (Freddy 1998, Barker 2008), and appears to stem from the effect of low sightability groups; the method

does not account effectively for such groups (McCorquodale et al. 2013), but sightability models have validated well where most elk have reasonably high detection probabilities (Unsworth et al. 1990).

Mark-resight modeling represents a fundamentally different approach to imperfect detectability and is based on a well-developed body of literature (Otis et al. 1978, White et al. 1982, Pollock et al. 1990, Schwarz and Seber 1999, Barker 2008). Traditional sightability models assume the probability of detecting a group is constant over time (under specific levels of predictor variables) and the probability of sighting is estimated once, during model development; whereas, in mark-resight models, the probability of detection is potentially re-estimated during each resighting occasion. Mark-resight has proven to be a relatively robust and useful method for estimating abundance of large ungulate herbivores (Gardner and Mangel 1996, White and Shenk 2001,Gould 2005, McCorquodale et al. 2013), and the LNME model has been shown to well-suited for applications such as aerial elk surveys. However, at large spatial scales, models such as the LNME tend to be very impractical. The LNME model requires replicated surveys, physically marked animals (such as radiomarked individuals) perpetually, and the effort to individually identify marked animals observed during surveys. We believe the LNME model provided reasonable estimates of elk abundance during our work, and the detection rates we estimated were sufficient to expect a mark-resight application to perform acceptably (Neal et al. 1993). We do not believe, however, that mark-resight is a practical alternative for long-term monitoring of elk abundance on this landscape for the aforementioned reasons.

Our aerial survey data and abundance estimates derived from those data (both sightability model and mark-resight estimates) suggested a decline in total elk and total cow elk abundance during our 2009-2013 study. Trends appeared to vary spatially across our study landscape. Estimated abundance clearly declined substantially for GMUs 520 and 550, the west-most GMUs in our study area. Raw counts within counting units in GMUs 520 and 550 also suggested declines in total elk and total cow elk abundance within these GMUs were most pronounced in counting units furthest west. A declining trend was also suggested by counts and abundance estimates for

GMU 524. Across these units, declining abundance was most pronounced the last 2 years of the study, and data from spring 2013 were very important in defining the trend for several estimates. Estimated rates-of-increase were more strongly negative for GMUs 520, 524, and 550 using sightability model abundance estimates relative to mark-resight estimates, but this was largely because GMU-specific mark-resight estimates were only available for 2009-2012. By the spring of 2013, attrition of radiomarked elk left too few collared individuals available to support GMU-specific mark-resight estimates; the last collaring effort had been in February 2012.

Our data did not clearly indicate a decline in elk abundance, 2009-2013, in GMU 556, although raw counts and the sightability model point estimates for total elk and total cow elk abundance in the spring of 2013 were the lowest we observed for this GMU across the years of our study. Estimated rates-of-increase for total elk and total cow elk in GMU 556 were slightly above zero, and confidence intervals on these estimates included positive values, which would not support a conclusion that elk in GMU 556 had declined during our study. In GMU 556, estimated elk abundance rose in spring 2011 and 2012 relative to 2009 and 2010, then it declined in 2013. In fitting the rate-of-increase estimate to the data, the increase in 2011 from 2010 was largely responsible for the non-negative indicated trend. Raw counts for counting units west-most in GMU 556 suggested declines across the years of our study, whereas in the other counting units within GMU 556, only 2013 data suggested a decline.

Our data implied elk abundance was stable-to-increasing in GMU 522 during our study, in contrast to other parts of the landscape. Our 2009 estimates in GMU 522 were likely artificially low relative to 2010-2013 estimates because we adjusted the boundaries of our counting unit to include areas further upstream on the North Fork of the Toutle River between the 2009 and 2010 surveys. We consistently counted slightly less or more than 1,000 elk in GMU 522, during 2010-2013. In most winters, we observed elk groups upstream on the North Fork of the Toutle River all the way to the edge of the pumice plain near the volcano. Elk were typically fewer this far upstream, but they were consistently there, even during moderate-to-severe winters. Radiomarked elk movements did indicate some elk moved into GMU 522 from adjacent

GMUs, particularly from GMUs 524 and 556, to winter on the mudflow. It was apparent that our late winter counts of elk in GMU 522 were likely more affected by immigration of elk from other GMUs, than were counts in other GMUs. Nonetheless, we had no indication that wintering elk density in GMU 522 declined during our 5-year study.

Overall, our results suggested a substantive decline in elk abundance in our 5-GMU study area, 2009-2013. However, it was apparent that most of this decline occurred on the western half of the study area (particularly GMU 550 and the western 1/2 of GMU 520). For virtually every geographic scale of abundance estimates for total elk and total cow elk, the 2013 point estimate was the lowest estimate obtained 2009-2013, except for GMU 522 estimates. For total elk and total cow elk across the 4-GMU landscape (excluding GMU 522), 2013 estimated abundance was on the order of 30-35% lower than the 2009 estimates. GMU-specific sightability model estimates of total elk and total cow elk abundance were on the order of 60-70% lower in 2013 than in 2009 for GMUs 520 and 550, were ~40-60% lower for GMU 524, and were ~20-25% lower for GMU 556.

Relative to estimating absolute abundance, it was apparent that our sightability model routinely underestimated the numbers of elk at all geographic scales, compared to mark-resight estimates. Our sightability model estimates generally were about 50-70% of comparable mark-resight estimates. It was, however, encouraging to see that estimates from both methods supported very similar inference regarding trend. There was a very high correlation between corresponding sightability model and mark-resight estimates. There were data common to both estimates in the correlation analysis, although mark-resight estimates were a function of data from both replicate surveys and sightability model estimates were replicate-specific (*i.e.*, half of the data reflected in the mark-resight estimates were missing from each sightability model estimate). The way detectability was modeled in each method was also fundamentally independent; mark-resight modeled the detectability of individuals and mark-resight modeled detectability of elk groups as a function of what caused some groups to be missed. Mark-resight modeled detectability apart from any causative factor. Also, rate of increase estimates

were reasonably congruent between the 2 methods when the data times series were the same.

All of this suggested that although sightability model estimates were consistently underestimates of *absolute* abundance, the estimates supported apparently reliable trend inference. Essentially, sightability model estimates appeared to be a good index of *relative* abundance. It seems unlikely that management decisions based on a sightability model-derived index of abundance would be much different than decisions based on mark-resight estimates of absolute abundance, based on our data and analyses. Previously, sightability modeling appeared to perform erratically in northwestern Washington and was judged inferior to mark-resight (McCorquodale et al. 2013). However, the Nooksack elk population—the population that was the focus of the McCorquodale et al. (2013) work—was very small compared to the Mount St. Helens herd, and annual surveys of the Nooksack herd were characterized by only a few groups (<40 typically) being observed. When few groups are observed, the occasional detection of a group or 2 with low predicted sighting probabilities (*i.e.*, supporting large model corrections) dramatically affects overall estimates of abundance derived from a sightability correction model. At Mount St. Helens, a large number of elk groups (an order of magnitude more groups than typical of Nooksack herd surveys) are observed during each survey replicate, and this reduces the influence of a small number of low sightability groups being seen, should that occasionally occur. That is, the contribution of what are essentially *outlier* groups to the overall abundance estimates are dampened when many groups are typically observed.

Estimated annual survival rates for cow elk on our study area from our best-supported survival model and model-averaged GMU- and year-specific rates across the full model set were relatively high (c. $\hat{S}$ = 0.84-0.86) except for the last survival year (2012-2013) for all GMUs and cow elk in GMU 550 in all years. Annual adult cow survival of roughly $\hat{S}$ = 0.85 would potentially support a stable to increasing population if annual recruitment of calves to yearlings was at least 30 calves per 100 cows, assuming 50% of the recruited calves were females. In a previous study (1988-1993), annual survival for radiomarked cow elk at Mount St. Helens was estimated at $\hat{S}$ = 0.82

(Smith et al. 1994). During the same study, radiomarked cow elk survival was estimated at $\hat{S}$ = 0.86 on an Olympic peninsula study area. These rates are all lower than the $\hat{S}$ = 0.93 annual survival estimated for radiomarked cow elk in northwest Washington (McCorquodale et al. 2013) for an increasing population with limited antlerless harvest and lower than estimates of $\hat{S}$ = 0.89-0.96 for Roosevelt elk in western Oregon (Cole et al. 1997). Brodie et al. (2013) explored annual survival in a meta-analysis of 2,746 radiomarked Rocky Mountain elk (*C. e. nelsoni*) across 45 populations in western North America and derived estimates ranging $\hat{S}$ = 0.85-0.91, depending on the richness of carnivore assemblages across landscapes.

Our best-supported survival models indicated substantially lower annual survival among radiomarked adult cows in GMU 550 in all years and in all GMUs during 2012-2013. These rates ($\hat{S}$ = 0.51-0.66) would be associated with a declining population under even the best calf recruitment scenarios. This analysis indicated that during the last year of our study (2012-2013), adult cow mortality was high across the entire landscape. That this effect was likely real was further evidenced by the results of the spring overwinter mortality survey; the 2013 tally was the second highest in the last decade. The low survival estimate during 2012-2013 was also congruent with declines in raw elk counts and estimates of abundance stemming from the annual aerial survey in the spring of 2013. The last year of our study (2012-2013) was associated with a relatively high snowfall winter, a droughty summer-fall prior to winter, and a relatively high antlerless elk harvest in the fall of 2012.

Our tally of losses of radiomarked elk to non-hunting mortality was much higher the last year of our study relative to other years. This was congruent with the relatively high tally of unmarked elk deaths documented during the annual mortality survey and observations of a number of recently dead unmarked elk across the larger landscape during the aerial survey in spring 2013. As noted above, the environmental conditions—poor for both summer-fall and winter conditions—were predisposing for a challenging energetics scenario for elk. Based on post-mortem examinations of both radiomarked and unmarked elk, almost all of the winter-spring deaths were due to malnutrition. Some of these elk had clinical hoof disease of varying severity, but most

did not. Our data were not suitable for definitively addressing whether the presence of hoof disease substantively raises the risk of overwinter mortality for affected elk or not; our study design was not intended to address this question. Clearly, some elk are severely debilitated by the condition—others less so—leading to a seemingly logical assumption that some additional mortality risk is likely associated with advanced disease. The only information we have, however, derived from the fates of radiomarked elk, indicated that most of the small number of these elk known to have a hoof affliction survived for an extended time.

Annual survival among branch-antlered bulls, estimated from our models, was $\hat{S}$ = 0.56. This rate was similar to an annual survival estimate ($\hat{S}$ = 0.59) for bull elk managed under *limited entry* regulations in western Washington, a harvest strategy designed to yield modest bull mortality (Bender and Miller 1999) and was higher than bull elk survival estimated during a previous telemetry study at Mount St. Helens ($\hat{S}$ = 0.49) (Smith et al. 1994). In a western Oregon study, bull survival was estimated at 0.54-0.58—very similar to our estimated survival rate—under point-restricted and any bull general season hunting regulations across 3 GMUs (Biederbeck et al. 2001). In that study, most bulls were killed before their 4th birthday. During our study, branch-antlered bull abundance appeared relatively stable across years; bull harvest regulations and permit levels were relatively static during our study, in contrast with antlerless elk permitting that was increased substantially to reduce the density of antlerless elk.

IFBF levels in late fall, estimated from hunter-harvested elk, were about 8.0% body fat for lactating elk and about 10% for non-lactating elk for most of our study area. Elk on high quality diets are capable of much higher fat accretion (Cook et al. 2004a, Bender et al. 2006, Piasecke and Bender 2009, Cook et al. 2013). On high quality summer-fall diets, even lactating elk are capable of IFBF levels in the 15-18% range in fall (Cook et al. 2004a). However, elk in western Washington and Oregon—presumably mostly Roosevelt elk or a mixed lineage of Roosevelt elk/ Rocky Mountain elk—are often strongly nutritionally limited (Bender et al. 2008, Cook et al. 2013). Among the *west-slope* elk populations for which condition data have been collected, elk at Mount

St. Helens appear to be relatively typical, based on our data from hunter-harvested elk and data in Cook et al. (2013) derived from live elk sampling via ultrasound in the fall. Fall data for live Mount St. Helens elk included in Cook et al.'s (2013) work indicate a bit lower condition than what we estimated from harvested elk, but derive from sampling only elk on the mudflow of the North Fork of the Toutle River in 2003 and 2005. In comparison to our fall estimates of ~8.0% and ~10.0% IFBF for lactaters and non-lactaters, Trainer's (1971) elk condition data, based on kidney fat indices (KFI) for a large sample of hunter-harvested elk in western Oregon, suggested mean values of about 8.50% and 13.50% IFBF (converting KFI to IFBF using the transformation in Cook et al. [2001a]). Similarly, earlier work by Merrill et al. (1985) at Mount St. Helens early in the elk recolonization phase, post-eruption indicated fall IFBF levels of ~8.0% and ~10.5% derived from KFI data for lactaters and non-lactaters. These estimates are very similar to our fall estimates, the methodological differences notwithstanding. Note, however, that Cook et al. (2001a, 2001b) have demonstrated that condition assessments derived only from KFI can be problematic because of a strongly nonlinear relationship between KFI and actual IFBF. KFI estimates appear to work reasonably well at moderate levels of IFBF, but are less reliable as an index to IFBF at both high and low IFBF levels (Cook et al. 2001b). Our mean IFBF estimates for fall, derived from hunter-harvested elk, suggested modest, but not poor condition typified elk on our study area. However, the interquartile range for fall IFBF estimates included values of ~7.0% and ~5.0% for nonlactaters and lactaters, indicating strong nutritional limitation for a substantive number of elk within our samples.

Our late winter (Feb) estimates of IFBF from live-handled elk indicated mean body fat levels of a little less than 5.0% to a little more than 6.0% for nonlactaters and a little less than 3.0% to a little more than 4.0% for lactaters. Using mean IFBF values from the fall-harvested elk and the late winter live-handled elk would suggest that Mount St. Helens elk on our study area lose about half of their fall fat stores by the end of winter. By late winter, these elk are quite lean. Based on the data from Cook et al. (2013) for wild elk populations across the western U.S., nonlactating Mount St. Helens elk are fairly typical, condition-wise, of western Washington and western Oregon elk; elk with

evidence of late-season lactation at Mount St. Helens were among the leanest relative to other coastal and west-slope elk, but sample sizes for late-season lactaters at Mount St. Helens were small (Cook et al. 2013).

We estimated the overall pregnancy rate among elk we handled in Feb, 2009-2012, at just under 70%. That is clearly a suboptimal rate for elk on a good nutritional plane (Cook et al. 2004a). Prime-aged elk with access to quality forage during summer-fall typically have pregnancy rates in the mid-to-high 90% range (Cook et al. 2001c, Cook et al. 2004a, 2013). However, coastal and west-slope elk populations in Washington and Oregon are often nutritionally limited and display suboptimal pregnancy rates. Using a large sample of reproductive tracts from harvested Roosevelt elk in western Oregon in the 1960s, Trainer (1971) estimated the pregnancy rate across cow age classes at 50%, with the highest rate (59%) for prime-aged cows (ages 4-10 yrs.). Later, Harper (1985) reported a pregnancy rate of 57% for a larger sample of reproductive tracts from western Oregon elk (included the data from Trainer 1971) ≥ 2-yrs-old and a rate of 63% for prime-aged (ages 4-10 yrs.) elk. Collectively, the data in Harper (1985) represented sampling spanning 3 decades (1960-1980s) in western Oregon. Using reproductive tracts from elk harvested in southwest Washington (Willapa Hills) during the early 1970s, Kuttel (1975) estimated a pregnancy rate of 70.3% across all cows ≥1 year-old, and a rate of 74.1% if yearling cows were excluded. Smith et al. (1980) measured pregnancy rates from harvested cow elk on Washington's Olympic peninsula and reported rates of 61.3% excluding yearlings and 53.5% across all age classes for data collected in the late 1970s. Cook et al. (2013), using ultrasound data from live-captured elk, documented pregnancy rates of 68.6-100.0% across 4 coastal elk herds in Washington and 76.9-100.0% for 8 west-slope Cascades herds in Washington and Oregon. Merrill et al. (1987) previously measured pregnancy rates for Mount St. Helens cow elk during 1982-1985 from a mixed sample of harvested and live-captured elk and reported a rate of 69% for 2-yr-olds and 87% for cows aged ≥3-yrs-old. In context, our pregnancy rate data for 2009-2012 indicated productivity on par—if not slightly better—with historic western Oregon and Washington elk data, but slightly lower than recent data for most western Washington and western Oregon Cascades elk

herds. Our data also indicated slightly depressed productivity for cow elk at Mount St. Helens in recent history, relative to the lower density elk population on the same landscape during the post-eruption, elk recolonization phase in the early to mid-1980s.

Spring calf recruitment during 2009-2013 was highly variable, according to our survey-based estimates. Calf recruitment—standardized by the abundance of adult cows—is the result of 2 demographic processes: cow elk fecundity (productivity) and 1st year calf survival. Large herbivore populations, including elk populations, are typically characterized by relatively high and consistent adult survival, but substantial annual variation in juvenile survival (Coughenour and Singer 1996, Gaillard et al. 1998, 2000, Bonenfant et al. 2002, Lubow et al. 2002, Garrott et al. 2003). Demographically, population change is most affected by adult female survival in theory, but because of relative stability in adult female survival rates, realized population fluctuations are usually associated with dynamic juvenile survival (Coughenour and Singer 1996, Lubow and Smith 2004, Raithel et al. 2007, Harris et al. 2008). Eberhardt (1977) hypothesized that declining per capita resource availability (driven either by environmental fluctuation or increasing animal density) would affect demographics of large mammal populations following a predictable pattern: 1) declining juvenile survival, 2) increasing age of primiparity (female sexual maturity), 3) declining reproductive rates of adult females, and lastly 4) declining survival of adults. This ordering reflects the expected relative sensitivity of each demographic parameter to increasing food limitation, and empirical data have largely supported this hypothesis for large herbivores (Gaillard et al. 1998, Bonenfant et al. 2002).

Our data indicated very good recruitment in the spring of 2010 and 2011, even after attempting to correct for antlerless elk harvest. During these years, we commonly estimated recruitment exceeding 35 calves per 100 cows, and for some GMU-specific estimates during 2010-2011, >40:100. Calf recruitment this high—under the pregnancy rates we documented for radiomarked cow elk—seems exceptional. During our work, we consistently tried to guard against misclassification of calves and yearlings. When large herbivores are food limited, early body growth is typically impacted (Albon et al. 1987, Loison and Langvatn 1998, Mysterud et al. 2001, Cook et al. 2004a). Variation in

calf birth mass, calf gender, maternal nutrition, and first-year growth effects combine to yield a range of calf sizes by later winter. This and nutritional effects that carry over to yearling body sizes can result in substantial overlap in the sizes of large calves and small yearlings. We attempted to avoid misclassification of calves by continually trying to calibrate our perception of yearling cow size using the sizes of yearling bulls present in the elk groups we observed. We believe we were fairly conservative to avoid overestimating the numbers of calves, but it is still likely that some misclassification error occurred. That said, post-season calf:cow ratios exceeding 35:100 have also been previously documented for other western Washington and western Oregon elk populations that had pregnancy rates ≤70% (Kuttel 1975, Smith 1980, Raedeke et al. 1982, Harper 1985). Early in the post-eruption, elk recolonization phase, Merrill et al. (1987) estimated Aug-Oct calf recruitment in the range of 40-57 calves per 100 cows at Mount St. Helens when corresponding pregnancy rates were 31% for yearlings, 69% for 2-yr-olds, and 87% for ≥3 yr-olds.

The high calf recruitment we estimated for spring 2010 and 2011 was associated with favorable annual conditions. The winter of 2009-2010 was extremely mild, nearly snow-free, and the winter of 2010-2011 was modest relative to snowfall and mild relative to early snowfall. The summer-fall of 2010 was the wettest among all of our study years, with substantial late-summer, fall precipitation. The summer-fall of 2009 was not as wet overall, but had significant late-summer, fall moisture. Thus, our highest estimates of recruitment did occur under conditions that intuitively would favor good summer foraging conditions and minimal overwinter mortality, presumably conditions favoring higher than average calf recruitment.

In contrast with the 2010 and 2011 estimates, elk calf recruitment was lower in the spring of 2009 and much lower in 2012, 2013. Overall, observed estimates were in the 25-30:100 range for the study area and in the 25-35:100 range for all GMU-specific estimates except for GMU 522 during these years. Estimates for GMU 522 during these years were slightly lower than for the other GMUs. After attempting to correct the observed ratios for removals of antlerless elk via hunter harvest—removals that were substantial in fall 2011 and 2012—calf recruitment was indexed mostly in the high teens

to 100 cows range for 2012, 2013 and in the 20-30-ish calves per 100 cows in 2009. Indexed recruitment in spring 2013 was the lowest—compared to other study years—for all GMUs except GMU 556; recruitment in 556 appeared similarly low in 2013 and 2009. Depressed calf recruitment in the spring of 2013 corresponded to high mortality among radiomarked elk that same year, high observed overwinter mortality of unmarked elk, and elk counts and abundance estimates that were also low. Weather-wise, the winters of 2008-2009 and 2012-2013 had relatively deep snow at mid-elevations, whereas the winter of 2011-2012 was relatively moderate for snow accumulation. The summer-fall of 2012 was characterized by almost no precipitation from July through September, and in 2011 overall growing season precipitation was even lower, with a droughty summer and fall rain only after mid-September. In 2009, the early summer period was very dry, but rainfall did occur throughout August and September.

We found statistical associations among several performance metrics (*e.g.*, overwinter mortality, spring calf recruitment, fall body condition of adult females) and strong associations between landscape environmental metrics and some performance metrics (notably, overwinter mortality and spring calf recruitment). The environmental metrics we used (growing season precipitation and winter snow water equivalents with various temporal constraints) were selected as proxies for summer-fall forage production/quality and winter severity with intuitive implications for elk nutrition, energetics, and survival. We detected a particularly strong association of spring calf recruitment and late summer-fall precipitation across years. When droughty conditions prevailed during this timeframe, calf recruitment was depressed relative to years with a good precipitation pulse during Aug-Sept. Elk calves increasingly consume forage by late July, as they become less dependent on nursing for nutrient and energy intake (Robbins et al. 1981, Cook et al. 1994, 1996, 2004). By September they are obtaining a substantial portion of their calories from forage (Robbins et al. 1981, Cook et al. 1996, 2004). A finding that late summer-fall precipitation—a harbinger of fall forage greenup—affects spring calf recruitment, presumably by enhancing overwinter calf survival, is intuitive. Empirical evidence from tame elk feeding trials has also clearly implied that deficient summer-fall nutrition (potentially affecting both calves and their

lactating dams) reduces overwinter survival probabilities for elk calves (Cook et al. 2004a).

We also found a striking association between winter snow water equivalents, particularly from mid-winter through early spring, and the recent historic overwinter mortality index derived from carcass counts on a portion of the N. Fork of the Toutle River mudflow. A link between winter severity and overwinter elk mortality is intuitive; however, elk often tolerate deep snow conditions and/or winter nutritional deprivation elsewhere (Leege and Hickey 1977, DelGuidice et al. 2001, Garrott et al. 2003, Cook et al. 2004b); winter survival probabilities can be robust if elk store adequate fat reserves prior to winter onset (Cook et al. 2004a, 2004b). However, at Mount St. Helens, and possibly in other mountainous areas of western Washington and Oregon, strong nutritional constraints on summer-fall range may predispose some individual elk—particularly lactaters—to substantial overwinter mortality risks during severe winters (Bender et al. 2008). It would be expected that high elk densities would exacerbate the risk (DelGuidice et al. 1991). Overwinter mortality data we used came from a limited area in a low elevation valley bottom. The strong correspondence we found between a winter severity metric and mortality likely reflected not only the effect of winter severity on survival, but also the effect of winter severity on elk distribution. During heavy snowfall years, more elk are typically observed on the mudflow (P. Miller, personal communication), presumably having moved in from surrounding higher elevation forested areas, such as from GMU 524. Movements of radiomarked elk somewhat corroborate this. In severe winters, more elk deaths are indexed on the mudflow both because the sampled area holds many elk and because certain nutritionally stressed individuals succumb.

We did not find strong associations relative to the estimates of cow elk body condition derived from live elk handling in February and other performance or weather metrics. This was not surprising, because we had relatively small samples (110 total samples across 4 years), because of unknown lactation histories by February, and because condition assessed in late winter is subject to variable overwinter condition loss, depending on an elk's fall body condition. Elk that are in better body condition in

the fall typically lose more body fat overwinter than elk in poorer condition (Cook et al. 2013, S. McCorquodale, unpublished data). Overwinter, some equilibration of body condition tends to occur for cows entering the winter at different condition levels, but this compensation is not absolute (*i.e.*, does not typically erase all differences in fall condition) (Cook et al. 2004a).

Elk abundance (and density) has evolved considerably over the last century on the core landscape occupied by the modern Mount St. Helens herd. As late as the 1930s, the number of elk believed to occupy the Green, Toutle, and Kalama River drainages was less than 500 elk (Pautzke et al. 1939); only about 2,000 elk were approximated for that portion of southwest Washington roughly corresponding to the current Willapa elk herd area (Pautzke et al. 1939). Methods for estimating elk abundance were admittedly rudimentary 70 years ago, but presumably we can conclude that elk densities in this part of Washington were relatively low in the early part of the 20th century. Historic evidence of elk abundance on this landscape is sketchy, stemming from the lack of suitable methods to support valid estimates for many years, but it appears that the combination of fairly conservative elk management and active forestry across ownerships that created considerable early seral habitat (Starkey et al. 1982, Witmer et al. 1985) facilitated growth in elk distribution and density during the latter part of the 20th century. The eruption of the volcano in 1980 set the stage for a large area of forested habitat to revert to early seral habitat that was both highly preferred by elk and supported high fitness (Merrill et al. 1987). For a time, the post-eruption plant successional pattern across a portion of this landscape appeared to support both increasing elk habitat values and elk numbers, but eventually elk habitat potential and elk population trajectories diverged (Miller and McCorquodale 2006).

High elk density and declining habitat capability led to strong herbivory-driven modification to plant communities used by elk (see Riggs et al. 2000) and predictable declines in per capita forage availability and forage quality. Strong nutritional constraints for some elk on this landscape were eventually manifested as sub-par fat accretion patterns (Cook et al. 2013) and episodic overwinter mortality (Miller and McCorquodale 2006). This led to some of the management changes described earlier

in this report designed to reduce elk density. Reducing elk density was intended to decrease intraspecific food competition, increase average elk condition, and reduce overwinter mortality.

As described in this report, elk abundance did apparently decline over our 5-GMU study area during 2009-2013, and on parts of the landscape, quite substantially. We did not have data to thoroughly evaluate whether the density reduction had any appreciable effect on individual elk condition. Much of the density reduction was apparently effected during the last 2 years of our work, and we did not collect samples from harvested elk after the fall of 2011 and only handled a few cow elk for radiocollaring in Feb 2012. Clearly, a substantive winterkill during the last winter we report on (2012-2013), indicated that reducing elk density did not eliminate overwinter mortality risks, at least in the short-term. As previously noted, the droughty summer-fall of 2012 and the relatively severe 2012-2013 winter presented a poor energetic scenario for elk in this population, even at a reduced elk density.

Density-dependence, potentially operating on fecundity (*i.e.*, productivity; Taper and Gogan 2002, Stewart et al. 2005), but usually through effects on non-hunting mortality (Guiness et al. 1978, Coughenour and Singer 1996, Lubow et al. 2002, 2004, Taper and Gogan 2002), is linked to the concept of ecological carrying capacity for large mammals such as elk (Fowler 1981). At high population density, intraspecific competition (both scramble and contest competition) occurs as per capita resource availability declines with predictable impacts to the most vulnerable individuals in a population (*e.g.*, juveniles, senescent individuals, the infirm, those with high costs associated with reproduction). Density-dependent effects on survival have been demonstrated for juveniles in elk populations many times (Sauer and Boyce 1983, Coughenour and Singer 1996, Singer et al. 1997, Lubow et al. 2002, 2004) and similarly in conspecific red deer populations (Guiness et al. 1978, Clutton-Brock et al. 1987, Coulson et al. 1997). Density-dependent survival in adult elk has also been documented (Taper and Gogan 2002, Eggeman 2012), but less commonly (see also Sauer and Boyce 1983, Coughenour and Singer 1996). Density-dependent effects on adult female red deer have been shown to influence body size (Loison and Langvatn

1998, Mysterud et al. 2001, Bonenfant et al. 2002), but not strongly survival (Clutton-Brock et al. 1985, Bonenfant et al. 2002, but see Forchhammer et al. 1998) or age of senescence (Mysterud et al. 2001).

Density-independent effects on survival, typically mediated through weather influences on energetics, have also been demonstrated for juvenile elk (Singer et al.1997, Garrott et al. 2003, Lubow et al. 2002, Lubow and Smith 2004, Eberhardt et al. 2007) and even adults (Sauer and Boyce 1983, Coughenour and Singer 1996, DelGuidice et al. 2001, Garrott et al. 2003). Irrespective of population density, the effects of poor forage years and/or severe winters can apparently often reduce survival of juveniles and, sometimes, that of adults.

Our work implied logical causal links between density-independent effects of extreme weather (both summer-fall and winter) and calf recruitment and adult survival. These effects may have been exacerbated by density-dependent influences, but we cannot unequivocally demonstrate this. Overwinter mortality during the last year of our work, although high under the combination of a droughty summer-fall and a severe winter, was substantially lower than in the spring before our work began (2008), also a year with a droughty summer and a relatively snowy winter. The much lower apparent overwinter mortality in spring 2013, relative to 2008, occurred after the documented reduction in elk population size. Whether or not the change in elk density had anything to do with the differences in the overwinter mortality index between spring 2013 and 2008 is unclear, due to the absence of relevant corroborating data prior to the initiation of our work in 2009.

Reducing the elk population within our core study area was a logical prescription, given evidence of strong food limitation effects on elk body condition, modest pregnancy rates, strong herbivory effects on plant communities, and episodically high overwinter mortality. The degree to which a lower elk density will yield the desired improvements across these parameters is likely yet to be seen. Although the elk population has been reduced, it is reasonable to expect there may be some time lag associated with subsequent changes to elk habitats, and ultimately, to the restructured elk population. Although the relatively wet southwest Washington climate produces substantial

herbaceous biomass, particularly in early seral habitats preferred by elk, the proportion of this biomass that represents nutritious and palatable elk forage is actually quite small (Cook 2002, Geary 2013, J. Cook, unpublished data). Herbivory strongly influences the structure and composition of plant communities used by foraging elk (Augustine and McNaughton 1998, Riggs et al. 2000, Geary 2013), typically by reducing the density and biomass of preferred forage species and increasing the proportion of the plant community represented by species elk do not consume, or consume only as forages of last resort. These plant community changes can be dramatic under high levels of herbivory sustained for long periods, such as has likely occurred in highly preferred elk habitats at Mount St. Helens. Recovery of the herbaceous component, which has been depressed by herbivory, typically takes some time even after the plant community has been released from excessive herbivory. This has clearly been demonstrated elsewhere for red deer (Tanentzap et al. 2009). How long substantive recovery of palatable elk forage species is likely to take in these impacted habitats is difficult to predict, but it is unlikely to be immediate or very short-term.

Forsyth and Caley (2006) recently discussed what they termed "*the irruptive paradigm*" relative to large herbivores; this paradigm postulates that when released from harvest control, large herbivore populations characteristically grow past ecological carrying capacity, subsequently decline to a much reduced density, and then recover to a relatively stable density somewhat lower than the pre-crash high density. It is not clear if the Mount St. Helens elk herd actually exceeded ecological carrying capacity, despite some evidence of density-dependent effects on elk condition, and possibly, mortality. The density reduction that has recently occurred was also directed by management actions, not imposed solely by environmental constraints.

Other high-density elk populations have been associated with strong apparent herbivory-mediated habitat modification and have been surmised to be at or above ecological carrying capacity. For decades, the northern Yellowstone elk herd was managed within Yellowstone National Park under a *natural regulation* paradigm (Coughenour and Singer 1996); elk abundance rose substantially (Houston 1982, Eberhardt et al. 2007), herbivory modification to plant communities was apparent

(Houston 1982, Frank and McNaughton 1992), and population demographics were shown to be influenced by both density-dependent and density-independent processes (Houston 1982, Coughenour and Singer 1996, Singer et al. 1997, Taper and Gogan 2002). Occasional winterkills have historically occurred, mostly affecting juvenile elk (Houston 1982, Eberhardt et al. 2007); despite these observations, the evidence that these elk exceeded ecological carrying capacity prior to wolf (*Canis lupus*) reintroduction was considered equivocal, perhaps except for the short-term right after the large-scale fires of 1988 (Houston 1982, Frank and McNaughton 1992, Coughenour and Singer 1996b, DelGuidice et al. 2001, Taper and Gogan 2002).

Similarly, a high density elk population in and around Rocky Mountain National Park was previously surmised to exceed ecological carrying capacity, as evidenced by a strong herbivory signature on some plant communities, occasional winter losses of elk, and density-correlated variability in population growth rates (Lubow et al. 2002, Singer et al. 2002). However, Bender and Cook (2005) found considerable variability in individual elk condition, the population consisting of some elk at very high condition levels, some at low levels, and the average condition modest. This would seem to be similar to the recent situation at Mount St. Helens, in light of our data from hunter-harvested and live captured elk. Bender and Cook (2005) argued that the presence of elk at very high levels of condition, even if that did not typify most elk, did not support a conclusion that the population was above ecological carrying capacity at a landscape level.

A prudent near-term goal at Mount St. Helens would seem to be to continue to manage the elk population at a lower density with the objectives of promoting improved habitat condition, higher average elk condition, and reduced overwinter mortality. Again, such outcomes may operate with a time lag reflecting an evolving plant community response to reduced herbivory. Such management may well dampen the influence of density-independent effects—such as weather—on calf recruitment and overwinter mortality, but it is unlikely to completely eliminate sub-par recruitment and overwinter mortality in years with very unfavorable conditions. The degree to which the presence of hoof disease in this elk herd will complicate meeting management

objectives is unclear, pending additional research to disentangle the effects of the condition on elk energetics and population processes such as age-specific mortality and fecundity.

MANAGEMENT IMPLICATIONS

Our results indicated that sightability correction modeling yielded a useful elk abundance index that should perform acceptably to support management decisions about elk in the west-central portion of the herd area. This approach will undoubtedly underestimate true elk numbers, but applied at a relatively large geographic scale, the index appears to correlate well with actual elk numbers across a range of abundance. Emerging approaches, such as integrated population models (Buckland et al. 2000, White and Lubow 2002, Newman et al. 2006), may provide potential future direction that would facilitate the use of sightability model estimates as inputs to a modeling approach supporting inference about actual elk densities. Sightability modeling, applied to aerial survey data, is both practical and cost-effective.

Our work confirmed that the Mount St. Helens elk herd, at least that portion inhabiting our 5-GMU study area, has been food limited in recent time. Although this is consistent with data for other elk herds in western Washington and Oregon, under certain environmental conditions and elk densities encountered during 2009-2013, food limitation in this herd yielded occasionally substantial overwinter mortality. Reducing elk density was a logical management response, and was achieved via liberalized antlerless elk hunting. It is unclear to what degree reducing elk density will affect elk survival in years with poor weather conditions in the immediate short-term. It is anticipated that plant community recovery in habitats exploited heavily by elk in the past will likely evolve at an unknown, but longer time scale. Periodic sampling of organ sets from hunter-harvested elk would provide a mechanism to monitor for habitat-mediated changes in elk condition levels through time.

Population dynamics in the Mount St. Helens elk herd appear to have been influenced both by density-dependent and density-independent mechanisms in recent time. There is also presumed to be an interaction between these effects (i.e., density-

independent effects should be magnified at higher elk densities). Managing for a lower density elk herd is expected to modify the population level effects of elk density on intraspecific competition for food, but is unlikely to completely mitigate for density-independent effects of poor forage years (i.e., droughts) and/or severe winters.

ACKNOWLEDGMENTS

We thank helicopter pilot J. Hagerman for many safe hours of flying while darting and aerially surveying elk at Mount St. Helens. We thank WDFW veterinarian K. Mansfield and volunteer veterinarian J. Gaydos for assisting with elk captures. Special thanks to WDFW biologist A. Prince and former WDFW biologist M. Koberstein who worked tirelessly on all field aspects of this project and who also assisted with data management. We also thank other WDFW staff who periodically assisted with elk captures and/or survey flights: B. Calkins, D. Hauswald, T. Holden (retired), N. Stephens, and B. George. We are also grateful to staff of the Cowlitz Wildlife Area and the students and volunteers who helped collect and process elk organ samples each year. We thank WDFW managers D. Ware, J. Nelson, and S. Jonker for administrative and logistic support. We thank A. Duff for developing the GIS tool we used to record in-flight elk survey data, for helping test the tool during early survey flights, and for other GIS support. We thank S. Knapp for statistical advice. We appreciated help from University of Alberta graduate student A. Geary and his advisor E. Merrill on aspects of our work. Special thanks go to R. Cook and J. Cook (National Council for Air and Stream Improvement) for their assistance collecting elk body condition data during live captures. We thank the Weyerhaeuser Company for its cooperation and for access to its managed forest lands in the vicinity of Mount St. Helens for elk captures, surveys, and other field activities. We also thank the Mount St. Helens National Volcanic Monument (USFS) staff for facilitating occasional field activities within the monument. We thank Cowlitz County for use of the Hoffstadt Bluffs helipad as a staging/refueling area for elk capture flights and aerial surveys each winter. We also thank the many elk hunters who contributed valuable information by providing samples (*i.e.*, hearts,

kidneys, teeth, etc.) from their harvested elk and/or reported harvesting of radiomarked elk.

LITERATURE CITED

Adams, D. M., and G. S. Latta. 2007. Timber trends on private lands in western Oregon and Washington: a new look. Western Journal of Applied Forestry 22:8-14.

Albon, S. D., T. H. Clutton-Brock, and F. E. Guinness. 1987. Early development and population dynamics in red deer. II. Density-independent effects and cohort variation. Journal of Animal Ecology 56:69-81.

Anderson, C. R., D. S. Moody, B. L. Smith, F. G. Lindzey, and R. P. Lanka. 1998. Development and evaluation of sightability models for summer elk surveys. Journal of Wildlife Management 62:1055-1066.

Augustine, D. J., and S. J. McNaughton. 1998. Ungulate effects on the functional species composition of plant communities: herbivore selectivity and plant tolerance. The Journal of Wildlife Management 62:1165-1183.

Barker, R. 2008. Theory and application of mark-recapture and related techniques to aerial surveys of wildlife. Wildlife Research 35:268-274.

Bartmann, R. M., L. H. Carpenter, R. A. Garrott, and D. C. Bowden. 1986. Accuracy of helicopter counts of mule deer in pinyon-juniper woodland. Wildlife Society Bulletin 14:356-363.

Bartmann, R. M., G. C. White, L. H. Carpenter, and R. A. Garrott. 1987. Aerial mark-recapture estimates of confined mule deer in pinyon-juniper woodland. Journal of Wildlife Management 51:41-46.

Bear, G. D., G. C. White, L. H. Carpenter, R. B. Gill, and D. J. Essex. 1989. Evaluation of aerial mark-resighting estimates of elk populations. Journal of Wildlife Management 53:908-915.

Bender, L. C., and J. G. Cook. 2005. Nutritional condition of elk in Rocky Mountain National Park. Western North American Naturalist 65:329-334.

Bender, L. C., and P. J. Miller. 1999. Effects of elk harvest strategy on bull demographics and herd composition. Wildlife Society Bulletin 27:1032-1037.

Bender, L. C., and R. D. Spencer. 1999. Estimating elk population size by reconstruction from harvest data and herd ratios. Wildlife Society Bulletin 27:636-645.

Bender, L. C., M. A. Davison, J. G. Cook, R. C. Cook, and P. B. Hall. 2006. Assessing elk population status and potential performance in the Nooksack area, Washington. Northwestern Naturalist 87:98-106.

Bender, L. C., J. G. Cook, R. C. Cook, and P. B. Hall. 2008. Relations between nutritional condition and survival of North American elk *Cervus elaphus*. Wildlife Biology 14:70-80.

Biederbeck, H. H., M. C. Boulay, and D. H. Jackson. 2001. Effects of hunting regulations on bull elk survival and age structure. Wildlife Society Bulletin 29:1271-1277.

Bleich, V. C., C. S. Y. Chun, R. W. Anthes, T. E. Evans, and J. K. Fischer. 2001. Visibility bias and development of a sightability model for tule elk. Alces 37:315-327.

Bonenfant, C., J. Gaillard, F. Klein, and A. Loison. 2002. Sex and age-dependent effects of population density on life history traits of red deer, *Cervus elaphus*, in a temperate forest. Ecography 25:446-458.

Bowden. D. C., and R. C. Kufeld. 1995. Generalized mark-sight population estimation applied to Colorado moose. Journal of Wildlife Management 59:840-851.

Brodie, J., H. Johnson, M. Mitchell, P. Zager, K. Proffitt, M. Hebblewhite, M. Kauffman, B. Johnson, J. Bissonette, C. Bishop, J. Gude, J. Herbert, K. Hersey, M. Hurley, P. M. Lukacs, S. McCorquodale, E. McIntire, J. Nowak, H. Sawyer, D. Smith, and P. J. White. 2013. Relative influence of human harvest, carnivores, and weather on adult female elk survival across western North America. Journal of Applied Ecology 50:295-305.

Burnham, K. P., and D. R. Anderson. 2002. Model selection and inference: a practical information-theoretic approach. Springer-Verlag. New York, NY, USA. 488 pp.

Cameron, R. D., and J. M. Ver Hoeff. 1994. Predicting parturition rate of caribou from autumn body mass. Journal of Wildlife Management 58:674-679.

Caughley, G. 1974. Bias in aerial survey. Journal of Wildlife Management 38:921-933.

Clutton-Brock, T. H., M. Major, and F. E. Guiness. 1985. Population regulation in male and female red deer. Journal of Animal Ecology 54:831-846.

Clutton-Brock, T. H., M. Major, S. D. Albon, and F. E. Guiness. 1987. Early development and population dynamics of red deer I. density-dependent effects on juvenile survival. Journal of Animal Ecology 56:53-67.

Cole, E. K., M. D. Pope, and R. G. Anthony. 1997. Effects of road management on movement and survival of Roosevelt elk. Journal of Wildlife Management 61:1115-1126.

Cook, J. G., L. L. Irwin, L. D. Bryant, and J. W. Thomas. 1994. Fecal nitrogen and dietary quality relationships in juvenile elk. Journal of Wildlife Management 58:46-53.

Cook, J. G., L. J. Quinlan, L. L. Irwin, L. D. Bryant, R. A. Riggs, and J. W. Thomas. 1996. Nutrition-growth relations of elk calves during late summer and fall. Journal of Wildlife Management 60:528-541.

Cook, J. G. 2002. Nutrition and food. Pages 259-349 *in* D. E. Toweill and J. W. Thomas (eds.). North American elk: ecology and management. Smithsonian Institution Press, Washington, D.C., USA.

Cook, J. G., B. K. Johnson, R. C. Cook, R. A. Riggs, T. Delcurto, L. D. Bryant, and L. L. Irwin. 2004a. Effects of summer-autumn nutrition and parturition date on reproduction and survival of elk. Wildlife Monographs 155:1-61.

Cook, R. C., J. G. Cook, D. L. Murray, P. Zager, B. K. Johnson, and M. W. Gratson. 2001*a*. Development of predictive models of nutritional condition for Rocky Mountain elk. Journal of Wildlife Management 65:973-987.

Cook, R. C., J. G. Cook, D. L. Murray, P. Zager, B. K. Johnson, and M. W. Gratson. 2001*b*. Nutritional condition models for elk: which are the most sensitive, accurate, and precise? Journal of Wildlife Management 65:988-997.

Cook, R. C., D. L. Murray, J. G. Cook, P. Zager, and S. L. Monfort. 2001*c*. Nutritional influences on breeding dynamics in elk. Canadian Journal of Zoology 79:845-853.

Cook, R. C., J. G. Cook, and L. D. Mech. 2004b. Nutritional condition of northern Yellowstone elk. Journal of Mammalogy 85:714-722.

Cook, R. C., J. G. Cook, T. R. Stephenson, W. L. Myers, S. M. McCorquodale, D. J. Vales, L. L. Irwin, P. B. Hall, R. D. Spencer, S. L. Murphie, K. A. Schoenecker, and P. J. Miller. 2010. Revisions of rump fat and body condition scoring indices for deer, elk, and moose. Journal of Wildlife Management 74:880-896.

Cook, R. C., J. G. Cook, D. J. Vales, B. K. Johnson, S. M. McCorquodale, L. A. Shipley, R. A. Riggs, L. L. Irwin S. L. Murphie, B. Murphie, K. A. Schoenecker, F. Geyer, P. B. Hall, R. D. Spencer, D. A. Immell, D. H. Jackson, B. L. Tiller, P. J. Miller, and L. Schmitz. 2013. Regional and seasonal patterns of nutritional condition and reproduction in elk. Wildlife Monographs 184:1-44.

Coughenour, M. B., and F. J. Singer. 1996a. Elk population processes in Yellowstone National Park under the policy of natural regulation. Ecological Applications 6:573-593.

Coughenour, M. B., and F. J. Singer. 1996b. The concept of overgrazing and its application to Yellowstone's northern winter range. Pages 1-11in F. J. Singer (editor). Effects of grazing by wild ungulates in Yellowstone National Park. Technical Report NPS/NRYELL/NRTR/96-01. U. S. Department of the Interior, National Park Service, Denver, Colorado, USA. 375 pp.

Coulson, T., S. Albon, F. Guiness, J. Pemberton, and T. Clutton-Brock. 1997. Population substructure, local density, and calf winter survival in red deer (*Cervus elaphus*). Ecology 78:852-863.

Delguidice, G. D., F. J. Singer, and U. S. Seal. 1991. Physiological assessment of winter nutritional deprivation in elk of Yellowstone National Park. Journal of Wildlife Management 55:653-664.

DelGuidice, G. D., R. A. Moen, F. J. Singer, and M. R. Riggs. 2001. Winter nutritional restriction and simulated body condition of Yellowstone elk and bison before and after the fires of 1988. Wildlife Monographs 147. 60 pp.

Del Moral, R., and D. M. Wood. 1988. Dynamics of herbaceous vegetation recovery on Mount St. Helens, Washington, USA, after a volcanic eruption. Vegetatio 74:11-27.

Del Moral, R., and D. M. Wood. 1993. Early primary succession on the volcano Mount St. Helens. Journal of Vegetation Science 4:223-234.

Del Moral, R. 1998. Early succession on lahars spawned by Mount St. Helens. American Journal of Botany 85:820-828.

Eberhardt, L. L. 1977. Optimal management policies for marine mammals. Wildlife Society Bulletin 5:162-169.

Eberhardt, L. L., P. J. White, R. A. Garrott, and D. B. Houston. 2007. A seventy-year history of trends in Yellowstone's northern elk. Journal of Wildlife Management 71:594-602.

Eggeman, S. 2012. Migratory behavior and survival of adult female elk in a partially migratory population. Thesis. University of Montana, Missoula, MT, USA.

Fieberg, J. 2012. Estimating population abundance using sightability models: R Sightability-Model package. Journal of Statistical Software 51:1-20.

Forchhammer, M. C., N. C. Stenseth, E. Post, and R. Langvatn. 1998. Population dynamics of Norwegian red deer: density-dependence and climatic variation. Proceedings of the Royal Society: Biological Sciences 265:341-350.

Forsyth, D. M., and P. Caley. 2006. Testing the irruptive paradigm of large-herbivore dynamics. Ecology 87:297-303.

Fowler, C. W. 1981. Density dependence as related to life history strategy. Ecology 62:602-610.

Frank, D. A., and S. J. McNaughton. 1992. The ecology of plants, large mammalian herbivores, and drought in Yellowstone National Park. Ecology 73:2043-2058.

Franklin, J. F., and C. T. Dyrness. 1973. Natural vegetation of Oregon and Washington. General Technical Report PNW-8, U. S. Forest Service. 417 pp.

Franklin, J. F., P. M. Frenzen, and F. J. Swanson. 1995. Re-creation of ecosystems at Mount St. Helens: contrasts in artificial and natural approaches. Pages 287-333 *in:* J. Cairns, Jr. (Editor). Rehabilitating damaged ecosystems. Lewis Publishers, CRC Press, Boca Raton, Florida, USA. 427 pp.

Freddy, D. J. 1998. Estimating survival rates of elk and developing techniques to estimate population size. Colorado Division of Wildlife Report W-153-R-11. Fort Collins, Colorado, USA.

Gaillard, J., M. Festa-Bianchet, and N. G. Yoccoz. 1998. Population dynamics of large herbivores: variable recruitment with constant adult survival. Trends in Ecology and Evolution 13:58-63.

Gaillard, J., M. Festa-Bianchet, N. G. Yoccoz, A. Loison, and C. Toĭgo. 2000. Temporal variation in fitness components and population dynamics of large herbivores. Annual Review of Ecology and Systematics 31:367-393.

Gardner, S. N., and M. Mangel. 1996. Mark-resight population estimation with imperfect observations. Ecology 77:880-884.

Garrott, R. A., L. L. Eberhardt, P. J. White, and J. Rotella. 2003. Climate-induced variation in vital rates of an unharvested large-herbivore population. Canadian Journal of Zoology 81:33-45.

Geary, A. B. 2013. Forage dynamics and elk condition related to changing forest practices at Mount St. Helens, Washington. Thesis, University of Alberta, Calgary, Alberta, Canada. 155 pp.

Gilbert, B. A., and B. J. Moeller. 2008. Modeling elk sightability bias of aerial surveys during winter in the central Cascades. Northwest Science 82:222-228.

Gould, W. R., S. T. Smallidge, and B. C. Thompson. 2005. Mark-resight superpopulation estimation of a wintering elk *Cervus elaphus canadensis* herd. Wildlife Biology 11:341-349.

Guiness, F. E., T. H. Clutton-Brock, and S. D. Albon. 1978. Factors affecting calf mortality in red deer (*Cervus elaphus*). Journal of Animal Ecology 47:817-832.

Hanley, T. A. 1980. Nutritional constraints on food and habitat selection by sympatric ungulates. Dissertation. University of Washington, Seattle, Washington, USA. 177 pp.

Hanley, T. A. 1983. Black-tailed deer, elk, and forest edge in a western Cascades watershed. Journal of Wildlife Management 47:237-242.

Harper, J. A. 1985. Ecology and management of Roosevelt elk in Oregon. Oregon Department of Fish and Wildlife. Portland, OR, USA. 70 pp.

Harris, N. C., M. J. Kauffman, and L. S. Mills. 2008. Inference about ungulate population dynamics derived from age ratios. Journal of Wildlife Management 72:1143-1151.

Hett, J., R. Taber, J. Long, and J. Schoen. 1978. Forest management policies and elk summer carrying capacity in the *Abies amabilis* forest, western Washington. Environmental Management 2:561-566.

Hosmer, D.W., and S. Lemeshow. 1989. Applied logistic regression. John Wiley and Sons, New York, NY, USA.

Houston, D. B. 1982. The northern Yellowstone elk. MacMillan Publishing. New York, NY, USA. 474 pp.

Jarding, A. R. 2010. Population estimation procedures for elk and deer in the Black Hills, South Dakota: development of a sightability model and spotlight survey. Thesis. South Dakota State University, Brookings, SD, USA.

Jenkins, K., and E. Starkey. 1996. Simulating secondary succession of elk forage values in a managed forest landscape, western Washington. Environmental Management 20:715-724.

Kendall, W. L. 1999. Robustness of closed capture-recapture methods to violations of the closure assumption. Ecology 80:2517-2525.

Kistner, T. P., C. E. Trainer, and N. A. Hartmann. 1980. A field technique for evaluating physical condition of deer. Wildlife Society Bulletin 8:11-16.

Kuttel, M. P. 1975. Second report on the Willapa Hills elk herd: September 1, 1974-April 1, 1975. File Report. Washington Department of Game, Olympia, Washington, USA. 69 pp.

Lawrence, R. L., and W. J. Ripple. 2000. Fifteen years of revegetation of Mount St. Helens: a landscape-scale analysis. Ecology 81:2742-2752.

Leege, T. A., and W. O. Hickey. 1977. Elk-snow-habitat relationships in the Pete King drainage, Idaho. Wildlife Bulletin No. 6. Idaho Department of Fish and Game. Boise, ID, USA. 23 pp.

Loison, A., and R. Langvatn. 1998. Short- and long-term effects of winter and spring weather on growth and survival of red deer in Norway. Oecologia 116:489-500.

Lubow, B. C., F. J. Singer, T. L. Johnson, and D. C. Bowden. 2002. Dynamics of interacting elk populations within and adjacent to Rocky Mountain National Park. Journal of Wildlife Management 66:757-775.

Lubow, B. C., and B. L. Smith. 2004. Population dynamics of the Jackson elk herd. Journal of Wildlife Management 68:810-829.

McCorquodale, S.M., S. M. Knapp, M. A. Davison, J. S. Bohannon, C. D. Danilson, and W. C. Madsen. 2013. Mark-resight and sightability modeling of a western Washington elk population. Journal of Wildlife Management 77:359-371.

Merrill, E. H., K. L. Knutson, B. Biswell, R. D. Taber, and K. J. Raedeke. 1985. Mount St. Helens cooperative elk study: Progress Report 1981-1984. Report No. W-93-R-4, University of Washington, Seattle, WA, USA. 56 pp.

Merrill, E., K. Raedeke, and R. Taber. 1987. The population dynamics and habitat ecology of elk in the Mount St. Helens blast zone. University of Washington, Seattle, WA, USA. 186 pp.

Miller, P. J., and S. M. McCorquodale. 2006. Washington state elk herd plan: Mount St. Helens elk herd. Washington Department of Fish and Wildlife, Olympia, Washington, USA. 52 pp.

Millspaugh, J. J., J. R. Skalski, R. L. Townsend, D. R. Diefenbach, M. S. Boyce, L. P. Hansen, and K. Kammermeyer. 2009. An evaluation of Sex-Age-Kill (SAK) model performance. Journal of Wildlife Management 73:442-451.

Mysterud, A., N. Yoccoz, N. C. Stenseth, and R. Langvatn. 2001. Effects of age, sex, and density on body weight of Norwegian red deer: evidence of density-dependent senescence. Proceedings of the Royal Society: Biological Sciences 268:911-919.

Neal, A. K., G. C. White, R. B. Gill, D. F. Reed, and J. H. Olterman. 1993. Evaluation of mark-resight model assumptions for estimating mountain sheep numbers. Journal of Wildlife Management 57:436-450.

Otis, D. L., K. P. Burnham, G. C. White, and D. R. Anderson. 1978. Statistical inference from capture data on closed animal populations. Wildlife Monographs 62. 135 pp.

Pautzke, C., B. Lauckhart, and L. Springer. 1939. Washington elk report—1939. State of Washington Department of Game, Seattle, Washington. 47 pp.

Piasecke, J. R., and L. C. Bender. 2009. Relationships between nutritional condition of adult females and relative carrying capacity for Rocky Mountain elk. Rangeland Ecology and Management 62:145-152.

Pollock, K. H., and W. L. Kendall. 1987. Visibility bias in aerial surveys: a review of estimation procedures. Journal of Wildlife Management 51:502-510.

Pollock, K. H., J. D. Nichols, C. Brownie, and J. E. Hines. 1990. Statistical inference for capture-recapture experiments. Wildlife Monographs 107. 97 pp.

Pollock, K. H., J. D, Nichols, T. R. Simons, G. L. Farnsworth, L. L. Bailey, and J. R. Sauer. 2002. Large scale wildlife monitoring studies: statistical methods for design and analysis. Environmetrics 13:105–119.

R Development Core Team. 2008. R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. ISBN 3-900051-07-0, URL http://www.R-project.org.

Raedeke, K. J., D. Paige, E. Merrill, and R. D. Taber. 1982. Elk populations: Mt. St. Helens blast zone, 1981. Contract report to the Weyerhaeuser Company. College of Forest Resources, University of Washington, Seattle, WA, USA.

Raithel, J. D., M. J. Kauffman, and D. H. Pletscher. 2007. Impact of spatial and temporal variation in calf survival on the growth of elk populations. Journal of Wildlife Management 71:795-803.

Riggs, R. A., A. R. Tiedemann, J. G. Cook, T. M. Ballard, P. J. Edgerton, M. Vavra, W. C. Krueger, F. C. Hall, L. D. Bryant, L. L. Irwin, and T. Delcurto. 2000. Modification of mixed-conifer forests by ruminant herbivores in the Blue Mountains ecological province. Research Paper PNW-RP-527. U.S.D.A., Forest Service, Pacific Northwest Research Station. 77 pp.

Robbins, C. T., R. S. Podbielancik-Norman, D. L. Wilson, and E. D. Mould. 1981. Growth and nutrient consumption of elk calves compared to other ungulate species. Journal of Wildlife Management 45:172-186.

Salwasser, H., D. W. MacCleery, and T. A. Snellgrove. 1993. An ecosystem perspective on sustainable forestry and new directions for the U. S. National Forest system. Pages 44-89 *in* G. H. Aplet, N. Johnson, J. T. Olson, and V. A. Sample (eds.). Defining sustainable forestry. The Wilderness Society, Washington, D.C., USA.

Samuel, M. D., E. O. Garton, M. W. Schlegel, and R. G. Carson. 1987. Visibility bias during aerial surveys of elk in northcentral Idaho. Journal of Wildlife Management 51:622-630.

Samuel, M. D., and K. H. Pollock. 1981. Correction of visibility bias in aerial surveys where animals occur in groups. Journal of Wildlife Management 45:993-997.

Sauer, J. R., and M. S. Boyce. 1983. Density dependence and survival of elk in northwestern Wyoming. Journal of Wildlife Management 47:31-37.

Schwarz, C. J., and G. A. F. Seber. 1999. Estimating animal abundance: review III. Statistical Science 14:427-456.

Singer, F. J., A. Harting, K. K. Symonds, and M. B. Coughenour. 1997. Density dependence, compensation, and environmental effects on elk calf mortality in Yellowstone National Park. Journal of Wildlife Management 61:12-25.

Singer, F. J., L. C. Zeigenfuss. B. Lubow, and M. J. Rock. 2002. Ecological evaluation of potential overabundance of ungulates in U. S. National Parks: a case study. Pages 205-248 in F. J. Singer and L. C. Zeigenfuss (compilers). Open File Report 02-208. U. S. Geological Survey. Fort Collins, Colorado, USA. 268 pp.

Skalski, J. R., K. E. Ryding, and J. J. Millspaugh. 2005. Wildlife demography: analysis of sex, age, and count data. Elsevier Academic Press, Burlington, Massachusetts, USA. 636 pp.

Smith, J. L. 1980. Reproductive rates, age structure, and management of Roosevelt elk in Washington's Olympic Mountains. Pages 67-111 *in:* W. MacGregor (editor). Proceedings of the 1980 Western States Elk Workshop. British Columbia Ministry of Environment, Cranbrook, BC, Canada. 174 pp.

Smith, J. L., W. A. Michaelis, K. Sloan, J. Musser, and D. J. Pierce. 1994. An analysis of elk poaching losses, and other mortality sources in Washington using biotelemetry. Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Starkey, E. E., D. S. deCalesta, and G. W. Witmer. 1982. Management of Roosevelt elk habitat and harvest. Pages 353-362 *In:* K. Sabol (Editor). Transactions of the 47th North American Wildlife and Natural Resources Conference. Washington D.C., USA.

Steinhorst, R. K., and M. D. Samuel. 1989. Sightability adjustment methods for aerial surveys of wildlife populations. Biometrica 45:415-425.

Stewart, K. M., R. T. Bowyer, B. L. Dick, B. K. Johnson, and J. G. Kie. 2005. Density-dependent effects on physical condition and reproduction in North American elk: an experimental test. Oecologia 143:85-93.

Tanentzap, A. J., L. E. Burrows, W. G. Lee, G. Nugent, J. M. Maxwell, and D. A. Coomes. 2009. Landscape-level vegetation recovery from herbivory: progress after four decades of invasive red deer control. Journal of Applied Ecology 46:1064-1072.

Taper, M. L., and P. J. Gogan. 2002. The northern Yellowstone elk: density dependence and climatic conditions. Journal of Wildlife Management 66:106-122.

Tracey, J. P., P. J. S. Fleming, and G. J. Melville. 2008. Accuracy of some aerial survey estimators: contrasts with known numbers. Wildlife Research 35:377-384.

Trainer, C. E. 1971. The relationship of physical condition and fertility of female Roosevelt elk (Cervus canadensis roosevelti) in Oregon. Thesis. Oregon State University, Corvallis, Oregon, USA. 93 pp.

Unsworth, J. W., L. Kuck, and E. O. Garton. 1990. Elk sightability model validation at the National Bison Range, Montana. Wildlife Society Bulletin 18:113-115.

Washington Department of Fish and Wildlife. 2008. 2009-2015 Game Management Plan. Wildlife Program, Washington Department of Fish and Wildlife, Olympia, WA, USA. 136 pp.

White, G. C., D. R. Anderson, K. P. Burnham, and D. L. Otis. 1982. Capture-recapture and removal methods for sampling closed populations. Report No. LA-8787-NERP, Los Alamos National Laboratory, New Mexico. 235 pp.

White, G. C., and K. P. Burnham. 1999. Program MARK: survival estimation from populations of marked animals. Bird Study 46 (Supplement):120-138.

White, G. C., and T. M. Shenk. 2001. Population estimation with radio-marked animals. Pages 329-350 in J. J. Millspaugh and J. M. Marzluff, eds. Radio tracking and animal populations. Academic Press, San Diego, California, USA. 474 pp.

Witmer, G. W., M. Wisdom, E. P. Harshman, R. J. Anderson, C. Carey, M. P. Kuttel, I. D. Luman, J. A. Rochelle, R. W. Scharpf, and D. Smithey. 1985. Deer and Elk. Pages 231-258 In: E. R. Brown (Editor). Management of wildlife and fish habitats

in forests of western Oregon and Washington. U.S.D.A. Forest Service Publication No. R6-F&WL-192-1985, Portland, Oregon, USA.

Wood, D. M., and R. Del Moral. 1988. Colonizing plants on the pumice plains, Mount St. Helens, Washington. American Journal of Botany 75:1228-1237.

ASSESSING THE POTENTIAL EFFECTS OF TREPONEME ASSOCIATED HOOF DISEASE (TAHD) ON ELK POPULATION DYNAMICS IN SOUTHWEST WASHINGTON

PROJECT UPDATE
OCTOBER 2018

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INTRODUCTION

Various hoof diseases have been reported worldwide in numerous free-ranging ungulates, including elk (*Cervus elaphus*; Murie 1930, Gray et al. 2001, Thorne et al. 2002), mule deer (*Odocoileus hemionus*; Wobeser et al. 1975), white-tailed deer (*O. virginianus;* Sleeman et al. 2009), moose (*Alces;* Flynn et al. 1977, Clauss et al. 2009), fallow deer (*Dama*; Lavin et al. 2004), reindeer (*Rangifer tarandus*; Handeland et al. 2010), roe deer (*Capreolus*; Handeland and Vikøren 2005), and mouflon (*Ovis gmelini musimon*; Volmer et al. 2008). Reports of elk in southwestern Washington with evidence of lameness or various hoof abnormalities were historically sporadic and infrequent. In early 2008, however, the number and geographic extent of elk displaying evidence of an apparently novel hoof disease significantly increased (Mansfield et al. 2011, WDFW unpublished data).

The emergence of this disease in southwest Washington elk herds is unique in that bacteria in the genus *Treponema*, (aka "treponemes"), never previously associated with hoof diseases in any free-ranging ungulate, have been identified as causal (Clegg et al. 2015). Treponemes are strongly associated with similar diseases of domestic livestock: bovine digital dermatitis of cattle (Evans et al. 2009), contagious ovine digital dermatitis (CODD) of domestic sheep (Sayers 2009), and a CODD-like disease of domestic goats (Sullivan et al. 2015).

Elk affected by treponeme-associated hoof disease (TAHD) often have severely overgrown and deformed hooves with sole ulcers and sloughed hoof walls (Han and Mansfield 2014). TAHD can occur in multiple limbs and can affect all age and sex classes (Clegg et al. 2015). The severity of clinical signs, coupled with the seemingly rapid expansion of impacted areas, have generated a great deal of concern for the Washington Department of Fish and Wildlife (WDFW), other resource management agencies, hunters, tribes, and local citizens. In response to these concerns, WDFW continues to work with several specialists to better understand the etiology of TAHD. In addition, WDFW established a Hoof Disease Technical Advisory Group (HDTAG) and a Hoof Disease Public Working Group (HDPWG). The HDTAG has guided the diagnostic effort, identified research needs, and provided review and input to management options. The HDPWG has provided input to management and research options and serves as a venue for WDFW to share information with the public. However, it is difficult to assess what implications TAHD will have for the management of affected elk herds because the effects of TAHD on elk vital rates (e.g., survival, reproduction, etc.) are unknown.

It is reasonable to assume that elk with advanced stages of TAHD have a decreased probability of survival because their infirmities may predispose them to predation, harvest, severe weather events, or other types of disease (Bender et al. 2008). For example, mule deer with chronic wasting disease (CWD), prior to developing obvious clinical signs, have been shown to be more vulnerable to predation (Miller et al. 2008, Krumm et al. 2009), vehicle collisions (Krumm et al. 2005), and possibly harvest (Conner et al. 2000). This is an important consideration because the growth rate of large ungulate populations, such as elk, is highly sensitive to changes in adult female survival (Nelson and Peek 1982, Eberhardt 2002) and strongly correlated with the production and survival of juveniles (Gaillard et al. 2000; *see also* Smith and Anderson 1998, Raithel et al. 2007). When adult female and juvenile survival are concurrently reduced, populations would be expected to decline (Gaillard et al. 2000; *see also* Bender et al. 2007, McCorquodale et al. 2014). Consequently, if TAHD reduces the survival of adult females and calves, it has the potential to have a negative effect on the population dynamics of impacted elk herds.

Although McCorquodale et al. (2014) monitored 16 adult female elk that had varying degrees of presumed TAHD (i.e., they had varying degrees of hoof deformities, but no lab samples were collected and tested) inferences from their work are limited. Twelve of 16 affected elk they monitored survived ≥ 1 year and of those that did not survive ≥ 1 year, all were harvest-related mortalities. In addition, 3 of 4 elk that were fitted with VHF collars that had a battery life of several years survived until radio contact was lost 3-4 years after they were captured. Anecdotally, this indicates that if TAHD negatively affects the natural survival of elk, it may take several years before it does so. We need to improve our understanding of how quickly TAHD progresses and if, and when, it may begin to predispose affected elk to mortality.

TAHD may also have the potential to affect the population dynamics of impacted elk herds because of its effect on the energy dynamics of female elk. The nutritional condition of female ungulates can influence age at first breeding (Cook et al. 2004), timing of estrus and subsequent birth date (Andersen and Linnell 1998, Cook et al. 2004, Bishop et al. 2009), probability of conception (Cook et al. 2004, Cook et al. 2013), fetal development and survival (Verme 1969, Ozoga and Verme 1982), birth weight (Verme and Ullrey 1984, Keech et al. 2000, Lomas and Bender 2007), milk yield or composition (Landete-Castillejos et al. 2003, Tollefson 2007), and subsequent growth and survival of juveniles (Clutton-Brock et al. 1982, Bishop et al. 2009). For example, elk from the Mount St. Helens elk herd area (MSH) and other coastal regions of Washington are

characterized by pregnancy rates for prime-aged females that are consistently depressed [Kuttel 1975 (74%), Smith 1980 (61%), Cook et al. 2013 (68-100%), McCorquodale et al. 2014 (71%)] because marginal nutrition limits the level of condition female elk are able to achieve during the summer-autumn period (Cook et al. 2013). Due to the additional energetic requirements for mounting an immune response and for tissue repair (Deming 2009), TAHD may further limit the ability of affected elk to improve their condition during the summer-autumn period and therefore has the potential to reduce overall pregnancy rates even further, which could reduce demographic vigor.

Some have attributed recent declines in the MSH elk herd to TAHD because the monitored portions of the MSH herd declined by 30-35% over a 4-year period (2009–2013; McCorquodale et al. 2014) that coincided with an increase in the prevalence and distribution of the disease (WDFW, unpublished data). However, this period of population decline also occurred concurrently with a directed effort by WDFW to reduce the elk population through substantial increases in antlerless harvest because of evidence that the MSH elk herd was above ecological carrying capacity (WDFW 2006, McCorquodale et al. 2014). Moreover, density independent severe winter weather that occurred in 2012 likely contributed to the documented decline (McCorquodale et al. 2014). Because these three events overlapped temporally and elk with presumed TAHD represented <15% of the adult females that were monitored, McCorquodale et al. (2014) were not able to conclude whether or not TAHD was a contributing factor in observed declines.

The number of elk that have TAHD and the effects of TAHD on elk vital rates, collectively, will determine what the long-term implications of TAHD are for the viability, and subsequent management, of impacted elk herds (Wobeser 2007). Consequently, our primary research goals are to quantify how TAHD may affect the survival, pregnancy rates, productivity, and nutritional condition of adult female elk. Our specific study objectives include:

1. *Estimate the effects of TAHD on survival of adult (≥ 2 years old) female elk.*
2. *Determine cause-specific mortality rates for adult female elk that have TAHD.*
3. *Estimate the effects of TAHD on the pregnancy rates of adult female elk.*
4. *Estimate the effects of TAHD on elk productivity (i.e., survivorship of calves).*

5. *Estimate the effects of TAHD on the level of condition (i.e., IFBF) adult female elk are able to achieve in autumn.*

6. *Increase our understanding of how TAHD progresses in individual elk, and whether affected elk may recover from the disease.*

STUDY AREA

Our study area consists of 5 Game Management Units (GMUs) that, collectively, represent the core range of the MSH herd (Figure 1). The primary reasons we focused our work in this area are: 1) it occurs within the TAHD endemic area; 2) it decreases the probability of stochastic variation in the data independent of TAHD; and 3) it is the same study area of McCorquodale et al. (2014). Having the same study area as McCorquodale et al. (2014) afforded us the opportunity to put more emphasis on monitoring elk affected by TAHD because we could potentially use their findings for non-affected elk, 2009–2012, as baseline estimates of survival for elk independent of the disease.

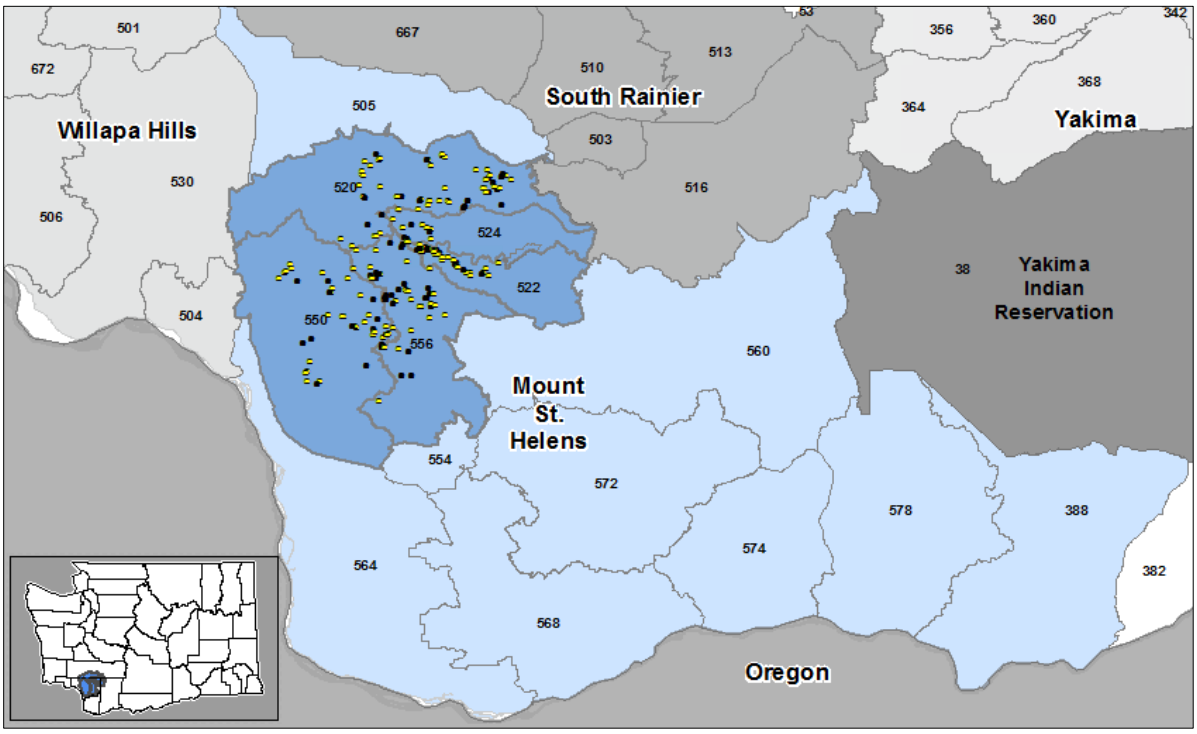

Figure 1. Map depicting the Game Management Units (GMUs) that comprise the Mount St. Helens elk herd area (light blue), the 5 GMUs that represent the core range of the herd and our study area (dark blue), and the locations where we have captured elk affected (yellow) or seemingly unaffected (black) by treponeme-associated hoof disease, February 2015–December 2017. Also included for spatial reference are GMUs associated with the Willapa Hills, South Rainier, and Yakima elk herds.

METHODS AND RESULTS

Capture and Marking

We initiated captures February 17–27, 2015 with the goal of capturing and marking 80 adult female elk at a ratio of 3 elk affected by TAHD (hereafter, diseased group) to every 1 elk that was unaffected (hereafter, control group). We conducted subsequent captures December 2015–2017, with the primary goal of maintaining our desired sample size and 3:1 ratio within each GMU. We conducted captures December 16–22 in all 3 years. When attempting to mark elk for inclusion in our diseased group, we only targeted individuals that were visibly limping, which, in most instances, was indicative of an elk having advanced stages of TAHD–of the elk we captured that were limping, only 3 were unaffected by TAHD. However, subsequent to us capturing them, we determined some elk we had captured for inclusion in our control group (i.e., not limping) had early stages of the disease. Although we were primarily interested in marking elk most severely affected by TAHD, we made the decision to include these elk in the diseased group because it afforded us the opportunity to increase our understanding of disease progression. Lastly, in order to increase the likelihood that our sample of diseased elk was an unbiased sample, we attempted to capture the first limping elk we detected within a group, regardless of their apparent condition (i.e., some elk were visibly emaciated at time of capture).

We captured female elk via aerial darting from a Bell 206B Jet Ranger helicopter using recommended immobilizing and reversal agents (Kreeger and Armeno, 2007). We blindfold elk to minimize stress during handling, administered clostridium vaccine (the first time the animal was captured), vitamin E and analgesic (flunixin meglumine) injections, and treated the dart wound. We marked each elk using a colored and numbered ear-tag and a mortality-sensitive, GPS (Global Positioning System)-equipped radio-collar. We determined disease status by having a veterinarian, knowledgeable of hoof deformities commonly associated with TAHD and other hoof diseases, examine each hoof after we had used a saline solution to remove mud and debris from the hoof. We also removed an upper canine tooth to determine age using microhistological analysis of cementum annuli (Hamlin et al. 2000; Matson's Laboratory, Milltown, MT).

We captured 80, 46, 43, and 42 female elk February 2015, December 2015, December 2016, and December 2017, respectively (Table 1). A subset of the elk we captured in December 2015 (n = 20 diseased, 10 control), December 2016 (n = 15 diseased, 8 control), and December 2017 (n = 6 diseased, 4 control) represented elk we had originally marked during previous capture events.

We recaptured these elk to accomplish three objectives: 1) to confirm disease status of elk in our control group; 2) to increase our understanding of disease progression; and 3) to index the proportion of elk known to be pregnant within each group that successfully raised a calf through late-autumn. Collectively, we captured 148 individuals during 211 capture events.

Table 1. The number of female elk we captured in each Game Management Unit (GMU) by capture event and the number of those elk that had visible signs of being affected by treponeme-associated hoof disease (Diseased Group), or appeared to be unaffected by the disease (Control Group).

	Diseased Group					**Control Group**				
GMU	**Feb 2015**	**Dec 2015**	**Dec 2016**	**Dec 2017**	**Total**	**Feb 2015**	**Dec 2015**	**Dec 2016**	**Dec 2017**	**Total**
520	24	10	10	3	47	6	5	4	2	17
522	11	6	5	9	31	1	2	3	5	11
524	1	4	2	0	7	3	0	0	1	4
550	15	6	4	5	30	5	0	2	5	12
556	9	5	9	6	29	5	8	4	6	23
Total	**60**	**31**	**30**	**23**	**144**	**20**	**15**	**13**	**19**	**67**

We did not mark two of the elk we captured in February 2015 because they died during the capture process (1 yearling and 1 adult; both had TAHD). In addition, we had 1 diseased elk we captured in December 2016 and 1 control elk in December 2017 that died within 1 day of being captured. In both instances, we immediately retrieved the radio-collar and redeployed it on a different elk. We included data from these elk in all analyses, except for survival.

Ages of female elk at time of initial capture that we assigned to our diseased group (n = 101) ranged 1-16 years and averaged 6 years old (95% CI = 5-7), while ages of female elk we assigned to our control group (n = 45) ranged 1-13 years and averaged 7 years old (95% CI = 6-8) (Figure 2). We were not able to collect a tooth for age determination from 2 elk in our diseased group.

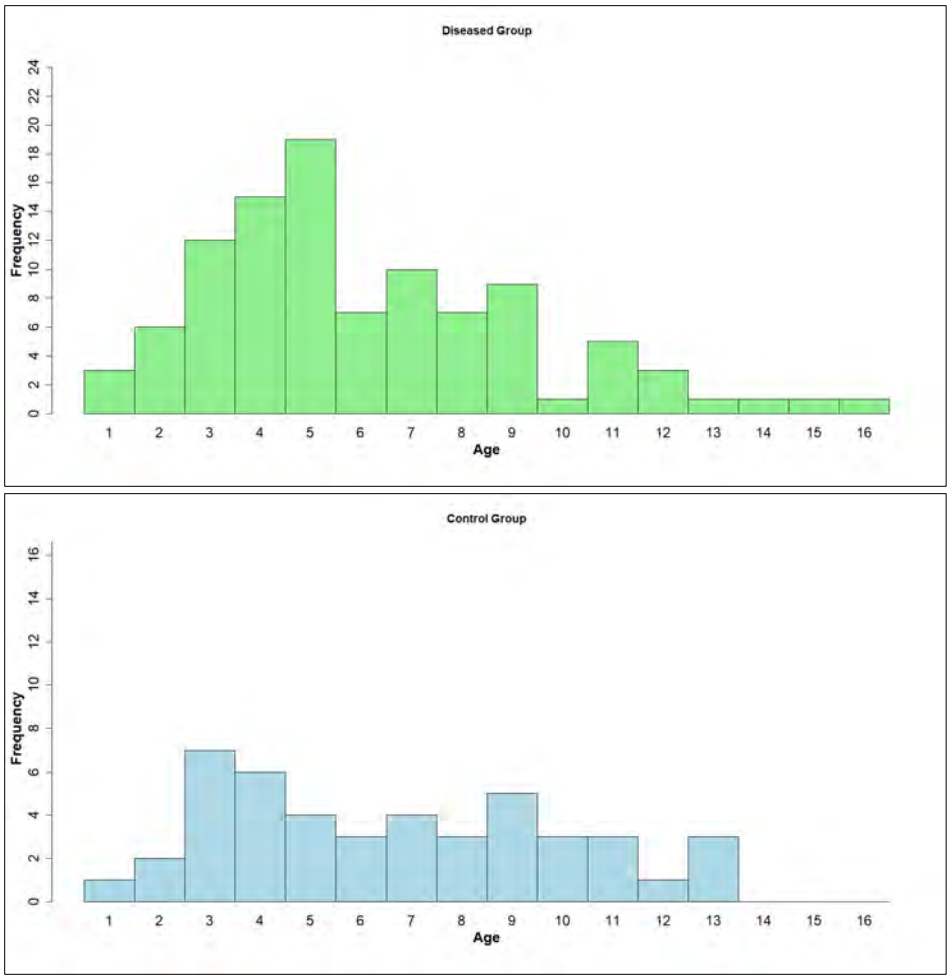

Figure 2. Distribution of ages at time of initial capture for female elk we captured, 2015–2017, that were affected by treponeme-associated hoof disease (Diseased Group) or had no visible signs of being affected by the disease (Control Group).

Disease Occurrence within Control Group

To date, we have marked and assigned 44 elk to our control group, of which, 14 are new study animals we captured for the first time in December 2017 (does not include the control elk that died during capture in December 2017). We have confirmed disease status for 25 of 30 elk we captured prior to December 2017, of which 0.48 (12/25) have contracted TAHD after we initially marked them. For elk within our control group that we captured during subsequent capture events, 0.25 (3/12), 0.22 (2/9), and 0.50 (3/6) in December 2015, 2016, and 2017, respectively, had contracted TAHD between capture events.

Disease Severity, Progression, and Recovery

We have continued to observe wide variation in hoof disease severity subsequent to our initial capture in February 2015. We initially developed grades of the disease that were related to a visual characterization of hoof deformities (Figure 3), but recognize our scoring system is subjective and may not exactly correlate with the effects of TAHD on the energy dynamics of elk. For example, we have preliminarily defined Grade IV of the disease to include any elk that is missing 1 or more hoof capsules, which would include an elk that recently sloughed its hoof capsule and is dealing with a painful, badly infected foot, and likely using a lot of energy fighting that infection. However, elk classified as having Grade IV may also include an animal that sloughed its hoof capsule several years prior and has, relatively speaking, healed and is no longer expending the same amount of energy it was when the hoof initially sloughed. Although we anticipate incorporating some measure of disease severity will strengthen the inferences we can make, our grading system is still evolving as we continue to increase our understanding of the disease during subsequent examinations of recaptured elk, from histology and microbiology examinations of hooves from study animals and hunter-harvested elk, and from evaluations of individual elk health status via clinical pathology of blood samples.

Severity.—We captured 103 elk that were affected by TAHD at the time of initial capture and we completed a full examination of all 4 hooves for 98 of them. The back hooves were involved in all 98 cases, only 1 back hoof was involved in 0.66 (65/98) of the cases, and both back hooves were involved in 0.26 (25/98) of the cases. It does not appear the rate at which TAHD involves the back right (57/98 = 0.58) or back left (66/98 = 0.67) hooves is disproportionate. The front hooves were involved in only 0.10 (10/98) of the elk we examined. The majority of elk within our diseased group either had TAHD on a single hoof with characteristics we have preliminarily associated with advanced stages of the disease (i.e., Grade 3 or Grade 4; 53/98 = 0.54) or had the disease on multiple hooves (33/98 = 0.34) (Figure 4).

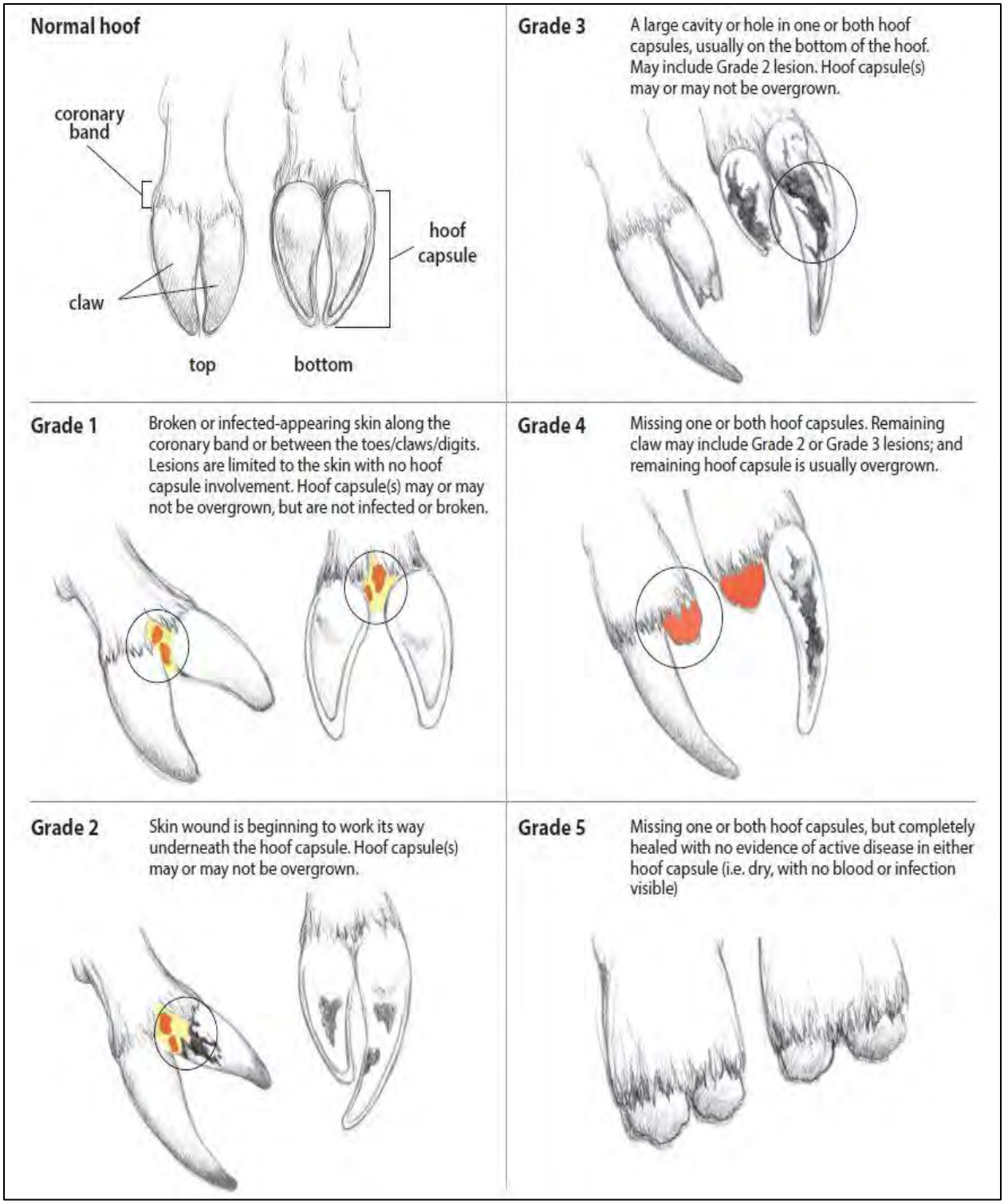

Figure 3. Diagram depicting characteristics we preliminarily associated with the 5 grades of treponeme-associated hoof disease we defined after capturing 60 female elk in February 2015, showing widely variable manifestation of the disease.

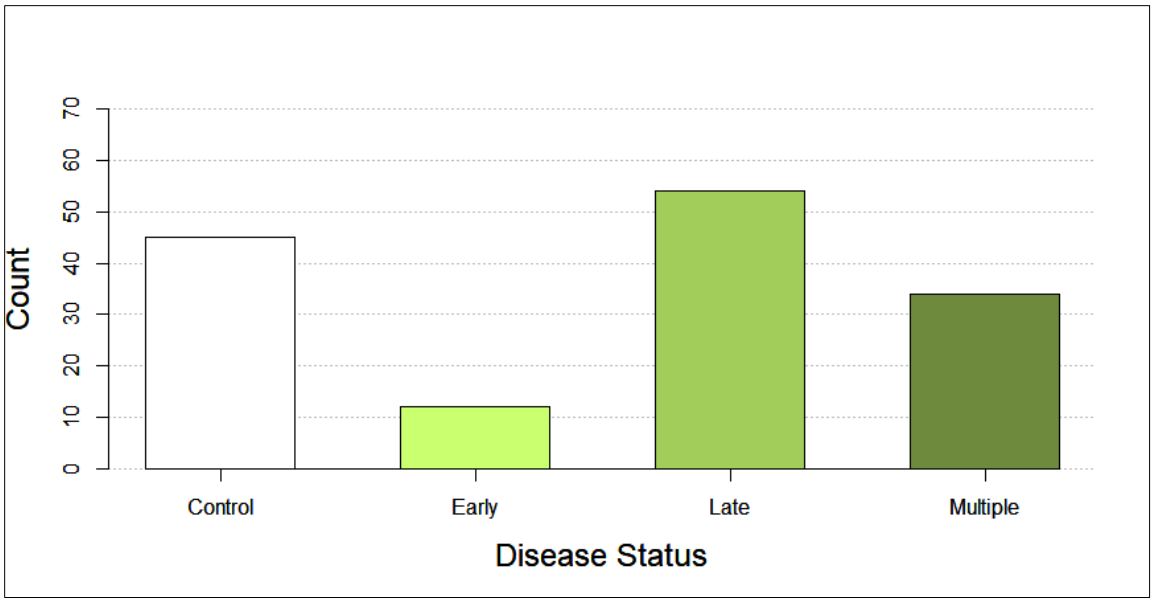

Figure 4. Distribution of hoof condition scores [Control, Early (Grade I or II), Late (Grade III or IV on a single hoof), and Multiple (present on multiple hooves)] at time of initial capture for female elk we captured February 2015–December 2017.

Progression.—We have recaptured 28 elk from our diseased group during subsequent capture events, which represented 36 hooves that were affected by TAHD during the previous capture. Of those 36 hooves, the disease progressed in 14, stayed the same in 16 (14 were Grade IV), had resolved in 6 (all were Grade I or Grade II), and 6 additional hooves had become involved. Five elk had progressed from having TAHD on a single hoof to multiple hooves, 13 had a single hoof involved during both captures, 4 transitioned from having multiple hooves involved to a single hoof, 4 had multiple hooves involved during both captures, and the disease had potentially resolved in 2 elk (Elk 161 and 162 both had Grade I on a single hoof the previous year; see below). In addition, 8 of the 27 elk from our control group had developed TAHD, with one of them having developed Grade IV on a single rear hoof between February 2015 and December 2015. Collectively, this information indicates that in many cases TAHD progresses quite rapidly and most individuals likely develop advanced stages of the disease within the first year of becoming infected.

Recovery.—We have only observed 1 case where an elk affected by TAHD had definitively recovered from the disease. We originally captured Elk 315 in December 2016, at which time we determined she had Grade II on her right hind hoof (Figure 5). She was subsequently legally harvested in November 2017 and formal examinations indicated all four hooves were grossly and

histologically normal, in addition to silver stains being negative for any spiral bacteria with typical *Treponema* morphology. We are not able to definitively claim the disease resolved in Elk 161 and Elk 162 because we only made that assessment during a gross examination of the hooves in a field setting.

Figure 5. Photos of the right hind hoof from Elk 315 at time of initial capture on December 16, 2016 (left image) and photos of both rear hooves at time of histological examination at the Colorado State University Veterinary Diagnostic Laboratory, Fort Collins, Colorado, USA in 2017. The elk was legally harvested on November 5, 2017.

Body Condition

We determined body condition [i.e., percent ingesta-free body fat (IFBF)] at time of capture by having an experienced observer use a portable ultrasound to measure maximum subcutaneous rump fat thickness (MAXFAT) and determine a rump body condition score (rBCS) following the procedures of Cook et al. (2001*a*). We then used estimates of MAXFAT and rBCS to estimate IFBF at time of capture following the procedures of Cook et al. (2010). We also measured each elk's chest girth to estimate body mass following the procedures of Cook et al. (2003). Lastly, because lactation status has consistently been shown to be a primary determinant of the level of condition female elk are able to achieve in autumn (Cook et al. 2004, Cook et al. 2013), we classified elk as lactating (milk could be extracted from the udder) or non-lactating (milk was not present). The presence of milk indicated the female had been nursing a calf sometime within the previous 11 days (Flook 1970). Our non-lactating group undoubtedly included a combination of females that were not bred the previous autumn (true non-lactators), females that lost their calf at or near parturition, females that lost their calf at various times between parturition and capture,

and females that successfully produced a calf, but ceased lactating prior to capture. We pooled data December 2015–2017 to increase sample sizes.

Mean estimates of IFBF were consistently lowest for elk that were affected by TAHD, albeit those differences were minimal and have a low probability of being statistically significant, except for non-lactating elk in December (Table 2 and Figure 6). However, our current estimates include all elk affected by TAHD, irrespective of disease severity, which as discussed we cannot confidently quantify at this time. For example, 12 (6 lactating, 6 non-lactating) of the elk in our diseased group that we captured in December represented elk that had early stages of the disease, and given that we have learned the disease progresses quickly, there is a reasonable likelihood these elk spent a majority of the summer-autumn period unaffected by TAHD. Although sample sizes are small, our preliminary observations indicate the condition of adult female elk with early stages of the disease may be more similar to the condition of adult female elk within our control group.

Table 2. Mean estimates and associated 95% confidence intervals (CI) of percent ingesta-free body fat (IFBF) by disease and lactation status for adult female elk we captured in February and December in the Mount St. Helens elk herd area, 2015–2017.

	Non-Lactating						**Lactating**					
	Diseased Group			**Control Group**			**Diseased Group**			**Control Group**		
Season	***n***	$\bar{x}$	**CI**	***n***	$\bar{x}$	**CI**	***n***	$\bar{x}$	**CI**	***n***	$\bar{x}$	**CI**
February	56	4.2	3.6-4.7	19	5.1	3.9-6.2	---	---	---	---	---	---
December	46	5.8	5.2-6.5	16	8.5	7.7-9.2	36	5.3	4.7-6.0	31	6.3	5.7-6.94

Pregnancy

We determined pregnancy status at time of capture via ultrasonography and analysis of Pregnancy–Specific Protein B (PSPB) in serum samples collected during capture (Noyes et al. 1997). None of the elk we classified as yearlings (n = 4) were pregnant. For adult female elk, pregnancy rates have consistently been higher for our control group (range = 0.69–0.84) than for our diseased group (range = 0.32–0.59) (Figure 7). Overall, 50% (95% CI = 41–58%) of elk within our diseased group (n = 139) and 79% (95% CI = 67–87%) of elk within our control group (n = 66) have been pregnant. For comparison, McCorquodale et al. (2014) reported an overall pregnancy rate of 67% for the 109 adult female elk they captured 2009–2012.

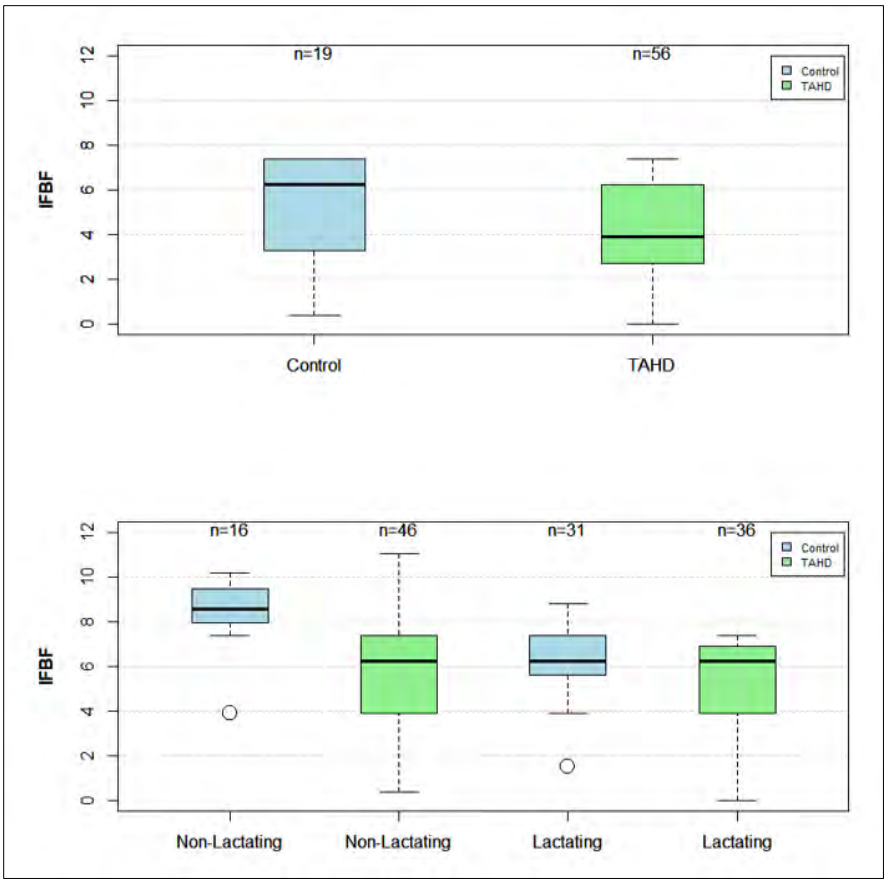

Figure 6. Boxplots of percent ingesta-free body fat (IFBF) by disease status for adult female elk we captured in the Mount St. Helens elk herd area February 2015 (top) and by disease and lactation status for adult female elk we captured December, 2015–2017 (bottom).

Productivity

In our original proposal, we defined productivity as the early survivorship of calves (e.g., to 6 months of age) and proposed we would estimate productivity using calf-at-heel ratios or lactation rates from hunter harvested elk. We have since abandoned those efforts and are only indexing calf survival using lactation rates observed in December and directly estimating calf survival from elk that we captured during subsequent capture events (i.e., we know what their pregnancy status was the previous year and assume a calf died if they were pregnant in $Year_t$, but not lactating in $Year_{t+1}$).

The proportion of adult female elk that were lactating at time of capture in December has ranged 0.63–0.69 for elk in our control group and 0.42–0.45 for elk within our diseased group (Figure 8). Overall, 0.66 (95% CI = 0.52–0.78) of elk within our control group (n = 47) and 0.44 (95% CI = 0.34–0.55) of elk within our diseased group (n = 82) have been lactating in December.

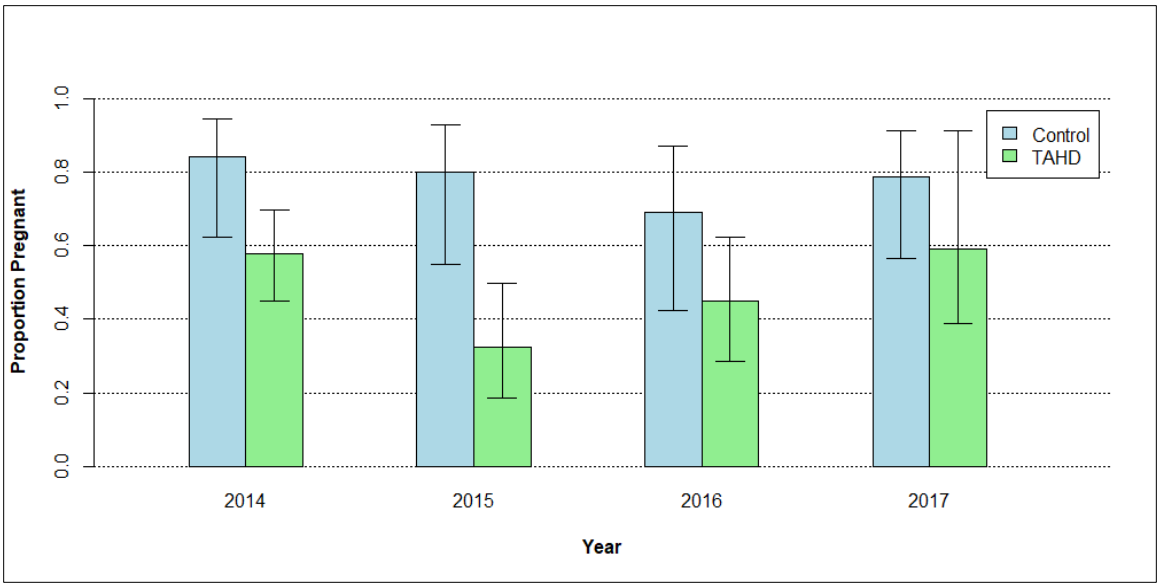

Figure 7. The proportion (and associated 95% confidence intervals) of adult female elk that were pregnant and affected by treponeme-associated hoof disease (TAHD) or had no visible signs of being affected by the disease (Control) at time of capture in the Mount St. Helens elk herd area, 2014–2017.

Although lactation rates were consistently lower for elk in our diseased group, they also had lower pregnancy rates, which indicates calf survival may not be substantially disparate between groups. Although inferences are limited by our small sample size, estimates of calf survival using pregnancy and lactation status of elk captured during subsequent capture events, also indicate calf survival to 6 months of age may be similar between groups. We estimated calf survival for our control group to be 0.60 (n = 10) in 2015, 0.75 (n = 8) in 2016, and 0.50 (n = 6) in 2017. Estimates of calf survival for our diseased group were 0.62 (n = 13) in 2015, 0.50 (n = 6) in 2016, and 0.67 (n = 3) in 2017. Overall, 0.63 of adult female elk within our control group where pregnancy status was known and 0.60 within our diseased group have successfully raised a calf through late-autumn.

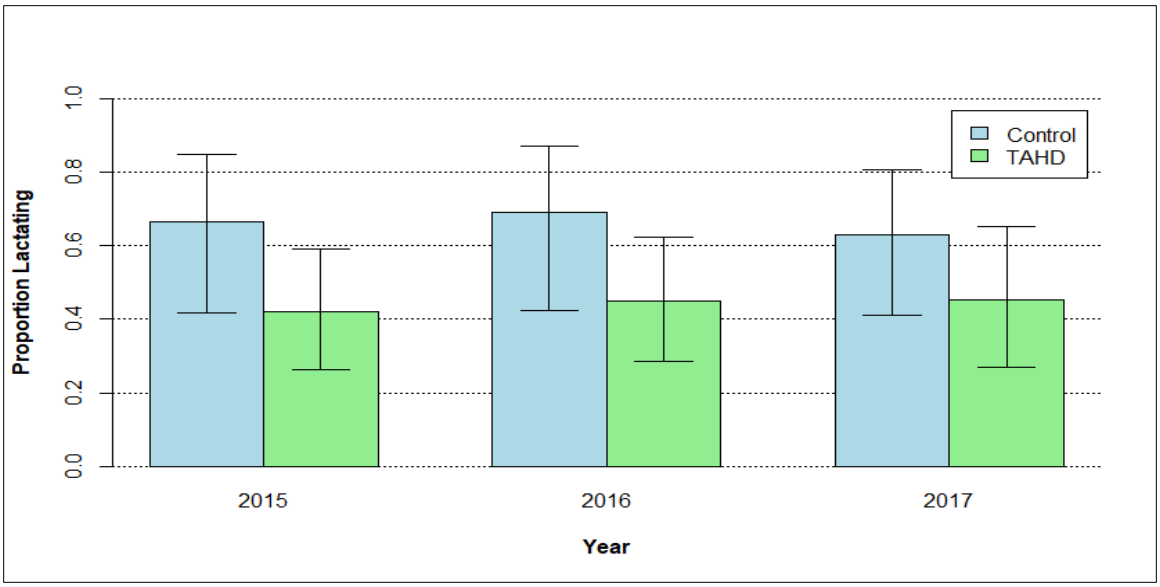

Figure 8. The proportion (and associated 95% confidence intervals) of adult female elk that were lactating in December and affected by treponeme-associated hoof disease (TAHD) or had no visible signs of being affected (Control), in the Mount St. Helens elk herd area, 2015–2017.

Survival

For our preliminary analysis, we estimated survival using the Kaplan-Meier estimator, modified for staggered-entry of individuals (Pollock et al. 1989). In addition to estimating survival since project initiation (i.e., March 2015–August 2018), we also estimated annual survival rates (i.e., May $1_{\text{Year t}}$–April $30_{\text{Year t+1}}$) and survival rates during 3 seasons that were biologically relevant to elk. These seasons included: 1) summer (May–August), the period of greatest nutritional demand for female elk supporting calves, 2) autumn (September–December), when the nutritional demands associated with lactation diminish and hunting seasons occur, and 3) winter (January–April), when elk primarily rely on fat reserves they accrued the previous summer-autumn period to meet their basic metabolic requirements.

In addition to censoring elk that died during or immediately following the capture process, we censored two mortalities from our survival analyses because, in both instances, the elk died within a couple weeks of their capture and we could not rule out capture-related stress as a contributing factor (e.g., Beringer et al. 1996). We also censored 1 elk from all analyses because she was originally captured in February 2015 as a control, missed in December 2015, and then her radio-collar quit transmitting in November 2016—thus, we have no way of knowing whether or not she had maintained her control status. In addition, we have had 5 radio-collars fail and subsequently

censored these elk from our analyses at the last point in time we received a GPS location transmission or determined the elk's status via VHF monitoring. Lastly, any elk within our control group that developed TAHD and had advanced stages of the disease was censored during the time period when disease status was unknown. For example, we censored the 3 elk confirmed to have lost their control status between February 2015 and December 2015 from our analysis during the period of February 2015–November 2015 and then brought them back into the analysis as a diseased elk in December 2015. We took this approach because we have no way of knowing when exactly they developed the disease. Lastly, we have had 2 control elk die within a few months of us capturing them (February and May, both captured the previous December) that had developed early stages of the disease by the time they died. In both instances, we kept them in the control group for this preliminary analysis. We believed this decision was justified given that disease progression appears to be quite rapid (i.e., they likely contracted the disease shortly before death) and they had spent the majority of the year as an elk unaffected by TAHD, which may have influenced their probability of survival during winter months. This decision will be considered more thoroughly as the project progresses.

Estimated survival since project initiation (i.e., March 2015–August 2018) has been 0.23 (95% CI = 0.16–0.29) for our diseased group and 0.37 (95% CI = 0.24–0.51) for our control group. Annual survival rates were similar between groups in 2017, but greater for elk in our control group in 2015 and 2016 (Table 3). Survival during summer has been similar between groups and among years within groups (Table 3). Substantial differences in estimates of survival between groups have primarily occurred during the winter season and survival of elk in both groups was lowest in winter 2016 when abnormally severe winter conditions persisted (Table 3). Although survival during autumn has not been markedly dissimilar between groups, and lower for elk in our control group 2 of 3 years, all 6 mortalities we have documented for elk in our control group during autumn have been human-caused (i.e., natural survival has been 1.00), compared to only 5 of 15 mortalities in our diseased group.

Table 3. Estimated survival rates (Ŝ) and associated 95% confidence intervals (CI) for elk affected by treponeme-associated hoof disease (Diseased Group) and for elk that were seemingly unaffected by the disease (Control Group) during 3 seasons of biological relevance to elk in the Mount St. Helens elk herd area, 2015–2017.

Diseased Group								
	Summer		**Autumn**		**Winter**		**Annual**	
Year	**Ŝ**	**CI**	**Ŝ**	**CI**	**Ŝ**	**CI**	**Ŝ**	**CI**
2015	0.93	0.86-0.99	0.92	0.85-0.99	0.80	0.70-0.90	0.68	0.57–0.79
2016	0.94	0.87-0.99	0.91	0.84-0.99	0.68	0.56-0.79	0.58	0.47–0.69
2017	1.00	–	0.86	0.76-0.96	0.75	0.65-0.86	0.65	0.54–0.76
Control Group								
	Summer		**Autumn**		**Winter**		**Annual**	
Year	**Ŝ**	**CI**	**Ŝ**	**CI**	**Ŝ**	**CI**	**Ŝ**	**CI**
2015	0.93	0.81-0.99	0.85	0.65-0.99	1.00	–	0.79	0.61–0.97
2016	0.94	0.81-0.99	1.00	–	0.83	0.66-0.99	0.78	0.60–0.97
2017	1.00	–	0.67	0.43-0.91	1.00	–	0.67	0.51–0.84

[1]Summer = May–August; Autumn = September–December; and Winter = January–April

Cause-specific Mortality

We have documented 86 mortalities (73 diseased group, 13 control group) since project initiation and attempted to investigate all deaths within 24 hours of receiving a message that a mortality event had occurred. In instances where the carcass was fully, or mostly, intact, we performed a field necropsy to determine proximate cause of death and to collect tissue samples that we submitted to the Colorado State University Veterinary Diagnostic Laboratory (CSU) for histological examination. Samples we collected and submitted to CSU included tissue samples from the heart, lungs, liver, kidney, spleen, pancreas, mammary gland, brain, popliteal and pre-scapular lymph nodes, any other tissues that seemed abnormal in appearance, and all 4 hooves. We also collected a femur and measured bone marrow fat content to estimate percent body fat at time of death (Neiland 1970). We were not able to collect all samples from every mortality event. We have received final histology reports from CSU for all but 3 mortalities to date, but have not completed bone marrow analysis for 8 elk that died April 2018–present.

To date, we have classified proximate causes of mortality as malnutrition (only applies to our control group), general debilitation (only applies to our diseased group), disease (non-TAHD),

human-caused (legal and illegal harvest), unknown, accident, and predation. Mortalities we classified as general debilitation were typically characterized by severe emaciation, the presence of advanced hoof disease, and no evidence of another primary disease based on histology of all major organs sampled. The emaciation observed in these animals indicates that they are in an extreme negative energy balance. However, we have no way of determining the relative contribution of the catabolic effects of a chronic severe disease such as TAHD (Demling 2009), compared to the catabolic effects resulting from nutritional limitations, such as those already known to occur in this herd (Cook et al. 2013, McCorquodale 2014), and how they may interact to affect the survival of elk. Mortalities we classified as disease (non-TAHD) have included cases where histological findings indicated the elk was afflicted by a severe case of pneumonia, severe renal disease, or septicemia. Lastly, mortalities we have classified as accidents have included 4 elk that have gotten stuck in bogs/mud, 1 elk that apparently drowned, and 1 elk that fell down an extremely steep and rocky slope—in all 6 cases the elk were in extremely poor condition, which we believe contributed to their plight.

Of the 13 mortalities we have documented for our control group, we have preliminarily classified 1 as unknown. Of the remaining 12, we have classified 6 (0.50) as human-caused (3 legal, 2 wounding loss, 1 illegal), which has been the leading cause of mortality (Figures 9 and 10). Of the 73 mortalities we have documented for our diseased group, we censored 3, 2 are pending histological findings, and have preliminarily classified 14 as unknown. Of the remaining 54, the leading causes of mortality have been general debilitation (0.44, n = 24) and predation (0.28, n =15). Most mortality events for our diseased group have occurred January–April (Figure 10). In instances where we have classified mortalities in our diseased group as general debilitation, predation, and unknown, 1.00, 0.83, and 0.89, respectively, have had bone marrow content levels indicative of severe negative energy balance.

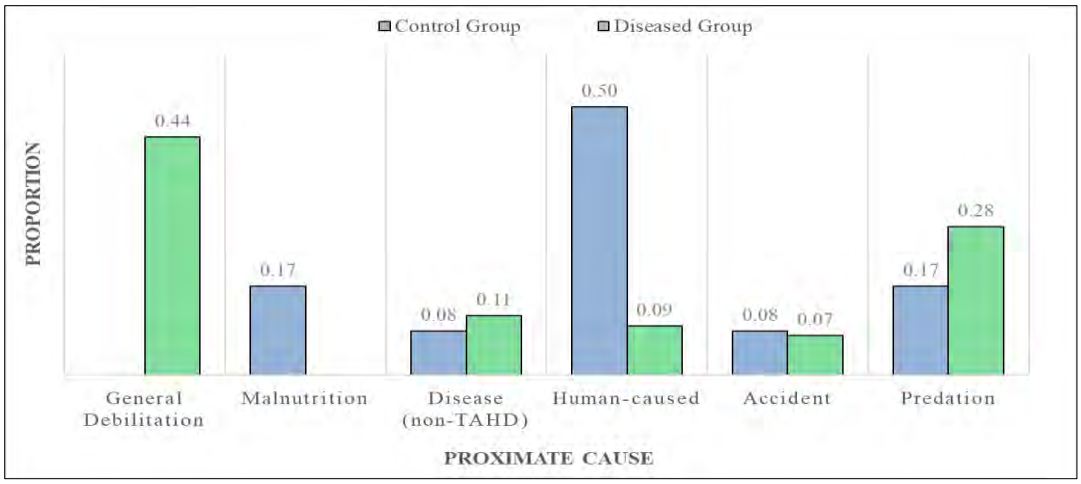

Figure 9. Proportion of deaths by proximate cause for adult female elk that were affected by treponeme-associated hoof disease (Diseased Group) or had no visible signs of being affected by TAHD (Control Group) in the Mount St. Helens elk herd area, February 2015–August 2018.

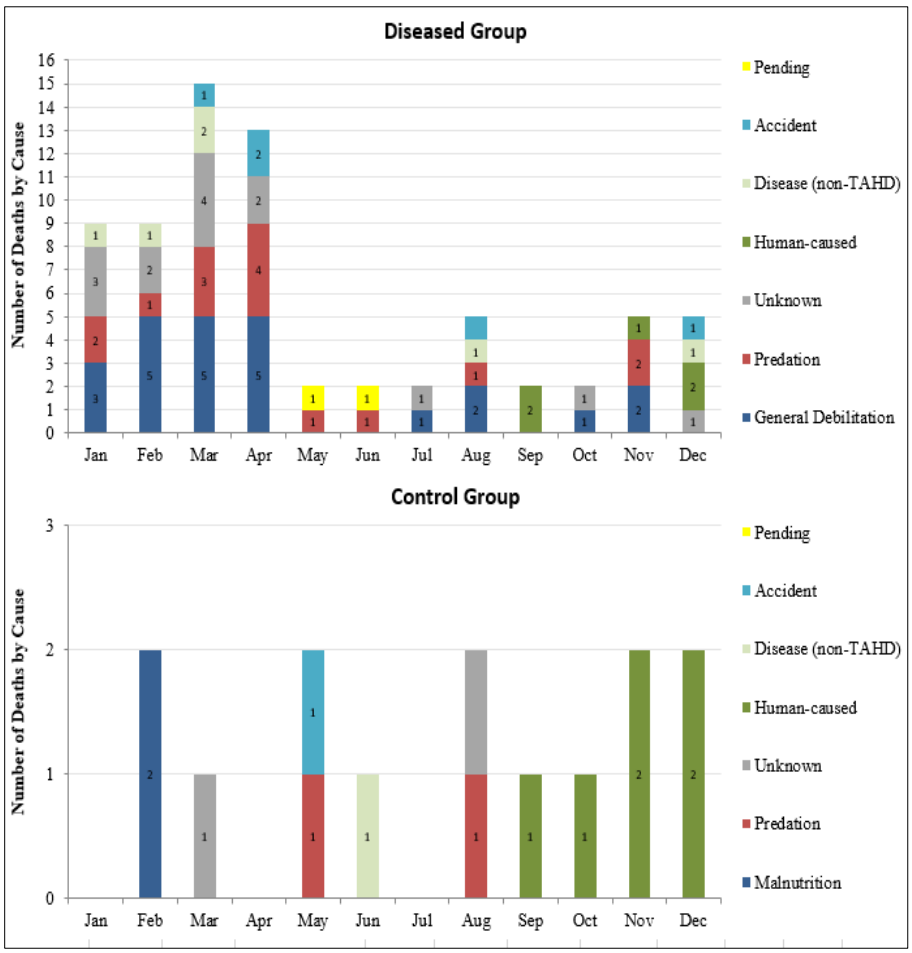

Figure 10. Number of deaths by cause and month for elk that were affected by treponeme-associated hoof disease (Diseased Group) or had no visible signs of being affected by the disease (Control Group) in the Mount St. Helens elk herd area, February 2015–August 2018.

DISCUSSION

It is far too soon for us to make any definitive statements that relate to our research objectives or to discuss our results in any detail. Preliminarily, elk affected by TAHD have had lower levels of condition in December, lower pregnancy rates, lower lactation rates, and lower annual survival rates. Our estimates of IFBF in December indicate elk in the Mount St. Helens elk herd area continue to experience strong nutritional limitations during late-summer and autumn, regardless of disease status. Irrespective of proximate cause, 0.88 of the mortalities we have documented for elk affected by TAHD, have included animals that had bone marrow content levels indicative of a severe negative energy balance. However, at this time we are not able to quantify the degree to which the catabolic effects of TAHD are contributing to those observations.

Our preliminary observations indicate that it will be important for us to consider disease severity when we complete our final analysis and we will continue to evaluate how we define disease status and severity as the study progresses. Similarly, we will continue to examine when we censor elk in our survival analysis that transition from our control group to our diseased group. At this point in time, we do not anticipate any changes to our study design and plan to conduct captures in December 2018.

LITERATURE CITED

Andersen, R., and J. D. C. Linnell. 1998. Ecological correlates of mortality of roe deer fawns in a predator-free environment. Canadian Journal of Zoology 76:1217–1225.

Bender, L. C., J. G. Cook, R. C. Cook, and P. B. Hall. 2008. Relations between nutritional condition and survival of North American elk *Cervus elaphus*. Wildlife Biology 14:70–80.

Bender, L. C., L. Lomas, and J. Browning. 2007. Condition, survival, and cause-specific mortality of adult female mule deer in north-central New Mexico. The Journal of wildlife management 71:1118–1124.

Beringer, J., L. P. Hansen, W. Wildling, J. Fischer, and S. L. Sheriff. 1996. Factors affecting capture myopathy in white-tailed deer. Journal of Wildlife Management 60:373–380.

Bishop, C. J., G. C. White, D. J. Freddy, B. E. Watkins, and T. R. Stephenson. 2009. Effect of enhanced nutrition on mule deer population rate of change. Wildlife Monographs No. 172.

Clauss, M., A. Keller, A. Peemoller, K. Nygren, J.M. Hatt, and K. Nuss. 2009. Postmortal radiographic diagnosis of laminitis in a captive European moose (*Alces alces*). Schweizer Archiv für Tierheilkunde 151:545–549.

Clegg, S.R, K.G. Mansfield, K. Newbrook, L. Sullivan, R. Blowey, S.D. Carter, and N.J. Evans. 2015. Isolation of digital dermatitis treponemes from hoof lesions in wild North American elk (*Cervus elaphus*) in Washington state, USA. Journal of Clinical Microbiology 53:88-94.

Clutton-Brock, T. H., F. E. Guinness, and S. D. Albon. 1982. Red deer: Behaviour and ecology of two sexes. University of Chicago Press, Chicago, Illinois, USA.

Conner, M. M., C. W. McCarty, and M. W. Miller. 2000. Detection of bias in harvest-based estimates of chronic wasting disease prevalence in mule deer. Journal of Wildlife Diseases 36:691–699.

Cook, J. G., B. K. Johnson, R. C. Cook, R. A. Riggs, T. Delcurto, L. D. Bryant, and L. L. Irwin. 2004. Effects of summer-autumn nutrition and parturition date on reproduction and survival of elk. Wildlife Monographs No. 155.

Cook, R. C., J. G. Cook, D. J. Vales, B. K. Johnson, S. M. McCorquodale, L. A. Shipley, R. A. Riggs, L. L. Irwin, S. L. Murphie, B. L. Murphie, K. A. Schoenecker, F. Geyer, P. B. Hall, R. D. Spencer, D. A. Immell, D. H. Jackson, B. L. Tiller, P. J. Miller, and L. Schmitz. 2013. Regional and seasonal patterns of nutritional condition and reproduction in elk. Wildlife Monographs No. 184.

Cook, R. C., J. G. Cook, D. L. Murray, P. Zager, B. K. Johnson, and M. W. Gratson. 2001*a*. Development of predictive models of nutritional condition for Rocky Mountain elk. Journal of Wildlife Management 65:973–987.

Cook, R. C., J. G. Cook, and L. L. Irwin. 2003. Estimating elk body mass using chest firth circumference. Wildlife Society Bulletin 31:536–543.

Cook, R. C., J. G. Cook, T. R. Stephenson, W. L. Meyers, S. M. McCorquodale, D. J. Vales, L. L. Irwin, P. B. Hall, R. D. Spencer, S. L. Murphie, K. A. Schoenecker, and P. J. Miller. 2010. Revisions of rump fat and body scoring indices for deer, elk, and moose. Journal of Wildlife Management 74:880–896.

Demling RH. 2009. Nutrition, anabolism, and the wound healing process: an overview. Eplasty 9:65-94.

Eberhardt, L. E. 2002. A paradigm for population analysis of long-lived vertebrates. Ecology 83:2841–2854.

Evans, N. J., J. M. Brown, I. Demirkan, P. Singh, B. Getty, D. Timofte, W. D. Vink, R. D. Murray, R. W. Blowey, and R. J. Birtles. 2009. Association of unique isolated treponemes with bovine digital dermatitis lesions. Journal of Clinical Microbiology 47:689–696.

Flook, D. R. 1970. A study of sex differential in the survival of wapiti. Canada Wildlife Service Report, Serial Number 11. Queens Printer, Ottawa, Ontario, Canada.

Flynn, A. A., A. W Franzman, P. D. Arneson, and J. L. Oldemeyer. 1977. Indications of copper deficiency in a subpopulation of Alaska moose. Journal of Nutrition 107:1182–1189.

Gaillard, J.-M., M. Festa-Bianchet, N. G. Yoccoz, A. Loison, and C. Toigo. 2000. Temporal variation in fitness components and population dynamics of large herbivores. Annual Review of Ecology and Systematics 31:367–393.

Gray, H. E., C. Card, K. E. Baptiste, and J. M. Naylor. 2001. Laminitis in a mature elk hind (*Cervus elaphus*). The Canadian Veterinary Journal. 42:133–134.

Hamlin, K. L., D. F. Pac, C. A. Sime, R. M. Desimone, and G. L. Dusek. 2000. Evaluating the accuracy of ages obtained by two methods for montane ungulates. Journal of Wildlife Management 64:441–449.

Han, S., and K. G. Mansfield. 2014. Severe hoof disease in free-ranging Roosevelt elk (cervus elaphus roosevelti) in southwestern Washington, USA. Journal of Wildlife Diseases 50:259–270.

Handeland, K., and T. Vikøren. 2005. Presumptive gangrenous ergotism in free-living moose and a roe deer. Journal of Wildlife Diseases 41:636–642.

Handeland, K., M. Boye, M. Bergsjø, H. Bondal, K. Isaksen, and J. S. Agerholm. 2010. Digital necrobacillosis in Norwegian wild tundra reindeer (*Rangifer tarandus tarandus*). Journal of Comparative Pathology 143:29–38.

Heisey, D. M., and T. K. Fuller. 1985. Evaluation of survival and cause-specific mortality rates using telemetry data. Journal of Wildlife Management 49:668–674.

Keech, M. A. R., T. J. Bowyer, M. VerHoef, R. D. Boertje, B. W. Dale, and T. R. Stephenson. 2000. Life history consequences of maternal condition in Alaskan moose. Journal of Wildlife Management 64:450–462.

Kreeger, T. J. and J.M. Armeno. 2007. Handbook of Wildlife Chemical Immobilization. 4th Ed. Published by the Author.

Krumm, C. E., M. M. Conner, and M. W. Miller. 2005. Relative vulnerability of chronic wasting disease infected mule deer to vehicle collisions. Journal of Wildlife Diseases 41:503–511.

Krumm, C. E., M. M. Conner, N. T. Hobbs, D. O. Hunter, and M. W. Miller. 2009. Mountain lions prey selectively on prion-infected mule deer. Biology Letters 6:209–211.

Kuttel, M. P. 1975. Second report on the Willapa Hills elk herd: September 1, 1974-April 1, 1975. File Report. Washington Department of Game, Olympia, Washington, USA.

Landete-Castillejos, T., A. Garcia, J. A. Gomez, and L. Gallego. 2003. Lactation under food constraints in Iberian red deer *Cervus elaphus hispanicus*. Wildlife Biology 9:131–139.

Lavin, S., M. Ruiz-Bascarán, I. Marco, M. L. Abarca, M. J. Crespo, and J. Franch. 2004. Foot infections associated with *Arcanobacterium pyogenes* in free-living fallow deer (*Dama dama*). Journal of Wildlife Diseases 40:607–611.

Lomas, L. A., and L. C. Bender. 2007. Survival and cause-specific mortality of neonatal mule deer fawns in northcentral New Mexico. Journal of Wildlife Management 71:884–894

Mansfield, K., T. Owens, P. Miller, and E. Rowan. 2011. Geographical distribution and prevalence of hoof disease in southwestern Washington elk based on hunter surveys. Internal Report, Washington Department of Fish and Wildlife, Wildlife Program, Olympia, WA, USA.

McCorquodale, S. M., P. J. Miller, S. M. Bergh, and E. W. Holman. 2014. Mount St. Helens elk population assessment: 2009–2013. Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Miller, M. W., H. M. Swanson, L. L. Wolfe, F. G. Quartarone, S. L. Huwer, C. H. Southwick, and P. M. Lukacs. 2008. Lions and prions and deer demise. PLoS ONE 3:e4019.

Murie, O. J. 1930. An epizootic disease of elk. Journal of Mammalogy 11:214–222.

Neiland, K. A. 1970. Weight of dried marrow as indicator of fat in caribou femurs. Journal of Wildlife Management 34:904–907.

Nelson, L. J., and J. M. Peek. 1982. Effect of survival and fecundity on rate of increase of elk. Journal of Wildlife Management 46:535–540.

Noyes, J. H., R. G. Sasser, B. K. Johnson, L. D. Bryant, and B. Alexander. 1997. Accuracy of pregnancy detection by serum protein (PSPB) in elk. Wildlife Society Bulletin 25:695–698.

Ozoga, J. J., and L. J. Verme. 1982. Physical and reproductive characteristics of a supplementally-fed white-tailed deer herd. Journal of Wildlife Management 46:281–301.

Pollock, K. H., S. R. Winterstein, C. M. Bunck, and P. D. Curtis. 1989. Survival analysis in telemetry studies: the staggered entry design. Journal of Wildlife Management 53:7–15.

Raithel, J. D., M. J. Kauffman, and D. H. Pletscher. 2007. Impact of spatial and temporal variation in calf survival on the growth of elk populations. Journal of Wildlife Management 71:795–803.

Sayers, G., P. X. Marques, N. J. Evans, L. O'Grady, M. L. Doherty, S. D. Carter, and J. E. Nally. 2009. Identification of spirochetes associated with contagious ovine digital dermatitis. Journal of Clinical Microbiology 47:1199–1201.

Sleeman, J. M., J. E. Howell, W. M. Knox, and P. J. Stenger. 2009. Incidence of hemorrhagic disease in white-tailed deer in association with winter and summer climatic conditions. EcoHealth 6:11–15.

Smith, B. L., and S. H. Anderson. 1998. Juvenile survival and population regulation of the Jackson elk herd. Journal of Wildlife Management 62:1036–1045.

Smith, J. L. 1980. Reproductive rates, age structure, and management of Roosevelt elk in Washington's Olympic Mountains. Pages 67-111 *in:* W. MacGregor (editor). Proceedings of the 1980 Western States Elk Workshop. British Columbia Ministry of Environment, Cranbrook, BC, Canada.

Sullivan, L.E., N.J Evans, S. R. Clegg, S.D. Carter, J.E. Horsfield, D. Grove-White, and J.S. Duncan. 2015. Digital dermatitis treponemes associated with a severe foot disease in dairy goats. Veterinary Record 176:283.

Tollefson, T. N. 2007. The influence of summer and autumn forage quality on body condition and reproduction of lactating mule deer and their fawns (*Odocoileus hemionus*). Dissertation, Washington State University, Pullman, Washington, USA.

Verme, L. J. 1969. Reproductive patterns of white-tailed deer related to nutritional plane. Journal of Wildlife Management 33:881–887.

Verme, L. J., and D. E. Ullrey. 1984. Physiology and nutrition. Pages 91–118 *in* L. K. Halls, editor. White-tailed deer: Ecology and management. Stackpole Books, Harrisburg, Pennsylvania, USA.

Volmer, K., W. Hecht, R. Weiß, and D. Grauheding. 2008. Treatment of foot rot in free-ranging mouflon (*Ovis gmelini musimon*) populations—does it make sense? European Journal of Wildlife Research 54:657–665.

Washington Department of Fish and Wildlife. 2006. Mount St. Helens Elk Herd Plan. Wildlife Program, Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Wobeser, G. W. 2007. Disease in wild animals: investigation and management. Springer-Verlag, Heidelberg, Germany.

Wobeser, G., W. Runge, and D. Noble. 1975. Necrobacillosis in deer and pronghorn antelope in Saskatchewan. The Canadian Veterinary Journal 16:3–9.

CALIFORNIA FISH AND GAME COMMISSION - NONREGULATORY REQUESTS - ACTIVE

Revised 8/11/2020

FGC: California Fish and Game Commission | DFW: California Department of Fish and Wildlife | WRC: Wildlife Resources Committee | MRC: Marine Resources Committee

Date Received	Subject	Short Description	Name/ Organization of Requestor	Category	Recommendation
6/24/2020	Ballona restoration plan	Requested the FEIR for the Ballona Wetlands restoration project to come before FGC for public comment before final approval.	Marcia Hanscom, Sierra Club and Ballona Institute	Wildlife	The public is free to comment before FGC on any issue of interest at any meeting. FGC will request an update from DFW after the Ballona restoration plan is finalized. No action recommended.
6/24/2020	Ballona workgroups	Requested FGC create workgroups to discuss Ballona Wetlands restoration.	Patricia McPherson	Wildlife	Discussion of any regulatory or other issues within the authority of FGC will commence once the Ballona restoration plan is finalized. No action recommended.
6/24/2020	Coyote letter	Requested response to letter that Chief Bess delivered to FGC and would like this item on a future agenda. Requested to form some kind of working group in SoCal.	Theresa Hew	Wildlife	As it was provided at a WRC meeting and addressed to the WRC, the letter was included in the March 5, 2020 WRC meeting materials under General Public Comment. FGC staff have provided a response; no further action recommended.

California Fish and Game Commission
Potential Agenda Items for October 2020 Commission Meeting

The next Commission meeting is scheduled for October 14-15, 2020. Due to ongoing health concerns related to COVID-19 and state travel restrictions, the meeting will be held by webinar/teleconference. This document identifies potential agenda items for the meeting, including items to be received from Commission staff and the California Department of Fish and Wildlife (Department).

Wednesday, October 14: Marine-related and administrative items

1. General public comment for items not on the agenda
2. Executive director's report
3. Receive Department informational items (marine)
4. Tribal Committee
5. Marine Resources Committee
6. Extend the emergency regulation for recreational take of purple sea urchin in Caspar Cove, Mendocino County, by another 90 days (*if the first extension is approved today by the Commission under Agenda Item 4*)
7. Discuss: amendment to recreational fishing regulations for red and purple sea urchin in Tanker's, Reef Monterey County and purple sea urchin in Caspar Cove, Mendocino County (*if approved for notice today by the Commission under Agenda Item 16*)
8. Discuss: amendment of sunset date in recreational take of red abalone fishery regulation (*if approved for notice today by the Commission under Agenda Item 10*)
9. Adopt: recreational and commercial groundfish regulations
10. Discuss: recreational crab marine life protection measures regulations (*if approved for notice today by the Commission under Agenda Item 11*)
11. Marine items of interest from previous meetings
12. Action on marine petitions for regulation change
13. Action on marine non-regulatory requests from previous meetings
14. Executive (closed) session

Thursday, October 15: Wildlife- and inland fisheries-related and administrative items

15. General public comment for items not on the agenda
16. Receive Department informational items (wildlife and inland fisheries)
17. Wildlife Resources Committee
18. Adopt: simplification of statewide inland fishing regulations
19. Receive presentation about the Department's five-year status review for Kenwood Marsh checkerbloom
20. Consider and potentially act on the 90-day evaluation report to change the status of the Mohave desert tortoise (also known as Agassiz's desert tortoise) from threatened to endangered status under CESA
21. Wildlife and inland fisheries items of interest from previous meetings

22. Action on wildlife and inland fisheries petitions for regulation change
23. Action on wildlife and inland fisheries non-regulatory requests from previous meetings
24. Administrative items (next meeting agenda, rulemaking timetable, new business)

State of California
Department of Fish and Wildlife

Received
August 4, 2020

M e m o r a n d u m

Date: July 31, 2020

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

From: Charlton H. Bonham
Director

Subject: **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 change to the Fish and Game Commission's (Commission's) 2020 regulatory timetable:

- Extend the emergency regulation in section 29.06, Title 14, CCR for 90 days. The emergency regulation removes the bag limit and authorizes recreational divers to cull purple sea urchin underwater within the area commonly referred to as Caspar Cove, Mendocino County (located seaward of Caspar Headlands State Beach, along Point Cabrillo Drive), provided that such removal is done using hands or manual handheld tools. The extension is necessary to determine if this activity can help promote the recovery of kelp and the numerous species and ecosystem services that kelp supports, including red abalone.

- Add a rulemaking to amend section 29.06, Title 14, CCR. The regulation removes the bag limit and authorizes recreational divers to cull purple sea urchin underwater within the area commonly referred to as Caspar Cove, Mendocino County (located seaward of Caspar Headlands State Beach, along Point Cabrillo Drive), provided that such removal is done using hands or manual handheld tools. The regulation also abolishes the current bag limit of 35 individuals per day and establishes no bag limit for the recreational take of urchins by hand or with manually operated hand-held tools at Tanker's Reef, Monterey County. The regulation includes a sunset date of three years.

  The rulemaking is necessary to determine if this activity can help promote the recovery of kelp and the numerous species and ecosystem services

that kelp supports, including red abalone. This rulemaking will make permanent the emergency regulation adopted February 21, 2020. The proposed schedule is notice (by memo) in August, discussion in October, and adoption in December 2020.

If you have any questions or need additional information, please contact Regulations Unit Manager, Michelle Selmon at (916) 653-4674 or by email at Michelle.Selmon@wildlife.ca.gov.

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California Fish and Game Commission: Perpetual Timetable for Anticipated Regulatory Actions

Updated Aug 7, 2020

Items proposed for change are shown in blue underlined font

Regulatory Change Category	Title 14 Section(s)	TC Webinar/Teleconference Aug 18, 2020	FGC Webinar/Teleconference Aug 19, 2020	FGC Webinar/Teleconference Aug 20, 2020	WRC Webinar/Teleconference Sep 17, 2020	FGC Webinar/Teleconference Oct 14, 2020	FGC Webinar/Teleconference Oct 15, 2020	TC Webinar/Teleconference Nov 9, 2020	MRC Webinar/Teleconference Nov 10, 2020	FGC Webinar/Teleconference Dec 9, 2020	FGC San Diego Dec 10, 2020	WRC TBD Jan 2021	TC TBD Jan 2021	FGC TBD Feb 2021	FGC TBD Feb 2021	MRC TBD Mar 2021	FGC TBD Apr 2021	FGC TBD Apr 2021	FGC TBD May 2021	WRC TBD May 2021	TC TBD Jun 2021	FGC TBD Jun 2021	FGC TBD Jun 2021
Klamath River Basin Sport Fishing (Annual) [2]	5.87(f),7.50(b)(91.1)	E 8/15								N				D			A						
Recreational Purple Sea Urchin emergency regulations (180 days)	29.06				EE 9/16																		
Recreational Purple Sea Urchin emergency regulations (90 days ext.)	**29.06**		EM 90 Day X		NLT 9/16					EE 12/XX													
Commercial Pacific Herring Eggs on Kelp (Fishery Management Plan Implementation)	163, 164					E 10/1																	
Groundfish	27.30, 27.35, 27.40, 27.45, 27.50, 28.27, 28.28, 28.54, 28.55, 28.65, 150.16		D			A						E 1/1											
Simplification of Statewide Inland Fishing Regulations [3]	3.00, 4.00, 5.00, 5.41, 5.84, 5.86, 5.89, 7.00, 7.40, 7.50, 8.10			D			A									E 3/1							
Recreational Dungeness Crab Marine Life Protection Measures	29.80, 29.85 701		N			D				A						E 3/1							
Recreational Take of Red Abalone	29.15		N			D				A						E 3/1							
Recreational Purple Sea Urchin regulations [5]	**29.06**		**N**			**D**				**A**						**E 3/1**							

Rulemaking Schedule to be Determined	Title 14 Section(s)	TC Webinar/Teleconference Aug 18, 2020	FGC Webinar/Teleconference Aug 19, 2020	FGC Webinar/Teleconference Aug 20, 2020	WRC Webinar/Teleconference Sep 17, 2020	FGC Webinar/Teleconference Oct 14, 2020	FGC Webinar/Teleconference Oct 15, 2020	TC Webinar/Teleconference Nov 9, 2020	MRC Webinar/Teleconference Nov 10, 2020	FGC Webinar/Teleconference Dec 9, 2020	FGC San Diego Dec 10, 2020	WRC TBD Jan 2021	TC TBD Jan 2021	FGC TBD Feb 2021	FGC TBD Feb 2021	MRC TBD Mar 2022	FGC TBD Apr 2021	FGC TBD Apr 2021	FGC TBD May 2021	WRC TBD May 2021	TC TBD Jun 2021	FGC TBD Jun 2021	FGC TBD Jun 2021
CA Grunnion (FGC Petition #2019-014)	**TBD**																						
Mammal Hunting	TBD																						
Waterfowl (Annual)	502																						
Commercial Kelp and Algae Harvest Management	165, 165.5, 705																						
Santa Cruz Harbor Salmon Fishing (FGC Petition #2016-018)	TBD																						
European Green Crab (FGC Petition #2017-006)	TBD																						
Wildlife Areas/Public Lands [4]	TBD																						
Experimental Fishing Permit (EFP) Program (Phase II)	TBD																						
Possess Game / Process Into Food	TBD																						
American Zoological Association / Zoo and Aquarium Association	671.1																						
Night Hunting in Gray Wolf Range (FGC Petition #2015-010)	474																						
Shellfish Aquaculture Best Management Practices	TBD																						
Ban of Neonicotinoid Pesticides on Department Lands (FGC Petition #2017-008)	TBD																						
Commercial Pink Shrimp Trawl	120, 120.1, 120.2																						
Ridgeback Prawn Incidental Take Allowance	120(e)																						

KEY

FGC = California Fish and Game Commission MRC = FGC Marine Resources Committee WRC = FGC Wildlife Resources Committee TC = FGC Tribal Committee

EM = Emergency **EE = Emergency Expires** E = Anticipated Effective Date (**RED "X" = expedited OAL review**)

N = Notice Hearing D = Discussion Hearing A = Adoption Hearing

V = Vetting R = Committee Recommendation

1 = FGC Petition #2018-005 2 = Includes FGC Petition 2019-020 3 = Includes FGC Petition #2018-008 4 = Includes FGC Petition #2018-003 5 = Includes FGC Petition #2020-001

BEFORE THE
FISH AND GAME COMMISSION
DEPARTMENT OF FISH AND WILDLIFE
STATE OF CALIFORNIA

In the Matter of the Accusation Against:

THANH VAN, Respondent.

Agency Case No. 19ALJ17-FGC

OAH No. 2020021121

PROPOSED DECISION

Administrative Law Judge Traci C. Belmore, State of California, Office of Administrative Hearings, heard this matter on June 25, 2020, by telephone.

Lauren Goodmiller, Staff Counsel, represented complainant David Bess, Chief of the Law Enforcement Division, Department of Fish and Wildlife.

Respondent Thanh Van was present at the hearing, representing himself.

The matter was submitted for decision on June 25, 2020.

FACTUAL FINDINGS

1. The Fish and Game Commission (Commission) issued respondent Thanh Van a sport fishing license on a date not established by the evidence, and the license is

renewed annually. The license was in full force and effect until December 31, 2019, and has not been renewed since that expiration date.

2. On September 18, 2019, complainant David Bess issued an accusation in his official capacity as Chief of the Law Enforcement Division, Department of Fish and Wildlife, seeking to impose discipline on respondent's license based on several convictions for violations of Title 14 of the California Code of Regulations, regarding natural resources. Respondent filed a notice of defense, and this hearing followed.

3. On September 29, 2014, in the Superior Court of California, County of Marin respondent was convicted of a violation of California Code of Regulations, title 14, section 29.25 (limiting taking of gaper and Washington clams), an infraction. Respondent was fined $500.

4. The facts and circumstances underlying the conviction were that on May 17, 2014, respondent was observed with two companions digging clams. When contacted, respondent and his two companions possessed a total of 30 clams, with each claiming to have 10 clams, the legal limit. (Cal. Code Regs., tit.14, § 29.25.) Respondent was observed digging 15 clams himself. He was also observed placing several of the clams he dug in the bag of a companion. Respondent mistakenly believed he could assist his companion if each person had no more than 10 clams.

5. On March 11, 2015, in the Superior Court of California, County of Marin, respondent was convicted of a violation of California Code of Regulations, title 14, section 29.85, subdivision (a)(7) (Dungeness crab minimum size limit), an infraction. Respondent was fined $150.

6. The facts and circumstances underlying the conviction were that on November 21, 2014, respondent was contacted while in possession of two Dungeness

crabs. When properly measured, the crabs were less than the minimum size limit of five and three-quarter inches in size. Respondent incorrectly believed the crabs were to be measured from the tip of one lateral spine to the tip of the opposite lateral spine, rather than from the edge of shell to the edge of shell just in front of the lateral spines.

7. On April 29, 2015, respondent was convicted of violations of California Code of Regulations, title 14, sections 29.25 (limiting taking of gaper and Washington clams) and 29.05, subdivision (b)(1) (allowing the taking of certain invertebrates, not including cone snails), infractions. Respondent was fined $1,313.

8. The facts and circumstances underlying these convictions are that on January 31, 2015, respondent, his brother, and his father were observed digging clams and taking cone snails. When contacted and questioned about the cone snails, respondent stated he believed the limit for taking cone snails was 150. They were in possession of over 1,000 cone snails. Respondent was also observed digging more than his limit of 10 gaper clams and placing them in the bags of his brother and father. (Cal. Code Regs., tit. 14, § 29.25.)

9. On July 15, 2015, in the Superior Court of California, County of Marin, respondent was convicted of a violation of California Code of Regulations, title 14, section 29.25 (limiting taking of gaper and Washington clams) an infraction. Respondent was fined $582.

10. The facts and circumstances underlying this conviction are that on April 22, 2015, respondent was observed digging 11 clams but only retaining the largest 10.

11. Respondent's license has not been cited since his July 2015 conviction. He has renewed his license annually until its most recent expiration date, December 31, 2019.

12. Respondent took full responsibility for all his past wrongdoing. He admitted that he had made several mistakes but since his last conviction he has been vigilant to ensure he did not repeat those mistakes.

13. Respondent testified in an open and forthright manner at hearing, consistent with one who is telling the truth.

LEGAL CONCLUSIONS

1. California Code of Regulations, title 14, section 745.5, subdivision (a) authorizes the Commission to suspend or revoke a sport fishing license or permit privileges if that person has been convicted of a violation of any provision of the Fish and Game Code, title 14 of the California Code of Regulations, or any law intended to protect fish and wildlife, and it is determined the licensee committed the offense intentionally, knowingly, or recklessly.

2. Respondent's September 29, 2014, conviction of a violation of California Code of Regulations, title 14, section 29.25 (Factual Finding 3) falls within the class of convictions for which discipline may be imposed (Cal. Code Regs., tit. 14, § 745.5, subd. (a).). However, respondent did not commit the offense intentionally, knowingly, or recklessly, because his violation was due to a mistaken understanding of the limit on taking clams. (Factual Finding 4.). As such, cause does not exist to discipline respondent's license based on this conviction.

3. Respondent's March 11, 2015 conviction of a violation of California Code of Regulations, title 14, section 29.85, subdivision (a) (Factual Finding 5), falls within the class of convictions for which discipline may be imposed (Cal. Code Regs., tit. 14, § 745, subd. (a).). However, he did not commit the offense intentionally, knowingly or recklessly, because his violation was due to a mistaken understanding of the correct method for measuring Dungeness crabs (Factual Finding 6). Therefore, cause does not exist to discipline respondent's license for this conviction.

4. Cause exists to discipline respondent's license pursuant to California Code of Regulations, title 14, section 745.5, subdivision (a), in that the offenses underlying respondent's April 29, 2015 convictions (Factual Finding 7) were committed intentionally and knowingly. Respondent knew he could only dig 10 gaper clams but dug in excess of the limit and placed them in the bags of his father and brother (Factual Finding 8). Respondent was in possession of over 1,000 cone snails knowing that was not allowed. Respondent intentionally committed the offense. (Factual Finding 8.)

5. Cause exists to discipline respondent's license pursuant to California Code of Regulations, title 14, section 745.5, subdivision (a), in that the offense underlying respondent's May 13, 2015 conviction (Factual Finding 9) was committed intentionally and knowingly. Respondent dug more clams than the limit and discarded the smallest clam. (Factual Finding 10.)

6. Respondent intentionally violated the law on more than one occasion. In mitigation, respondent has held a license for four years since his last violation without incident, accepted responsibility for his errors and convincingly testified that he has been and will be vigilant in following the law. Permanent revocation of his license

appears unduly harsh in these circumstances. However, discipline is appropriate, and respondent's license will be suspended for two years.

ORDER

Respondent Thanh Van's sport fishing license and privileges are suspended for two years from the date of the Decision in this matter.

DATE: July 21, 2020

DocuSigned by:

Traci C. Belmore

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TRACI C. BELMORE

Administrative Law Judge

Office of Administrative Hearings