

California Fish and Game Commission Meeting Binder



June 24-25, 2020
Webinar/Teleconference

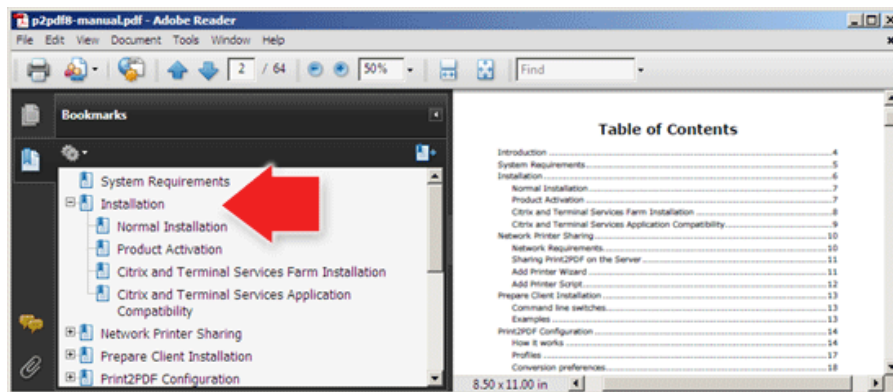
EASY GUIDE TO USING THE BINDER

Note: We make every effort to ensure that documents we produce are compliant with Americans with Disabilities Act standards, pursuant to state and federal law; however, some materials included in our meeting binders that are produced by other organizations and members of the public may not be compliant.

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 when your name is 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

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	Branch Chief, Wildlife Branch
Kevin Shaffer	Branch 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



*Wildlife Heritage and Conservation
Since 1870*

Melissa Miller-Henson
Executive Director
P.O. Box 944209
Sacramento, CA 94244-2090
(916) 653-4899
fgc@fgc.ca.gov
www.fgc.ca.gov

REVISED* MEETING AGENDA **June 24-25, 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.

***This agenda is revised to provide a link to instructions to participate in the webinar, add detail to existing agenda item numbers 8 and 24, update the “amended sections” under agenda item 7, and add agenda item (D)II under Executive Session.**

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, including written public comment deadlines, and procedures at the end of the agenda starting on page 12. Unless otherwise indicated, the California Department of Fish and Wildlife is identified as Department.

DAY 1 – June 24, 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 an update from the executive director.
4. **Delegations to staff**
Discuss and potentially approve delegations to the executive director to ensure staff can perform necessary responsibilities.
5. **150th Anniversary**
Discuss the 150th anniversary of the Commission.

CONSENT ITEMS

6. **Pacific leatherback sea turtle**
Receive the Department's 90-day evaluation report for the petition to list Pacific leatherback sea turtle (*Dermochelys coriacea*) as a threatened or endangered species under the California Endangered Species Act (CESA)
(Pursuant to 2073.5, Fish and Game Code, and subsection 670.1(d), Title 14, CCR)
 7. **Groundfish**
Consider authorizing publication of notice of intent to amend recreational and commercial groundfish regulations to conform to federal regulations and modify state-managed fishery regulations.
(Amend sections 27.30, 27.35, 27.40, 27.45, 27.50, 28.27, 28.28, 28.54, 28.55, and 150.16, Title 14, CCR)
8. **Department informational items (marine)**
The Department will highlight marine items of note since the last Commission meeting.
 - (A) Director's report
 - I. Update on actions taken after May 14, 2020 pursuant to the emergency sport and recreational fishing regulations
 - (B) Marine Region
 - I. Update on Drift Gill Net Transition Program
 - II. Update on CARES Act Fisheries Assistance Funding
 - (C) Law Enforcement Division
 9. **Annual tribal planning meeting**
Report on the annual tribal planning meeting to be held pursuant to the Commission's Tribal Consultation Policy.
 10. **Tribal Committee**
Discuss and consider approving new topics for addition to the work plan. Discuss and consider approving draft agenda topics for the next committee meeting.
 - (A) Work plan development
 - I. Update on work plan and draft timeline
 - II. Discuss and consider approving new topics
 - (B) Discuss and consider approving draft agenda topics for the August 18, 2020 meeting

11. Marine Resources Committee

Discuss updates and recommendations from the previous committee meeting. Consider approving new topics to address at a future committee meeting.

- (A) Summary of part 2 of the March 17/April 29, 2020 meeting and recommendations
 - I. Receive the Department's updated marine aquaculture information report
 - II. Consider proposed six-month hiatus on receiving new aquaculture lease applications
 - III. Consider scheduling updates on experimental fishing permits phase 2 and recreational swordfish for July 2020
- (B) Work plan development
 - I. Update on work plan
 - II. Discuss and consider approving new topics

12. Pacific herring eggs on kelp

Discuss and consider adopting regulations for commercial Pacific herring eggs on kelp that implement the Pacific Herring Fishery Management Plan.
(Amend sections 163 and 164, Title 14, CCR)

13. Dungeness crab

Discuss and consider direction on regulatory options and consider authorizing publication of notice to intent to amend recreational Dungeness crab regulations for marine life protection measures.
(Amend sections 1.74, 29.80, 29.85, 29.91, Title 14, CCR)

- (A) Update and consider direction for:
 - I. Criteria for director's action under proposed delegated authority
 - II. Criteria for severe weather extension to proposed service interval
 - III. Inclusion of sunset option for validation stamp
 - IV. Potential recreational lost gear retrieval provision
- (B) Consider staff request to continue notice to August so that direction on regulatory options can be integrated into draft rulemaking

14. Marine items of interest from previous meetings

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

- (A) Update on red abalone recreational fishery closure sunset date and consider a potential rulemaking to continue the closure.

15. Marine non-regulatory requests

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

16. Strategic planning

Review feedback provided by Commissioners and the public regarding potential revisions to the mission and draft goals, potentially adopt draft goals and a revised mission statement, and provide direction on a draft plan.

Staff will recommend that this item be continued to a future meeting.

17. Proposed meeting dates and locations for 2021

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

Recess

DAY 2 – June 25, 2020, 9:00 AM

Call to order/roll call to establish quorum

18. 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

19. Private lands wildlife habitat enhancement and management area (PLM) licences and plans (annual and five-year)

Consider approving or amending annual PLM plans and 2020/2021 licenses for:
(Pursuant to Section 601, Title 14, CCR)

- (A) Butte County
 - I. Deseret Farms – Ballard Unit
 - II. Deseret Farms – Wilson Unit
 - III. Soper-Wheeler
- (B) Calaveras County
 - I. Ordway Ranch
- (C) Glenn County
 - I. Anderson Ranch
 - II. Bird Haven Ranch
- (D) Kern/Los Angeles
 - I. Tejon Ranch (correction to season dates only)
- (E) Lassen County
 - I. Ash Valley Ranch
 - II. Clarks Valley Ranch
 - III. Dixie Valley Ranch
 - IV. Five Dot Ranch - Avila
 - V. Kramer Ranch PLM
 - VI. Mendiboure Cold Springs Ranch
 - VII. Observation Peak Ranch
 - VIII. Red Rock Ranch
 - IX. Walton Homestead Family, LLC (formerly Coon Camp Springs)
- (F) Mendocino County
 - I. Four Pines Ranch
 - II. R-R Ranch
 - III. Schneider Ranch

- (G) Modoc County
 - I. Basin View Ranch
 - II. Lookout Ranch
 - III. SL Ranch
- (H) San Bernardino County
 - I. Big Morongo Springs Ranch
- (I) Shasta County
 - I. Black Ranch
 - II. Clover Creek Ranch PLM
 - III. Duncan Creek Ranch
 - IV. Hathaway Oak Run Ranch
 - V. Jerusalem Creek Ranch
 - VI. Rickert Ranch
- (J) Siskiyou County
 - I. Long Prairie Farms
 - II. Pondosa
 - III. Red Rock Valley Farms
- (K) Tehama County
 - I. El Rancho Rio Frio
 - II. Little Dry Creek Ranch
 - III. Salt Creek Ranch
- (L) Yuba County
 - I. Sugarloaf-Bangor Ranch

Consider approving five-year PLM plans and 2020-2024 licenses for:
(Pursuant to Section 601, Title 14, CCR)

- (M) Butte County
 - I. Llano Seco Rancho
- (N) Butte/Tehama counties
 - I. Rock Creek
- (O) Glenn County
 - I. Spurlock Ranch
- (P) Lassen County
 - I. Five Dot Ranch - Horse Lake
 - II. Five Dot Ranch - School Section
 - III. Five Dot Ranch - Tunnel Springs
 - IV. Five Dot Ranch - Willow Creek
 - V. Mendiboure Ranch
- (Q) Mendocino County
 - I. Ackerman-South Daugherty WMA
- (R) Monterey County
 - I. Bardin Ranch
- (S) Shasta County
 - I. JS Ranch
- (T) Tehama County
 - I. Big Bluff Ranch
- (U) Trinity County
 - I. Stewart Ranch

20. Agassiz's desert tortoise

Receive the Department's 90-day evaluation report for the petition to list Agassiz's desert tortoise (*Gopherus agassizii*) as a threatened or endangered species under CESA.

(Pursuant to Section 2073.5, Fish and Game Code)

The evaluation report is not due until July 12, 2020. Staff mistakenly added this item to the draft list of agenda items the Commission approved at its April 15-16, 2020 meeting and recommends that it be continued to the August 2020 meeting.

21. San Bernardino kangaroo rat

Receive the Department's request for a six-month extension to deliver the one-year status review report on the petition to list San Bernardino kangaroo rat (*Dipodomys merriami parvus*) as threatened or endangered species under CESA.

(Pursuant to Section 2074.6, Fish and Game Code)

22. Owens pupfish

Receive Department's five-year status review for Owens pupfish (*Cyprinodon radiosus*), which is listed as an endangered species under CESA.

(Pursuant to Section 2077, Fish and Game Code)

23. Duck Stamps

Consider approving proposed projects for the Duck Stamp Dedicated Account funds in Fiscal Year 2020-21.

(Pursuant to Section 3702, Fish and Game Code)

24. 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

- I. Update on actions taken after May 14, 2020 pursuant to the emergency sport and recreational fishing regulations that expired on May 31, 2020

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

- I. Update on the Strategic Surveillance Plan for the Treponeme-Associated Hoof Disease in California

(C) Law Enforcement Division

25. Wildlife Resources Committee

Discuss updates and recommendations from the May 14, 2020 committee meeting. Consider approving new topics to address at a future committee meeting.

(A) May 14, 2020 meeting summary

(B) Work plan development

- I. Update on work plan
- II. Discuss and consider approving new topics

26. Simplification of statewide inland fishing

Consider authorizing publication of notice of intent to amend 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)

27. 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.

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.

28. Riparian brush rabbit

Receive overview of the Department's five-year status review of riparian brush rabbit (*Sylvilagus bachmani riparius*), which is listed as an endangered species under CESA. (Pursuant to Section 2077, Fish and Game Code)

29. Wildlife Prosecutor of the Year

Announce recipient of the Commission's annual Wildlife Prosecutor of the Year award, consistent with the Commission's policy adopted in 2016.

30. 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 #2020-003: Eliminate authorized recreational uses in Area C and currently allowed parking in existing designated areas at Ballona Wetlands Ecological Reserve
- II. Petition #2020-004: Steelhead fishery opener date change on Trinity River
- III. Petition #2020-005: Striped bass slot limits

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

31. Wildlife and inland fisheries non-regulatory requests

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

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

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

(A) Discuss urban coyote issues

Staff will recommend that this item be continued to a future meeting.

33. Commission administrative items

- (A) Next meeting – August 19-20, 2020 in Fortuna
- (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 appeal filed by Michael Anderson in Agency Case No. 19ALJ14-FGC regarding his request to renew his salmon vessel permit
 - II. Consider the appeal filed by Christian Buschmann in Agency Case No. 20ALJ05-FGC regarding his request to renew his transferable market squid vessel permit

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
July 29		Marine Resources California Department of Parks and Recreation Orange Coast District Office Training Room 3030 Avenida del Presidente San Clemente, CA 92672
August 18		Tribal River Lodge Conference Center 1800 Riverwalk Drive Fortuna, CA 95540
August 19 - 20	River Lodge Conference Center 1800 Riverwalk Drive Fortuna, CA 95540	
September 17		Wildlife Resources Natural Resources Building Redwood Room 1416 Ninth Street, 14 th Floor Sacramento, CA 95814
October 14 - 15	Elihu M Harris Building Auditorium 1515 Clay Street Oakland, CA 94612	
November 9		Tribal Monterey area
November 10		Marine Resources Monterey area
December 9 - 10	San Diego area	

OTHER 2020 MEETINGS OF INTEREST

Association of Fish and Wildlife Agencies

- September 13-16, Sacramento, CA

Pacific Fishery Management Council

- September 10-17, Spokane, WA
- November 13-20, Garden Grove, CA

Pacific Flyway Council

- August 28 (location TBD)

Western Association of Fish and Wildlife Agencies

- July 9-14, Park City, UT

Wildlife Conservation Board

- August 26, Sacramento, CA
- November 18, Sacramento, CA

IMPORTANT COMMISSION MEETING PROCEDURES 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 Reasonable Accommodation Coordinator at (916) 653-9089. Requests for facility and/or meeting accessibility should be received at least 10 working days prior to the meeting to ensure the request can be accommodated.

Stay Informed

To receive meeting agendas and regulatory notices about those 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 **June 11, 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 **June 19, 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.

STAFF SUMMARY FOR JUNE 24-25, 2020

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. *Anderson salmon vessel permit appeal*: Consider the appeal filed by Michael Anderson in Agency Case No. 19ALJ14-FGC regarding his request to renew his salmon vessel permit. On Jun 6, 2019, Mr. Anderson filed an appeal with FGC. On Feb 21, 2020, FGC granted Mr. Anderson's appeal and subsequently entered the attached decision (Exhibit D1). The order requires the fees be paid within 60 days of the decision. Mr. Anderson requested additional time to pay the pending fees due to economic hardship based on the COVID-19 pandemic (Exhibit D2). A proposed revised decision is included as Exhibit D3.
- II. *Buschmann transferable market squid vessel permit appeal*: Consider the appeal filed by Christian Buschmann in Agency Case No. 20ALJ05-FGC, regarding his request to renew his transferable market squid vessel permit. On May 5, 2020, DFW provided Mr. Buschmann notice that DFW could not reinstate Mr. Buschmann's transferable market squid vessel permit (Exhibit D4). On Jun 3, 2020, Mr. Buschmann filed an appeal with FGC (Exhibit D5). On

STAFF SUMMARY FOR JUNE 24-25, 2020

Jun 10, 2020, DFW submitted a letter to FGC stating that DFW does not oppose granting the appeal (Exhibit D6).

Significant Public Comments (N/A)

Recommendation

FGC staff: Approve the revised order regarding the appeal of Michael Anderson given his stated economic hardship based on the unprecedented circumstances associated with the COVID-19 pandemic. Grant the appeal filed by Christian Buschmann.

Exhibits

- D1. [Anderson Decision](#), dated Feb 21, 2020
- D2. [Email from Michael Anderson to FGC](#), dated Apr 21, 2020
- D3. [Revised \[draft\] decision for Michael Anderson](#)
- D4. [Letter from DFW to Christian Buschmann](#), dated May 5, 2020
- D5. [Letter from Chris Buschmann to FGC](#), dated Jun 3, 2020
- D6. [Letter from DFW to FGC](#), dated Jun 10, 2020

Motion/Direction

- (D) Moved by _____ and seconded by _____ that the Commission approves the revised order regarding the appeal of Michael Anderson.

AND

Moved by _____ and seconded by _____ that the Commission grants the appeal filed by Christian Buschmann.

BEFORE THE FISH AND GAME COMMISSION
STATE OF CALIFORNIA

In the Matter of the Appeal by:

Case No. 19ALJ14-FGC

Michael Anderson

Appellant.

Decision

Pursuant to the authority provided in Fish and Game Code Section 7852.2, subdivision (d), and Government Code section 11445.20, the Fish and Game Commission hereby orders that:

1. The Commission hereby grants reinstatement of the salmon vessel permit (#SA0724) (Permit) previously issued to Mr. Anderson by the Department of Fish and Wildlife (Department).
2. The Appellant must pay the Department all license, permit, and late fees owed pursuant to Section 7852.2, subdivision (a) and the fees owed for the 2019-2020 permit year, within 60 days of this Decision, which total **\$ 1,764.98**.
3. The Department shall issue Appellant the Permit if the fees are paid consistent with this Decision.

This decision shall become effective the 25th day of February 2020.

IT IS SO ORDERED this 21st day of February 2020.



Eric Sklar, President

From: Mike Anderson [REDACTED]
Sent: Tuesday, April 21, 2020 10:07 AM
To: Yaun, Michael@FGC <Michael.Yaun@fgc.ca.gov>
Subject: Re: Agency case no. 19ALJ14-FGC, Anderson Appeal - final decision

Me. Yuan,

I am entering week five of no employment due the the Coronavirus virus pandemic. Federal and state assistance has not arrived in a timely fashion. Who must I petition for an extension for the pending fees to reinstate my CA salmon license?

Thank you

Sent from my iPhone

BEFORE THE FISH AND GAME COMMISSION
STATE OF CALIFORNIA

In the Matter of the Appeal by:

Case No. 19ALJ14-FGC

Michael Anderson

Appellant.

Revised Decision

Pursuant to the authority provided in Fish and Game Code Section 7852.2, subdivision (d), and Government Code section 11445.20, the Fish and Game Commission hereby orders that:

1. The Commission hereby grants reinstatement of the salmon vessel permit (#SA0724) (Permit) previously issued to Mr. Anderson by the California Department of Fish and Wildlife (Department).
2. The Appellant must pay the Department all license, permit, and late fees owed pursuant to Section 7852.2, subdivision (a), and the fees owed for the 2019-2020 permit year, which total **\$ 1,764.98**.
3. The Department shall issue Appellant the Permit if the fees are paid consistent with this Decision and any required fees for future fishing years not subject to this order.

This decision shall become effective the ____ day of June 2020.

IT IS SO ORDERED this ____ day of June 2020.

Eric Sklar, President



State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
License and Revenue Branch
1740 N. Market Blvd.
Sacramento, CA 95834-1997
www.wildlife.ca.gov

GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director



CERTIFIED MAIL

May 5, 2020

Mr. Christian W. Buschmann
[REDACTED]

**SUBJECT: NOTICE OF DENIAL FOR REINSTATEMENT OF A TRANSFERABLE
MARKET SQUID VESSEL PERMIT, PERMIT NUMBER SVT027**

Dear Mr. Buschmann:

This letter is in response to your request to reinstate your Transferable Market Squid Vessel Permit (TMSVP) for the F/V *St. Teresa* (FG38647).

Authority-Market Squid Vessel Permit

Pursuant to California Code of Regulations (CCR), Title 14, Section 149.1(g), all application and permit fees specified in CCR, Title 14, Section 705, for renewal of Market Squid Vessel Permits, Market Squid Brail Permits, and Market Squid Light Boat Permits, must be received by the California Department of Fish and Wildlife (Department) at the address specified on the application, or, if mailed, postmarked on or before April 30 of each permit year. Late fees, late fee deadlines, and late renewal appeal provisions are specified in Fish and Game Code (FGC) Section 7852.2.

Authority-Late Renewal Applications

FGC Section 7852.2(a) establishes a graduated late fee for any renewal application that is received after the deadline.

FGC Section 7852.2(b) states the Department shall not waive the applicable late fee. Additionally, FGC Section 7852.2(c) requires the Department to deny any application for renewal received after March 31 of the permit year following the year in which the applicant last held a valid permit for that fishery.

Reason for Appeal to the Department

In your email dated April 23, 2020, you requested that TMSVP, permit number SVT027, for the F/V *St. Teresa* (FG38647) be reinstated.

Department Findings

Department license records show that the F/V *St. Teresa* last held a valid TMSVP in 2018-2019, which made you eligible to renew the permit for the 2019-2020 permit year.

Mr. Christian W. Buschmann

May 5, 2020

Page 2

Department Determination

Your request to reinstate your TMSVP for the F/V *St. Teresa* is denied because the F/V *St. Teresa* last held a valid TMSVP in the 2018-2019 permit year. The Department received your request for reinstatement on April 23, 2020. FGC Section 7852.2(c) requires the Department to deny any application for renewal received after March 31 of the permit year following the year in which the applicant last held a valid permit for that fishery.

Deadline to File an Appeal to the Fish and Game Commission

If you wish to appeal the Department's decision, you must submit a written appeal to the Fish and Game Commission (Commission) either by mail at P.O. Box 944209, Sacramento, CA 94244-2090, or by email at fgc@fgc.ca.gov. Pursuant to FGC Section 7852.2(d), your written appeal must be received within 60 days of the date of this letter. The Commission, upon consideration of the appeal, may grant the renewal of the TMSVP. If the Commission grants the renewal, it shall assess the applicable late fees, which amount to **\$7,688.25**. A fee schedule is enclosed.

If you have any questions or require further assistance, please contact Ms. Genalyn Lobel at (916) 928-5816 or Genalyn.Lobel@wildlife.ca.gov.

Sincerely,



Joshua Morgan, Chief
License and Revenue Branch

cc: Ms. Melissa Miller-Henson
Fish and Game Commission
Sacramento, CA

Ms. Genalyn Lobel
California Department of Fish and Wildlife
Sacramento, CA



State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
License and Revenue Branch
1740 N. Market Blvd.
Sacramento, CA 95834-1997
www.wildlife.ca.gov

GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director



May 5, 2020

Mr. Christian W. Buschmann (L91206)
Fees Required for Reinstatement of a
Transferable Market Squid Vessel Permit (TMSVP)
Permit Number SVT027
F/V St. Teresa (FG38647)

Prior Year Fees		Permit Fees
2019-2020	Nonresident Commercial Boat Registration	\$1,122.00
	TMSVP	\$2,937.00
	Late Fee (61 days to March 31, 2019)	<u>\$627.50</u>
Prior Year Fees Due		\$4,686.50
Prior Year permit fees must be paid before a 2020-2021 TMSVP can be issued.		
Current Year Fees		
2020-2021	TMSVP	<u>\$3,001.75</u>
Total Current Fees		\$3,001.75
Total Fees Due		\$7,688.25

If the Fish and Game Commission grants the renewal of the permit, payment of \$7,688.25 would be due.

Chris Buschmann



California Fish and Game Commission
P.O. Box 944209
Sacramento, CA 94244-2090

June 3, 2020

Sent via email

Re: Appeal of Market Squid Vessel Permit Denial (SVT027)

Dear Commissioners,

I am writing to respectfully request that you reinstate my market squid vessel permit for my fishing vessel, the St. Teresa (SVT027). On May 5, 2020, the Department of Fish and Wildlife (DFW) denied my application to renew my permit because my application was submitted after the March 31, 2020 deadline. As described below, a variety of circumstances contributed to my oversight in failing to timely renew my permit. While this mistake was certainly my fault, I took all possible steps to renew my permit upon becoming aware of the oversight. This permit is absolutely critical to my livelihood, particularly during these trying times, as I struggle to keep afloat and provide for my family. If renewed, I will make sure that I do not repeat this mistake again.

I grew up in a fishing family and have been a fisherman since I purchased my first boat when I was 19 years old. Over the years, I have regularly maintained my fishing licenses in Alaska, Washington, Oregon, and California. Once I was able to purchase the St. Teresa, a 58-foot purse seine vessel, I was excited to obtain a California market squid vessel permit in 2018. I could not wait to participate in a fishery I enjoy for the benefit of my family and become a member of the California squid fishing community.

It appears that DFW sent a notice to my Alaska business address in December 2019, stating that I needed to renew my permit. I was not in Alaska at the time and did not see any written notification regarding my permit renewal until I tried to renew my permit in April and learned that I had missed the deadline. During this time, I was consistently engaged in both the crab fishery in Oregon and Washington and the squid fishery in Oregon. In March, I was extremely busy trying to do everything possible to land whatever product I could, given the very uncertain times during the coronavirus pandemic. This contributed to my oversight in missing the permit renewal deadline. In previous years, I have made sure to stay on top of these deadlines and file on time. Regardless, it was my mistake that I did not renew on time.

In April, I discovered this oversight when I tried to renew my permit at the same time as my other state permits and licenses. I found my California permit was unavailable to renew because I had inadvertently missed the deadline for doing so. After learning I needed to renew my permit, I

immediately tried to do so but communications with DFW were difficult given that DFW's offices were shut down due to COVID-19. I tried nine different numbers within DFW in an effort to discuss with staff.

This permit is essential to my business, particularly given the economic downturn. I am missing critical fishing time right now and my small fishing operation may not survive if I am not able to fish for squid this year. I humbly ask that you allow me to renew my permit, with the appropriate late fees and any other fees required for reinstatement.

I realize this is a failure on my part and I will not let it happen again. I have already taken steps to ensure better tracking of California permit and license renewals so that this does not fall through the cracks in the future. I will prioritize this renewal every year and I promise we will not have this issue again. Please let me fish!

Thank you for your time and consideration.

Chris Buschmann



State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Office of the General Counsel
P.O. Box 944209
Sacramento, CA 94244-2090
www.wildlife.ca.gov

GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director



June 10, 2020

California Fish and Game Commission
P.O. Box 944209
Sacramento, CA 94244-2090

Re: *In the Matter of Christian Buschmann*

Dear Commissioners:

This letter is in response to Christian Buschmann's appeal of the Department of Fish and Wildlife's ("Department") denial of his request to renew his Transferable Market Squid Vessel Permit, #SVT027 ("Permit"). The Permit was last valid during the 2018-19 fishing year. Mr. Buschmann submitted his appeal to the Commission on June 3, 2020. The Department will not be participating in this appeal and accordingly, does not oppose the renewal of the Permit for the 2020-2021 fishing year provided that he pays all applicable fees.

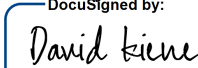
The fees that Mr. Buschmann must pay to renew the Permit are described in Fish and Game Code, section 7852.2 ("Section 7852.2"), subdivision (a). Section 7852.2, subdivision (a) states:

- (a) In addition to the base fee for the license, stamp, permit, or other entitlement, the department shall assess a late fee for any renewal the application for which is received after the deadline, according to the following schedule:
- (1) One to 30 days after the deadline, a fee of one hundred twenty-five dollars (\$125).
 - (2) Thirty-one to 60 days after the deadline, a fee of two hundred fifty dollars (\$250).
 - (3) Sixty-one days or more after the deadline, a fee of five hundred dollars (\$500).

To emphasize that these fees must be paid, Section 7852.2, subdivision (b) states that "The department shall not waive the applicable late fee," while subdivision (d) states "If the commission grants renewal, it shall assess the applicable late fee pursuant to subdivision (a)." The fees total **\$7,688.25** and are described in the attached fee statement.

If you have any questions please contact me at the address above or by telephone number (916) 651-7646, or e-mail at David.Kiene@wildlife.ca.gov.

Sincerely,
DocuSigned by:



0251C8A9A1D45E

DAVID KIENE
Senior Staff Counsel

Cc: Robert Smith
Attorney for Christian Buschmann



State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
License and Revenue Branch
1740 N. Market Blvd.
Sacramento, CA 95834-1997
www.wildlife.ca.gov

GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director



May 5, 2020

Mr. Christian W. Buschmann (L91206)
Fees Required for Reinstatement of a
Transferable Market Squid Vessel Permit (TMSVP)
Permit Number SVT027
F/V St. Teresa (FG38647)

Prior Year Fees		Permit Fees
2019-2020	Nonresident Commercial Boat Registration	\$1,122.00
	TMSVP	\$2,937.00
	Late Fee (61 days to March 31, 2019)	<u>\$627.50</u>
Prior Year Fees Due		\$4,686.50
Prior Year permit fees must be paid before a 2020-2021 TMSVP can be issued.		
Current Year Fees		
2020-2021	TMSVP	<u>\$3,001.75</u>
Total Current Fees		\$3,001.75
Total Fees Due		\$7,688.25

If the Fish and Game Commission grants the renewal of the permit, payment of \$7,688.25 would be due.

STAFF SUMMARY FOR JUNE 24-25, 2020

2. GENERAL PUBLIC COMMENT (DAY 1)**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 | Jun 24-25, 2020; Webinar/teleconference |
| • Consider granting, denying or referring | Aug 19-20, 2020; Fortuna |

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 Aug 19-20, 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. The new petition for regulation change is summarized in Exhibit 1, and the original petition is provided as Exhibit 2.
2. Informational comments are provided as exhibits 3-5.

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 petition for regulation change received by June 11, 2020 at 5:00 p.m.](#)

STAFF SUMMARY FOR JUNE 24-25, 2020

2. [Petition #2020-008: Elk hunting closure](#), received Jun 10, 2020
3. [Email from Action for Animals, regarding China and wildlife trade](#), received Apr 19, 2020
4. [Letter from Kathy Lynch, regarding state Senate hearings on wildlife trade](#), received May 26, 2020
5. [Letter from Peter Flournoy, regarding restoration of a fishing license for Adam Aliotti](#), received Jun 9, 2020

Motion/Direction (N/A)

STAFF SUMMARY FOR JUNE 24-25, 2020

3. EXECUTIVE DIRECTOR'S REPORT**Today's Item****Information** ☒**Action** ☐

Receive the executive director's report, including an update on COVID-19 pandemic response, the state budget, staffing, and legislation.

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

Unprecedented. Challenging. Uncertain. Difficult. Extraordinary. Unparalleled. Tough. All words in daily use as we continue our work in the midst of a global pandemic and social change. It was difficult to even begin putting words to virtual paper in preparing this report given how much FGC staff has experienced, anticipated, adapted and grown in the last couple of months, and yet how much more we have to learn, understand, build and transform.

As an institution that has evolved over 150 years, through world wars, prior pandemics and social turmoil, how will we unfold over the next 5, 20, 100 years? The organization will change, but in what ways, and how will we proactively contribute to the broader and greater good? At the moment staff is listening, exploring and educating ourselves. We are asking why and why not? Inequity in access exists on many levels, but how do we increase access to California's invaluable fish and wildlife resources? Finding solutions necessarily requires inclusion, collaboration, transparency, and integrity, all elements of our core values. We have committed staff, commissioners and stakeholders; now we need to reach out and connect with those who are not yet connected and ask why.

These are indeed unprecedented, challenging, uncertain, difficult, extraordinary, unparalleled and tough times; *often those are also times of greatest opportunity.*

Today's report contains seven elements:

- [COVID-19 Pandemic Response](#)
- [State Budget](#)
- [Staffing](#)
- [Public Engagement](#)
- [Thinking Strategically about the Future](#)
- [California Law Revision Commission](#)
- [Legislative Matters](#)

COVID-19 Pandemic Response

The adaptable mindset that has been sharpened in recent years as FGC staff faced and managed a number of significant changes in leadership and staffing served us well when the pandemic hit in Mar 2020. Like other government agencies, FGC staff has quickly adjusted its operations for the new normal. I am incredibly proud of how FGC staff stepped up to the

STAFF SUMMARY FOR JUNE 24-25, 2020

challenges of the last few months, going above and beyond and continuing to adapt to new ways of doing business.

COVID-19 and the ensuing economic crisis have significantly diverted staff attention from normal workload due to a number of changes, including high-priority requests and guidance from other state agencies (i.e., California Department of Human Resources, California Department of Public Health, California Department of Finance, California Natural Resources Agency), information-gathering, lost efficiencies from teleworking, ensuring ergonomically-sound home offices, and the recent COVID-19 contact tracing reassignment.

Over the past three months, staff has continued to adapt its work to achieve FGC's mission in the midst of the global pandemic. Since mid-March, staff in eight of FGC's ten positions, plus our Sea Grant fellow and legal counsel, are mostly teleworking under emergency agreements that outline expectations for work products and communication. Two staff are in the office most days to ensure we cover critical or essential tasks that must be done in the office and to keep it open during normal business hours (8:00 am – 5:00 pm); recent protests led to a couple of days of closures.

Your executive director and deputy executive director are active members of the California Natural Resources Agency (CNRA) COVID-19 task force composed of CNRA staff and the directors and deputies from the various state natural resource departments, boards, commissions and conservancies. The task force is currently meeting weekly to share information and discuss ways to assist in addressing the pandemic.

Stay-at-Home Modification Plan

In May, at the request of the California Department of Human Resources, staff developed and submitted a "stay-at-home modification plan" for moving into Phase 2 of California's recovery from COVID-19. CalHR asked agencies statewide to develop plans to safely accomplish their missions and fully re-open any services that had been temporarily closed. The Newsom Administration has shared its goal of having at least 75% of staff who are currently teleworking continue to do so until the end of stay-at-home orders or until a vaccine is approved. Since 80% of FGC staff has been teleworking and the FGC office has remained mostly open, FGC operations will largely remain the same in this next phase, though at reduced capacity (discussed more under staffing). The modification plan includes measures for ensuring physical distancing for those who are in the office, and other practices to keep staff, commissioners, and visitors safe.

Safety at the FGC Office

Related to the modification plan, in early June the California Department of Public Health released updated guidance to reduce the risk of COVID-19 in California state facilities, which includes self-health checks for staff prior to coming into the office, access to sanitizing supplies, use of face coverings, and physical distancing. Most of the updated guidance had been implemented already at the FGC office. In addition, individual staff members have been identified as belonging to one of two subgroups and there is never overlap between the two when staff is in the office; this strategy is intended to help prevent any illness from spreading throughout the entire team or between employees who are back-ups to one another.

STAFF SUMMARY FOR JUNE 24-25, 2020

Statewide Contact Tracing and Public Awareness

In the ongoing effort to mitigate the spread of COVID-19, Governor Newsom launched California Connected (californiaconnected.ca.gov), the state's comprehensive contact tracing program and public awareness campaign. Contact tracing requires a core group of carefully trained people to connect by phone with individuals who are COVID-19 positive to help them obtain medical care and determine who they might have exposed without knowing it so that those individuals can be contacted as well; the goal is to help slow the spread of the virus and prevent outbreaks. The state needs an estimated 10,000 contact tracers to safely move through the stages of reopening. In late May, the governor directed state agencies to identify at least 5% of their staffs to be redirected to COVID-19 response efforts as contact tracers on a full-time basis for the next six to nine months; as of mid-June, just over 3,000 state employees had been identified for the assignment.

Meeting Venues and Formats

Holding virtual FGC, committee and collaboration meetings reflects just one of many operational changes staff has made due to COVID-19. FGC staff recognizes that the public safety concerns associated with COVID-19 will likely continue into 2021. Budget constraints and associated travel restrictions are expected to continue through the upcoming fiscal year (Jul 2020 – Jun 2021), creating additional uncertainty. Staff anticipates that FGC will need to meet remotely via webinar/teleconference through at least the remainder of the calendar year, as discussed under Agenda Item 17, meeting dates and locations. We will continue to refine and improve meeting processes as we learn and become more familiar with the multiple technological platforms available for virtual meetings. While there will be savings from not using meeting venues, hotel sleeping rooms, and travel, those funds are necessary now for increased technology costs, expenses for home office equipment, and sanitation supplies.

State Budget

The COVID-19 pandemic has resulted in sudden and severely negative economic consequences for California, which has significant implications for the state's budget and, in turn, local governments. The Legislative Analyst's Office (LAO) has estimated that the fiscal challenges we are facing are "...unlikely to dissipate quickly and will extend well beyond the end of the public health crisis." Under two different economic scenarios, LAO estimates that the budget deficits will persist until at least 2023-24, another three years.

In approaching the 2020-21 budget problem, the governor and legislature have used a mix of tools to address what is projected to be an over \$50 billion deficit, including using reserves, reducing expenditures, increasing revenues, and shifting costs. The governor and legislature have conveyed that the 2020-21 budget will experience further revisions throughout the summer to adjust for updated revenue projections, primarily income tax receipts that will be received by Jul 15 or potential federal assistance. Given projections for the budget deficits, it is possible additional, sizable reductions will be necessary for major state programs.

Currently there are at least four budget-related actions that are or will directly impact FGC:

1. *A statewide travel ban for anything other than mission-critical activities.* Beyond the current safety concerns with in-person meetings, the travel ban means that FGC and

STAFF SUMMARY FOR JUNE 24-25, 2020

committee meetings will continue to be held via webinar and/or teleconference through at least the end of 2020 and most likely through the 2020-21 fiscal year (ending Jun 2021). The virtual meeting format requires more time to accomplish the same amount of work that we have become accustomed to achieving in recent years, not only during FGC and committee meetings, but also for staff who are engaged in highly collaborative work.

2. *A pay cut/furloughs and delayed raises for employees.* The governor has already negotiated modifications to pay and benefits with two state unions and more are expected to follow. Most employees will receive a salary reduction that equates to one or two furlough days per month. While some of the pay cut for individuals will be offset by deferred health care or retirement contributions, the reduction in the number of hours staff is available to work remains the same. Also problematic for FGC in particular is that several employees with long-term institutional knowledge are eligible for retirement, which puts FGC at risk for additional staff turnover and loss of that experience sooner than anticipated.
3. *A 5% across-the-board budget cut for the 2021-22 fiscal year.* FGC has long had a very lean operation, but staff will look for ways to reduce costs for the next fiscal year.
4. *DFW loss of funding.* Last year Director Bonham committed to providing FGC with a position and funding for a tribal advisor/liaison to support the Tribal Committee and engage in tribal consultations. With what was an improving budget situation late last year, the director identified the possibility of another four to five positions with funding for increasing committee, regulatory and California Environmental Quality Act staffing. The new fiscal reality we are facing precludes receiving and filling those positions and, when combined with contact tracing assignments necessitates tough conversations about fundamental priorities given that FGC's responsibilities and authorities extend far beyond the capacity of its current staff and what its primary partner, DFW, can provide in support, and the loss of 20-25% of staff capacity (described under "thinking strategically").

Staffing

At the beginning of January, prior to COVID-19 impacting our operations, recruitment efforts were underway for three vacant positions as well as for the Sea Grant State Fellow contractor. As noted in the most recent staff report, with the hiring of our new regulatory analyst at the end of Apr 2020, FGC currently has no vacant positions. Efforts to refill the seasonal clerk position, a temporary classification used to supplement our administrative tasks, is suspended due to the anticipated budget restrictions. Exhibit 2, *FGC staff biographies*, is included to summarize the background of your staff, a team that is passionate about and committed to the work of FGC.

Leave Reduction Plans

In recent years the state has begun to recognize the significant risk that accumulated leave balances can pose to the long-term health of individual agencies; FGC is no exception, especially as a small agency without the budget necessary to absorb the cost of an employee retiring with a significant leave balance. To help reduce future liability, the state has a cap on the number of leave hours employees can accumulate, though for many years little attention was paid when an employee surpassed that mark; exceptions were regularly made due to an

STAFF SUMMARY FOR JUNE 24-25, 2020

employee's extensive or mission-critical responsibilities or other extenuating circumstances. Most recently, the California Department of Human Resources has taken a more proactive role and requires that any employee with excess leave have on file a leave reduction plan; the employee's supervisor is responsible for ensuring that the plan is implemented.

FGC's insufficient staffing level to meet basic mandates and authorities, combined with past furloughs and hiring freezes, has made it extremely difficult to keep leave balances below the cap without compromising our ability to meet expectations for even fundamental responsibilities. Three staff currently have leave reduction plans on file; if those plans continue to be implemented, it represents about a 5% reduction in staff time for the next year.

COVID-19 Contact Tracer Assignment

Helping save lives and allowing the economy to begin reopening is a noble job; we honor and commend Associate Government Program Analyst Craig Castleton who volunteered for the worthy duty as a COVID-19 contact tracer. While he will be sorely missed, this is a once-in-a-lifetime opportunity to serve the people of California in a time of crisis. Craig completed his training in the first half of June and, at the time the binder was produced, was awaiting assignment.

The contact tracing assignment represents 10% of FGC staff capacity for the next six to nine months (and potentially longer). The assignment has already affected our operations and slowed work as various staff members with backup assignments to Craig's tasks assume those responsibilities.

Overall Reduction in Staff Capacity

Small, individual, short-term (i.e. a few months) reductions in capacity are part of normal business operations and something we accommodate on a regular basis. At this moment, what we are facing as an organization is not small, nor will it be short-term. The 10% loss of staff for contact tracing is expected to last at least six to nine months and possibly longer. If continued, the 5% loss for mandatory leave reduction will last about a year and then drop to about 3-4% for another two years. What is anticipated to be one or two furlough days per month equates to a 5-10% reduction in capacity. Far less certain are potential retirements spurred by the furloughs, which could lead to another 10-20% reduction. When combined, the changes to staff capacity constitute a major reduction (at a minimum 20%) in a relatively short time frame.

Public Engagement

FGC holds integrity, transparency, and collaboration as core values. All FGC and committee meetings are accessible to the public and FGC strives to make decisions based on multiple inputs in an open, inclusive, and public process that solicits a diverse set of perspectives.

Comments Submitted to FGC

FGC receives hundreds to thousands of written public comments each week via print mail, email and at public meetings. Due to the large volume, it is impossible to include in FGC's meeting binders every comment received. At the direction of FGC, staff reviews and organizes

STAFF SUMMARY FOR JUNE 24-25, 2020

all comments and develops a binder of meeting materials to help inform FGC's decision-making, with summaries of the ideas submitted and samples of the correspondence.

While not all public comments can be physically included in the meeting binders, staff works hard to ensure that a full spectrum of public opinion is represented in the comment summaries and in the sample public comment letters included in the binder. While only comments that are received prior to the public comment deadline (approximately two weeks before the meeting) can be included in the binder, comments received by the supplemental comment deadline are also summarized and compiled for commissioner review. All correspondence is available to commissioners for their review at any time requested.

Engaging in FGC Decision-Making

In general, agenda items before FGC are discussed and developed over a series of committee and commission meetings, prior to action at a full FGC meeting. While submitting written public comments is an important opportunity to share ideas and provide input on items under consideration, there are other ways to influence the decision-making process. Those members of the public who wish to engage more fully in FGC's decision-making process are encouraged to participate in discussions at committee meetings, which help to form many of the recommendations ultimately made to FGC for consideration. As always, staff welcomes the opportunity to assist stakeholders in initiating and becoming more active in discussions and welcomes suggestions about how to improve public engagement.

Thinking Strategically about the Future

Amid the turbulence we are experiencing, the relative certainty of long-term planning seems to be in short supply. We are regularly, sometimes daily, faced with situations in which we must pivot our efforts as the facts on the ground and their operational context shift, leaving limited time or energy for posing and analyzing long-term planning ideas and developing collaborative interests. Yet, at the same time, decisions made and actions taken in these trying times will resonate far beyond this moment.

Developing a strategic plan to provide long-term guidance on organizational priorities while actively responding and adapting to a public health emergency is not only a challenge, but also can lead to a plan that is not adequately designed to meet the new future we will collectively face. While staff has recommended a temporary pause on the effort to develop a strategic plan (Agenda Item 16), it does not obviate the need to think strategically about the near-term future.

FGC staff priorities necessarily have shifted rapidly over the last three months and we anticipate this shifting to continue for the foreseeable future as guidance and directives to state agencies evolve during both the health and economic crises. There is a need to assess our constraints moving forward and consider what can be accomplished over the next year, with a reassessment recommended in approximately six months.

Staff has been identifying those key functions recommended to continue and those that should be on pause as we collectively work our way through the remarkable circumstances in which we find ourselves. Under a number of agenda items for this meeting you will see proposals for how to potentially modify workload. For instance, you will receive a recommendation from the

STAFF SUMMARY FOR JUNE 24-25, 2020

Marine Resources Committee to establish a six-month hiatus for accepting new water-bottom lease applications beyond the three already in hand and being processed.

Other potential modifications include reducing the number of rulemakings by putting notice on hold for the commercial kelp and algae harvest and the experimental fishing permit program rulemakings, reconsidering the absolute need for rulemakings this year for such packages as mammals and upland game, and reconsidering the number of topics that are scheduled for FGC meetings. We are all familiar with the fact that a virtual meeting format takes longer to accomplish the same amount of work, so it is unrealistic to believe that with existing resources we can continue to achieve as much as pre-pandemic, and certainly not with the reduced capacity we expect to experience. Staff is making every effort to minimize the impacts to our core meeting planning, stakeholder engagement, and regulatory work.

California Law Revision Commission

At the direction of the California State Legislature, the California Law Revision Commission (CLRC) conducted a comprehensive review of the California Fish and Game Code to identify and clean-up obsolete, inconsistent, or duplicative sections; in December 2018, CLRC released a tentative recommendation for public review and comment.

The tentative recommendation includes over 3,500 changes to reorganize the Fish and Game Code into a proposed new Fish and Wildlife Code, as well as a series of over 500 “notes” regarding individual, proposed changes. Deadlines were initially set for July 1, 2020 to submit comments on the notes and July 1, 2021 to submit comments on the proposed reorganization.

Staff has completed an initial review of CLRC’s tentative recommendation and developed draft comments on the notes. FGC staff is coordinating with DFW on our proposed responses. Due to decreased staff capacity and other priorities since Dec 2019, FGC staff requested an extension of the July 1, 2020 deadline; in response, CLRC extended the deadline to December 28, 2020. Staff continues to work on a response to the notes as time allows.

Legislative Matters

Just as COVID-19 closed workplaces and curtailed activities throughout the state, the California State Legislature faced similar challenges and, in late Mar 2020, adjourned temporarily. In May, the senate and assembly returned to session, but a week apart; hence, there are different deadlines prior to summer recess. While the primary focus since returning has been on passing the 2020-21 budget, a large number of other bills continue to move through the legislative process. Staff has been unable to focus on legislative matters in recent months and relies heavily on colleagues at DFW to provide regular updates on the status of bills.

FGC staff has prepared a list of state legislation that may affect FGC’s resources and workload or be of interest (below). DFW has provided a report on state bills it has identified as being of interest, including the current status of each (Exhibit 3). Today is an opportunity for FGC to provide direction to staff concerning proposed legislation. At any meeting, FGC may direct staff to provide information to or share concerns with bill authors or regulatory agencies. FGC members may also take positions on bills at the same meeting an update is provided.

STAFF SUMMARY FOR JUNE 24-25, 2020

Legislative Calendar Highlights for 2019-2020

- Jun 19: Last day for Assembly to pass bills introduced in that house; Assembly summer recess begins upon adjournment
- Jun 22-26: Senate floor session only
- June 26: Last day for Senate to pass bills introduced in that house
- July 2: Senate summer recess begins upon adjournment
- July 13: Legislature reconvenes from summer recess (Senate and Assembly schedules will resume concurrently)
- Aug 7: Last day for policy committees to meet and report bills
- Aug 14: Last day for fiscal committees to meet and report bills
- Aug 17-31: Floor session only
- Aug 21: Last day to amend bills on the floor
- Aug 31: Last day for each house to pass bills; final recess begins upon adjournment

Bills Introduced during the 2019-2020 Session

A number of the 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:

- AB 1305 (*Obernolte*) *Junior hunting licenses: eligibility: age requirement* (introduced 2/22/2019; withdrawn from committee, re-referred to Committee on Rules 6/19/19)
- AB 1561 (*Rubio, Blanca*) *Endangered wildlife: crocodiles and alligators* (introduced 2/22/2019; read second time, ordered to third reading, re-referred to Committee on Rules pursuant to Senate Rule 29.10(c) 9/9/2019)
- AB 1949 (*Boerner Horbath*) *Fisheries: California Ocean Resources Enhancement and Hatchery Program* (introduced 1/17/2020; in Senate, read first time, to Committee on Rules for assignment 6/11/2020)
- AB 2028 (*Aguiar-Curry*) *State agencies: meetings* (introduced 1/30/2020; in Senate, read first time, to Committee on Rules for assignment 6/9/2020)
- AB 3030 (*Kalra*) *Resource conservation: land and ocean conservation goals* (introduced 2/21/2020; in Senate, read first time, to Committee on Rules for assignment 6/9/2020)
- SB 1046 (*Dahle*) *Fish and wildlife: catastrophic wildfires: Sierra Nevada region: reports* (Introduced 2/18/2020; from Committee with author's amendments, read second time and amended, re-referred to Committee on Rules 3/25/2020)
- SB 1175 (*Stern*) *Animals: prohibitions on importation and possession of wild animals: live animal markets* (Introduced 2/20/2020; set for Jun 18 hearing on 6/11/2020)
- SB 1208 (*Monning*) *Wildlife: dudleya: taking and possession* (Introduced 2/20/2020; from Committee with author's amendments, read second time and amended, re-referred to Committee on Rules 3/25/2020)
- SB 1235 (*Caballero*) *Administrative Procedure Act: adverse economic impact* (Introduced 2/20/2020; from Committee with author's amendments, read second time and amended, re-referred to Committee on Rules 3/25/2020)

STAFF SUMMARY FOR JUNE 24-25, 2020

Two other bills that would have an impact on FGC that are not in the DFW report are:

- AB 2093 (*Gloria*) *Public records: writing transmitted by electronic mail: retention* (introduced 2/5/2020; Passed Committee on Judiciary, re-referred to Committee on Appropriations 3/10/2020)

Summary: Unless a longer retention period is required by statute or regulation, or established by the Secretary of State pursuant to the State Records Management Act, this bill would require a public agency, for purposes of the California Public Records Act, to retain and preserve for at least 2 years every public record, as defined, that is transmitted by electronic mail.

- SB 937 (*Hill*) *State agencies: web accessibility* (introduced 2/6/2020; referral to Committee on Judiciary and rescinded due to the shortened 2020 Legislative Calendar 5/12/2020).

Summary: This bill would authorize a state agency to temporarily remove public documents from digital access if a justifiable impediment exists and the Director of Technology verifies the impediment prohibits full compliance and the state agency complies with certain requirements, including citing the reason for the document's removal and listing options and instructions for how to access the document offline. The bill would make any file or document removed after Oct 14, 2017, subject to these requirements.

Significant Public Comments

An international sportsmen's organization opposes the Jun 2, 2020 version of SB 1175 on the grounds that it will lead to unwinnable litigation since it is contrary to federal law, creates confusion by comingling live animal markets with legitimate hunting experiences, the listed game species have not been shown to present a human health risk, and the cost will have to be borne by an already struggling agency (DFW) at a time when it appears its General Fund budget will be reduced by almost \$34 million in the next fiscal year (Exhibit 4).

Recommendation (N/A)

Exhibits

1. [Staff Report on Staff Time Allocation and Activities](#), dated Jun 15, 2020
2. [FGC staff and contractor biographies](#), updated Jun 15, 2020
3. [DFW legislative report](#), dated Jun 16, 2020
4. [Letter from Safari Club International to Senator Anthony Portantino, chair, California State Senate Appropriations Committee](#), dated Jun 5, 2020

Motion/Direction (N/A)

STAFF SUMMARY FOR JUNE 24-25, 2020

4. DELEGATIONS TO STAFF**Today's Item****Information** ☐**Action** ☒

Discuss and potentially approve delegations to the executive director to ensure staff can perform necessary responsibilities.

Summary of Previous/Future Actions

- | | |
|--|--|
| • Received draft delegations for consideration | Feb 21, 2020; Sacramento |
| • Continued item to a future FGC meeting | Apr 15-16, 2020; Teleconference |
| • Today's potential approval | Jun 24-25, 2020; Webinar/teleconference |

Background

FGC's authorities require daily actions to meet its responsibilities and, hence, it employs an executive director and other staff to assist in conducting FGC's operations. Staff reviewed its delegated authorities from FGC and determined that it would be advisable to develop a more complete list of delegated tasks.

Staff presented a list to FGC at its Feb 21, 2020 meeting as a draft for initial consideration and to receive feedback; staff subsequently made several non-substantive revisions to the list and three substantive revisions:

1. added sections 1.h and 1.i regarding noticing amendments to rulemaking files and adopting, amending or repealing regulations consistent with FGC decisions;
2. added new sections 13.d and 13.e regarding reviewing and analyzing reports and declarations and circulating draft documents related to the California Environmental Quality Act; and
3. added a new section 19 regarding executing non-substantive amendments to leases for kelp beds or leases for state water bottoms.

The revised list of proposed delegations is in Exhibit 1.

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

FGC staff: Adopt the draft delegations to the executive director as proposed.

Exhibits

1. [Delegations to the Executive Director](#), draft dated Jun 12, 2020

Motion/Direction

Moved by _____ and seconded by _____ that the Commission adopts the draft document as the Commission's delegations to its executive director.

STAFF SUMMARY FOR JUNE 24-25, 2020

5. 150TH ANNIVERSARY**Today's Item****Information** ☒**Action** ☐

Discuss the 150th anniversary of the California Fish and Game Commission.

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

FGC and DFW turned 150 years old this year! Legislation establishing the Board of Fish Commissioners—the precursor to both FGC and DFW— was signed into law on Apr 2, 1870, just twenty years after California entered statehood. As the first wildlife conservation agency in the United States, predating even the U.S. Commission of Fish and Fisheries, the Board of Fish Commissioners was tasked with restoring and preserving the fish in California waters.

The first board was composed of three fish commissioners who received no compensation, but were responsible for the expenditure of up to \$5,000 appropriated by the legislature for an operating budget. One of the early decisions made by the board was to appoint two full-time wardens, one for Lake Tahoe and another for San Francisco Bay, who worked without pay but were compensated for their expenses.

Fast forward to 1909 when the board was renamed the California Fish and Game Commission and was responsible for four offices (San Francisco, Sacramento, Fresno and Los Angeles), seven hatcheries, and about 120 staff. A 1915 educational booklet (Exhibit 2) states that the commission was entirely self-supporting, with the cost of the hatcheries borne entirely by market and leisure fishermen (now known as commercial and recreational fishermen, respectively). The commission took pride in the fact that "...not one cent is contributed by the taxpayer through legislative appropriation."

In 1926, FGC reorganized itself to focus more broadly on general policy issues and transferred numerous administrative responsibilities to a new division called "Fish and Game." Activities like enforcement, fish culturing and managing commercial fisheries were part of the transfer. By 1951, the division had become the California Department of Fish and Game. In the meantime, FGC had expanded to five members in 1937, received greater autonomy for individual commissioners as appointees through a 1940 constitutional amendment, and was delegated authority by the legislature in 1945 to promulgate regulations for sport fishing and hunting.

Many more details about the 150-year history of FGC and DFW are featured in the Mar-Apr 2020 issue of *Outdoor California* (a print copy was sent by mail to commissioners; the cover is presented in Exhibit 1). During the next several FGC meetings, staff will highlight some of the history and share tidbits of reports and stories from over the years.

While a number of activities were to be scheduled throughout the year beginning in Apr 2020, the COVID-19 epidemic quickly changed our plans. Much of the initial preparations begun last fall to commemorate FGC's sesquicentennial, have had to be set aside; with a reduced workforce and additional COVID-related responsibilities, the sesquicentennial is a bit more muted and reflective.

STAFF SUMMARY FOR JUNE 24-25, 2020

Some of the things we are still planning for the recognition is a new logo that was designed on our behalf by DFW's outreach and media team (see the cover of this meeting binder), a slightly revised tagline for use with the logo (*Celebrating 150 years of wildlife heritage and conservation!*), various features and special columns in *Outdoor California*, and a video that was prepared by DFW's outreach and media team that includes a collection of historical public photos (Exhibit 3). We may even enjoy a storyteller or two at an upcoming meeting!

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

1. [Mar-Apr 2020 cover for Outdoor California](#)
2. [Conservation Through Education](#), undated booklet published by the California Fish and Game Commission c. 1915
3. <https://youtu.be/Gcrp-9fTvH4>

Motion/Direction (N/A)

STAFF SUMMARY FOR JUNE 24-25, 2020

6. PACIFIC LEATHERBACK SEA TURTLE (CONSENT)**Today's Item****Information** ☒**Action** ☐

Receive the Department's 90-day evaluation report for the petition to list Pacific leatherback sea turtle (*Dermochelys coriacea*) as a threatened or endangered species under the California Endangered Species Act (CESA).

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 receipt of petition and approval of DFW's 30-day extension request | Feb 21, 2020; Sacramento |
| • Today receive DFW's 90-day evaluation report | Jun 24-25, 2020; Webinar/teleconference |
| • Determine if listing may be warranted | Aug 19-20, 2020; Fortuna |

Background

A petition to list Pacific leatherback sea turtle as endangered under CESA was submitted by the Center for Biological Diversity and the Turtle Island Restoration Network on Jan 23, 2020. 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 to FGC within 90 days of receiving the petition; under this section, DFW may request an extension of up to 30 days to complete the evaluation. At its Feb 21, 2020 meeting, FGC approved a 30-day extension for DFW to complete its evaluation of the petition, which is being received today under the consent calendar (Exhibit 1).

This meeting is not intended for FGC discussion and FGC cannot consider the petition at this meeting, as Fish and Game Code Section 2074 requires the public to have 30 days to review the petition after receipt by FGC 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.

Significant Public Comments

A commercial fisher recommends an international, co-cultural approach to sea turtle conservation and environmental justice that incorporates ecological, fishery, and food security concerns (Exhibit 2).

Recommendation

FGC staff: Accept any public comment and receive the DFW petition evaluation under a motion to adopt the consent calendar.

STAFF SUMMARY FOR JUNE 24-25, 2020

Exhibits

1. [DFW transmittal memo and 90-day evaluation report](#), received Jun 2, 2020
2. [Email from Chris Miller](#), received Jun 7, 2020

Motion/Direction

Moved by _____ and seconded by _____ that the Commission adopts the staff recommendations for items 6-7 on the consent calendar.

STAFF SUMMARY FOR JUNE 24-25, 2020

7. GROUND FISH (CONSENT)**Today's Item****Information** ☐**Action** ☒

Consider authorizing publication of notice of intent to amend recreational and commercial groundfish regulations to conform to federal regulations and modify state-managed fishery regulations.

Summary of Previous/Future Actions

- | | |
|---------------------------------|--|
| • Today's notice hearing | Jun 24-25, 2020; Webinar/teleconference |
| • Discussion hearing | Aug 19-20, 2020; Fortuna |
| • Adoption hearing | Oct 14-15, 2020; Oakland |

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 10-19, 2020 meeting, the Pacific Fishery Management Council (PFMC) recommended recreational fishing regulations for federally-managed groundfish species for the 2021-2022 management cycle. The proposed action will require amending several state regulations to maintain consistency with the federal regulations that are expected to go into effect on or around Jan 1, 2021. In addition, DFW is proposing modifications to state-defined commercial trip limits for cabezon and greenling to stay within federally-established commercial harvest limits.

The initial statement of reasons for regulatory action (ISOR) is being prepared with the conclusion of the Jun 2020 PFMC meeting. Changes to recreational fishing regulations may include, but are not limited to, allowable fishing depths, bag/sub-bag limits, and allowable methods of take. Changes to commercial fishing regulations may include, but are not limited to, trip limits for cabezon and greenling.

DFW is expected to provide additional information regarding PFMC's final recommendations in the supplemental handouts for this meeting.

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

FGC staff: Authorize publication of the notice as recommended by DFW under a motion to adopt the consent calendar.

DFW: Authorize publication of a notice of intent to amend recreational and commercial fishing regulations for federal groundfish and associated species as necessary for consistency with federal rules for 2021 and 2022 and state-defined commercial trip limits for cabezon and greenling, as described in the DFW memo (Exhibit 1).

STAFF SUMMARY FOR JUNE 24-25, 2020

Exhibits

1. [DFW memo](#), received May 29, 2020

Motion/Direction

Moved by _____ and seconded by _____ that the Commission adopts the staff recommendations for items 6-7 on the consent calendar.

STAFF SUMMARY FOR JUNE 24-25, 2020

8. DEPARTMENTAL INFORMATION ITEMS**Today's Item****Information** ☒**Action** ☐

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

- (A) Director's report
 - I. Update on actions taken after May 14, 2020 pursuant to the emergency sport and recreational fishing regulations in Section 8.02
- (B) Marine Region
 - I. Update on the Drift Gill Net Transition Program
 - II. Update on CARES Act fisheries assistance funding
- (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 related to ocean salmon and Pacific halibut is provided as Exhibit B1.

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

- I. An update on the voluntary DFW Drift Gill Net Transition Program, which incentivizes drift gill net permittees to transition out of the drift gill net shark and swordfish fishery, reduces bycatch, and provides for a sustainable swordfish fishery. The program was established through legislation in 2018 and regulations establishing the program were adopted by DFW in late 2019. Since the regulations were adopted, significant progress has been made to establish the necessary agreements to begin implementing the program.
- 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.

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

- B.1 [DFW news release: CDFW Announces Publication of Rules for Ocean Salmon and Pacific Halibut](#), dated May 8, 2020

Motion/Direction (N/A)

STAFF SUMMARY FOR JUNE 24-25, 2020

9. ANNUAL TRIBAL PLANNING MEETING**Today's Item****Information** ☒**Action** ☐

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

Summary of Previous/Future Actions

- | | |
|--|--|
| • First annual tribal planning meeting | Feb 6, 2018; Sacramento |
| • Second annual tribal planning meeting | Feb 5, 2019; Sacramento |
| • Today's tribal planning update | Jun 24-25, 2020; Webinar/teleconference |
| • Informal version of the annual tribal planning meeting | Jul 15, 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 annually hosting a tribal planning meeting to coordinate upcoming regulatory and policy activities that are before FGC. The meeting is intended to provide a venue for education about process, identifying regulatory and policy needs, and developing collaborative interests.

Consistent with FGC's policy, the first annual tribal planning meeting was held in Feb 2018 and included several agenda items related to FGC and its functions. The second annual planning meeting was held in Feb 2019 and expanded upon the framework established in 2018, with a revised format that tribes indicated was more amenable to a learning and collaborative environment. The third annual meeting was originally scheduled for Mar 2020 with a long list of agenda topics, but was postponed as the threats posed by COVID-19 became more apparent and everyone's attention was necessarily diverted.

Amid the turbulence we are collectively experiencing, the relative certainty of long-term planning seems to be in short supply. We are regularly, sometimes daily, faced with situations in which we must pivot our efforts as the facts on the ground and their operational context shift, leaving little time or energy for posing and analyzing long-term planning ideas and developing collaborative interests, including those of sister agencies. Yet, at the same time, decisions made and actions taken in these trying times will resonate far beyond this moment.

Given the challenges faced by FGC, our tribal partners and sister agencies, this is an opportune time for a more informal version of the annual tribal planning meeting (in a roundtable discussion format) to check in with one another on how we are adapting to the challenges posed during this global pandemic and social change and to find new ways to work together to achieve shared priorities. The lessons we learn and the practices that are put in place now can make our organizations better prepared for the future; by sharing our collective experiences, we may all emerge stronger, more deeply engaged, and more capable than we were before.

STAFF SUMMARY FOR JUNE 24-25, 2020

Unless there is objection by FGC members, staff is rescheduling the annual tribal planning meeting to Jul 15, 2020 in consultation with Commissioner Hostler-Carmesin, using an informal, roundtable discussion format. Commissioner Hostler-Carmesin and Commissioner Burns are expected to be in attendance.

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

1. [FGC's Tribal Consultation Policy](#)

Motion/Direction (N/A)

STAFF SUMMARY FOR JUNE 24-25, 2020

10. TRIBAL COMMITTEE**Today's Item**Information ☐Action ☒

Discuss and consider approving new topics for addition to the TC work plan. Discuss and consider approving draft agenda topics for the next committee meeting.

Summary of Previous/Future Actions

- | | |
|--|--|
| • Most recent TC meeting | Jan 17, 2020; TC, Los Alamitos |
| • Today consider approving new topics and approving TC agenda topics for the next meeting | Jun 24-25, 2020; Webinar/teleconference |
| • Next TC meeting | Aug 18, 2020; TC, Fortuna |

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) FGC adopted the recommended co-management definition and asked TC to consider and make a recommendation regarding proposed amendments to the adopted definition, and (2) the kelp and algae commercial harvest management regulations were not ripe for a recommendation and have been continued as a discussion item for Aug 2020 and as a potential recommendation item for Nov 2020.

In addition to standing agenda items (i.e., agency updates, management plan updates, cross-pollination with MRC and WRC), agenda topics proposed for the Aug 2020 TC meeting are:

- Co-management definition: Discuss potential amendments
- Coastal Fishing Communities Project: Updates and guidance
- Kelp and algae commercial harvest management regulations: Discussion
- Studies of pinnipeds and California's fisheries: Update and discussion
- Annual tribal planning meeting: Report out

New TC Topics

Given the modified format of the annual tribal planning meeting (see Agenda Item 9), a draft topic proposed for addition to the TC work plan is to invite a presentation from the West Coast Ocean Alliance Tribal Caucus to support a discussion regarding its work to enhance coordination and management for the ocean along the West Coast of the United States.

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

FGC staff: Refer the new topic as recommended and approve the proposed agenda topics for the Aug 18, 2020 TC meeting.

STAFF SUMMARY FOR JUNE 24-25, 2020

Exhibits

1. [TC work plan](#), updated June 12, 2020

Motion/Direction

Moved by _____ and seconded by _____ that the Commission refers one new topic to the Tribal Committee and approves the agenda topics for the August 18, 2020 Tribal Committee meeting as recommended by staff.

STAFF SUMMARY FOR JUNE 24-25, 2020

11. MARINE RESOURCES COMMITTEE (MRC)**Today's Item****Information** ☐**Action** ☒

Discuss updates and potentially approve recommendations from the previous meeting. Consider approving new topics to address at a future committee meeting. Consider approving draft agenda topics for the next committee meeting.

Summary of Previous/Future Actions

- | | |
|--|---|
| • Most recent MRC meeting (Part 1) | Mar 17, 2020; MRC, Santa Rosa/ Teleconference/Webinar |
| • FGC adopted recommendations from MRC meeting Part 1 and scheduled Part 2 | Apr 15-16, 2020; Teleconference |
| • Most recent MRC meeting (Part 2) | Apr 29, 2020; Webinar/Teleconference |
| • Today consider recommendations from MRC meeting Part 2 and potentially approve agenda topics for next meeting | Jun 24-25, 2020; Webinar/Teleconference |
| • Next MRC Meeting | Jul 29, 2020; Webinar/Teleconference |

Background

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

(A) MRC Meeting Summary

In Apr 2020, FGC received a summary of the MRC's Mar 17 meeting. The MRC meeting agenda included eight substantive topics; not all topics could be completed due to unprecedented public turnout via a new remote participation option (teleconference and webinar) as well as the in-person venue.

At its Apr 15-16 meeting, FGC approved MRC recommendations related to topics covered on Mar 17, and approved an additional meeting day of Apr 29 to complete the agenda; today's meeting will focus on a summary and recommendations from the additional meeting day. MRC met on Apr 29 and covered the remaining substantive topics carried forward from Mar 17 (marine aquaculture in California, Experimental Fishing Permit (EFP) Program phase II rulemaking, recreational swordfish fishery, and Marine Life Management Act master plan implementation update).

A meeting summary spanning both meeting dates is provided as Exhibit A1.

MRC Recommendations from Apr 29

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

- I. Receive DFW's updated marine aquaculture information report (AIR; revised after the MRC meeting to integrate feedback) at FGC's Jun 2020 meeting (today)

STAFF SUMMARY FOR JUNE 24-25, 2020

and request that DFW present an update at the Jul 2020 MRC meeting regarding next steps and timeline for developing an aquaculture action plan.

- II. Approve a six-month hiatus on receiving new aquaculture lease applications for six months, schedule a review and discussion at the Nov 2020 MRC meeting, and authorize staff to engage in dialogue with the Port of San Diego concerning a potential lease application during the hiatus.
- III. Schedule updates on the EFP Program phase 2 and recreational swordfish, request that DFW refine EFP permit fee structure options and criteria, and request that DFW explore options for changing the recreational swordfish daily bag limit and for improving swordfish data collection methods. Schedule both items for the Jul 2020 MRC meeting. Note that staff is requesting a change to the schedule for swordfish (see FGC staff recommendations).

(B) *MRC Work Plan Development and Draft Timeline*

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

New MRC Topics

Staff requests that FGC refer to MRC an emerging management issue related to marine protected areas (MPAs) where artificial structures permitted by other agencies were installed prior to MPA designation. Structures require maintenance over time, which may result in injury, damage, take or possession of living, geological or cultural resources that are otherwise protected, incidental to any maintenance activities. Options to address the issue have been vetted through the MPA Statewide Leadership Team, and DFW is developing a proposed regulatory pathway. Due to imminent maintenance needs for some structures, staff recommends adding this to the Jul 2020 MRC agenda for discussion.

Draft Agenda Items for Jul 29

Staff has reviewed the list of work plan topics identified for Jul 2020 along with additional items proposed or requested by MRC or staff. The initial topic list for review and FGC direction includes:

1. agency updates, including California Ocean Protection Council update on experimental crab trap pop-up gear project (per MRC request),
2. kelp restoration and recovery tracking update,
3. MLMA master plan for fisheries implementation update,
4. recreational swordfish update from DFW
5. red abalone fishery management plan (FMP) update and potential recommendation,
6. update on next steps for developing an aquaculture action plan,
7. California grunion recreational fishing regulation changes (referred by FGC in Apr 2020),
8. California's Coastal Fishing Communities project update and direction,

STAFF SUMMARY FOR JUNE 24-25, 2020

9. MPAs and maintenance of permitted artificial structures,
10. EFP Program phase II discussion of fee structure and criteria options,
11. commercial kelp and algae harvest regulations update, and
12. cowcod recovery and stock status (South of Cape Mendocino).

Clearly there are more topics proposed for the Jul 2020 meeting than can be addressed in one day as stand-alone items, especially via a webinar format. Given recent experience, staff believes that the MRC and stakeholders would be better served by including fewer substantive topics, which would allow for more in-depth dialogue. However, that goal must not be met at the expense of advancing the most sensitive or urgent management issues.

Staff discussions with DFW regarding priorities and topics that can be presented as updates helped inform the staff recommendation below. As described under Agenda Item 33(B), rulemaking timetable updates, the commercial kelp and algae harvest rulemaking (topic 11) is proposed to be moved to “TBD” while DFW staff continues to work with industry members and other stakeholders to refine the proposal; therefore, this topic can be delayed to a future MRC meeting. Topic 10 (EFP Program) was going to be proposed to move onto the rulemaking timetable as discussed at the Mar 17, 2020 MRC, but is now proposed to remain under TBD; however, continuing to vet the proposal will allow DFW staff to prepare the materials necessary to quickly move a rulemaking forward once it can be scheduled. Topic 12 is not urgent and can be delayed to a future meeting, while topics 2-4 and 6 can be presented as updates.

Significant Public Comments

Comments Related to MRC Recommendations

1. *DFW aquaculture information report:* Three non-governmental organizations provide feedback on DFW’s draft AIR, with nine requested revisions (Exhibit A4). Of note, they request to remove or replace the “Looking Ahead” section of the report, which they believe is prematurely skewed toward aquaculture expansion. Other requests are for clarifications to be made about available acreage, permitting, environmental review, and shorebird and other wildlife and ecological impacts.
2. *Marine aquaculture state action plan:* A consortium of six academics express support for a state action plan for sustainable marine aquaculture, specifically focusing on seaweed and shellfish, and offering to assist with plan development. Examples of their current work in aquaculture are provided (Exhibit A5).
3. *Proposed marine aquaculture lease hiatus:* The Port of San Diego expresses opposition to a moratorium on new aquaculture lease applications and requests that any hiatus be limited to six months and exclude public agencies. The Port further expresses a desire to collaborate with FGC and offers to provide resources to assist in facilitating continued acceptance of aquaculture lease applications (Exhibit A6).

STAFF SUMMARY FOR JUNE 24-25, 2020

Comments Related to MRC Work Plan Topics

4. *Proposed kelp and algae regulation changes:* A commercial kelp harvester expresses opposition to harvest limits and statewide closure of bull kelp harvest (Exhibit B2).
5. *Red abalone FMP de minimis fishery options:* A former member of the FMP integration administrative team provides independent comments and requests that FGC direct DFW to include additional programmatic alternatives to the recommended biological and de minimis fisheries for the FMP (Exhibit B3).

The Waterman's Alliance requests that FGC direct DFW to include an option in the FMP to immediately open a small recreational fishery (600-900 per year) and submits a petition containing over 2,500 signatures and a table with individual comments (Exhibit B4, which includes a sample signature page).

Recommendation

FGC staff: (A) Approve the MRC recommendations from Apr 29, and (B) refer the topic related to maintenance of pre-existing structures in MPAs to MRC and approve the identified agenda topics for the Jul 2020 MRC meeting (some under agency updates), except to delay topics 11-12 to a future date.

Exhibits

- A1. [Summary of MRC meeting held Mar 17 and Apr 29, 2020](#)
- A2. [DFW memo transmitting AIR report](#), received Jun 17, 2020
- A3. [The Status of Commercial Marine Aquaculture in California](#), dated May 2020
- A4. [Email from Anna Weinstein on behalf of Audubon California, Oceana, and the Pew Charitable Trusts](#), received May 19, 2020
- A5. [Email from Maddelyn Hardin, University of Southern California \(USC\), on behalf of a consortium of researchers and staff from USC and Sea Grant](#), received Jun 11, 2020
- A6. [Email from Paula Sylvia, transmitting three letters from San Diego Port District](#), received Jun 11, 2020
- B1. [MRC work plan](#), updated Jun 6, 2020
- B2. [Email from Ian O'Hollaren, Sequoia Wild Seaweeds](#), received May 21, 2020
- B3. [Email from Jack Likins](#), received May 7, 2020
- B4. [Email from Joshua Russo, Watermen's Alliance, transmitting petition with over 2500 signatures and comments table](#), received Jun 11, 2020

Motion/Direction

- (A) Moved by _____ and seconded by _____ that the Commission approves the recommendations from the April 29, 2020 Marine Resources Committee meeting as recommended by staff.

OR

Moved by _____ and seconded by _____ that the Commission approves the recommendations from the April 29, 2020 Marine Resources Committee meeting as

STAFF SUMMARY FOR JUNE 24-25, 2020

as recommended except for _____ for which it approves
_____.

AND

- (B) Moved by _____ and seconded by _____ that the Commission approves the draft agenda topics for the July 2020 Marine Resources Committee meeting as recommended by staff.

OR

Moved by _____ and seconded by _____ that the Commission approves the draft agenda topics for the July 2020 Marine Resources Committee meeting as recommended by staff, except _____.

STAFF SUMMARY FOR JUNE 24-25, 2020

12. PACIFIC HERRING EGGS ON KELP**Today's Item****Information** ☐**Action** ☒

Discuss and consider adopting commercial Pacific herring eggs on kelp (HEOK) regulations that implement the Pacific Herring Fishery Management Plan (Herring FMP).

Summary of Previous/Future Actions

- | | |
|--|--|
| • FGC adopted Herring FMP and implementing regulations | Oct 9-10, 2019; Valley Center |
| • MRC discussed amendments to Herring FMP implementing regulations | Nov 5, 2019; MRC, Sacramento |
| • Notice hearing | Apr 15-16, 2020; Teleconference |
| • Today's discussion/adoption hearing | Jun 24-25, 2020; Webinar/teleconference |

Background

At the Oct 2019 adoption hearing for the Herring FMP and implementing regulations, comments from the HEOK representative of the DFW Director's Herring Advisory Committee highlighted potential concerns with the new regulations proposed for the HEOK fishery. While the regulations were adopted at the meeting, FGC and DFW committed to reviewing the Herring FMP implementing regulations based on the expressed concerns (see exhibits 2, 3 and 4 for more details); the rulemaking proposed for adoption today is the outcome of that review.

Proposed Regulations

As detailed in Exhibit 2, the proposed regulations will amend sections 163 and 164 concerning permittee on-board requirements; update the definition of HEOK fishing; clarify the definition of processing related to "rinsing"; and amend gear marking requirements, noise reduction measures, marine mammal deterrent device allowances, and weekend landing requirements. No changes are proposed to the Herring FMP itself, and no other substantive changes are proposed to the Herring FMP implementing regulations adopted by FGC in Oct 2019.

California Environmental Quality Act (CEQA)

A notice of exemption (Exhibit 8) has been drafted consistent with FGC staff's recommendation to rely on the statutory exemption in California Fish and Game Code Section 7078(e) that adopting regulations to implement an FMP or FMP amendment shall not trigger an additional review process under CEQA.

Significant Public Comments

1. Concerns expressed by the HEOK representative at the Oct 2019 FGC meeting are included on pages S-18 to S-20 of Appendix S of the Herring FMP (Exhibit 3) and are considered in this rulemaking.

STAFF SUMMARY FOR JUNE 24-25, 2020

2. At the Apr 2020 notice hearing, the HEOK representative verbally requested FGC reconsider setting individual HEOK quotas, allow up to two HEOK permits per permittee, provide for less severe penalties than suspension/revocation of permits for violations, and allow anchoring cork lines (versus to permanent structures). DFW does not support the requests and provides its rationale for rejecting the requested regulatory changes (Exhibit 6).

Recommendation

FGC staff: (1) Determine that a statutory CEQA exemption applies and (2) adopt the proposed regulations as recommended by DFW.

DFW: Adopt the regulations as described in the initial statement of reasons (ISOR; Exhibit 2) and, following adoption of any changes, request an effective date of Oct 1, 2020 (Exhibit 1).

Exhibits

1. [DFW memo transmitting ISOR](#), received Apr 6, 2020
2. [ISOR](#)
3. [Appendix S: Public Comments Received, Responses, and Changes to the Draft California Pacific Herring Fishery Management Plan, Nov 2019](#)
4. [Staff summary from Apr 15-16, 2020 \(for background purposes only\)](#)
5. [DFW memo transmitting response to comments, received Jun 1, 2020](#)
6. [Responses to comments received at the Apr 2020 FGC meeting \(Attachment 1\)](#)
7. [Economic and fiscal impact statement \(Std. 399\)](#)
8. [Draft notice of exemption](#)
9. [DFW presentation](#)

Motion/Direction

Moved by _____ and seconded by _____ that the Commission determines, based on the record, that this approval is exempt from the California Environmental Quality Act pursuant to the statutory exemption in California Fish and Game Code Section 7078(e), adopts the proposed changes to sections 163 and 164 related to commercial Pacific herring eggs on kelp regulations that implement the Pacific Herring Fishery Management Plan, and directs staff to request an effective date of October 1, 2020.

STAFF SUMMARY FOR JUNE 24-25, 2020

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.

STAFF SUMMARY FOR JUNE 24-25, 2020

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;

STAFF SUMMARY FOR JUNE 24-25, 2020

- 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.

STAFF SUMMARY FOR JUNE 24-25, 2020

14. MARINE 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, FGC will receive an update on the red abalone recreational fishery closure sunset date and discuss a potential rulemaking to continue the closure.

Summary of Previous/Future Actions

- | | |
|--|--|
| • FGC closed recreational red abalone fishery for one year | Dec 7, 2017; San Diego |
| • FGC extended fishery closure to 2021 | Dec 12-13, 2018; Oceanside |
| • Today's update and possible direction | Jun 24-25, 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; this unprecedented action was taken consistent with the ARMP and DFW observations, data and analysis. The closure included a sunset provision to re-open the fishery on April 1, 2019, or upon adoption of an abalone fishery management plan (FMP), whichever came first. The hope was that the need for a closure would be temporary and the fishery could re-open after conditions improved. In 2018, FGC determined that conditions had continued to worsen and, in Dec 2018, FGC took action to extend the fishery closure sunset date from Apr 1, 2019 to Apr 1, 2021. See Exhibit 1 for additional background information.

As FGC approved the revised sunset date regulation, it noted that the change was necessary to facilitate recovery of the red abalone population while preparing a red abalone fishery management plan (FMP); the FMP is underway and continues to be on the Marine Resources Committee (MRC) work plan. In early 2020, in light of current conditions, the FMP approach was revised to establish guidance and options to move from closure to scaled reopening of the fishery, including a *de minimis* option, as environmental indicators and abalone stock condition meet reopening criteria (see staff summary from Mar 17, 2020 MRC meeting, agenda item 4 for more background).

DFW recently confirmed that poor conditions continue to persist or worsen and advises that continuing the closure is necessary. A rulemaking to revise or remove the sunset date must be scheduled should FGC wish to extend the closure.

This agenda item today provides an opportunity to hear an update from DFW on environmental and abalone stock conditions and explore possible pathways to extend the closure per DFW recommendation (Exhibit 2). Recognizing that current modeling results project a long recovery period, the sunset date could be extended for longer periods of time (e.g., five-year intervals) or removed entirely, recognizing that the FMP under development and its implementing regulations may adjust the closure once adopted.

STAFF SUMMARY FOR JUNE 24-25, 2020

Significant Public Comments

Two comments were submitted for this agenda item; however, they are provided under Agenda Item 11, as they are more germane to an MRC topic.

Recommendation

FGC staff: Provide direction regarding extending or eliminating the recreational red abalone fishery closure sunset date and potentially add a rulemaking to the FGC rulemaking timetable.

DFW: Add a rulemaking to the FGC rulemaking timetable to remove the fishery closure sunset date.

Exhibits

1. [Staff summary from Aug 22-23, 2018 meeting, Agenda Item 12](#) (for background purposes only)
2. [DFW presentation](#)

Motion/Direction (N/A)

STAFF SUMMARY FOR JUNE 24-25, 2020

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 request Apr 15-16, 2020; Teleconference
- **Today's potential action on request Jun 24-25, 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.** The marine non-regulatory request scheduled for consideration today was received at the Apr 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 A1 summarizes and contains the staff recommendation for the request.

- (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.

There are no pending non-regulatory requests for today.

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

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

Exhibits

- A.1 [Summary of non-regulatory request and staff recommendation for request received through Apr 16](#), dated Jun 12, 2020

Motion/Direction

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

OR

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

STAFF SUMMARY FOR JUNE 24-25, 2020

16. STRATEGIC PLANNING**Today's Item****Information** ☐**Action** ☒

Review feedback provided by commissioners and the public regarding potential revisions to the mission and draft goals, potentially adopt draft goals and a revised mission statement, and provide direction on a draft plan.

FGC staff recommends that this item be continued to a future FGC meeting.

Summary of Previous/Future Actions

- | | |
|--|--|
| • Adopted mission, vision, and core values | Dec 12-13, 2018; Oceanside |
| • Received updates on second phase | Feb, Apr, Jun 2019; various |
| • Discussed seven key survey questions with stakeholders during workshop | Aug 7-8, 2019; Sacramento |
| • Discussed feedback from surveys and interviews | Dec 11-12, 2019; Sacramento |
| • Considered potential goals | Feb 21, 2020; Sacramento |
| • Continue discussion to future meeting | Jun 24-25, 2020; Webinar/teleconference |

Background

At its Feb 21, 2020 meeting, FGC discussed potential revisions to its mission statement and new goals, which were developed through a public input process. Following the meeting, FGC solicited public comment on refinements to its mission statement, proposed goals, and its previously adopted vision and core values. Approximately 23 comment letters were received. Staff has reviewed the comments and begun an assessment in anticipation of bringing them to FGC for consideration at a future meeting. However, events that have unfolded over the last few months have brought significant changes to the workload and priorities of staff.

As described in Agenda Item 3, the executive director's report, COVID-19 and the ensuing economic crisis have significantly reduced staff capacity for normal workload due to a number of changes, including high-priority requests and guidance from other state agencies (i.e., California Department of Human Resources, California Department of Public Health, California Department of Finance, California Natural Resources Agency), information-gathering, lost efficiencies from teleworking, and the recent COVID-19 contact tracing reassignment.

In general, a strategic plan is intended to guide an organization over three to five years. FGC staff priorities necessarily have shifted rapidly over the last three months and we anticipate this shifting of priorities to continue for the foreseeable future as guidance and directives to state agencies evolve during both the health and economic crises. Planning for the long-term while actively responding to an emergency is not likely to yield long-lasting goals and objectives that will sustain FGC; combined with current staff limitations, staff recommends pausing work on the strategic plan at this time and revisiting the topic at the Dec 2020 FGC meeting.

STAFF SUMMARY FOR JUNE 24-25, 2020

Significant Public Comments

Approximately 23 public comments regarding FGC's strategic plan were received in Mar 2020. FGC and staff thanks the commenters for their active engagement in this process. Comments will be summarized for FGC and considered when FGC returns to the stratetgic planning process.

Recommendation (N/A)

FGC staff: Continue this item to a future meeting.

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

Moved by _____ and seconded by _____ that the Commission continues discussion of strategic planning to a future meeting.

STAFF SUMMARY FOR JUNE 24-25, 2020

17. 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 January through December of 2021.

Summary of Previous/Future Actions

- | | |
|---|--|
| <ul style="list-style-type: none"> • Discuss draft 2021 meeting dates and locations | Jun 24-25, 2020; Webinar/teleconference |
| <ul style="list-style-type: none"> • Approve 2021 meeting dates and locations | Aug 19-20, 2020; Fortuna – Propose to move to 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 on Thursdays, MRC on Tuesdays), or the afternoon before the first day of three FGC meetings (TC on Tuesdays).

In 2020, one TC meeting was held in conjunction with an FGC meeting, one in conjunction with a WRC meeting, and the third is scheduled in conjunction with an MRC meeting; due to the awkward timing between TC meetings created by this format, reverting to scheduling TC meetings in conjunction with three FGC meetings would allow greater consistency in timing.

Normally, to ensure that staff has adequate time to identify and secure venue options that meet FGC's requirements related to cost, information technology, security conditions, and State-mandated bids, contracting conditions, and timelines, it would be important for meeting dates and locations to be identified well in advance. However, COVID-19 has changed the way we are operating, including holding meetings via webinar and teleconference rather than in person; as such, timing is more flexible than in the past.

FGC staff recognizes that the serious public safety concerns associated with COVID-19 will likely continue into 2021. Budget constraints and associated travel restrictions are likely to continue through the upcoming fiscal year (Jul 2020 – Jun 2021) create additional uncertainty. As a result, while staff has prepared a list of proposed meeting dates and locations for 2021 for FGC consideration and discussion today, the primary focus at this time is on the dates since it is not clear when in-person meetings can resume. Any consideration of potential meeting locations is best held for a future discussion when there is greater certainty about the ability to keep meeting participants safe and when travel restrictions are lifted.

Staff developed the proposed meeting dates (Exhibit 1) taking into consideration State holidays, other relevant meeting schedules, and regulatory deadlines. For this year's FGC meetings, marine items are heard the first day, and wildlife/inland fisheries items are heard the second day. For 2021, rotating the subject matter is recommended such that wildlife/inland fisheries are heard on the first day, and marine items on the second day.

STAFF SUMMARY FOR JUNE 24-25, 2020

Staff anticipates that FGC will continue to hold meetings by webinar and teleconference at least through the end of 2020 and likely through the end of the fiscal year (Jun 2021). Additionally, as described in Agenda Item 3, executive director's report, staff needs to reassess its constraints moving forward and consider what can be accomplished over the next year. Staff intends to take input received today from commissioners and stakeholders to develop an alternative proposal for meeting dates for FGC consideration at the Aug 2020 meeting.

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

Proposed Dates	Meeting Type	Potential Location if Not Webinar/Teleconference
Jan 14	WRC	Redding
Feb 10-11	FGC	Los Angeles/Orange County
Mar 16	MRC	Monterey area
Apr 13	TC	Sacramento
Apr 14-15	FGC	Sacramento
May 13	FGC	Teleconference
May 13	WRC	Santa Rosa
Jun 16-17	FGC	Merced or San Jose areas
Jul 20	MRC	San Clemente
Aug 17	TC	Fortuna
Aug 18-19	FGC	Fortuna
Sep 16	WRC	Ontario or Pasadena
Oct 13-14	FGC	Sacramento
Nov 9	MRC	Santa Rosa
Dec 14	TC	San Diego
Dec 15-16	FGC	San Diego

Other Relevant 2021 Meetings and Locations

- Association of Fish and Wildlife Agencies
 - September 12-15, Providence, RI
- Pacific Fishery Management Council
 - Mar 3-10, Seattle, Washington
 - Apr 6-13, San Jose, California
 - Jun 22-29, Vancouver, Washington
 - Sep 8-15, Spokane, Washington
 - Nov 15-22, Costa Mesa, California

STAFF SUMMARY FOR JUNE 24-25, 2020

- Pacific Flyway Council – Dates unknown at this time
- Western Association of Fish and Wildlife Agencies
 - Jan 7 - 10 Santa Ana Pueblo, NM
 - Jul 18 - 23, 2021, Santa Fe, NM
- Wildlife Conservation Board – Dates unknown at this time

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

FGC staff: (1) Realign TC meetings with FGC meetings in Apr, Aug and Dec; (2) Confirm intent to schedule FGC meetings on Wednesday and Thursday, TC and MRC meetings on Tuesdays, and WRC meetings on Thursdays; and (3) Provide direction on proposed 2021 dates and “locations.”

Exhibits

1. [FGC meeting locations for 2016-2021\(with 2021 potential locations if not via webinar and/or teleconference\)](#)

Motion/Direction (N/A)

STAFF SUMMARY FOR JUNE 24-25, 2020

18. 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 | Jun 24-25, 2020; Webinar/teleconference |
| • Consider granting, denying or referring | Aug 19-20, 2020; Fortuna |

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 Aug 19-20, 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)

STAFF SUMMARY FOR JUNE 24-25, 2020

19. ANNUAL AND FIVE-YEAR PLM LICENSES AND PLANS (CONSENT)**Today's Item****Information** ☐**Action** ☒

Consider approving or amending annual and five-year private lands wildlife habitat enhancement and management (PLM) plan renewals and licenses for 49 properties:

- New five-year PLM plans and 2020-2024 licenses for 13 properties continuing their participation in the PLM program
- Annual PLM plans and 2020/2021 licenses for 35 properties
- A correction to the 2020/2021 proposed seasons for one property's annual plan (approved at the Apr 16, 2020 FGC meeting with incorrect seasons)

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

Fish and Game Code sections 3400-3409 and Title 14, Section 601, prescribe conditions for a PLM program that provides incentives for landholders to manage their property for the benefit of fish and wildlife in exchange for access to increased recreational opportunities, such as hunting tags or extended seasons ("harvest program"). In return for a harvest program, the landholder must prepare a biologically-sound wildlife management plan and complete specific wildlife habitat improvements on the PLM property.

There are generally three types of actions associated with the PLM program: (1) an initial five-year PLM license; (2) an annual list of PLM seasons, harvests, and habitat improvements; and (3) a "new" five-year PLM license renewal. Conditions are unique to each participant's property.

Proposed annual seasons, harvests, and habitat improvements for the 49 PLM properties have been reviewed by DFW and found to be in compliance with FGC regulations and policies for PLMs; applicants have identified the location where records will be kept and made available for inspection (Exhibit 1).

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

FGC staff: Approve annual seasons, harvests, and habitat improvements for the 49 PLM properties as recommended by DFW, under a motion to adopt the consent calendar.

DFW: Approve 49 PLM licenses and plans, under the conditions specified in exhibits 2, 3 and 4.

Exhibits

1. [DFW memo](#), received May 22, 2020
2. [PLM Area License: Annual Renewals, 2020/2021, Proposed Seasons, Harvests, and Habitat Improvements](#), received May 22, 2020

STAFF SUMMARY FOR JUNE 24-25, 2020

3. [PLM Area License: New Five-Year Management Plans, 2020-2024, Proposed Seasons, Harvests, and Habitat Improvements](#), received May 22, 2020
4. [PLM Area License: Correction to 2020/2021 Proposed Seasons, for Tejon Ranch](#), received May 22, 2020

Motion/Direction

Moved by _____ and seconded by _____ that the Commission adopts the staff recommendations for items 19-23 on the consent calendar.

STAFF SUMMARY FOR JUNE 24-25, 2020

20. AGASSIZ'S DESERT TORTOISE (CONSENT)**Today's Item**Information ☐Action ☒

Receive DFW's 90-day evaluation report for the petition to list Agassiz's desert tortoise (*Gopherus agassizii*) as a threatened or endangered species under the California Endangered Species Act (CESA).

Summary of Previous/Future Actions

- | | |
|--|--|
| • Petition submitted | Mar 23, 2020 |
| • FGC transmitted petition to DFW | Apr 13, 2020 |
| • Public receipt of petition | Apr 15-16, 2020; Teleconference |
| • Published notice of receipt of petition | May 1, 2020 |
| • Today's receipt of DFW's 90-day evaluation report | Jun 24-25, 2020; Webinar/teleconference |
| • Receive DFW's 90-day evaluation report | Aug 19-20, 2020; Fortuna |
| • Determine if the petitioned action may be warranted | Oct 14-15, 2020; Oakland |

Background

On Mar 23, 2020 FGC received a petition to change the status of Agassiz's desert tortoise from a threatened species to an endangered species under CESA. Pursuant to Section 2073 of the Fish and Game Code, FGC referred the petition to DFW for its evaluation. DFW's evaluation report is due Jul 12, 2020.

Staff mistakenly added this item to the draft list of agenda items that FGC approved at its Apr 15-16, 2020 meeting. FGC is expected to formally receive the evaluation report at its Aug 19-20, 2020 meeting.

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

FGC staff: Continue this item to the Aug 2020 FGC meeting, under a motion to adopt the consent calendar.

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

Moved by _____ and seconded by _____ that the Commission adopts the staff recommendations for items 19-23 on the consent calendar.

STAFF SUMMARY FOR JUNE 24-25, 2020

21. SAN BERNARDINO KANGAROO RAT (CONSENT)**Today's Item**Information ☐Action ☒

Receive DFW's request for a six-month extension to develop the one-year status review report on the petition to list San Bernardino kangaroo rat (*Dipodomys merriami parvus*) as a threatened or endangered species under the California Endangered Species Act (CESA).

Summary of Previous/Future Actions

- | | |
|--|--|
| • Received petition | Mar 15, 2019 |
| • FGC transmitted petition to DFW | Mar 22, 2019 |
| • Published notice of receipt of petition | Apr 12, 2019 |
| • Public receipt of petition | Apr 17, 2019; Santa Monica |
| • Received DFW's 90-day evaluation report | Jun 12-13, 2019; Redding |
| • FGC determined listing may be warranted | Aug 7-8, 2019; Sacramento |
| • Today act on DFW request for a six-month extension to develop one-year status review report | Jun 24-25, 2020; Webinar/teleconference |
| • Receive DFW's status report | To be determined |

Background

In Mar 2019, FGC received a petition from the Endangered Habitats League to list San Bernardino kangaroo rat as endangered under CESA. On Aug 23, 2019, FGC published notice of acceptance of the petition, which initiated a 12-month review of the status of the San Bernardino kangaroo rat by DFW. On May 8, 2020, DFW submitted a request for FGC to grant a six-month extension of time to complete its review (Exhibit 1). The extension would allow time for further analysis and evaluation of the available science, completion of the status review, and a peer review process.

If the extension is approved, the status report will be due Feb 23, 2021. Following DFW's completion of the status report, FGC will receive the report at a regularly scheduled meeting and provide for final consideration of the petition at the next meeting.

Significant Public Comments

- Representatives of Friends of the Northern San Jacinto Valley convey concerns with DFW's review of projects under the California Environmental Quality Act, alleging that the process has led to the destruction of already decreasing habitat for the species. Attached to the comments is a report from the California State Auditor (Exhibit 2).

Recommendation

FGC staff: Approve DFW's request for a six-month extension to develop its one-year status review report for San Bernardino kangaroo rat, under a motion to adopt the consent calendar.

STAFF SUMMARY FOR JUNE 24-25, 2020

Exhibits

1. [DFW memo](#), received May 8, 2020
2. [Email from Tom Paulek and Susan Nash, Friends of the Northern San Jacinto Valley](#), received Jun 10, 2020

Motion/Direction

Moved by _____ and seconded by _____ that the Commission adopts the staff recommendations for items 19-23 on the consent calendar.

STAFF SUMMARY FOR JUNE 24-25, 2020

22. OWENS PUPFISH (CONSENT)**Today's Item****Information** ☒**Action** ☐

Receive DFW's five-year status review for 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 |
| • Today receive five-year status review | Jun 24-25, 2020; Webinar/teleconference |
| • DFW presentation | Aug 19-20, 2020; Fortuna |

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 (Section 670.5).

Pursuant to California Fish and Game Code Section 2077, upon the allocation of specific funding DFW is required to reevaluate threatened and endangered species every five years by developing a status review to determine whether conditions that led to the original listing are still present or have changed. The last status review for Owens pupfish was completed in 2009 by the U.S. Fish and Wildlife Service, with which DFW makes an effort to coordinate such reviews when species are listed under both the state and federal endangered species acts.

Today, DFW provides a 2020 status review of Owens pupfish in California, which updates descriptions, habitat requirements, threats, research needs, and other topics for this species (Exhibit 2). 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: Receive DFW's status review under a motion to adopt the consent calendar, accept any public comment, and schedule a presentation for the Aug 2020 FGC meeting.

DFW: Retain endangered species status for Owens pupfish.

Exhibits

1. [DFW memo](#), received Jun 8, 2020
2. [DFW five-year status review](#), received Jun 8, 2020

Motion/Direction

Moved by _____ and seconded by _____ that the Commission adopts the staff recommendations for items 19-23 on the consent calendar.

STAFF SUMMARY FOR JUNE 24-25, 2020

23. DUCK STAMP PROPOSALS (CONSENT)**Today's Item**Information ☐Action ☒

Consider approving proposed projects for Duck Stamp Account funds in Fiscal Year (FY) 2020-21.

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

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

DFW annually requests and reviews proposals for projects that meet the statutory goals of this dedicated account, which are reviewed by the DFW Duck Stamp Advisory Committee and then submitted to FGC as a list of recommended projects. Exhibits 1 and 2 contain an overview and summary of the proposed projects for consideration and approval for funding with Duck Stamp Account funds in FY 2020-21.

For FY 2020-21, spending authority for the fund is \$2,500,000. DFW proposes three new projects totaling \$2,040,000. A total of 10 projects are proposed, including the mandatory allocation to Canada for the purposes of the North American Waterfowl Management Plan, pursuant to Fish and Game Code Section 3704.

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

FGC staff: Under a motion to adopt the consent calendar, approve DFW's recommendations.

DFW: Approve the projects identified in Exhibit 2 for funding from the Duck Stamp Account in FY 2020-21.

Exhibits

1. [DFW memo](#), received Jun 11, 2020
2. [DFW summary of recommended projects for FY 2020-21 California Duck Stamp Account funding](#), received May 22, 2020

Motion/Direction

Moved by _____ and seconded by _____ that the Commission adopts the staff recommendations for items 19-23 on the consent calendar.

STAFF SUMMARY FOR JUNE 24-25, 2020

24. DEPARTMENTAL INFORMATION ITEMS**Today's Item****Information** ☒**Action** ☐

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

- (A) Director's report
 - I. Update on actions taken after May 14, 2020 pursuant to the emergency sport and recreational fishing regulations
- (B) Wildlife and Fisheries Division, and Ecosystem Conservation Division
 - I. Update on surveillance plan for treponeme-associated hoof disease
- (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 potential interest related to wildlife and inland fisheries are provided as exhibits A1-A2 and B2-B4.

Under Item (B), the Wildlife and Fisheries Division and Ecosystem Conservation Division report will include an update on the *Strategic Surveillance Plan for Treponeme-Associated Hoof Disease (TAHD) in California*. TAHD, also known as elk hoof disease, was confirmed for the first time in California in a Roosevelt elk in Del Norte County in April 2020. The plan outlines DFW's strategy to better understand and mitigate the risks this disease may pose to California's elk populations.

Significant Public Comments

- (A) FGC has received two comments related to fishing closures. One comment expresses concern related to a specific closure made under the authority granted to DFW under the emergency sportfishing regulation in Section 8.02 that FGC adopted on Apr 15, 2020 (Exhibit A4). The other addresses more general concerns that anglers cannot access fishing due to closures of state parks, beaches, launch ramps, etc. in response to the COVID-19 pandemic (Exhibit A3).
- (B) Two emails express concern regarding the effect of TAHD on Roosevelt elk, the availability of information, and question how the disease may impact the elk quotas approved in April 2020 (exhibits B5 and B6).

Recommendation (N/A)**Exhibits**

- A1. [DFW news release: After Coordination with Local Government, CDFW Lifts Fishing Delay in Mono County](#), dated May 22, 2020
- A2. [DFW news release: After Coordination with Local Government, California Department of Fish and Wildlife Lifts Delay in Inyo County](#), dated May 27, 2020

STAFF SUMMARY FOR JUNE 24-25, 2020

- A3. [Email from Alan Earles to DFW](#), received Apr 15, 2020
- A4. [Email from Bob White to DFW](#), received May 7, 2020
- B1. [DFW report: *Strategic Surveillance Plan for Treponeme-Associated Hoof Disease in California*](#), dated Jun 2020
- B2. [DFW news release: *Elk Hoof Disease Detected in Del Norte County Herd*](#), dated May 7, 2020
- B3. [DFW news release: *Deadly Disease Detected in California Wild Rabbits for the First Time*](#), dated May 13, 2020
- B4. [Email from Tom Wheeler](#), received May 11, 2020
- B5. [Email from Phoebe Lenhart](#), received Jun 7, 2020

Motion/Direction (N/A)

STAFF SUMMARY FOR JUNE 24-25, 2020

25. WILDLIFE RESOURCES COMMITTEE (WRC)**Today's Item**Information ☐Action ☒

Discuss updates and recommendations from the May 14, 2020 WRC meeting. Consider referring new topics to address at a future committee meeting.

Summary of Previous/Future Actions

- | | |
|--|--|
| • Most recent WRC meeting | May 14, 2020; WRC, Webinar/teleconference |
| • Today consider recommendations and potential new topics | Jun 24-25, 2020; Webinar/teleconference |
| • Next WRC meeting | Sep 17, 2020; WRC, Sacramento |

Background

WRC works under FGC direction to set and accomplish its work plan (Exhibit 2).

(A) Meeting Summary

WRC met on May 14, 2020 and discussed:

- initial vetting of regulation changes for mammal hunting, waterfowl hunting, Central Valley sport fishing, Klamath River Basin sport fishing, and inland sport fishing; and
- an update on the stakeholder engagement process for the bullfrogs and non-native turtles project.

WRC Recommendations

As the May 14 topics were at the initial vetting or update stage, no WRC recommendations were advanced for FGC consideration.

A written summary of the meeting is provided in Exhibit 1.

(B) Work Plan Development

No new topics have been identified for referral to WRC.

A draft revised timeline for the stakeholder engagement process for bullfrogs and non-native turtles project is included as Exhibit 3 for consideration today by FGC.

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

FGC staff: Approve the revised timeline for the American bullfrog and non-native turtle project.

Exhibits

1. [Meeting summary for May 14, 2020 WRC meeting](#)

STAFF SUMMARY FOR JUNE 24-25, 2020

2. [WRC work plan](#), updated Jun 15, 2020
3. [Draft Revised Stakeholder Engagement on American Bullfrog and Non-native Turtles Timeline](#), dated June 12, 2020

Motion/Direction

Moved by _____ and seconded by _____ that the Commission adopts the revised timeline for the American bullfrog and non-native turtles project.

STAFF SUMMARY FOR JUNE 24-25, 2020

26. SIMPLIFICATION OF STATEWIDE INLAND FISHING**Today's Item****Information** ☐**Action** ☒

Consider authorizing publication of notice of intent to amend inland sport fishing regulations.

Summary of Previous/Future Actions

- | | |
|---------------------------------|--|
| • WRC vetting | Jan 16, 2020; WRC, Long Beach |
| • WRC vetting | Mar 5, 2020; WRC, Sacramento |
| • Today's notice hearing | Jun 24-25, 2020; Webinar/teleconference |
| • Discussion hearing | Aug 19-20, 2020; Fortuna |
| • Adoption hearing | Oct 14-15, 2020; Oakland |

Background

For years, FGC and DFW have heard concerns from anglers about the complexity of freshwater sport fishing regulations. Some people are dissuaded from fishing due to actual or perceived difficulty in complying with the regulations. 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.

Major proposed changes to support the stated goals include:

- separate regulations for inland trout (i.e., non-anadromous waters) from those for steelhead and salmon (i.e., anadromous waters) to help provide clarity to anglers (new Section 7.40);
- replace the district regulations (Section 7.00) with statewide regulations separated for trout; and
- standardize and consolidate the “special fishing” regulations (Section 7.50).

Regulatory elements used to manage trout populations in California addressed by the rulemaking include:

- seasons (specified dates for opening and closing),
- bag and possession limits,
- size limits, and
- gear and bait restrictions.

DFW designed a framework for the simplification based on a “menu” concept, where one of several predefined season and bag limit combinations would be chosen for specific waterways. The menu framework on which the rulemaking is based was supported by FGC at its Feb 2019 meeting, following a WRC recommendation. The current rulemaking proposal follows two years of outreach, stakeholder engagement, and public input, including various WRC and TC meetings (see Exhibit 4 for details).

Each proposed change is assessed by DFW with detailed explanations in Exhibit 1, the initial statement of reasons (ISOR). Proposed regulatory text changes are presented in Exhibit 2.

STAFF SUMMARY FOR JUNE 24-25, 2020

Also provided as background material is Appendix A, a summary of the amendments proposed for Section 7.50(b) in the form of a decision matrix that outlines the proposed changes for specific waters, along with fisheries management goals and objectives, biological justifications, and socioeconomic considerations (Exhibit 3).

During FGC's Apr 15-16, 2020 meeting, a public request was made on behalf of Montna Farms to remove DFW's proposal related to the Truckee River. After discussion, FGC requested that DFW provide in the ISOR both the Truckee River recommendation from Montna Farms, along with the DFW proposal, to be considered at this notice hearing.

Significant Public Comments

1. Montna Farms opposes the DFW amendments for the Truckee River and requests specific alternatives, citing the need for supporting FGC's Wild Trout Waters designation and reduced mortality for a stretch of river that has seen an improved fishery with the development of several habitat structures (Exhibit 6).
2. Mark Smith, on behalf of the Northern California Guides and Sportsmen's Association, states that the association has engaged with the DFW outreach process over the past two years to promote angler opportunity and access, and supports DFW's proposed regulations for the Truckee River, citing increased angler opportunity (Exhibit 7).
3. State Senator Glazer and approximately 30 other individuals oppose the DFW-proposed amendments for the Truckee River and support the Montna Farms proposal, citing less complex regulations and greater conservation of wild trout (Exhibit 8).
4. Three fishing organizations support the Montna Farms proposal, including the Northern California Council of Fly Fishers International, Tahoe Truckee Fly Fishers, and the Truckee River Chapter of Trout Unlimited, which cite the need for conserving trout, supporting FGC's Wild Trout Waters designation, and nearby fish stocking (see Exhibit 9 for sample).
5. A number of local guides oppose the proposed changes for the Truckee River, citing an increased trout population, increased average size, and overall improved health of the fishery since more restrictive regulations were adopted in 2007 (Exhibit 10).

Recommendation

FGC staff: Authorize publication of a notice as recommended by DFW.

Committee: Authorize publication of a notice as recommended by DFW.

DFW: Authorize publication of a notice as proposed in the ISOR.

Exhibits

1. [Draft ISOR](#)
2. [Draft 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. [Draft economic and fiscal impact statement \(Std 399\) and addendum](#)

STAFF SUMMARY FOR JUNE 24-25, 2020

6. [Letter from George Osborn with attached letter from Al Montna of Montna Farms,](#) received Apr 14, 2020
7. [Letter from Mark Smith, on behalf of the Northern California Guides and Sportsmen's Association,](#) received May 15, 2020
8. [Letter from Senator Steven Glazer,](#) received Jun 11, 2020
9. [Letter from Dr. Mark Rockwell, Northern California Council of Fly Fishers International,](#) received Jun 4, 2020
10. [Letter from Dave Stanley, Truckee River Outfitters, et al.,](#) received Jun 4, 2020
11. [DFW presentation](#)

Motion/Direction

Moved by _____ and seconded by _____ that the Commission authorizes publication of a notice of its intent to amend Section 3.00 et al., related to simplification of statewide inland fishing regulations.

STAFF SUMMARY FOR JUNE 24-25, 2020

27. 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.

FGC staff recommends that this item be continued to the Aug 19-20, 2020 meeting based on conversations with the petitioner, other stakeholders, and DFW.

Summary of Previous/Future Actions

- | | |
|--|--|
| • Received petition | Oct 9-10, 2019; Valley Center |
| • FGC transmitted petition to DFW | Nov 1, 2019 |
| • Published notice of receipt of petition | Nov 22, 2019 |
| • Public receipt of petition and approved DFW's request for 30-day extension | Dec 11-12, 2019; Sacramento |
| • Received DFW's evaluation of petition | Apr 15-16, 2020; Teleconference |
| • Today receive request to continue to the Aug 2020 meeting | Jun 24-25, 2020; Webinar/teleconference |
| • Take action to determine if listing is warranted | Aug 19-20, 2020; Fortuna |

Background

On Oct 21, 2019, FGC received a petition from the Center for Biological Diversity to list the western Joshua tree as endangered under CESA. 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 to FGC a written evaluation with a recommendation, which was received at FGC's Apr 15-16, 2020 meeting.

Today's agenda item follows the public release and review period of the evaluation report prior to FGC action, as required in Fish and Game Code Section 2074. Fish and Game Code Section 2074.2 allows FGC to continue this agenda item to a future meeting, no later than 90 days after today's meeting.

Significant Public Comments

FGC has received over 250 emails and letters, both in support and in opposition as well as several letters in support of delaying any decision. If FGC continues this item, public comments will be summarized in the meeting materials for the Aug meeting.

Recommendation

FGC staff: Continue this item to the Aug 19-20, 2020 FGC meeting.

STAFF SUMMARY FOR JUNE 24-25, 2020

Exhibits (N/A)

Motion/Direction

Moved by _____ and seconded by _____ that the Commission, pursuant to Fish and Game Code Section 2074.2(d), continues both the public hearing and the meeting on the petition to list western Joshua tree to the August 19-20, 2020 Commission meeting.

STAFF SUMMARY FOR JUNE 24-25, 2020

28. RIPARIAN BRUSH RABBIT**Today's Item****Information** ☒**Action** ☐

Receive overview of DFW's five-year status review of riparian brush rabbit (*Sylvilagus bachmani riparius*), which is listed as an endangered species under the California Endangered Species Act (CESA).

Summary of Previous/Future Actions

- | | |
|--|--|
| • Determined listing riparian brush rabbit as endangered was warranted | Jan 4, 1994; Sacramento |
| • Received DFW's five-year status review | Feb 21, 2020; Sacramento |
| • Today's DFW presentation and potential FGC action | Jun 24-25, 2020; Webinar/teleconference |

Background

Riparian brush rabbit has been listed as endangered under CESA since 1994 and is included in FGC's list of endangered animals (Section 670.5). The species has been listed as endangered under the federal Endangered Species Act since 2000.

Pursuant to California Fish and Game Code Section 2077, DFW has prepared a status review for riparian brush rabbit (Exhibit 2) to evaluate whether the conditions that led to the original listing are still present, or if conditions have changed to warrant a different listing status. FGC received the status review at its Feb 21, 2020 meeting.

DFW finds there is sufficient scientific information to indicate that many of the conditions that led to the listing of riparian brush rabbit as endangered in 1994 have not changed and that it remains in danger of extinction in all or a significant portion of its range due to one or more causes. Therefore, DFW recommends that no change be made to riparian brush rabbit's endangered status (exhibits 1 and 2).

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

FGC staff: Retain endangered species status for riparian brush rabbit as recommended by DFW.

DFW: Retain endangered species status for riparian brush rabbit.

Exhibits

1. [DFW memo](#), received Feb 6, 2020
2. [DFW five-year status review](#), dated Feb 21, 2020, received Feb 6, 2020
3. [DFW presentation](#)

Motion/Direction (N/A)

STAFF SUMMARY FOR JUNE 24-25, 2020

29. WILDLIFE PROSECUTOR OF THE YEAR AWARD**Today's Item**Information ☐Action ☒

Announce recipient of FGC's 2019 Wildlife Prosecutor of the Year award, consistent with FGC's policy.

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

In 2016, FGC adopted a formal policy "...to honor a courtroom champion of California's fish, wildlife and natural resources, a person who tirelessly prosecutes fish, wildlife, natural resource and environmental crimes in California courts. The Commission will recognize this prosecutor through an annual Wildlife Prosecutor of the Year Award." The policy (Exhibit 1) was amended in 2019 to expand the eligibility criteria.

DFW's Law Enforcement Division (LED) makes up to four nominations, and FGC presents a California attorney with the award, which honors those attorneys who, in the previous three years, went above and beyond to prosecute wildlife crimes. Specifically, the award recognizes a district attorney or deputy district attorney who exhibits one or more of the following:

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

Selection is based upon recommendations from LED staff that regularly works with the various district attorneys' offices.

This year, FGC honors Deputy District Attorney Adam Kook from the City of Fresno. Exhibit 2 provides details about the ways in which Mr. Kook went above and beyond to prosecute wildlife crimes in the previous three years.

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

1. [Wildlife Prosecutor of the Year policy](#), amended Aug 7, 2019
2. [2019 Wildlife Prosecutor of the Year nomination for Deputy District Attorney Adam Kook](#), dated Mar 9, 2020

Motion/Direction (N/A)

STAFF SUMMARY FOR JUNE 24-25, 2020

30. 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 Apr 2020 meeting
- (B) Pending regulation petitions referred to staff or DFW for review – *None scheduled*

Summary of Previous/Future Actions

- FGC received petitions Apr 15-16, 2020; Teleconference
- **Today's actions on petitions Jun 24-25, 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 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.*** Three petitions received at the Apr 2020 meeting are scheduled for action:

- I. Petition #2020-003: *Eliminate authorized recreational uses in Area C and currently allowed parking in existing designated areas at Ballona Wetlands Ecological Reserve* (Exhibit A2)
- II. Petition #2020-004: *Steelhead fishery opener date change on Trinity River* (Exhibit A3)
- III. Petition #2020-005 AM 1: *Striped bass slot limits* (Exhibit A4)

Staff recommendations and rationales are provided in Exhibit A1.

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

No pending regulation petitions are scheduled for action at this meeting.

Significant Public Comments

- 1. Regarding Petition #2020-003, the Ballona Wetlands Trust requests that FGC make a determination for each authorized public use that it is appropriate and compatible with the property (Exhibit A5).
- 2. A commenter writes in support of Petition #2020-003 (Exhibit A5).

STAFF SUMMARY FOR JUNE 24-25, 2020

Recommendation

FGC staff: Adopt the staff recommendations as set forth in Exhibit A1 to: deny petition #2020-003 and #2020-004, and refer petition 2020-005 AM 1 to DFW for review and recommendation.

Exhibits

- A1. [Table of petitions for regulation change](#), updated Jun 15, 2020
- A2. [Petition #2020-003](#), received Feb 6, 2020
- A3. [Petition #2020-004](#), received Mar 10, 2020
- A4. [Petition #2020-005 AM 1](#), received Apr 9, 2020
- A5. [Email from Walter Lamb, Ballona Wetlands Trust](#), received Jun 10, 2020
- A6. [Email from Kathy Knight](#), received June 11, 2020

Motion/Direction

Moved by _____ and seconded by _____ that the Commission adopts the staff recommendations as reflected in Exhibit A1.

OR

Moved by _____ and seconded by _____ that the Commission adopts the staff recommendations as reflected in Exhibit A1, except for petition(s) # _____ for which the action is _____.

STAFF SUMMARY FOR JUNE 24-25, 2020

31. 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 Apr 15-16, 2020; Teleconference
- **Today's potential action on requests Jun 24-25, 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 Apr 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, two non-regulatory requests received at the Apr 2020 meeting are scheduled for action. Exhibit A1 summarizes and contains staff recommendations for each request.

- (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

- A1. [List of non-regulatory requests and staff recommendations for requests received through Apr 16](#), dated Jun 12, 2020

Motion/Direction

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

OR

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

STAFF SUMMARY FOR JUNE 24-25, 2020

32. WILDLIFE AND INLAND FISHERIES ITEMS 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.

FGC staff recommends that this item be continued to a future FGC meeting.

Summary of Previous/Future Actions

- | | |
|-------------------------------|--|
| • WRC recommendation approved | 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, WRC recommended that FGC host open discussions with DFW and the public on steps that can be taken to address the conflicts. FGC approved the recommendation in Feb 2020, scheduling the discussion for this meeting based on its originally-planned location in southern California.

Due to unanticipated demands in recent months on FGC staff and DFW, and a demanding agenda for this meeting, FGC staff recommends the discussion be postponed to a future meeting.

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

FGC staff: Postpone the discussion on resident coyotes in urban areas to a future meeting.

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

Moved by _____ and seconded by _____ that the Commission postpones the discussion on coyotes in urban areas to a future meeting.

STAFF SUMMARY FOR JUNE 24-25, 2020

33A. ADMINISTRATIVE ITEMS – NEXT MEETINGS**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 Aug 19-20, 2020 in Fortuna; however, due to 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 calendar year, as discussed under Agenda Item 17, meeting dates and locations.

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

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

FGC staff: Approve potential agenda items for the Aug 19-20, 2020 FGC meeting.

Exhibits

1. [Potential agenda items for the Aug 19-20, 2020 meeting](#)

Motion/Direction

Moved by _____ and seconded by _____ that the Commission approves the draft agenda items for the August 19-20, 2020 Commission meeting, as amended today.

STAFF SUMMARY FOR JUNE 24-25, 2020

33B. 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 | Apr 15-16, 2020; Teleconference |
| • Today consider approving the rulemaking timetable | Jun 24-25, 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.

In light of FGC and DFW regulatory staff capacity challenges associated with COVID-19, FGC staff consulted with DFW leadership to prioritize the rulemaking schedule. As a result, staff proposes that notice for two rulemakings that will be a significant effort be delayed to a later date to be determined (TBD), when staff capacity can be restored:

- commercial kelp and algae harvest management currently scheduled for notice in Aug 2020 (move to TBD), and
- Experimental Fishing Permit Program Phase 2 (keep it on TBD for now, rather than moving it onto the rulemaking schedule as discussed at the Mar 17, 2020 MRC meeting).

DFW concurs with both requests, noting that program staff may be able to continue progress on stakeholder outreach and developing materials until there is sufficient regulatory staff capacity to initiate the rulemaking process.

DFW also requests three changes to the timetable, based on rationale provided in Exhibit 1.

- Groundfish: Add a rulemaking to align state recreational and commercial fishing regulations for groundfish and associated species with federal regulations to be selected by Pacific Fishery Management Council in Jun 2020, with notice by memo in Jun 2020, discussion in Aug, and adoption in Oct.
- Red abalone: Add a rulemaking to extend or remove the recreational fishery closure sunset date, currently set to expire on Apr 1, 2021, with notice in Aug, discussion in Oct and adoption in Dec.
- Purple sea urchin (PSU): Schedule a 90-day extension of the PSU emergency regulation authorizing recreational divers to cull PSU underwater at Caspar Cove in Mendocino County.

Exhibit 2 is the latest timetable with proposed changes in bolded blue font.

STAFF SUMMARY FOR JUNE 24-25, 2020

Significant Public Comments (N/A)

Recommendation

FGC staff: Adopt proposed changes to the timetable for anticipated regulatory actions (Exhibit 2), including any rulemaking changes identified during the meeting.

Exhibits

1. [DFW memo](#), received Jun 16, 2020
2. [Perpetual Timetable for Anticipated Regulatory Actions](#), dated Jun 11, 2020

Motion/Direction

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

STAFF SUMMARY FOR JUNE 24-25, 2020

33C. 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)

STAFF SUMMARY FOR JUNE 24-25, 2020

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. *Anderson salmon vessel permit appeal*: Consider the appeal filed by Michael Anderson in Agency Case No. 19ALJ14-FGC regarding his request to renew his salmon vessel permit. On Jun 6, 2019, Mr. Anderson filed an appeal with FGC. On Feb 21, 2020, FGC granted Mr. Anderson's appeal and subsequently entered the attached decision (Exhibit D1). The order requires the fees be paid within 60 days of the decision. Mr. Anderson requested additional time to pay the pending fees due to economic hardship based on the COVID-19 pandemic (Exhibit D2). A proposed revised decision is included as Exhibit D3.
- II. *Buschmann transferable market squid vessel permit appeal*: Consider the appeal filed by Christian Buschmann in Agency Case No. 20ALJ05-FGC, regarding his request to renew his transferable market squid vessel permit. On May 5, 2020, DFW provided Mr. Buschmann notice that DFW could not reinstate Mr. Buschmann's transferable market squid vessel permit (Exhibit D4). On Jun 3, 2020, Mr. Buschmann filed an appeal with FGC (Exhibit D5). On

STAFF SUMMARY FOR JUNE 24-25, 2020

Jun 10, 2020, DFW submitted a letter to FGC stating that DFW does not oppose granting the appeal (Exhibit D6).

Significant Public Comments (N/A)

Recommendation

FGC staff: Approve the revised order regarding the appeal of Michael Anderson given his stated economic hardship based on the unprecedented circumstances associated with the COVID-19 pandemic. Grant the appeal filed by Christian Buschmann.

Exhibits

- D1. [Anderson Decision](#), dated Feb 21, 2020
- D2. [Email from Michael Anderson to FGC](#), dated Apr 21, 2020
- D3. [Revised \[draft\] decision for Michael Anderson](#)
- D4. [Letter from DFW to Christian Buschmann](#), dated May 5, 2020
- D5. [Letter from Chris Buschmann to FGC](#), dated Jun 3, 2020
- D6. [Letter from DFW to FGC](#), dated Jun 10, 2020

Motion/Direction

- (D) Moved by _____ and seconded by _____ that the Commission approves the revised order regarding the appeal of Michael Anderson.

AND

Moved by _____ and seconded by _____ that the Commission grants the appeal filed by Christian Buschmann.

CALIFORNIA FISH AND GAME COMMISSION
RECEIPT LIST FOR PETITIONS FOR REGULATION CHANGE: RECEIVED BY 5:00 PM ON JUNE 17, 2020
Revised 6/15/2020

Tracking No.	Date Received	Name of Petitioner	Subject of Request	Short Description	FGC Receipt Scheduled	FGC Action Scheduled
2020-008	6/10/2020	Thomas Wheeler	Elk hunting suspension	Suspend indefinitely all elk hunting (excluding by DFW depredation permit) in the Northwestern Elk Hunt Area or reduce tags issued under 14 Cal. Code Regs §§ 364, 364.1 to zero.	6/25/20	



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 report 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 because 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

☒ 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): 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

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)

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

* Correspondent: jrodzen@dfg.ca.gov

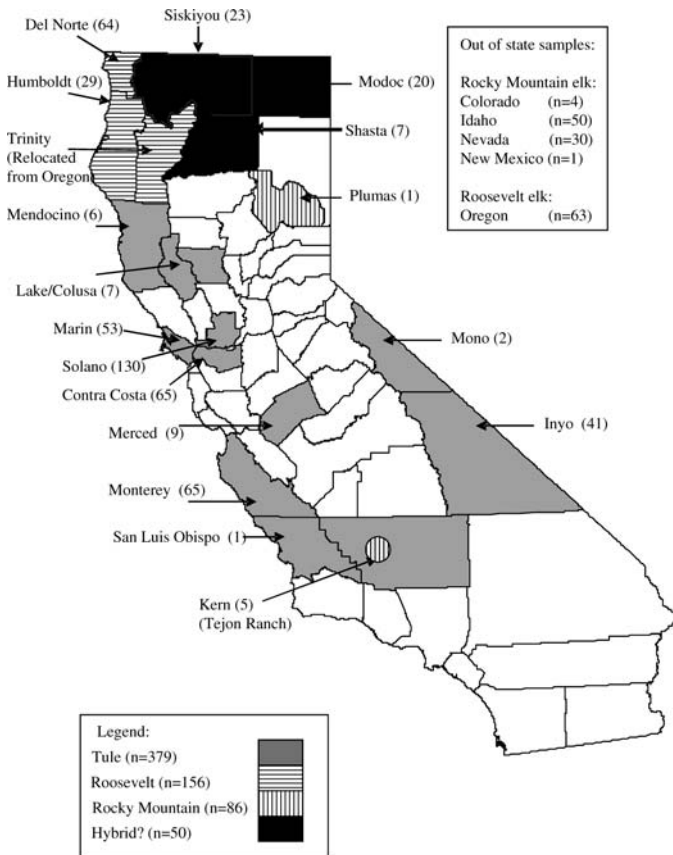


FIG. 1.—Map depicting number of individuals sampled at each herd location given by county name. Gray shaded areas represent counties that contain herds of tule elk, horizontal lines indicate counties with herds of Roosevelt elk, vertical lines indicate counties with herds of supposed Rocky Mountain elk, 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 tooththrows 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

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 Fluorimeter (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 thermocycler (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

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

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.).

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

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/software/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 (D_s —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.

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 STRUCTURE 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	<i>df.</i>	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	

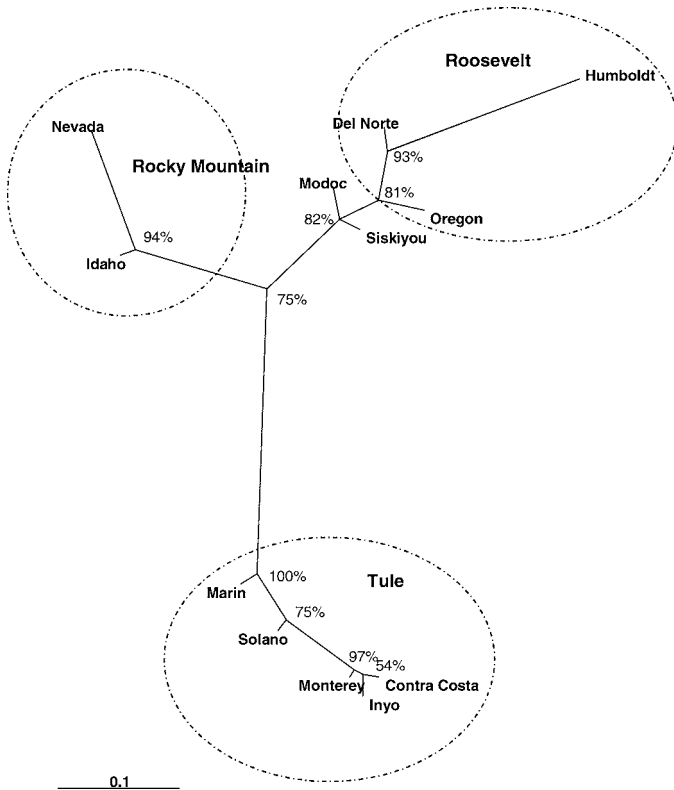


FIG. 2.—Unrooted tree of Nei's standard genetic distance after bootstrapping the data 1,000 times. The bootstrap level of support (out of 1,000) is indicated at each node. Included are all populations of elk with at least 20 samples.

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

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.

Program	County			
	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

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-

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 Peninsula 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.

ACKNOWLEDGMENTS

We thank California Department of Fish and Game wardens and biologists. Additionally, we appreciate the assistance of K. Rudolph (Idaho Department 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, *Oncorhynchus* 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.

Mount St. Helens Elk Population Assessment: 2009-2013



March 2014

S. M. McCorquodale, P. J. Miller, S. M. Bergh, E. W. Holman

Washington Department of Fish and Wildlife

Mount St. Helens Elk Population Assessment: 2009-2013

Prepared By:

Scott McCorquodale, Pat Miller, Stefanie Bergh, Eric Holman

March 2014

Washington Department of Fish and Wildlife
600 Capitol Way North
Olympia, WA 98501-1091

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 (\pm 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 (\pm 95% CI) in GMU 520, Mount St. Helens, 2009-2013.....	44
Figure 23.	
Sightability model estimates for total elk abundance (\pm 95% CI) in GMU 522, Mount St. Helens, 2009-2013.....	44
Figure 24.	
Sightability model estimates for total elk abundance (\pm 95% CI) in GMU 524, Mount St. Helens, 2009-2013.....	45

Figure 25.

Sightability model estimates for total elk abundance (\pm 95% CI) in GMU 550, Mount St. Helens, 2009-2013..... 45

Figure 26.

Sightability model estimates for total elk abundance (\pm 95% CI) in GMU 556, Mount St. Helens, 2009-2013..... 46

Figure 27.

Sightability model estimates for cow elk abundance (\pm 95% CI) in GMU 520, Mount St. Helens, 2009-2013..... 47

Figure 28.

Sightability model estimates for cow elk abundance (\pm 95% CI) in GMU 522, Mount St. Helens, 2009-2013..... 47

Figure 29.

Sightability model estimates for cow elk abundance (\pm 95% CI) in GMU 524, Mount St. Helens, 2009-2013..... 48

Figure 30.

Sightability model estimates for cow elk abundance (\pm 95% CI) in GMU 550, Mount St. Helens, 2009-2013..... 48

Figure 31.

Sightability model estimates for cow elk abundance (\pm 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 (\pm 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 (\pm 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 (\pm 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 (\pm 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 (\pm 95% CI) in GMU 556, Mount St. Helens, WA 59

Figure 37.

LNME Mark-resight estimates, 2009-2012, for total branch-antlered bull elk (\pm 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 ($\approx 4,710 \text{ mi}^2$) 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-

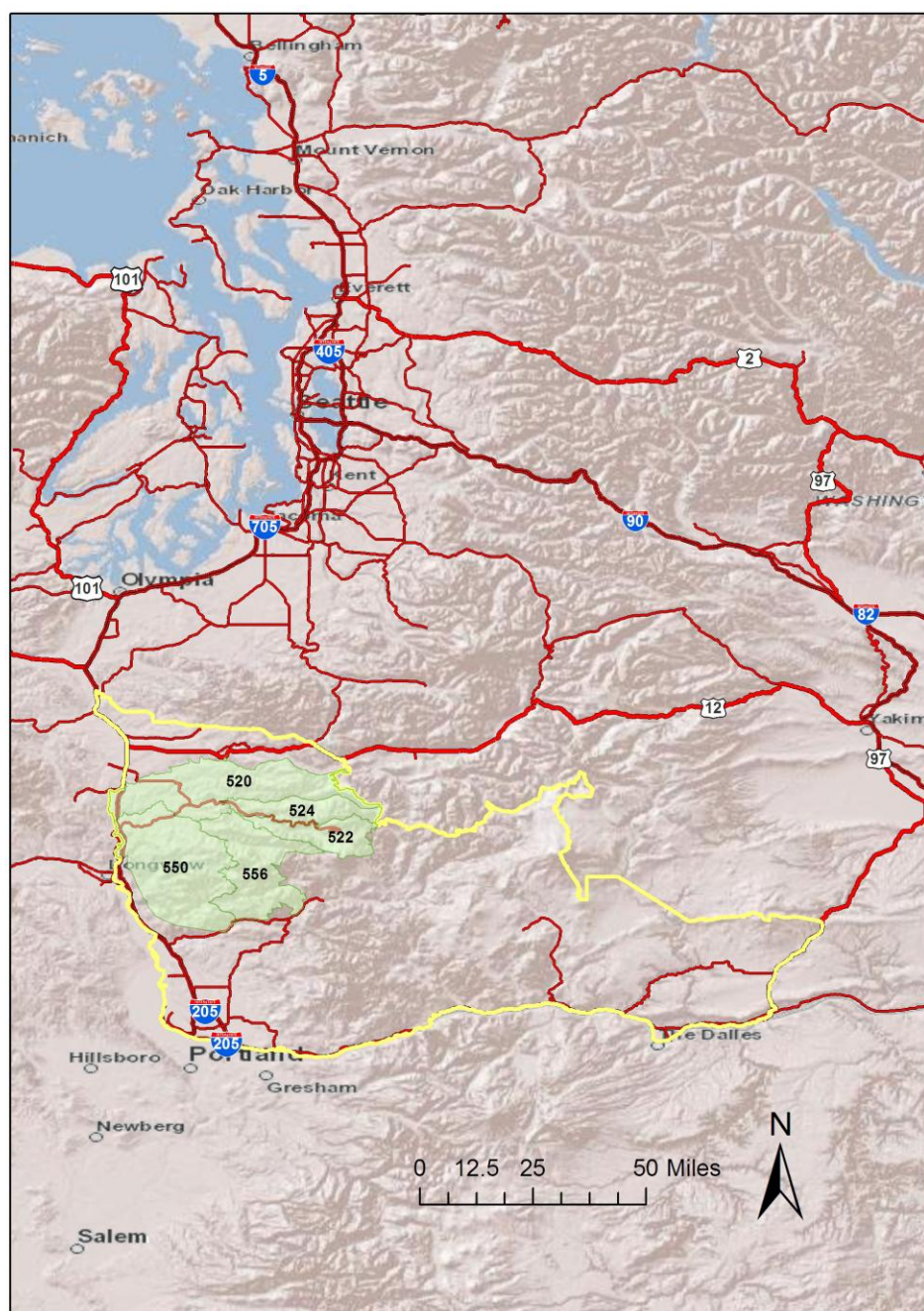


Figure 1. Map of the Mount St. Helens elk herd area (yellow outline) and the core study area (green shaded, with GMU numbers).

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 km² 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 km² 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.

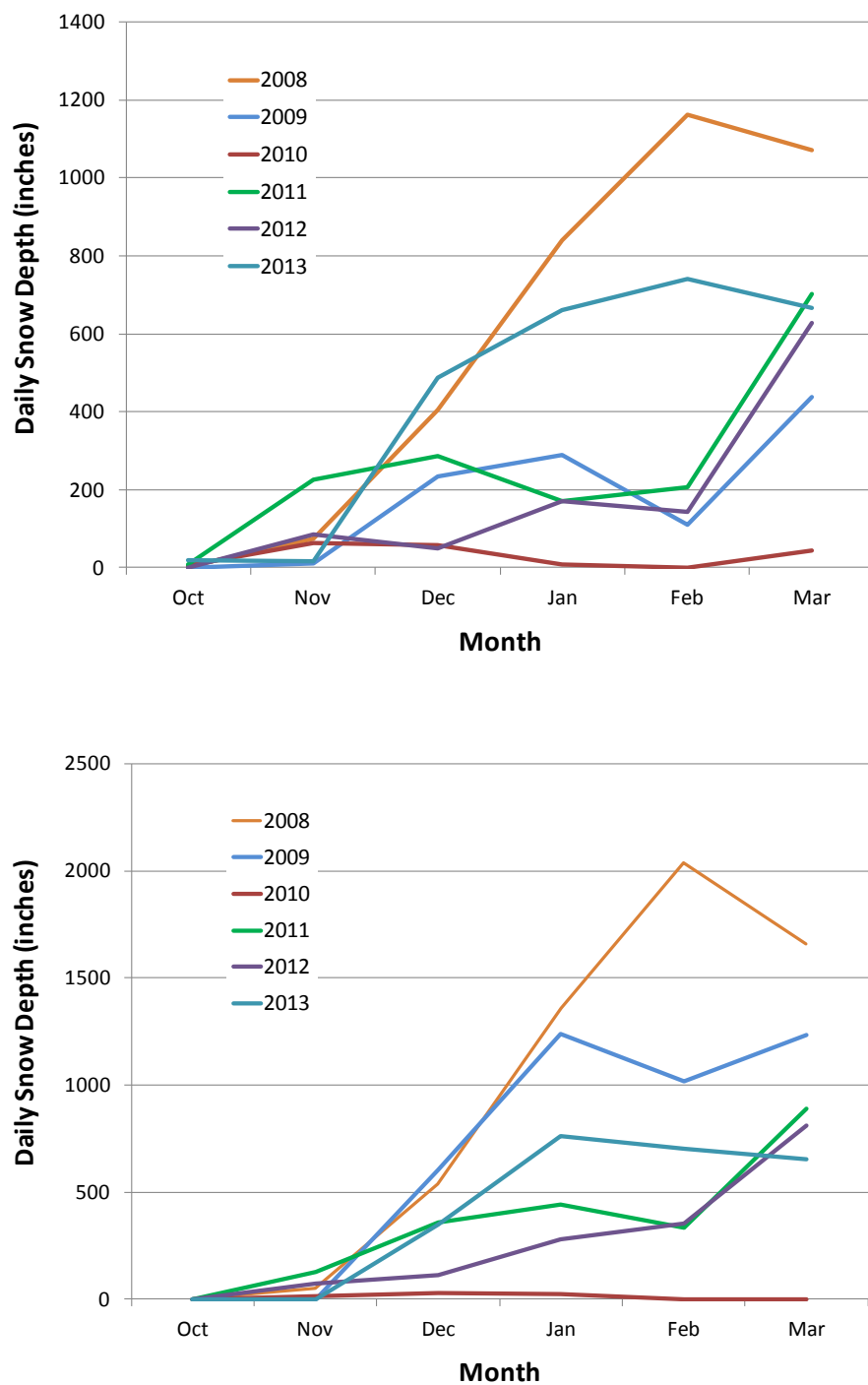


Figure 3. Cumulative daily snow depth (by month) for water years 2008-2013, from the Spirit Lake (upper panel; elevation = 1,067 m) and Pepper Creek (lower panel; elevation = 648 m) SNOTEL sites. A water year spans October 1 – September 30, and is labeled by the calendar year in which it ends.

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).

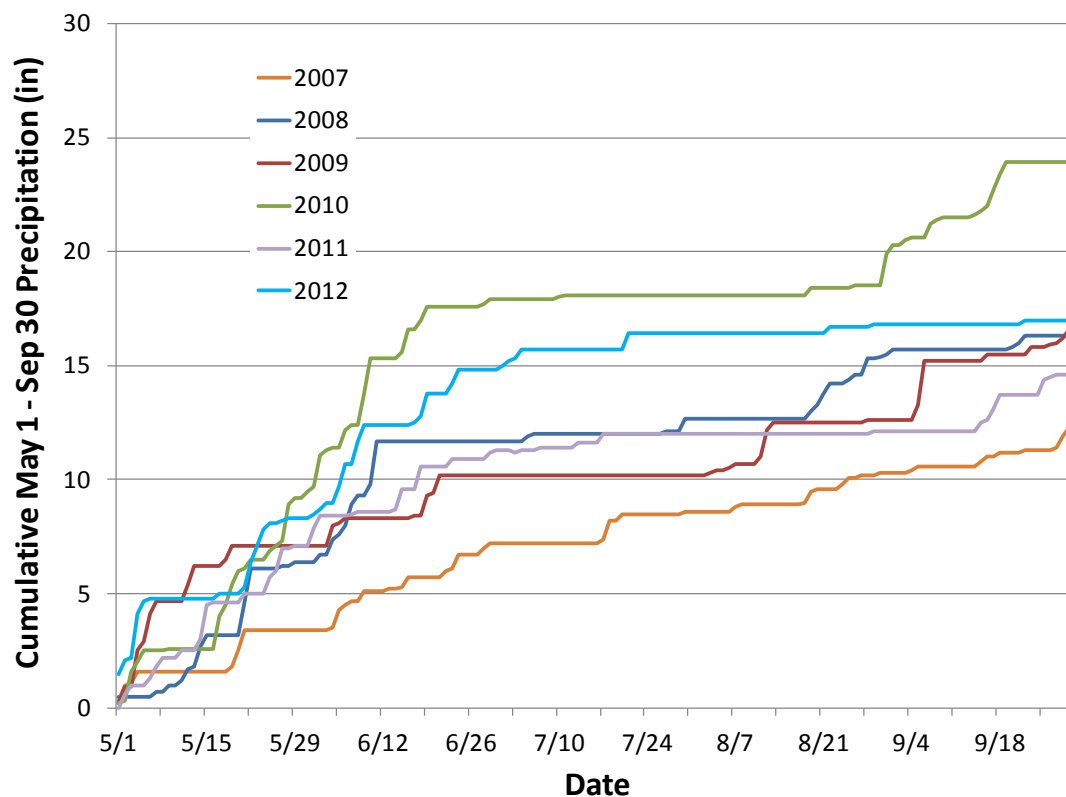


Figure 4. Cumulative spring-summer precipitation measured at the Spirit Lake SNOTEL site (elevation = 1,067 m), 2007-2012.

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 km² 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).

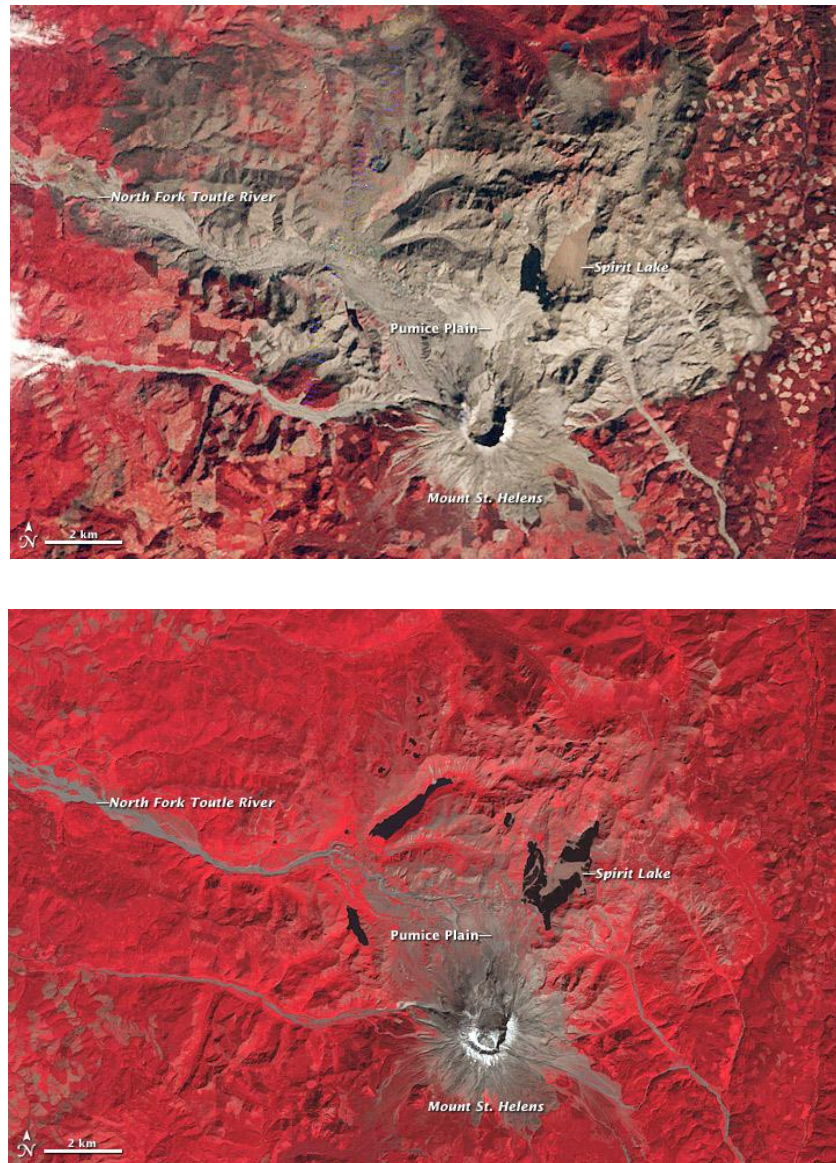


Figure 5. Infrared satellite images of the Mount St. Helens vicinity early post-eruption (top image, 1980), and nearly 30 years post-eruption (bottom image, 2009). In these images, vegetated areas (e.g., forest, grassland, vegetated clearcuts) are red/pink, and bare ground, ash, mudflow, etc. are gray/brown (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 km² 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.

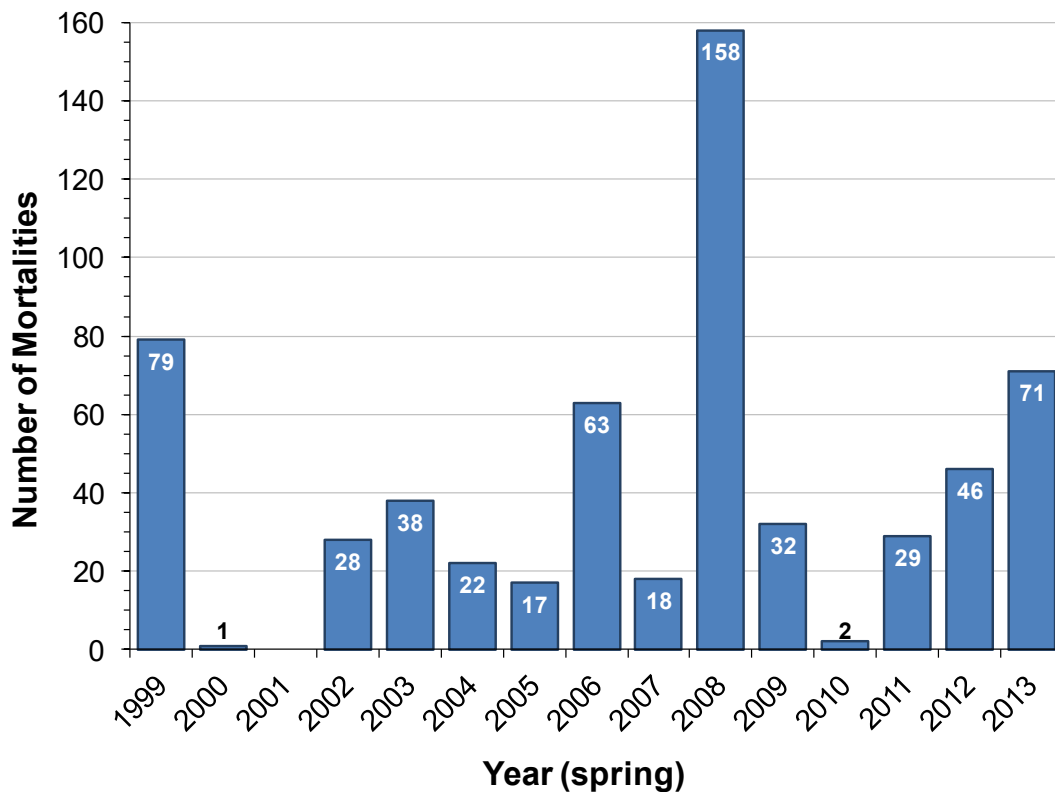


Figure 7. Number of current year overwinter elk mortalities tallied during the annual mortality survey on the Mount St. Helens Wildlife Area, April 1999-2013.

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.

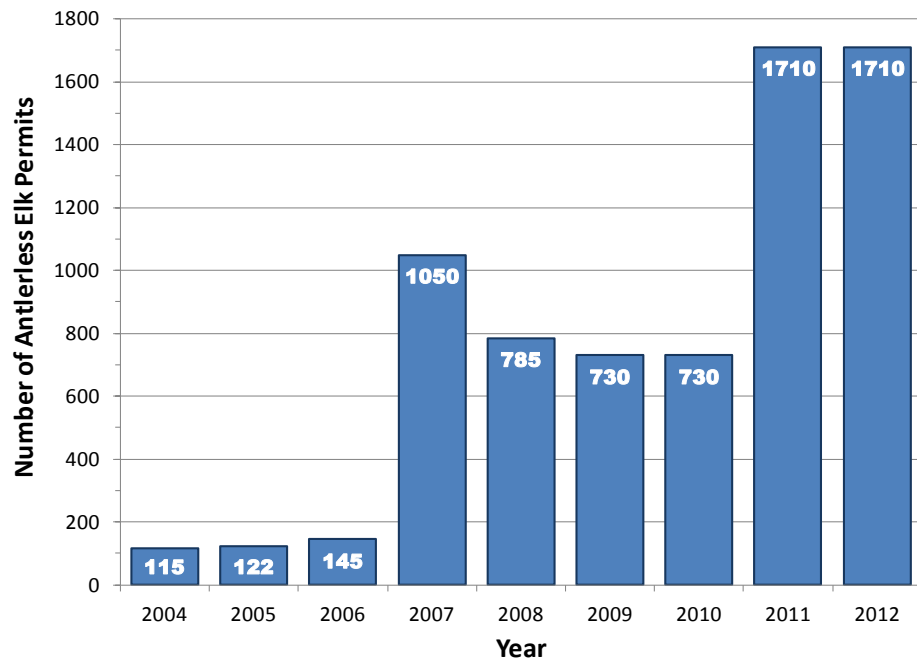


Figure 8. Numbers of antlerless elk permits issued, 2004-2012, for GMUs 520, 522, 524, 550, and 556, collectively.

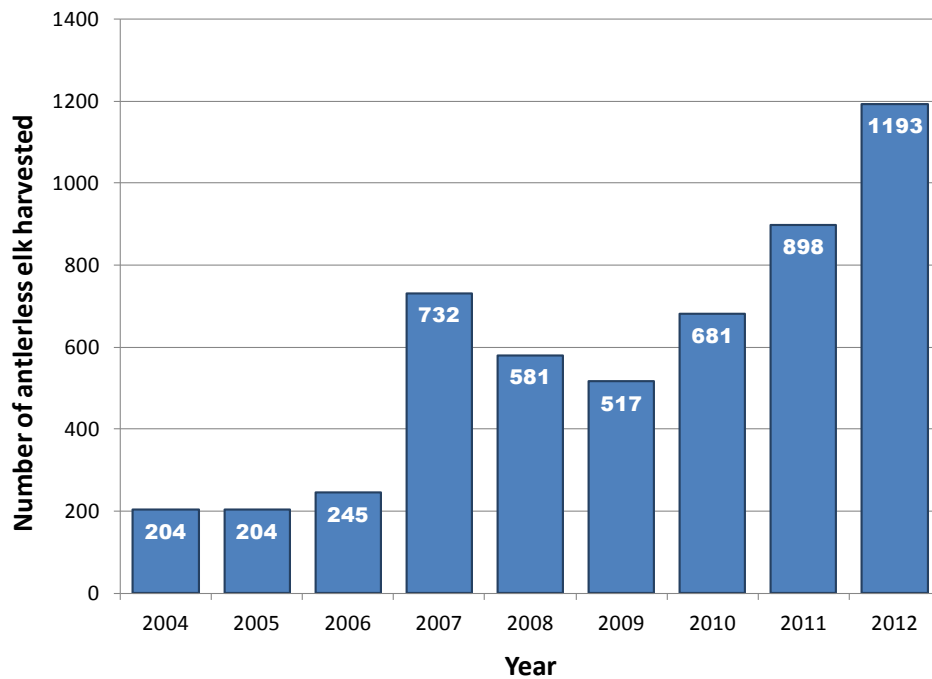


Figure 9. Numbers of antlerless elk killed, 2004-2012, in GMUs 520, 522, 524, 550, and 556, collectively.



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) km² (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

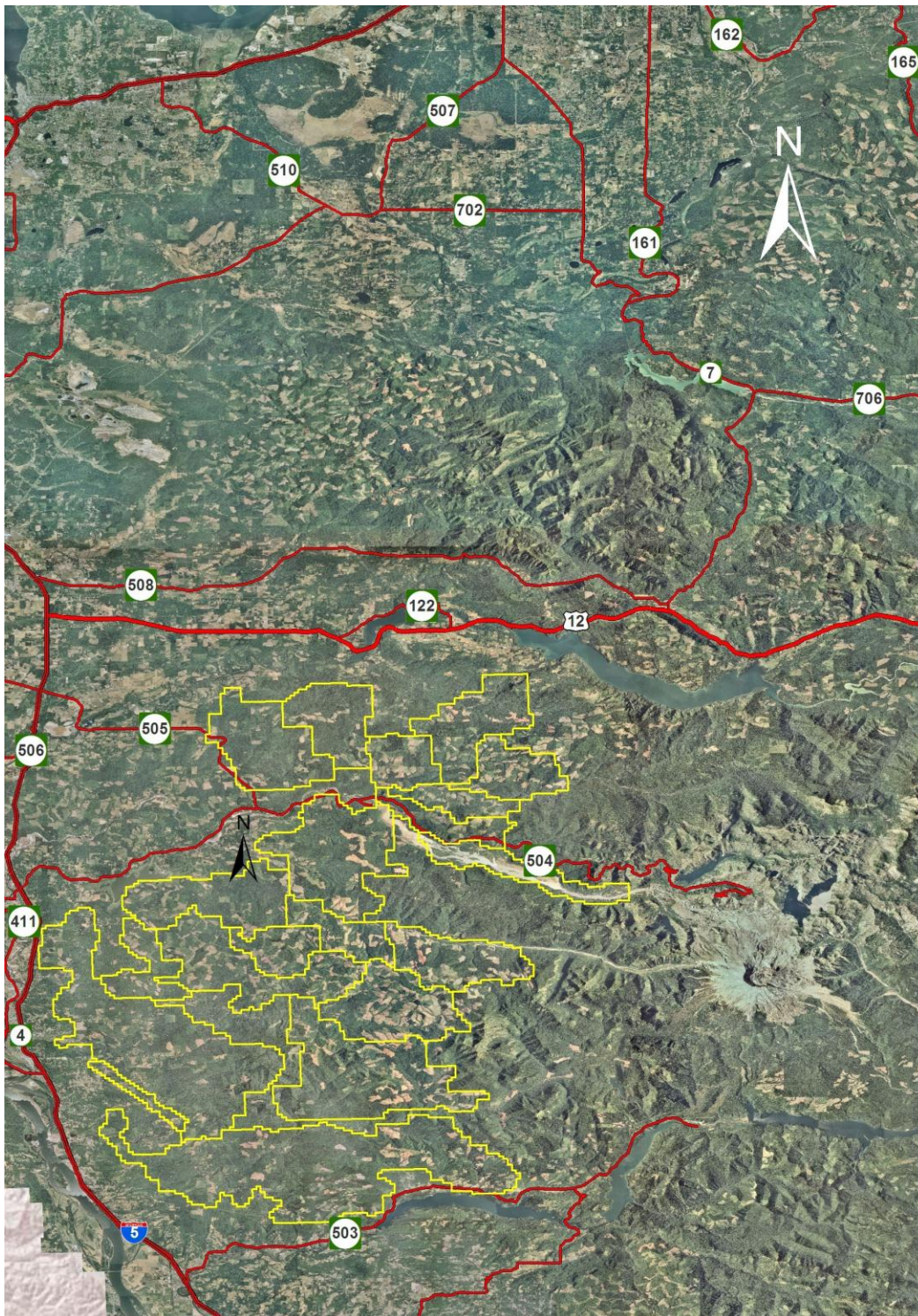


Figure 11. Initial delineation of counting units used for spring helicopter surveys and sightability modeling, 2009-2013, Mount St. Helens elk herd study area.

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 δ_{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 (\cdot), 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 IBBF, 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.

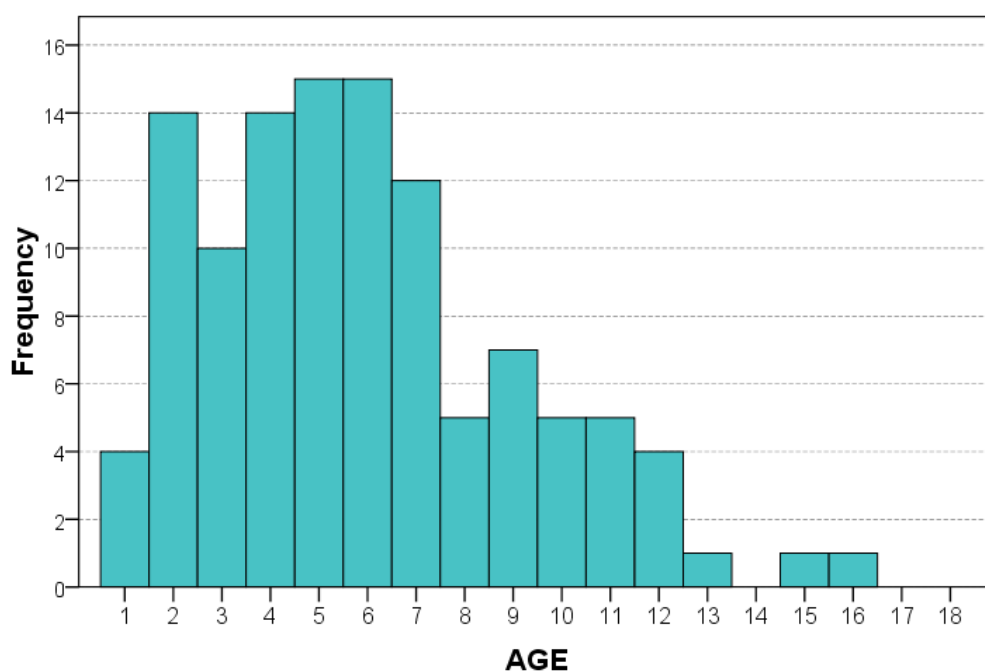


Figure 13. Distribution of ages for cow elk captured and radiomarked, Feb 2009-2012, Mount St. Helens, Washington.

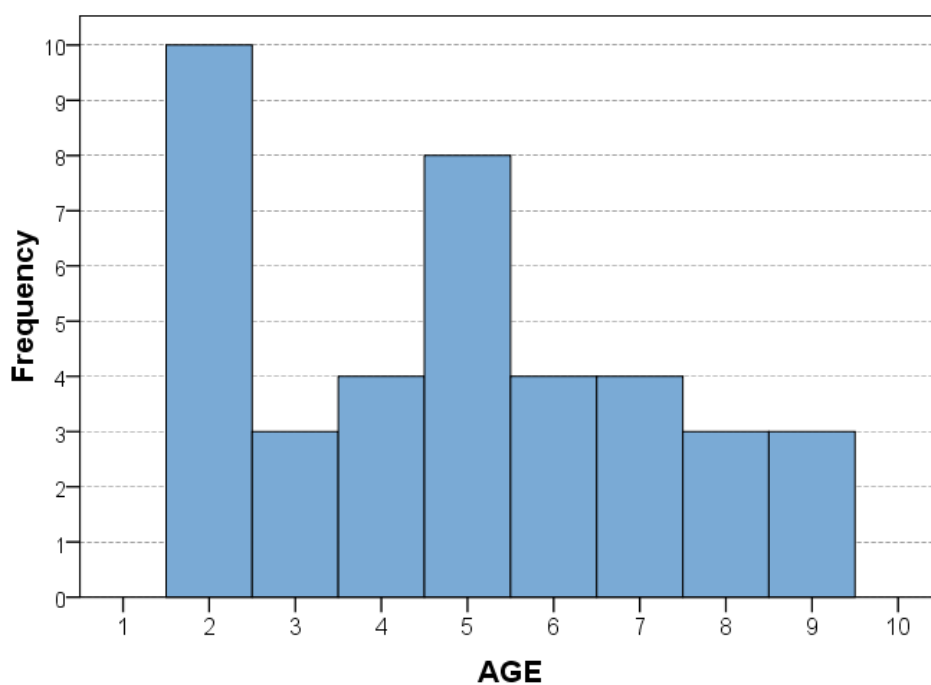


Figure 14. Distribution of ages for bull elk captured and radiomarked, Feb 2009-2012, Mount St. Helens, Washington.

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.

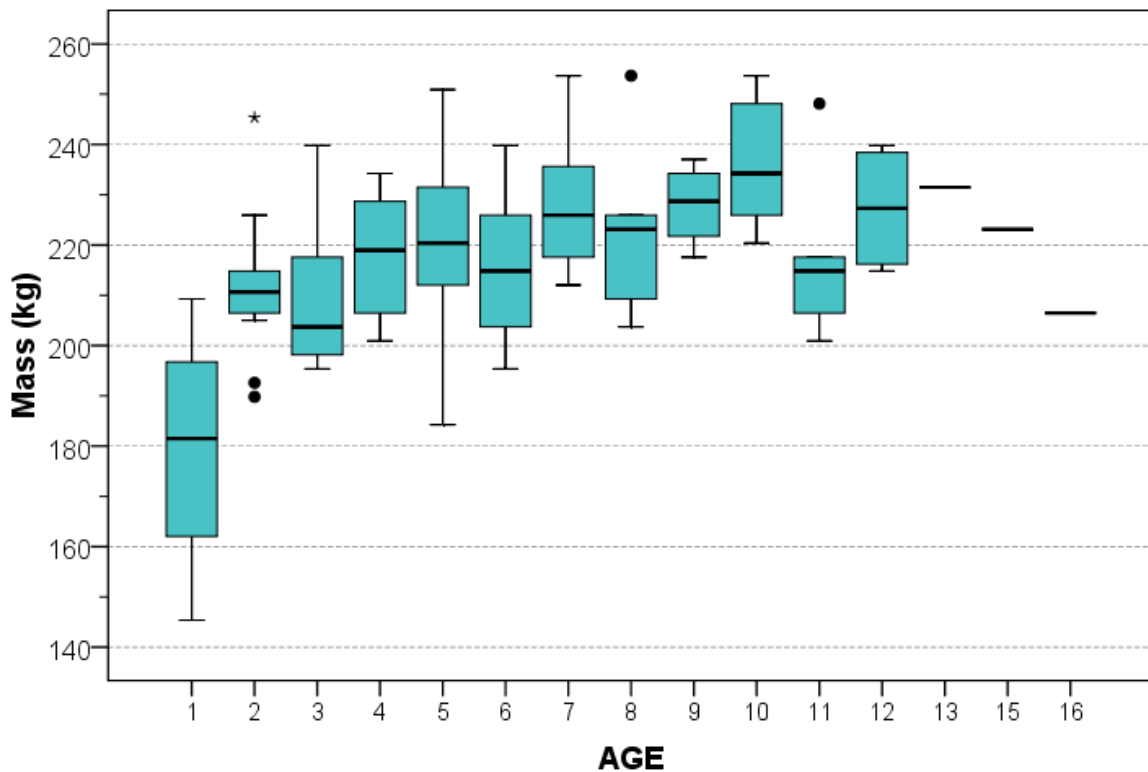


Figure 15. Boxplots of age-specific mass for cow elk captured and radiomarked, Feb 2009-2012, Mount St. Helens, Washington. Colored boxes represent the middle 50% of estimates within each age-class, and heavy horizontal lines represent median values. Only a single estimated mass was available for cows 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.

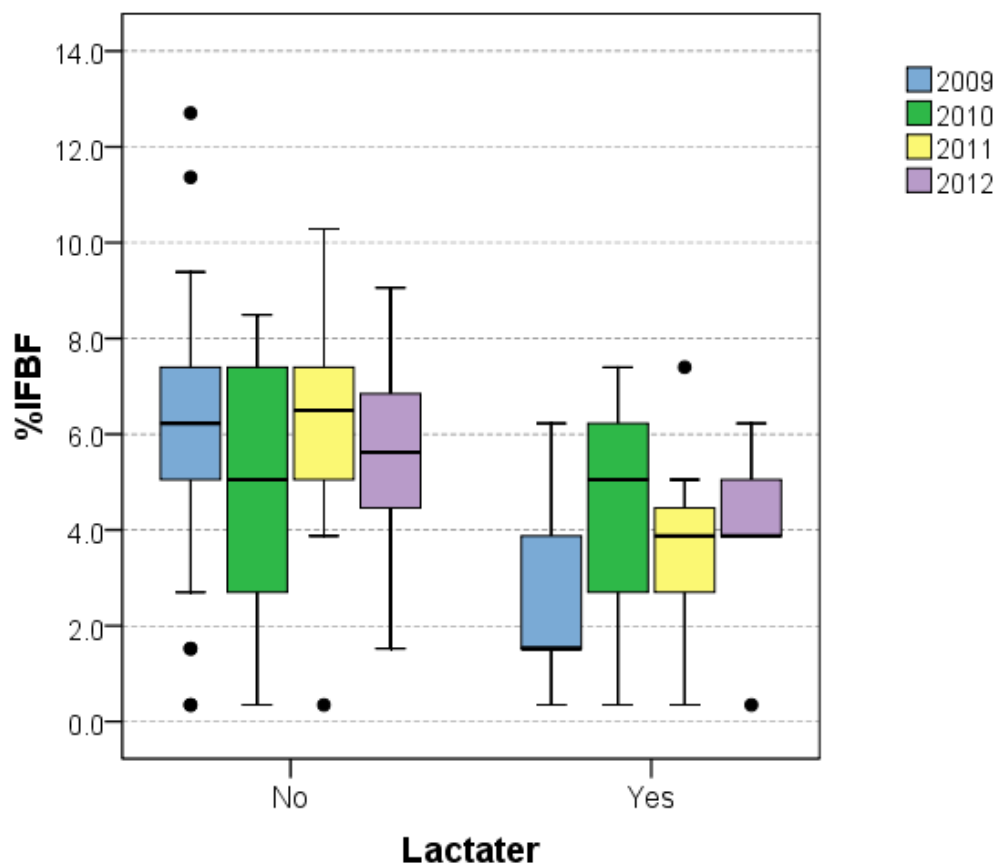


Figure 16. Boxplots for ingesta-free body fat (%IFBF) by lactation status for cow elk captured and radiomarked, Feb 2009-2012, Mount St. Helens, Washington. Colored boxes represent the middle 50% of estimates, and heavy horizontal lines represent median values.

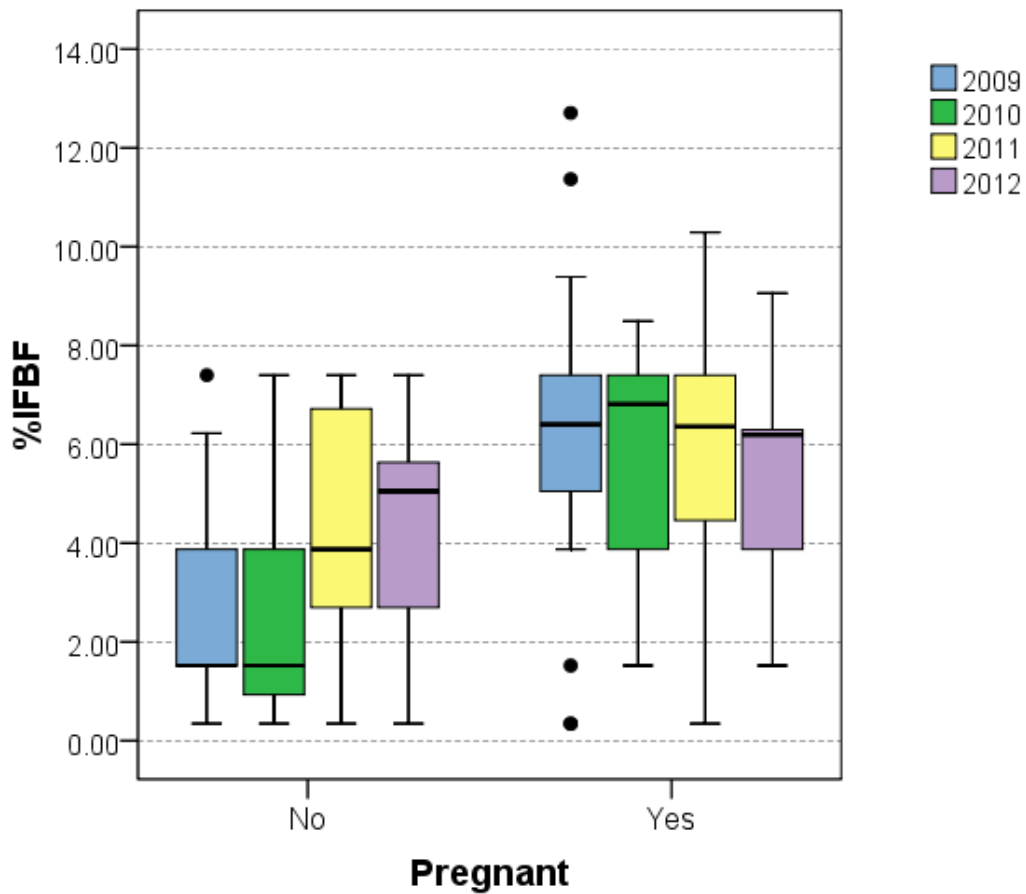


Figure 17. Boxplots for ingesta-free body fat (%IFBF) by pregnancy status for cow elk captured and radiomarked, Feb 2009-2012, Mount St. Helens, Washington. Colored boxes represent the middle 50% of estimates, and heavy horizontal lines represent median values.

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 ($P > 0.05$).

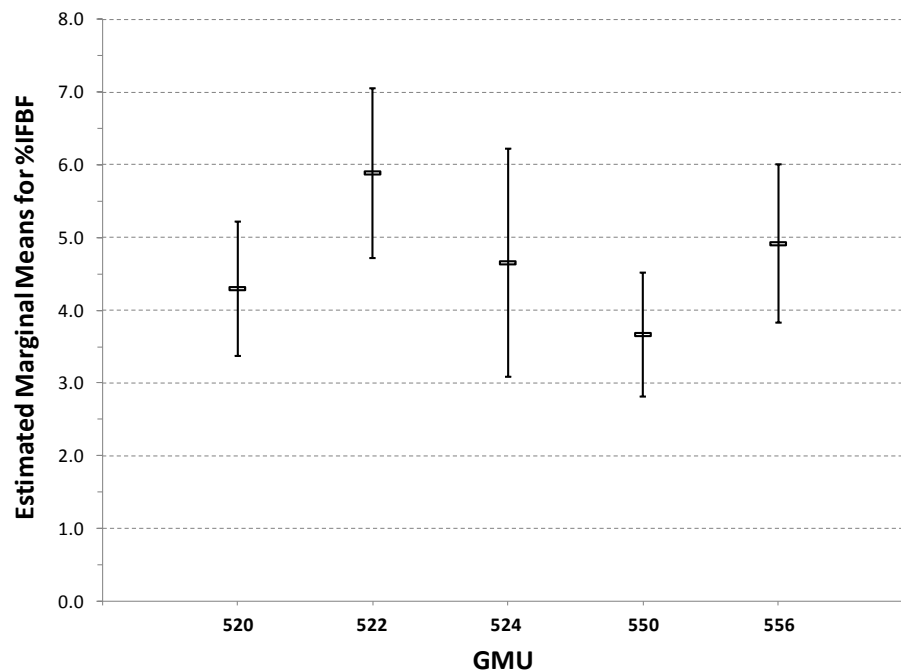


Figure 18. Plot of marginal means for %IFBF by GMU, controlling for pregnancy and lactation status, Mount St. Helens cow elk, 2009-2012.

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.

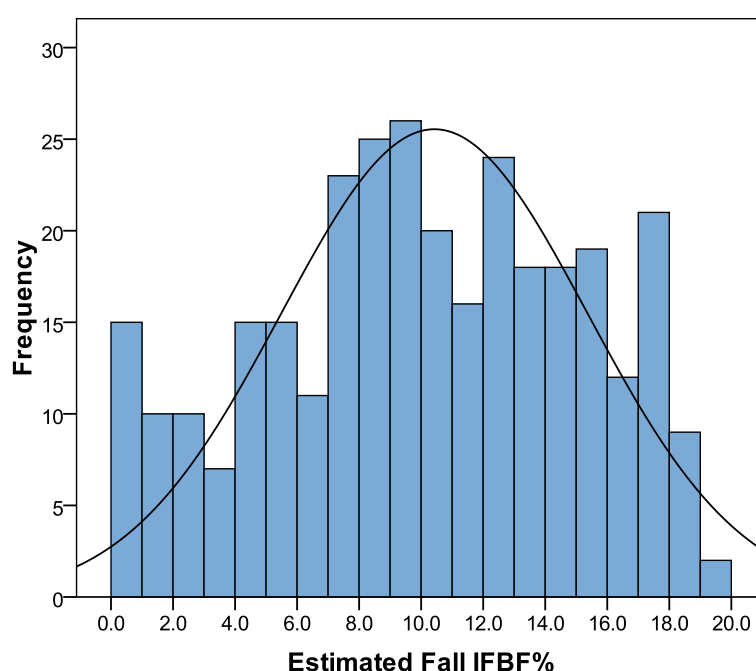


Figure 19. Frequency histogram (and normal curve) for fall IFBF estimates from hunter-killed cow elk, Mount St. Helens, WA, 2009-2011.

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.

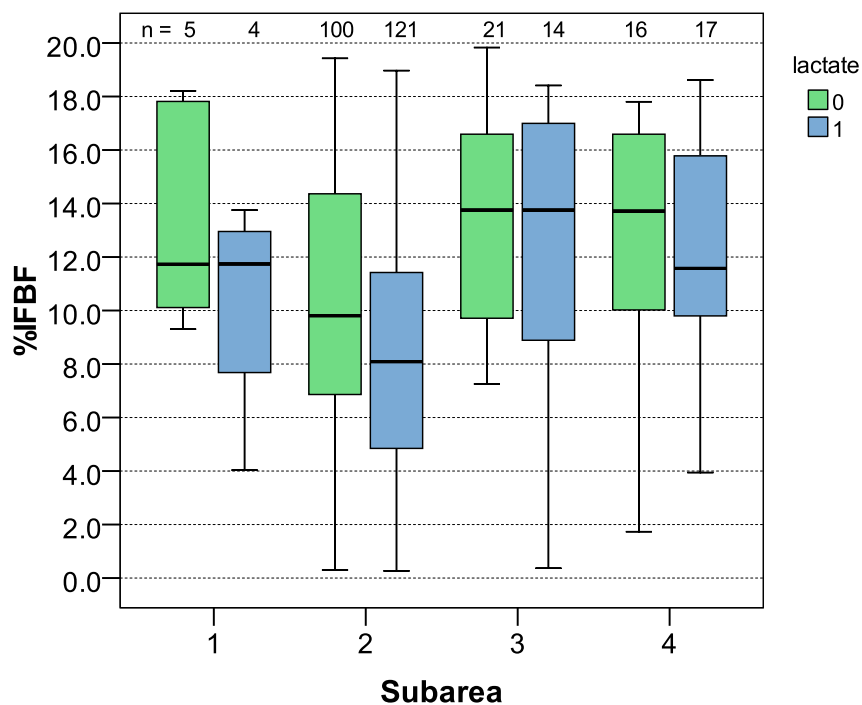


Figure 20. Boxplots for fall %IFBF from hunter-killed elk across subareas (1 = GMU 522, 2 = GMUs 520, 524, 550, 556, 3 = GMU 560, 4 = Columbia Gorge GMUs) by lactation status, Mount St. Helens, WA, 2009-2011.

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	χ^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 of 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	-2LL	AIC _c	Δ AIC _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

^aNumber of unique parameters in model_{*i*}.

^bDifference in AIC_c units between model_{*i*} and the best model.

^cRelative 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.

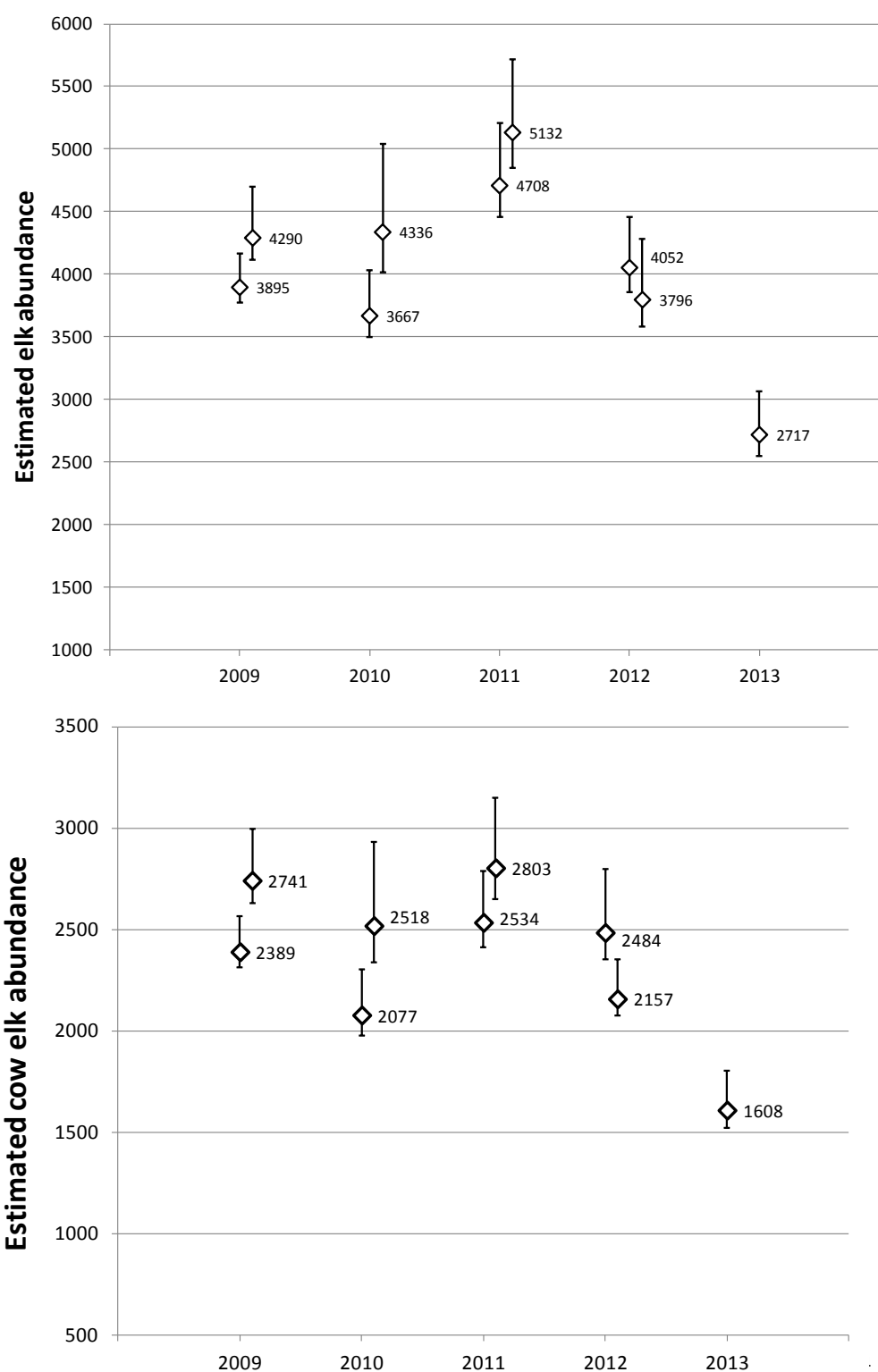


Figure 21. Sightability model estimates (\pm 95% CI) for total elk and total cow elk abundance in the study area, Mount St. Helens, 2009-2013.

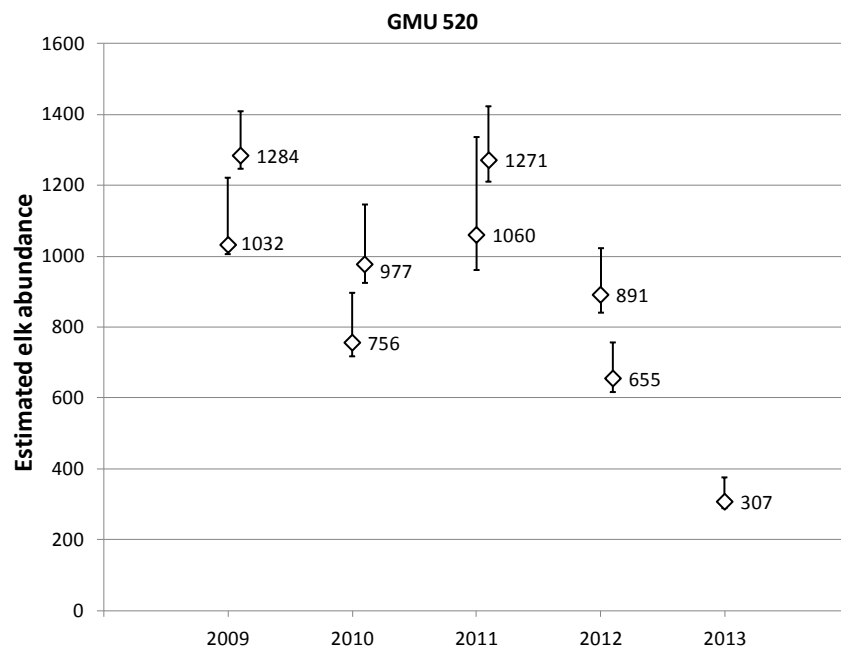


Figure 22. Sightability model estimates for total elk abundance (\pm 95% CI) in GMU 520, Mount St. Helens, 2009-2013.

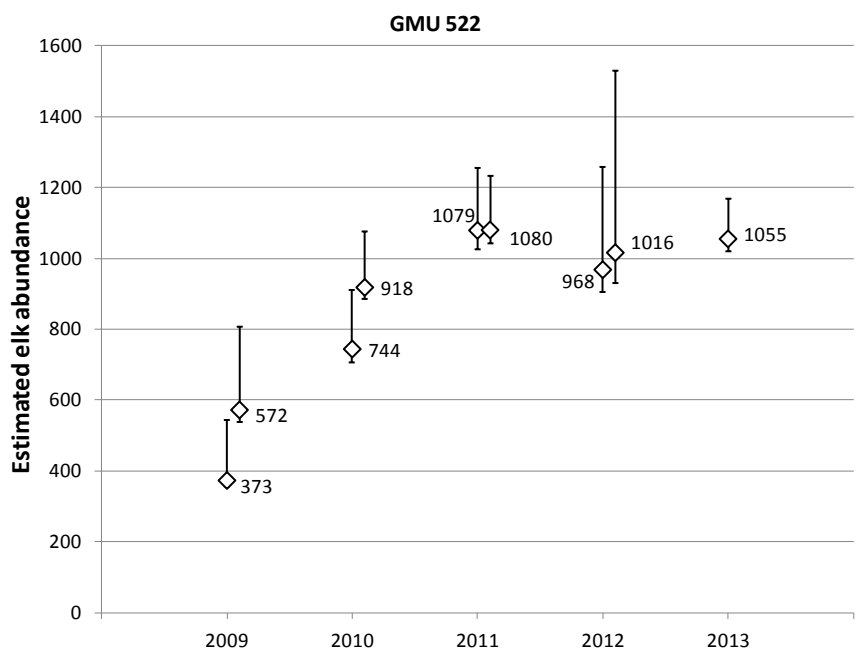


Figure 23. Sightability model estimates for total elk abundance (\pm 95% CI) in GMU 522, Mount St. Helens, 2009-2013.

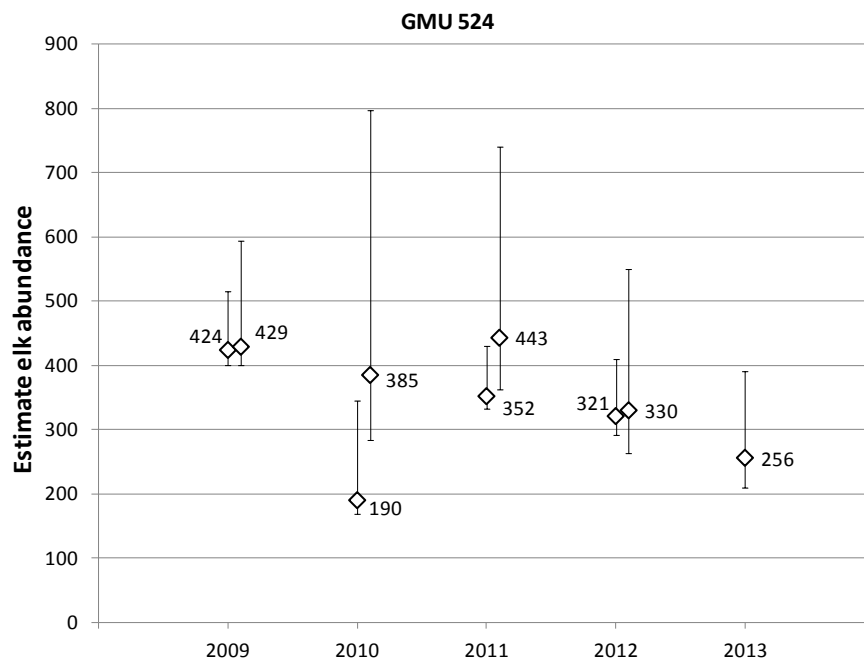


Figure 24. Sightability model estimates for total elk abundance (\pm 95% CI) in GMU 524, Mount St. Helens, 2009-2013.

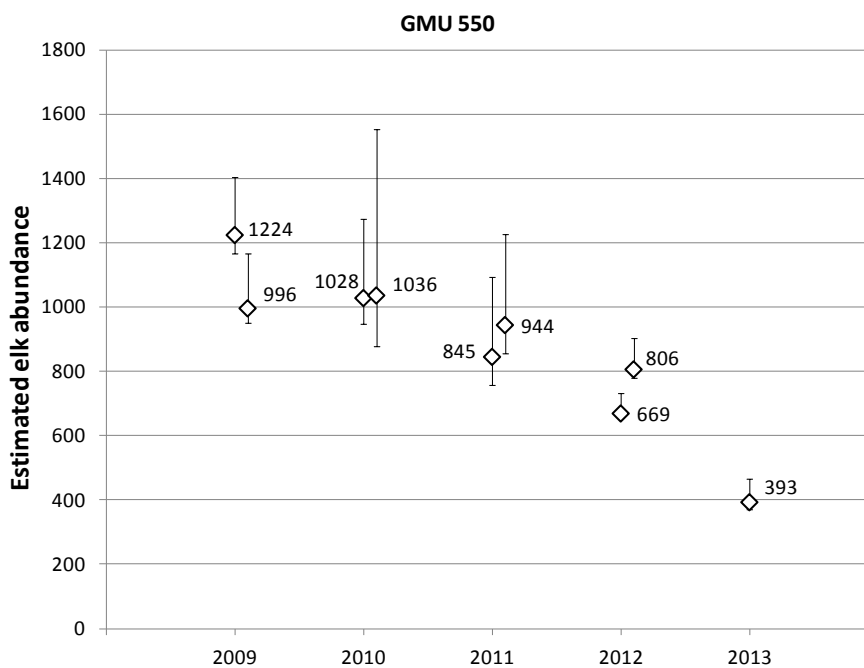


Figure 25. Sightability model estimates for total elk abundance (\pm 95% CI) in GMU 550, Mount St. Helens, 2009-2013.

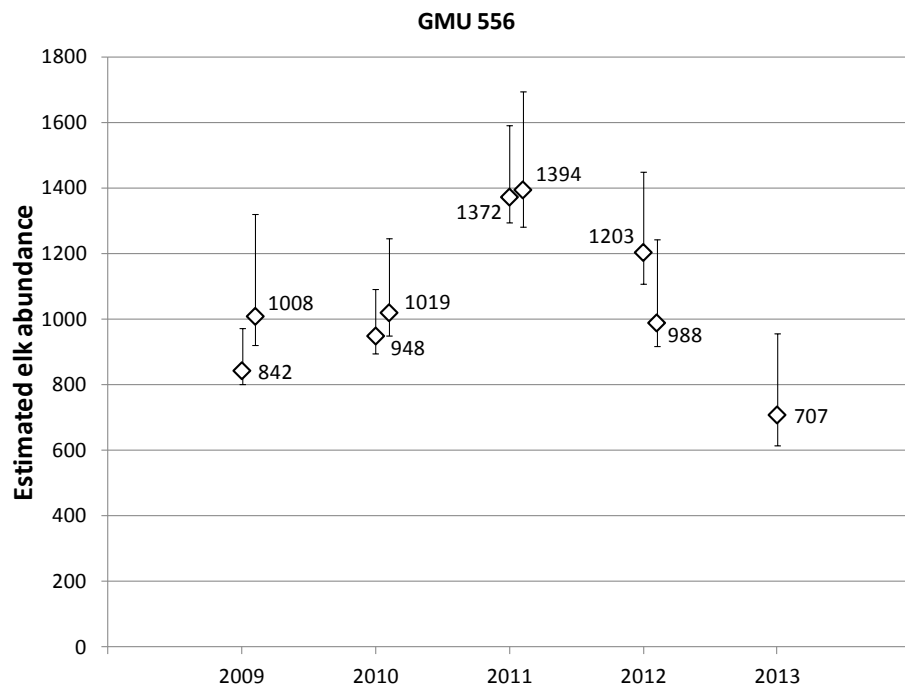


Figure 26. Sightability model estimates for total elk abundance (\pm 95% CI) in GMU 556, Mount St. Helens, 2009-2013.

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.

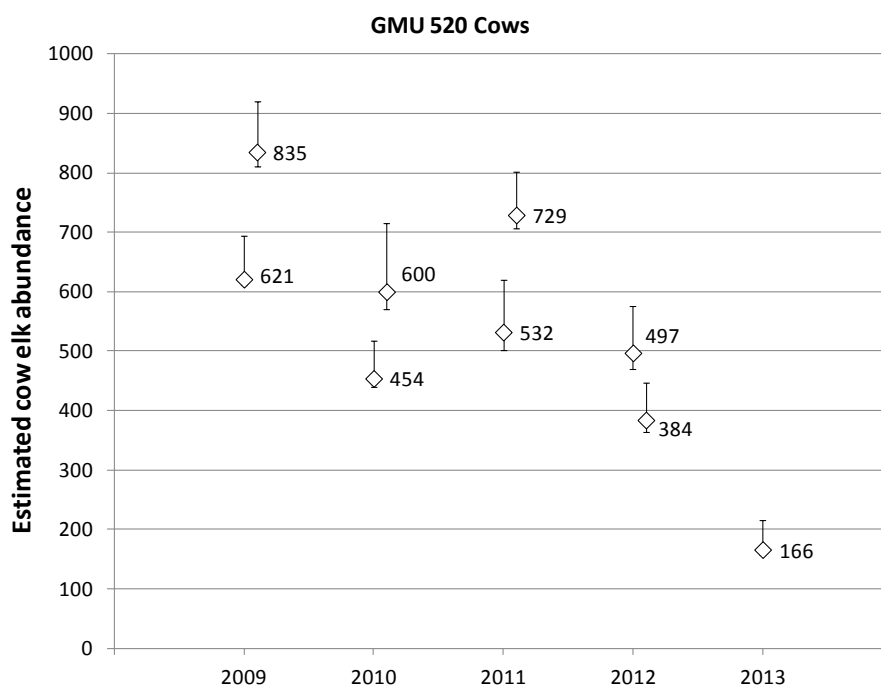


Figure 27. Sightability model estimates for cow elk abundance (\pm 95% CI) in GMU 520, Mount St. Helens, 2009-2013.

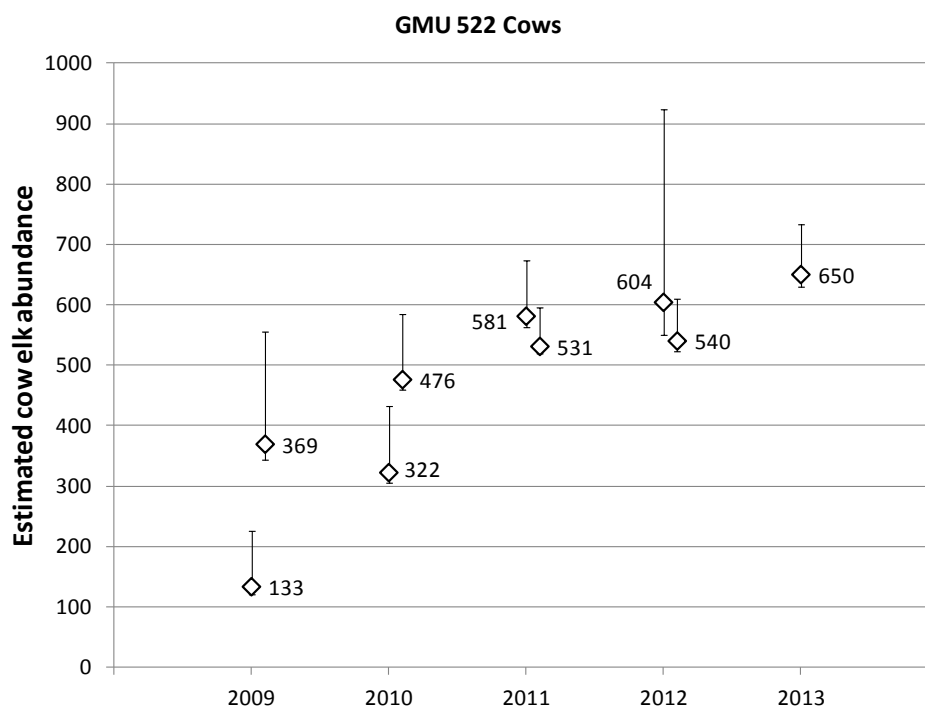


Figure 28. Sightability model estimates for cow elk abundance (\pm 95% CI) in GMU 522, Mount St. Helens, 2009-2013.

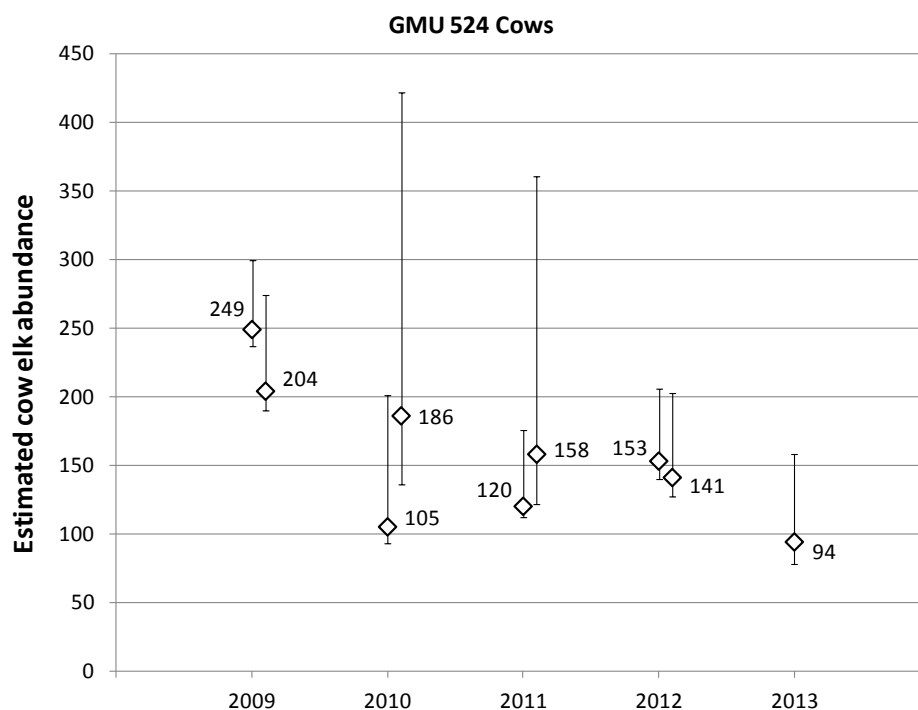


Figure 29. Sightability model estimates for cow elk abundance (\pm 95% CI) in GMU 524, Mount St. Helens, 2009-2013.

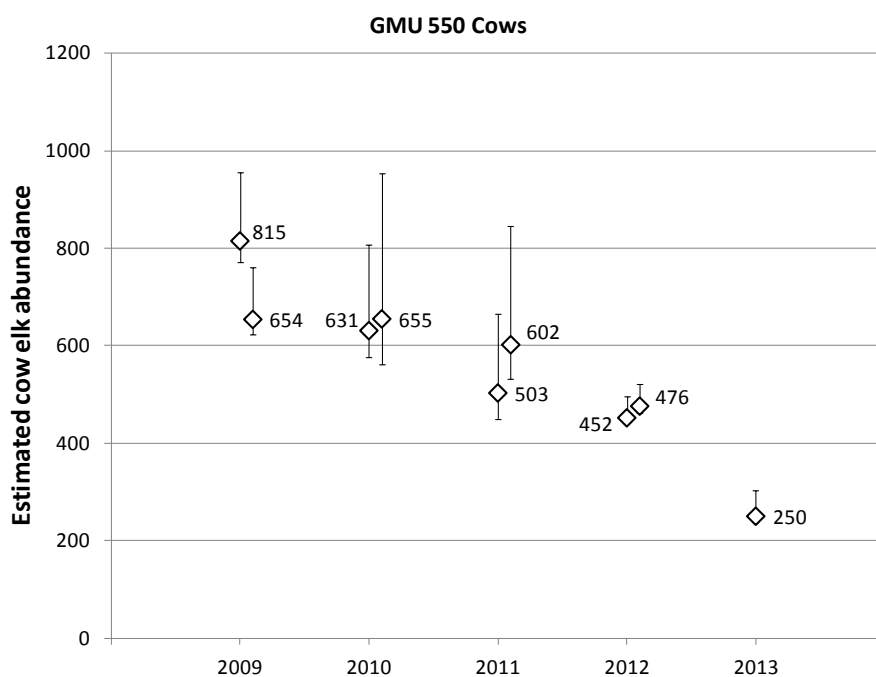


Figure 30. Sightability model estimates for cow elk abundance (\pm 95% CI) in GMU 550, Mount St. Helens, 2009-2013.

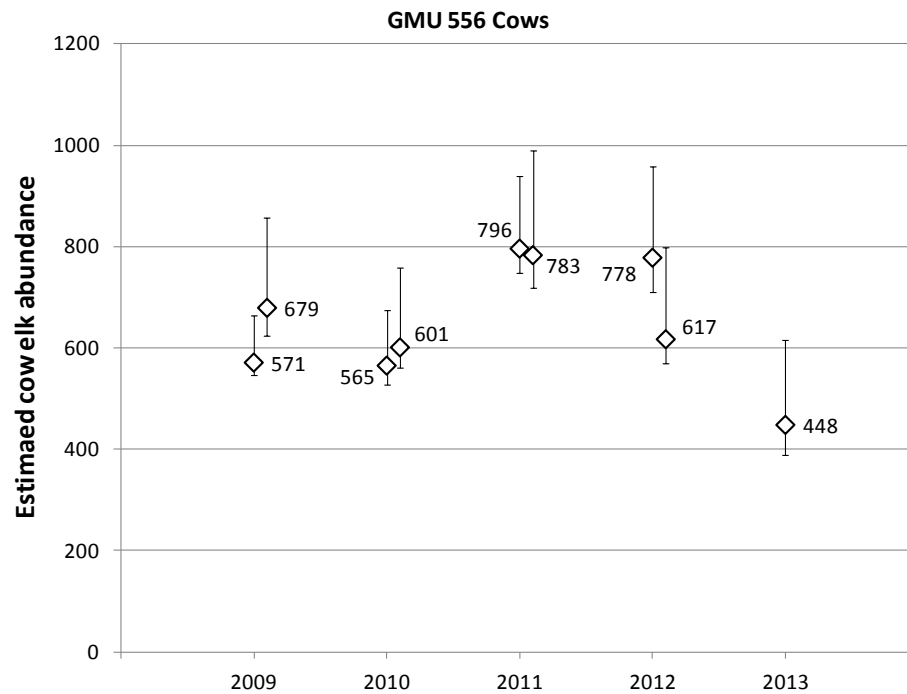


Figure 31. Sightability model estimates for cow elk abundance (\pm 95% CI) in GMU 556, Mount St. Helens, 2009-2013.

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	Δ AIC _c ^d	w _i ^e	Dev ^f
$p(\cdot), \sigma^2(2009=2011 \neq 2010=2012), N(\text{yr})$	7	829.28	0.00	0.32	814.88
$p(2012 \neq \text{else}), \sigma^2(\cdot), N(\text{yr})$	7	830.35	1.07	0.19	815.95
$p(\cdot), \sigma^2(\cdot), N(\text{yr})$	6	830.72	1.43	0.16	818.41
$p(2011 \neq \text{else}), \sigma^2(\cdot), N(\text{yr})$	7	832.12	2.84	0.08	817.72
$p(2009 \neq \text{else}), \sigma^2(\cdot), N(\text{yr})$	7	832.50	3.22	0.06	818.10
$p(\text{sess1} \neq \text{sess2}), \sigma^2(\cdot), N(\text{yr})$	7	832.52	3.23	0.06	818.11
$p(\cdot), \sigma^2(\text{yr}), N(\text{yr})$	9	833.35	4.06	0.04	814.70
$p(2010 \neq \text{else}), \sigma^2(\cdot), N(\text{yr})$	7	833.71	4.43	0.04	819.31
$p(\text{yr}), \sigma^2(\cdot), N(\text{yr})$	9	834.46	5.18	0.02	815.81
$p(\text{sess1} \neq \text{sess2}^g), \sigma^2(\text{yr}), N(\text{yr})$	10	835.19	5.90	0.02	814.39
$p(\text{full}), \sigma^2(\text{yr}), N(\text{yr})$	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.

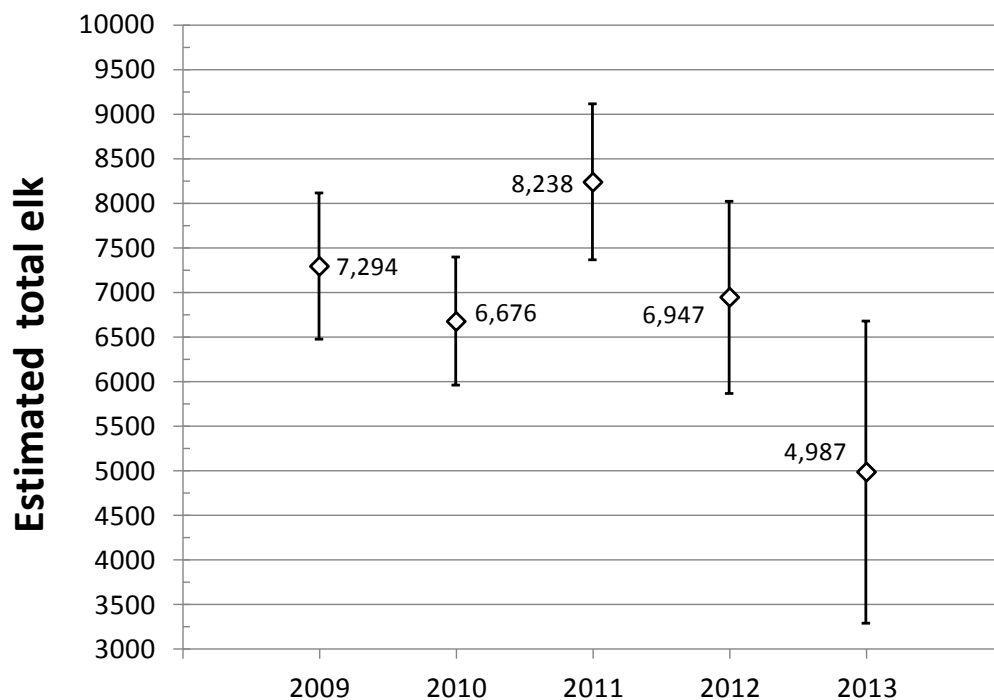


Figure 32. Mark-resight estimates (2009-2012 = LNME; 2013 = Lincoln-Petersen) for total elk (\pm 95% CI) in the 5-GMU study area, 2009-2013, Mount St. Helens, WA.

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 AICc 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
$p(\text{sex}), \sigma^2(\text{sex}), N(\text{sex} \times \text{yr})$	12	869.31	0.00	0.59	844.19
$p(\cdot), \sigma^2(\text{sex}), N(\text{sex} \times \text{yr})$	11	870.11	0.81	0.40	847.17
$p(\text{sex} \times \text{yr}), \sigma^2(\text{sex}), N(\text{sex} \times \text{yr})$	18	877.22	7.91	0.01	838.71
$p(\text{yr}), \sigma^2(\text{sex} \times \text{yr}), N(\text{sex} \times \text{yr})$	24	885.94	16.63	<0.001	833.43
$p(\text{sex} \times \text{yr}), \sigma^2(\text{sex} \times \text{yr}), N(\text{sex} \times \text{yr})$	32	901.08	31.77	0.00	828.89
$p(\text{sex}), \sigma^2(\text{sex}), N(F_{1=2 \neq 3 \neq 4}^g, M[\cdot])$	8	980.79	111.48	0.00	964.28
$p(\cdot), \sigma^2(\text{sex}), N(F_{1=2=3 \neq 4}, M[\cdot])$	7	1000.94	131.63	0.00	986.54
$p(\text{sex}), \sigma^2(\text{sex}), N(\text{sex})$	6	1022.40	153.09	0.00	1010.10
$p(\text{sex}), \sigma^2(\text{sex}), N(F_{1=2 \neq 3=4}, M[\cdot])$	7	1023.15	153.84	0.00	1008.75
$p(\cdot), \sigma^2(\cdot), N(\text{sex} \times \text{yr})$	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.

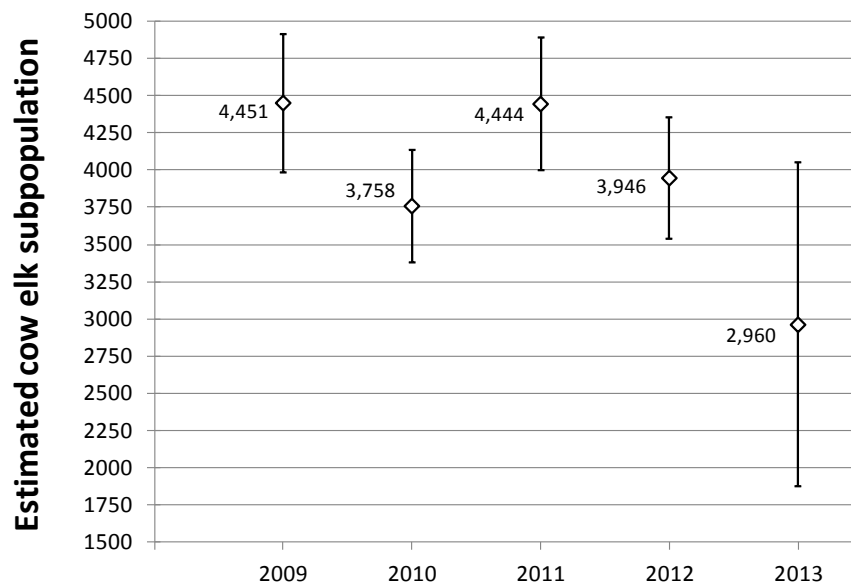


Figure 33. Mark-resight estimates (2009-2012 = LNME; 2013 = Lincoln-Petersen) for total cow elk (\pm 95% CI) in the 5-GMU study area, 2009-2013, Mount St. Helens, WA.

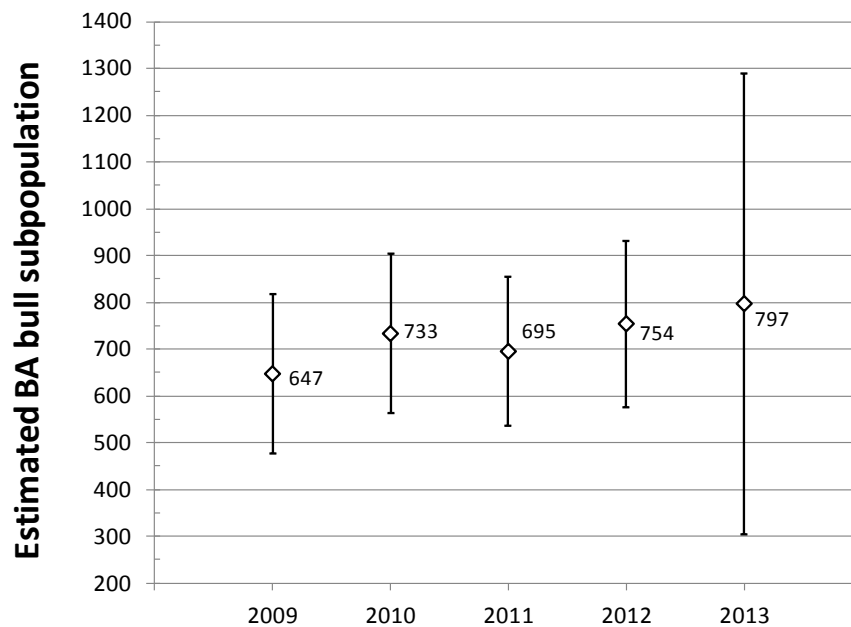


Figure 34. Mark-resight estimates (2009-2012 = LNME; 2013 = Lincoln-Petersen) for total branch-antlered bull elk (\pm 95% CI) in the 5-GMU study area, 2009-2013, Mount St. Helens, WA.

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, $\mu = 0.54$ (95% CI = 0.49-0.59) for radiomarked cows and $\mu = 0.44$ (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	Δ AIC _c ^d	w _i ^e	Dev ^f
$pF(522^g), pM(\text{grp}), \sigma^2(.), N(\text{grp} \times \text{yr})$	33	1041.28	0.00	0.58	967.18
$pF(522), pM(\text{grp}), \sigma^2(\text{sex}), N(\text{grp} \times \text{yr})$	34	1043.10	1.82	0.23	966.48
$pF(.), pM(\text{grp}), \sigma^2(.), N(\text{grp} \times \text{yr})$	32	1044.80	3.52	0.10	973.20
$pF(.), pM(\text{grp}), \sigma^2(\text{sex}), N(\text{grp} \times \text{yr})$	33	1046.45	5.18	0.04	972.35
$pF(\text{grp}), pM(\text{grp}), \sigma^2(\text{sex}), N(\text{grp} \times \text{yr})$	37	1047.24	5.97	0.03	962.94
$pF(522), pM(\text{grp}), \sigma^2(.), N(\text{grp} \times \text{yr}, M^h)$	30	1048.31	7.03	0.02	981.66
$pF(.), pM(\text{grp}), \sigma^2(.), N(\text{grp} \times \text{yr}, M')$	29	1051.76	10.48	0.003	987.56
$pF(522), pM(.), \sigma^2(\text{sex}), N(\text{grp} \times \text{yr})$	33	1055.57	14.30	<0.001	981.47
$pF(.), pM(.), \sigma^2(\text{sex}), N(\text{grp} \times \text{yr})$	32	1058.94	17.67	<0.001	987.35
$pF(522), pM(\text{grp}), \sigma^2(\text{sex}), N(\text{grp} \times \text{yr}, F^i)$	31	1127.33	86.06	0.000	1058.22
$pF(.), pM(\text{grp}), \sigma^2(\text{sex}), N(\text{grp} \times \text{yr}, F')$	30	1135.67	94.39	0.000	1069.03
$pF(522), pM(\text{grp}), \sigma^2(.), N(\text{grp} \times \text{yr}, F''^j)$	27	1262.98	221.70	0.000	1203.63
$pF(.), pM(\text{grp}), \sigma^2(.), N(\text{grp} \times \text{yr}, F'')$	26	1278.86	237.58	0.000	1221.92
$pF(522), pM(\text{grp}), \sigma^2(.), N(\text{grp})$	12	1898.10	856.82	0.000	1873.05
$pF(.), pM(\text{grp}), \sigma^2(.), N(\text{grp})$	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

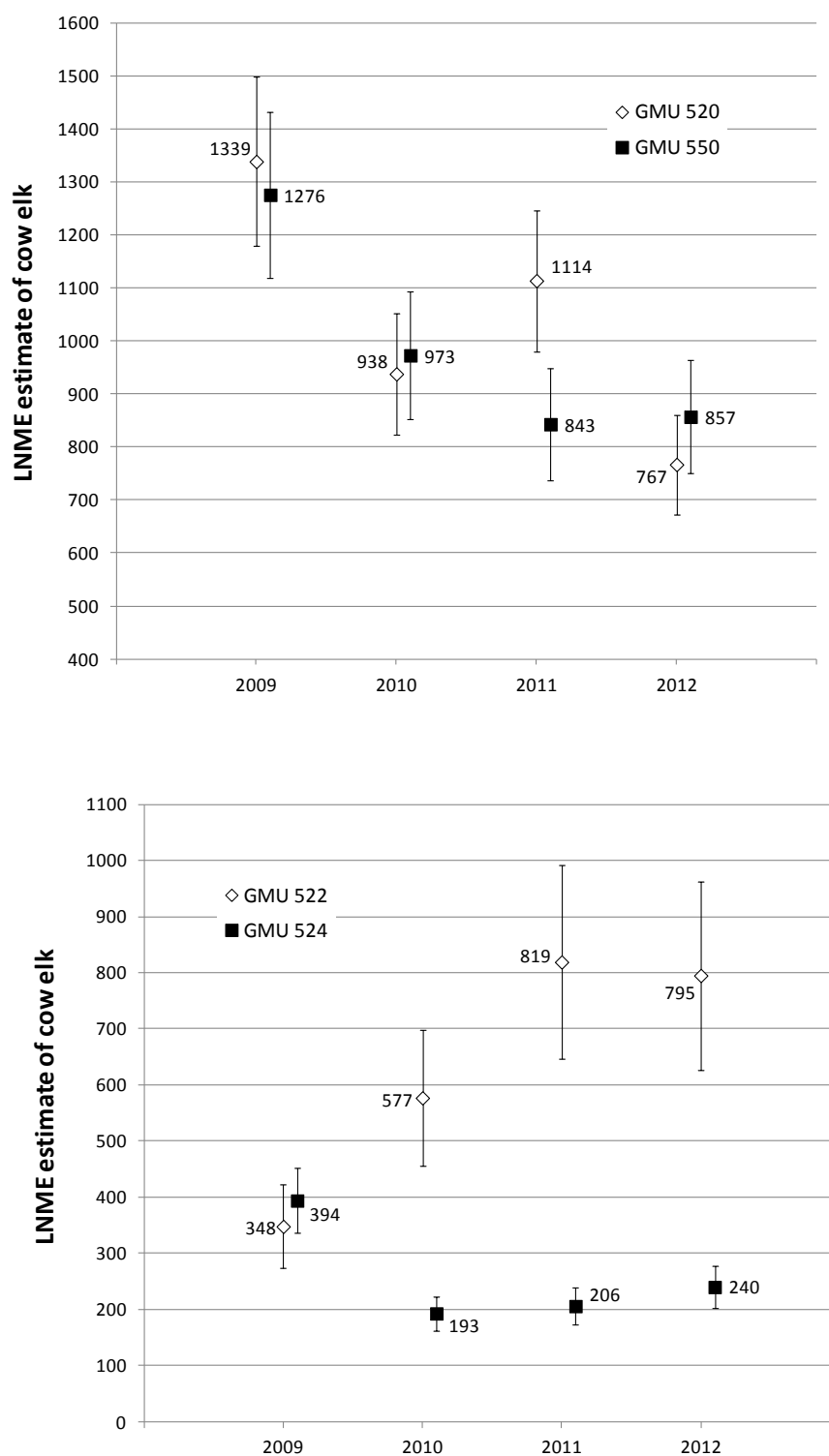


Figure 35. LNME Mark-resight estimates, 2009-2012, for total cow elk (\pm 95% CI) in GMUs 520 and 550 (top panel); 522 and 524 (bottom panel), Mount St. Helens, WA.

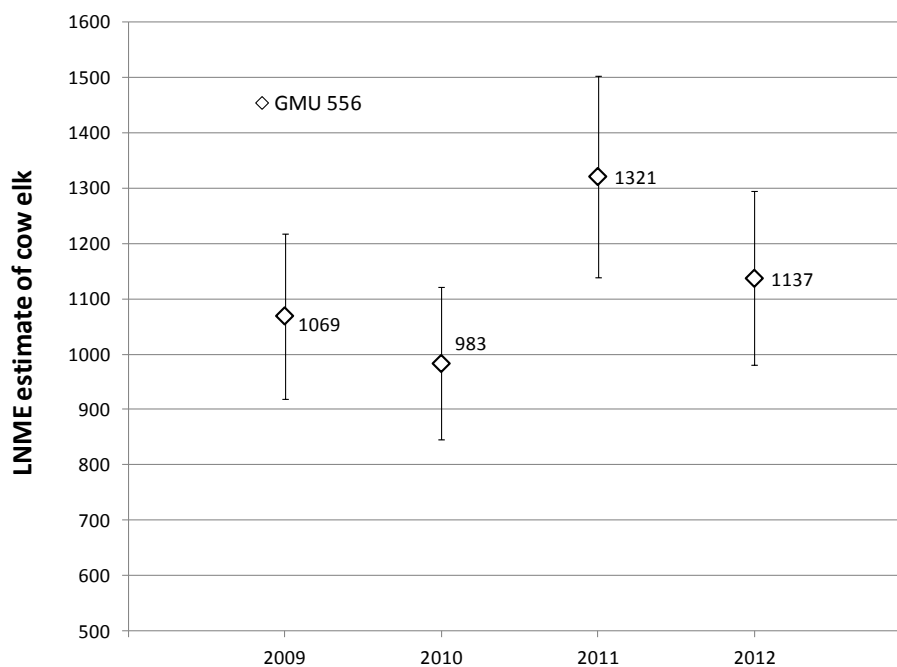


Figure 36. LNME Mark-resight estimates, 2009-2012, for total cow elk (\pm 95% CI) in GMU 556, Mount St. Helens, WA.

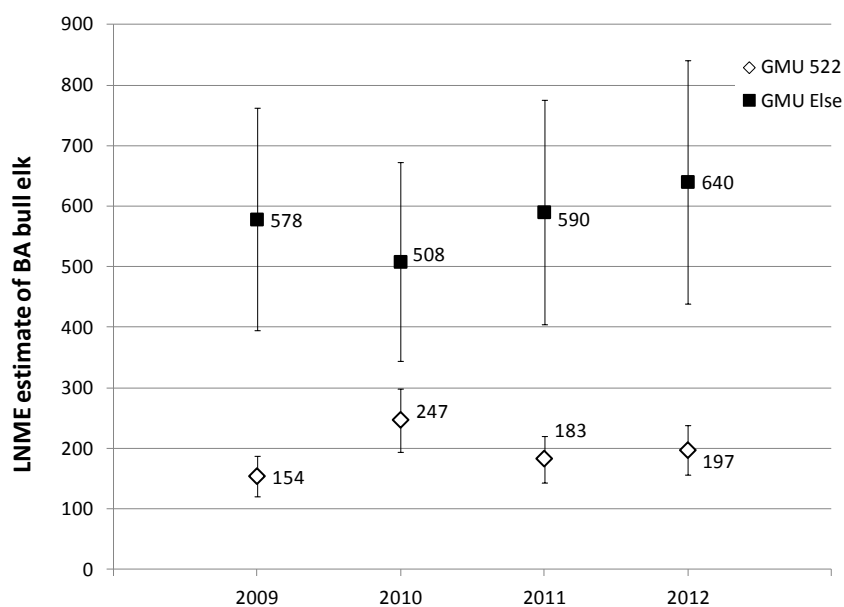


Figure 37. LNME Mark-resight estimates, 2009-2012, for total branch-antlered bull elk (\pm 95% CI), Mount St. Helens, WA.

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 ($\approx -20\%$) 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 ($\approx -15\%$); 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).

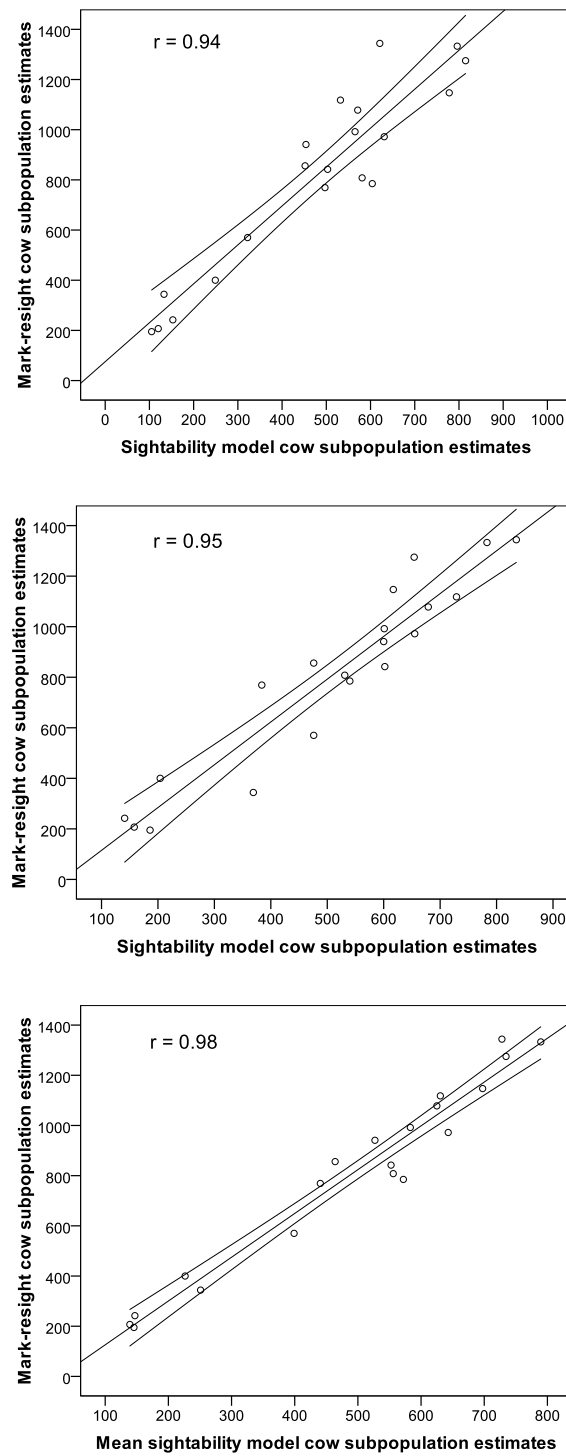


Figure 38. Correlation between Sightability Model (SM) estimates and LNME mark-resight estimates for cow elk abundance, 2009-2012 (panels are, top to bottom: for first survey replicate SM estimate, second survey SM estimate, and the means of the 2 annual SM estimates).

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).

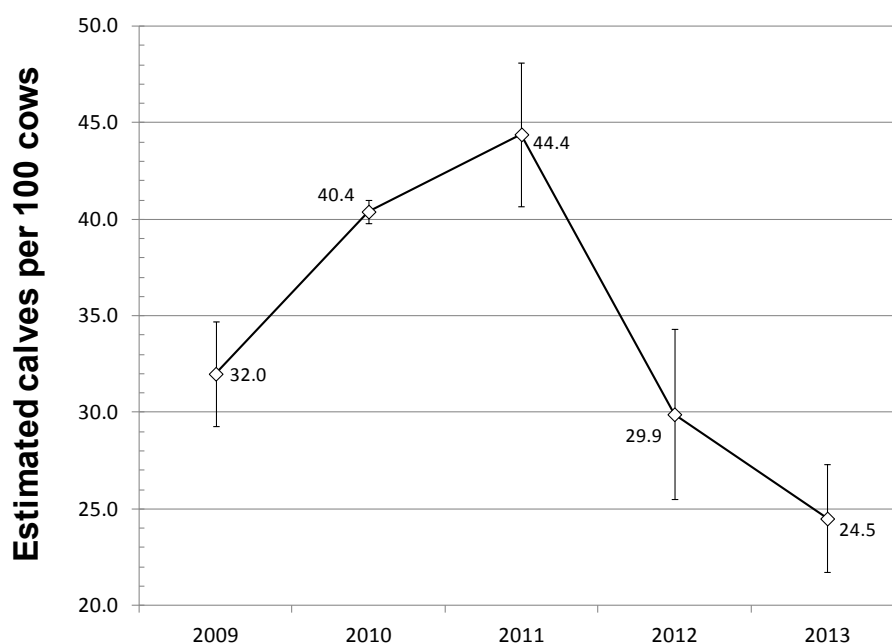


Figure 39. Elk calf-cow spring ratio estimates (plus 95% CI), 2009-2013, for the 5-GMU survey area, from aerial surveys, Mount St. Helens, WA.

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.

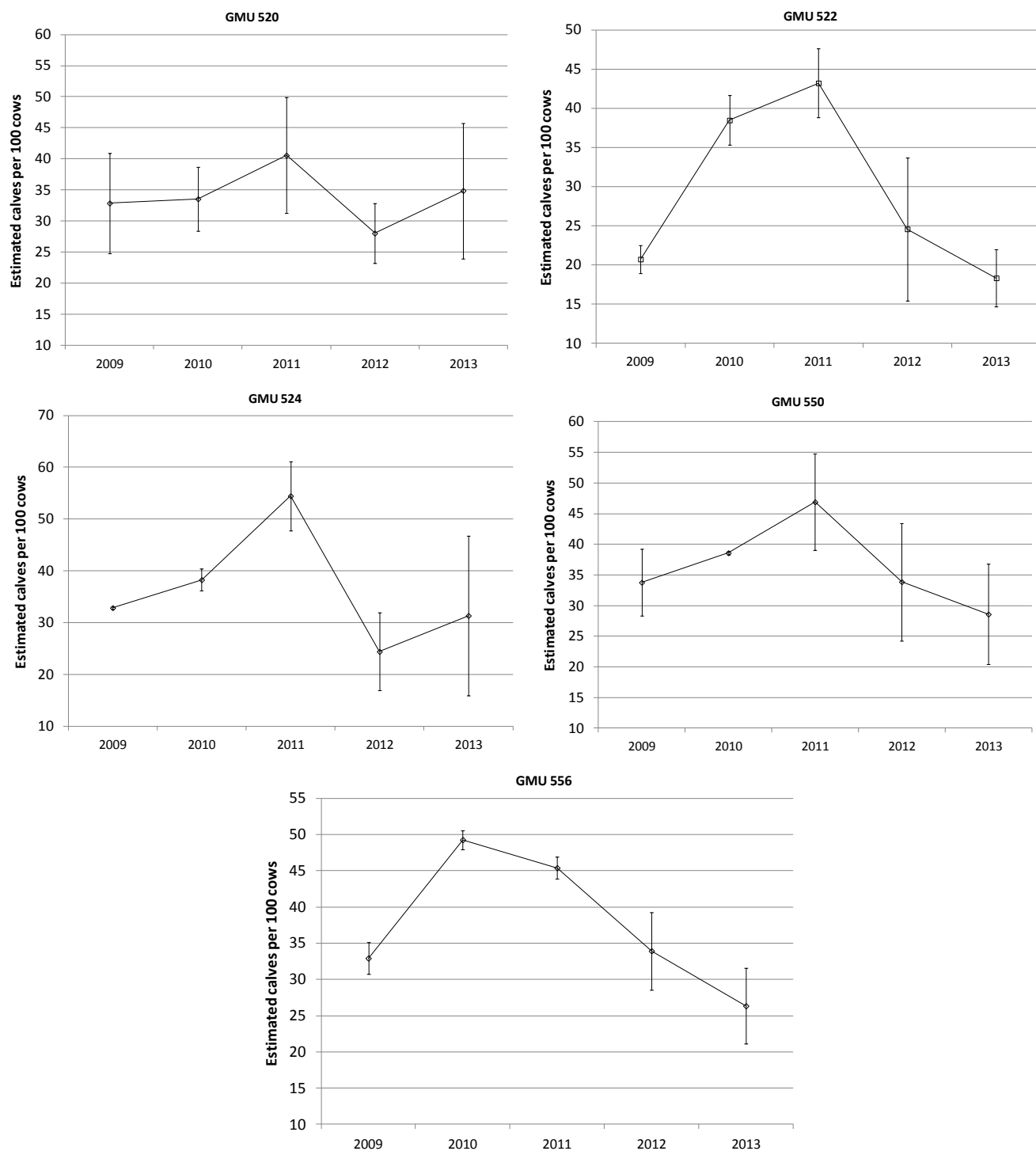


Figure 40. GMU-specific elk calf-cow spring ratio estimates (plus 95% CI), 2009-2013, from aerial surveys, Mount St. Helens, WA.

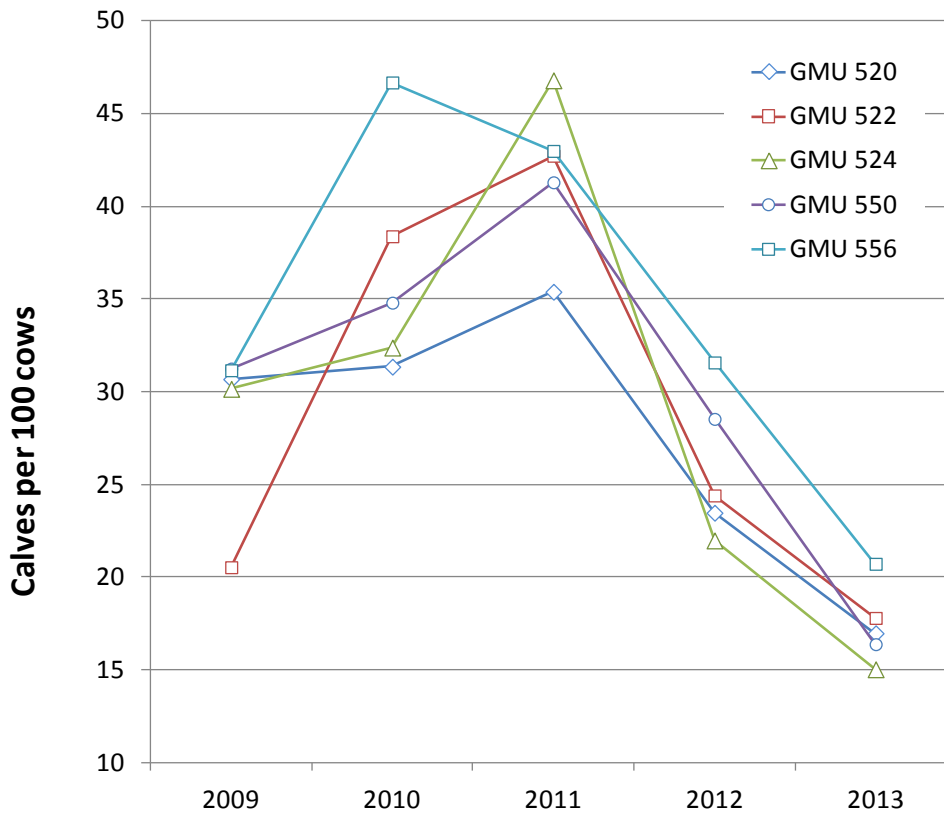


Figure 41. GMU-specific elk calf-cow spring ratio index (observed ratio adjusted for fall antlerless harvest), 2009-2013, Mount St. Helens, WA.

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).

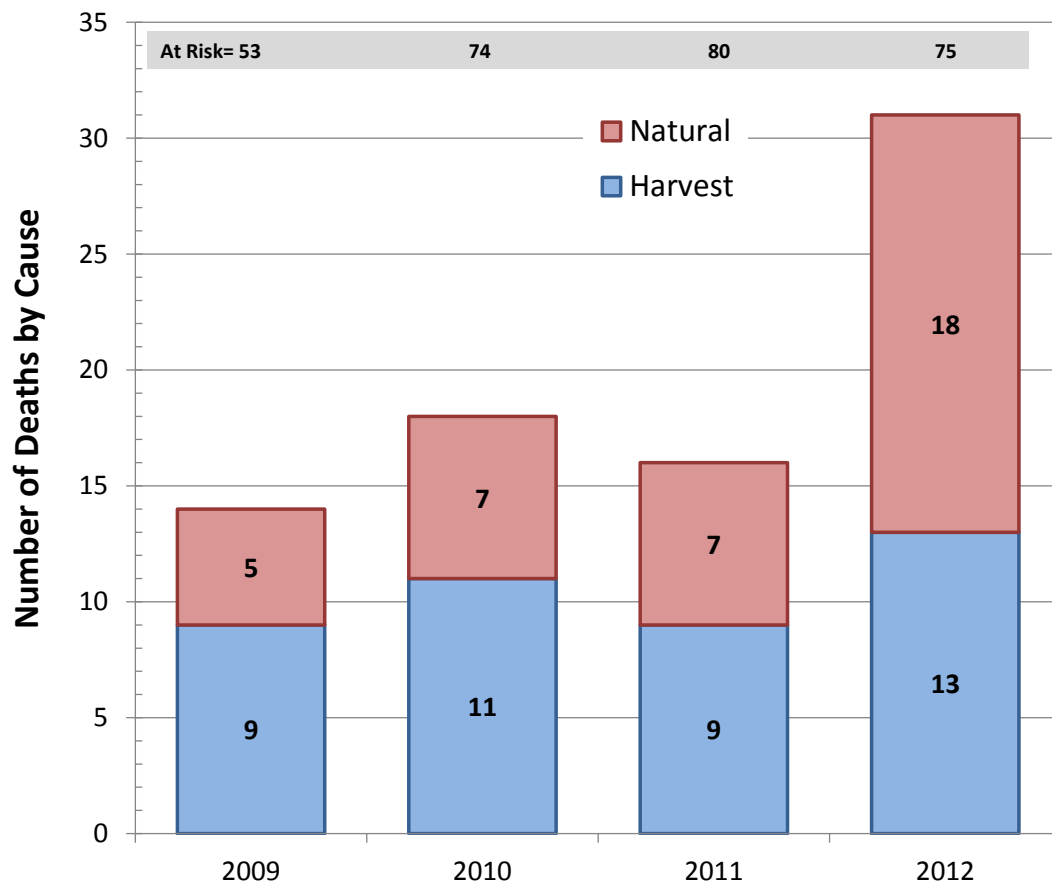


Figure 42. Total radiomarked elk deaths by cause, Mount St. Helens, Washington, survival years 2009-2012. Sample size of collared elk at risk at the beginning of each survival year is shown at the top of the panel.

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 AICc 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

^aNumber of unique parameters in model.

^bAIC_c difference between best model and model_i.

^cAkaike model weight.

^dGMU_{all} 2012≠GMU_{520,522,524,556} 2009-2011≠GMU₅₅₀ 2009-2011.

^eGMU₅₅₀ 2012≠GMU_{else} 2012≠GMU_{520,522,524,556} 2009-2011≠GMU₅₅₀ 2009-2011.

^fGMU₅₅₀ 2009≠2012≠2010=2011≠GMU_{else} 2009≠2012≠2010=2011.

^gGMU₅₂₀ 2012≠GMU_{else} 2012≠GMU_{522,524,550,556} 2009-2011≠GMU₅₂₀ 2009-2011.

^hGMU₅₅₀ 2012≠GMU_{else} 2012≠GMU_{all} 2009-2011.

ⁱGMU_{520,550} 2012≠ GMU_{else} 2012≠GMU_{520,550} 2009-2011≠GMU_{else} 2009-2011.

^jGMU₅₅₀ 2011=2012≠ GMU_{else} 2011=2012≠GMU₅₅₀ 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 ($r^2 = 0.86, P = 0.008$).

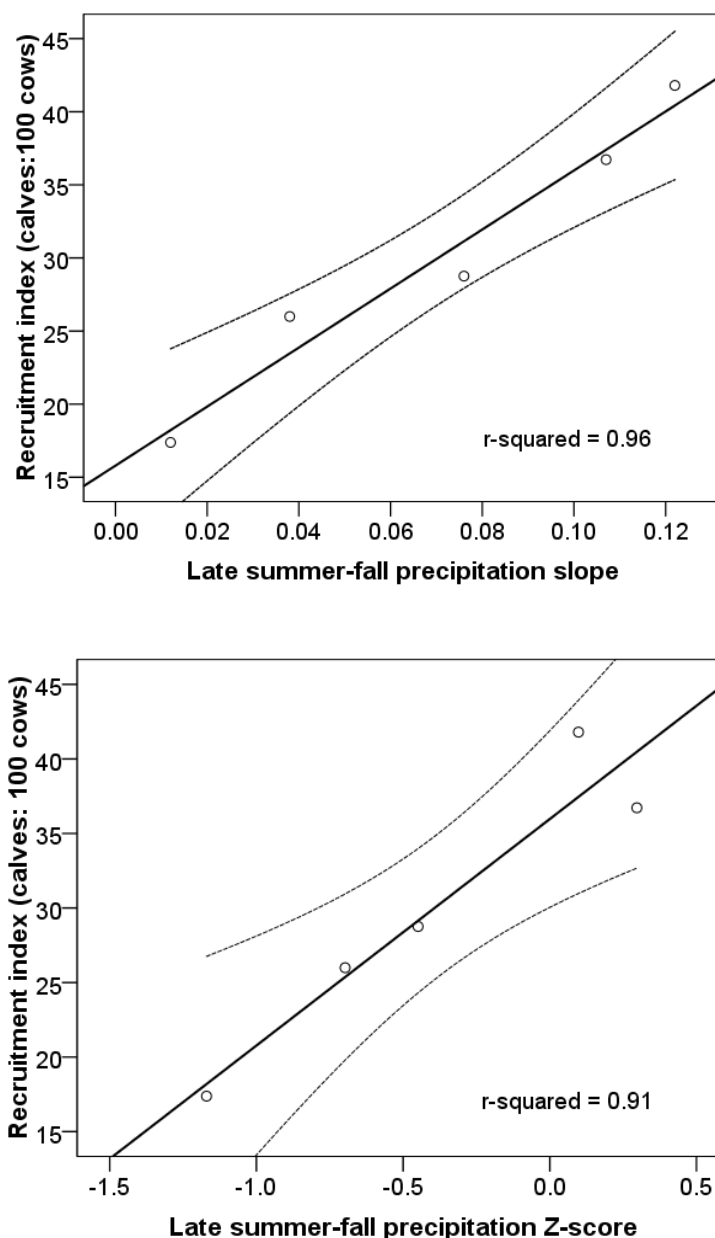


Figure 43. Linear fits of indexed spring calf-cow ratio to late summer-fall precipitation metrics, Mount St. Helens elk herd, 2009-2013.

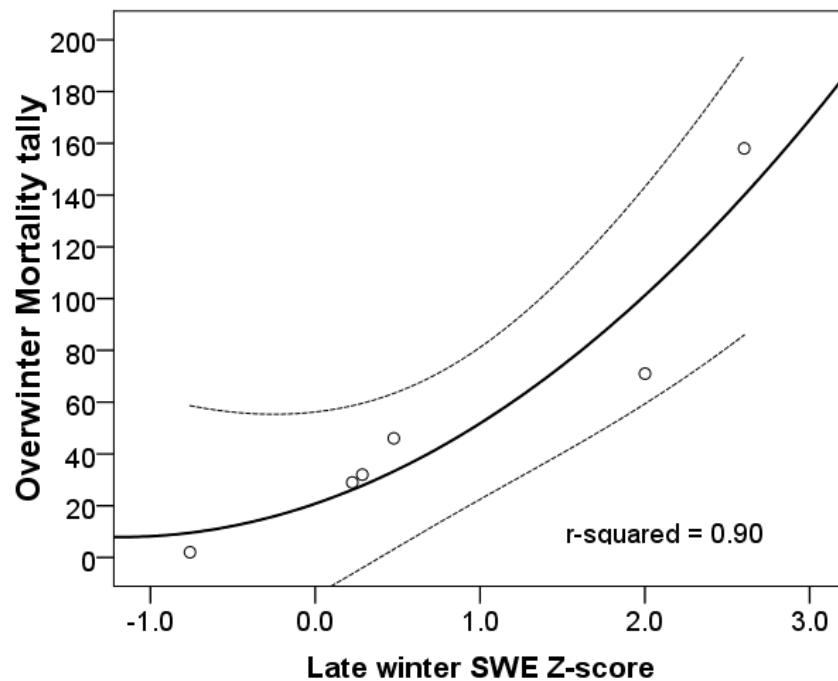


Figure 44. Non-linear fit of a spring overwinter mortality index to Z-scores for late winter snow water equivalents (SWE) measured at Spirit Lake, 2008-2013.

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).

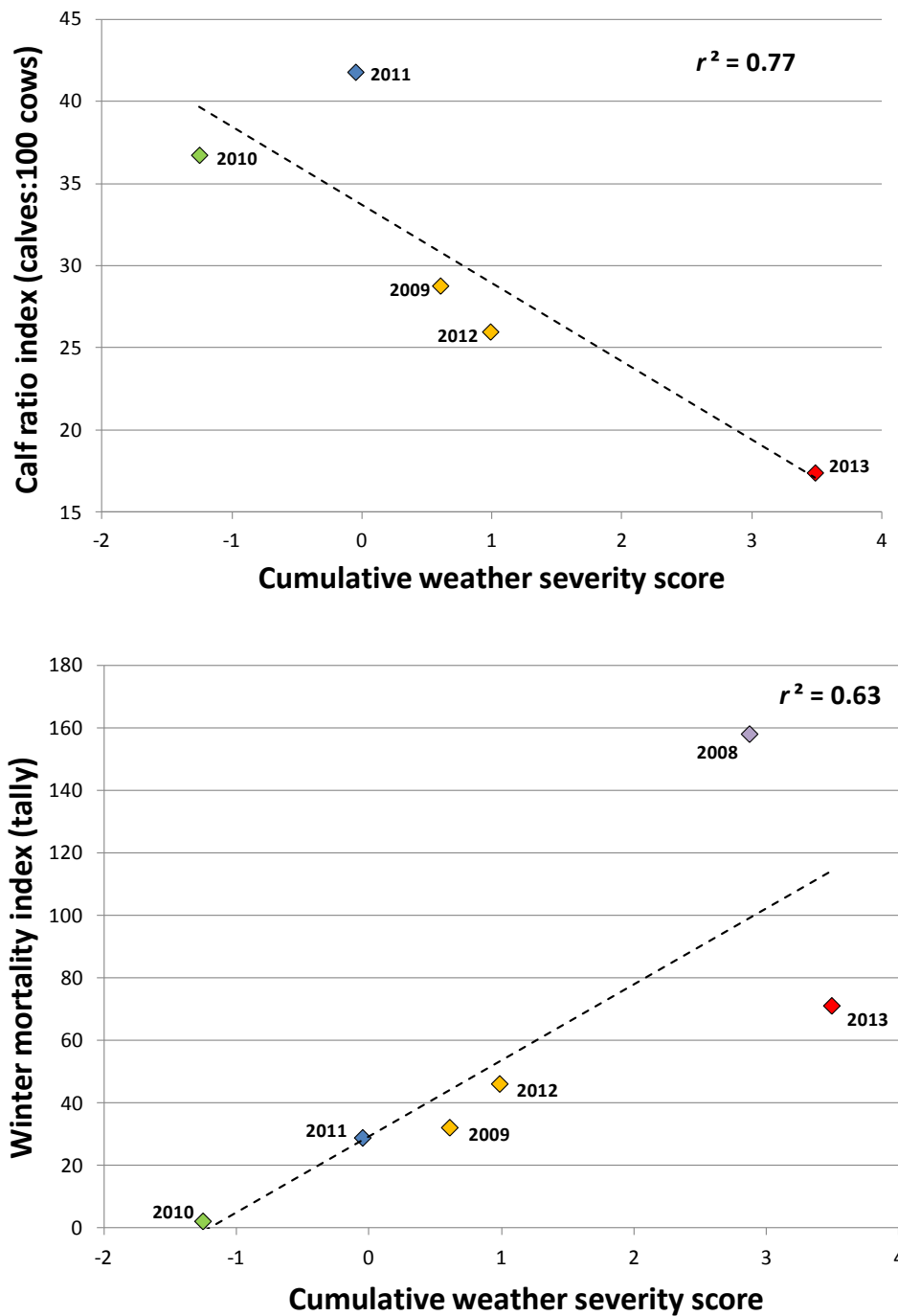


Figure 45. Linear fit of spring calf recruitment and overwinter mortality tallies to a combined index of current winter and previous late summer-fall weather severity. Marker colors: green = mild winter following normal summer; blue = normal winter and summer; yellow = normal winter and wet summer; purple = 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 (Millsbaugh 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 et 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. $\hat{S} = 0.84\text{--}0.86$) 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 lactators 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) \geq 2-yr-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 \geq 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 \geq 3-yr-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 $\leq 70\%$ (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 lactators—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 (Guinness 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 (Guinness 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. Guinness. 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. Guinness. 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. 2001a. 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. 2001b. 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. 2001c. 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 1-11 in 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. Guinness, 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. Toïgo. 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. *Biometrics* 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. Millsaugh 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**

Prepared by:

Brock Hoenes, Elk Specialist
Washington Department of Fish and Wildlife

Co-Investigators:

Kristin Mansfield, DVM, MVPM, State Wildlife Veterinarian
Washington Department of Fish and Wildlife

Ilai Keren, Ph.D., Biometrician
Washington Department of Fish and Wildlife

Kyle Garrison, Hoof Disease Coordinator
Washington Department of Fish and Wildlife

Brooke George, Wildlife Biologist
Washington Department of Fish and Wildlife

Eric Holman, District Wildlife Biologist
Washington Department of Fish and Wildlife

Nicholle Stephens, Assistant District Wildlife Biologist
Washington Department of Fish and Wildlife

Rachel Cook, Ph.D., Research Scientist
National Council for Air and Stream Improvement

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., IFFB) 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.

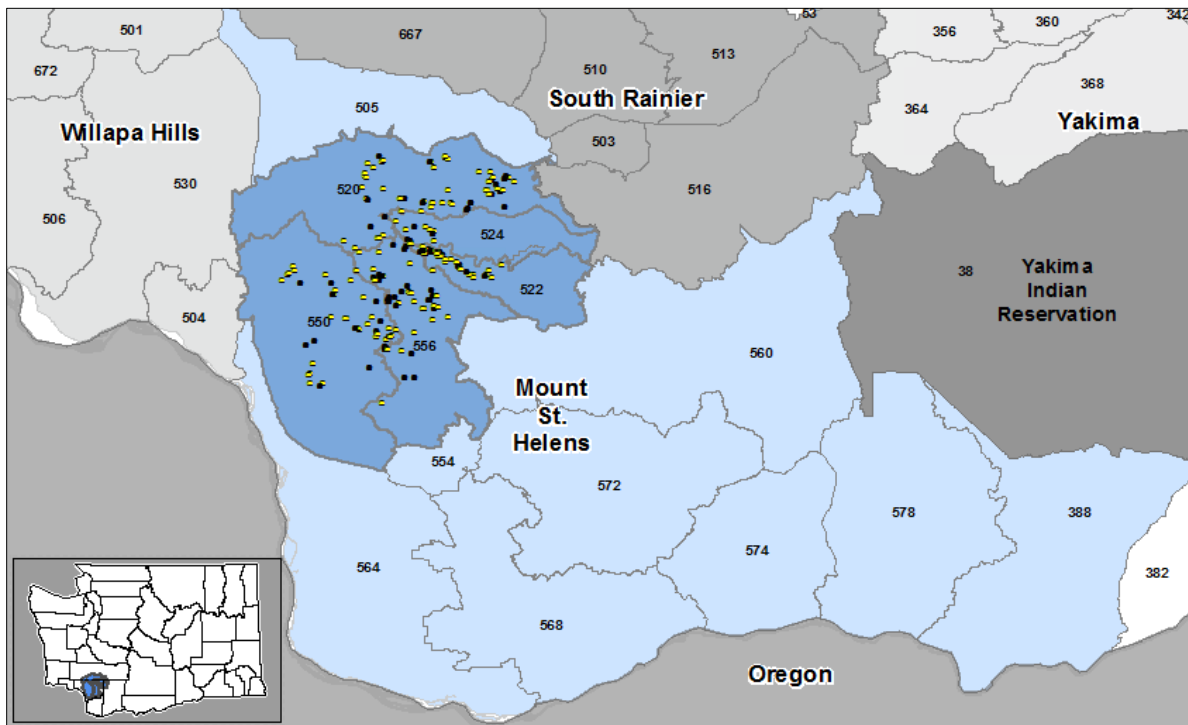


Figure 1. Map depicting the Game Management Units (GMUs) that comprise the Mount St. Helens elk herd area (light blue), the 5 GMUs that represent the core range of the herd and our study area (dark blue), and the locations where we have captured elk affected (yellow) or seemingly unaffected (black) by 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).

GMU	Diseased Group					Control Group				
	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.

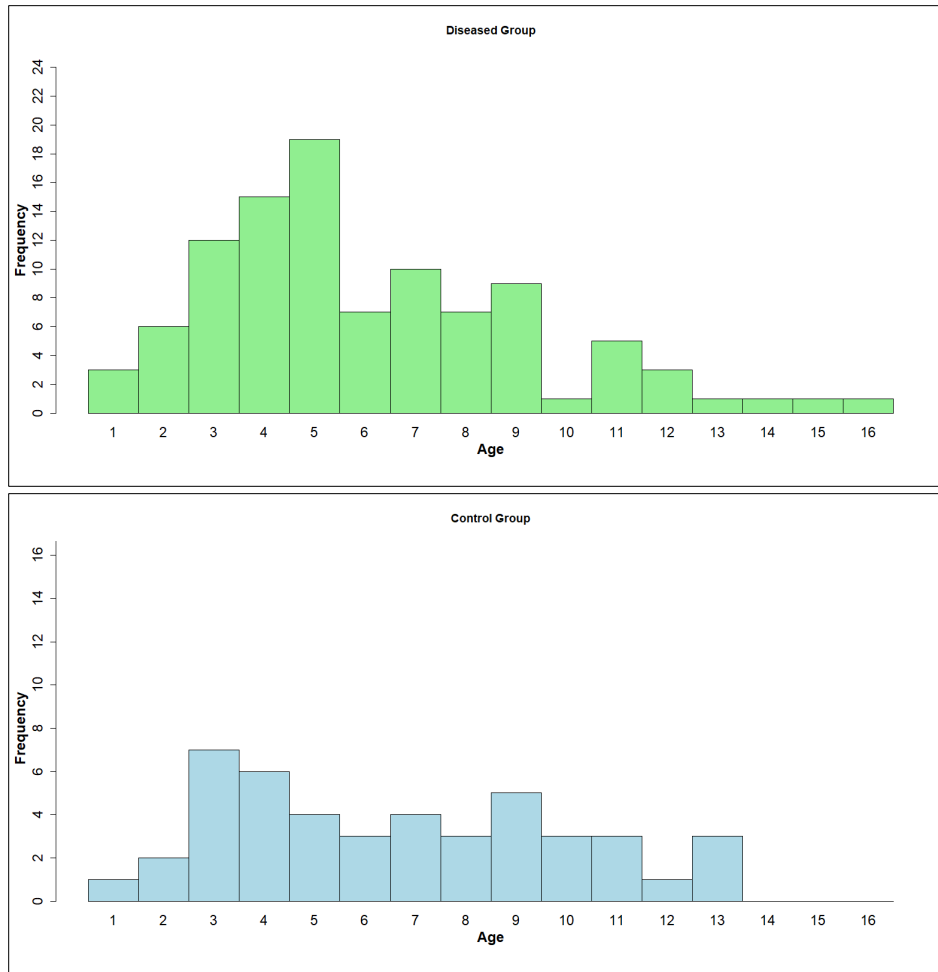


Figure 2. Distribution of ages at time of initial capture for female elk we captured, 2015–2017, that were affected by treponeme-associated hoof disease (Diseased Group) or had no visible signs of being affected by the disease (Control Group).

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).

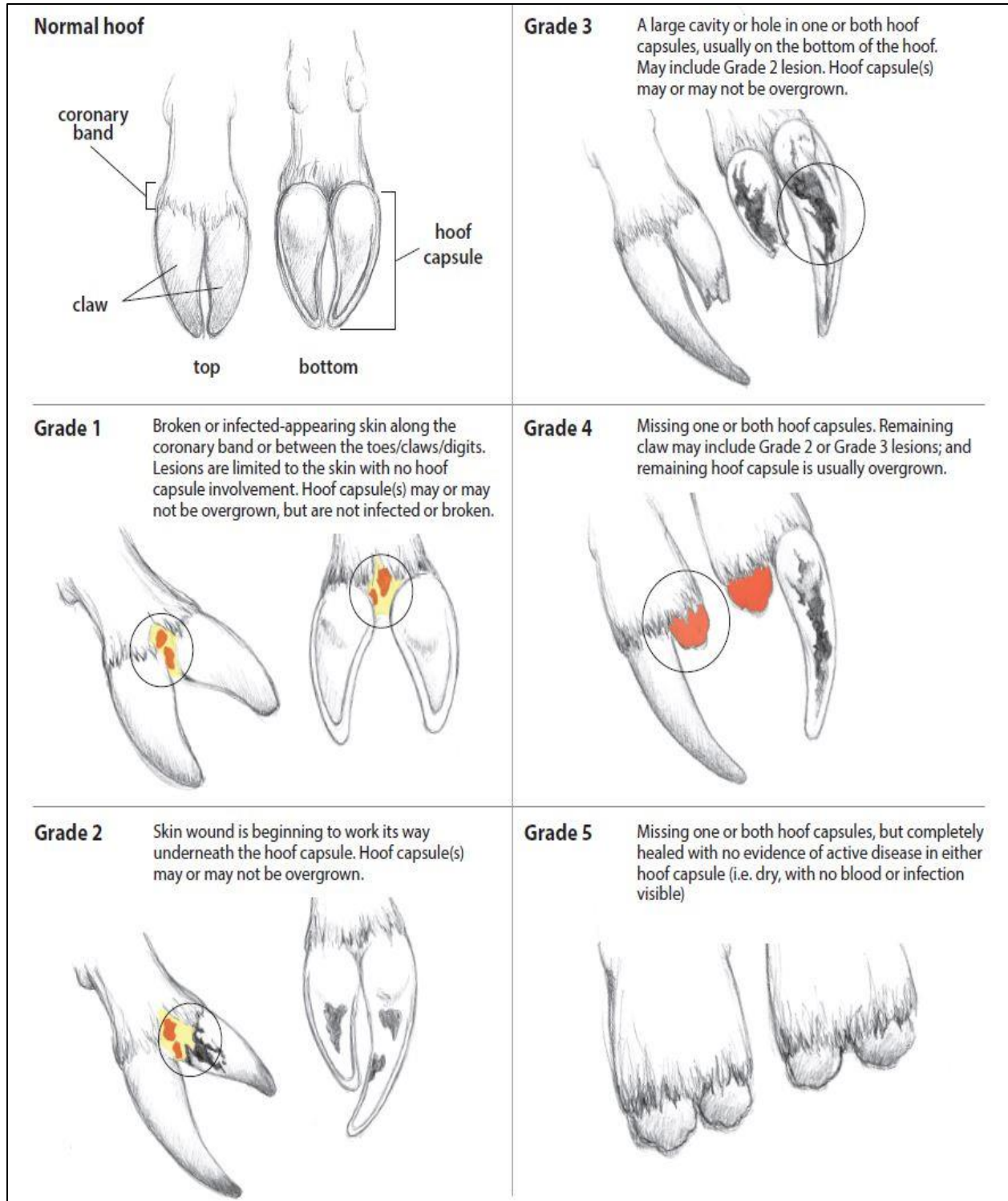


Figure 3. Diagram depicting characteristics we preliminarily associated with the 5 grades of treponeme-associated hoof disease we defined after capturing 60 female elk in February 2015, showing widely variable manifestation of the disease.

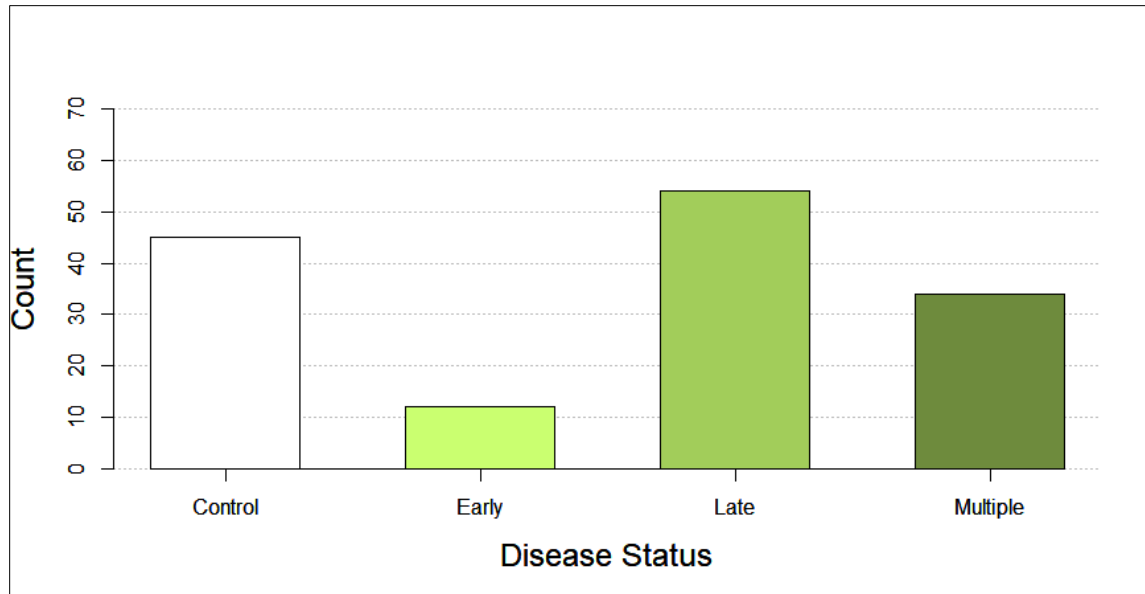


Figure 4. Distribution of hoof condition scores [Control, Early (Grade I or II), Late (Grade III or IV on a single hoof), and Multiple (present on multiple hooves)] at time of initial capture for female elk we captured February 2015–December 2017.

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. (2001a). 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	<i>n</i>	\bar{x}	CI	<i>n</i>	\bar{x}	CI	<i>n</i>	\bar{x}	CI	<i>n</i>	\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.

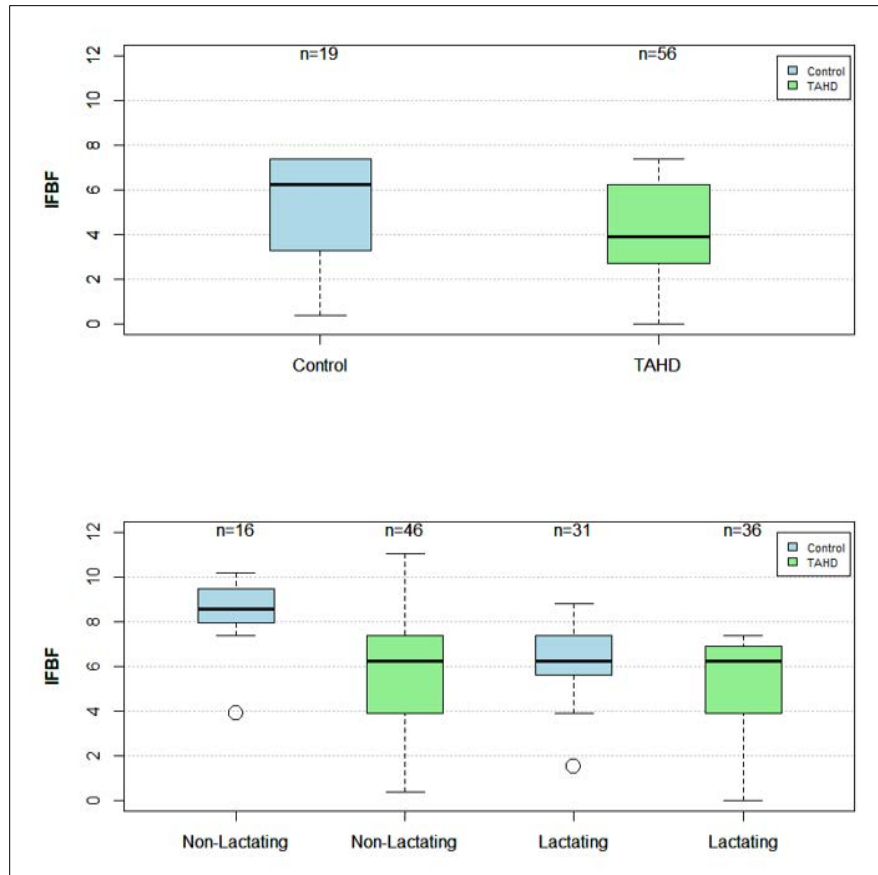


Figure 6. Boxplots of percent ingesta-free body fat (IFBF) by disease status for adult female elk we captured in the Mount St. Helens elk herd area February 2015 (top) and by disease and lactation status for adult female elk we captured December, 2015–2017 (bottom).

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.

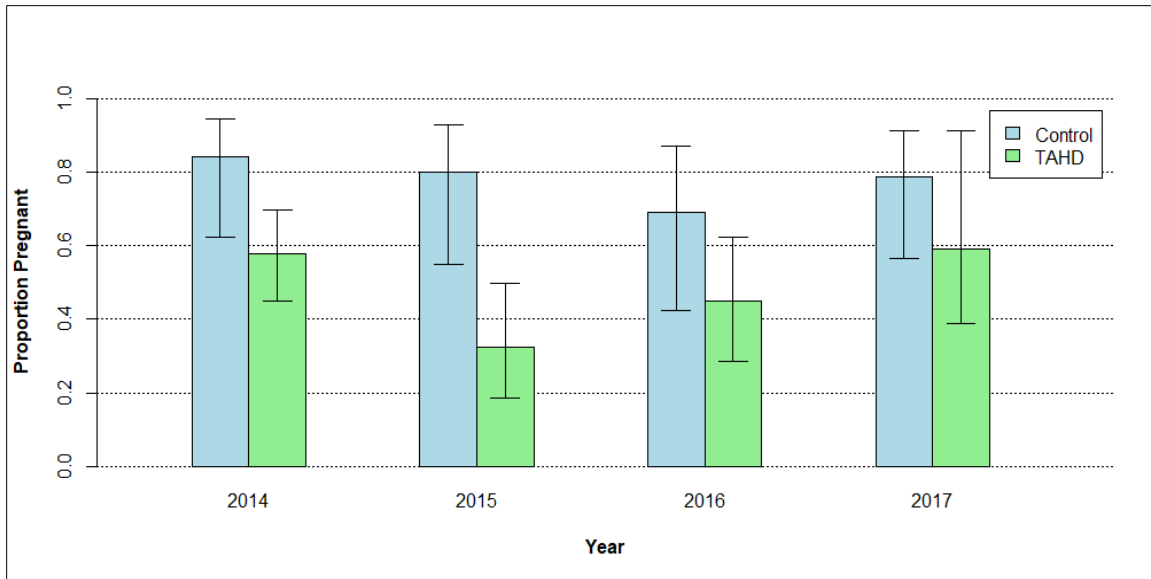


Figure 7. The proportion (and associated 95% confidence intervals) of adult female elk that were pregnant and affected by treponeme-associated hoof disease (TAHD) or had no visible signs of being affected by the disease (Control) at time of capture in the Mount St. Helens elk herd area, 2014–2017.

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.

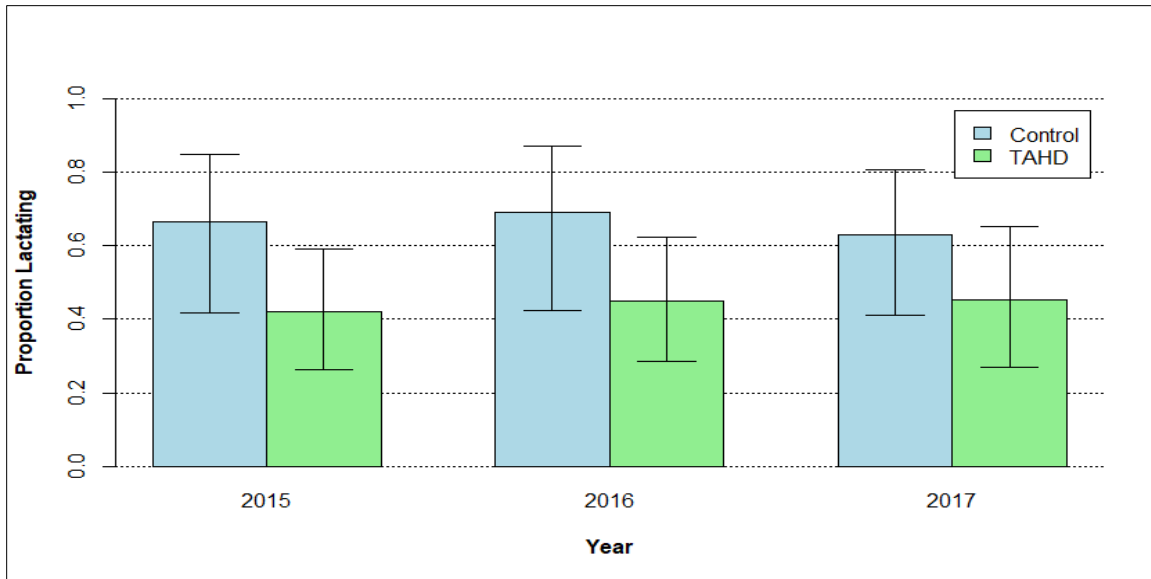


Figure 8. The proportion (and associated 95% confidence intervals) of adult female elk that were lactating in December and affected by treponeme-associated hoof disease (TAHD) or had no visible signs of being affected (Control), in the Mount St. Helens elk herd area, 2015–2017.

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_{Year t}–April 30_{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 (\hat{S}) 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	\hat{S}	CI	\hat{S}	CI	\hat{S}	CI	\hat{S}	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	\hat{S}	CI	\hat{S}	CI	\hat{S}	CI	\hat{S}	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

¹Summer = 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.

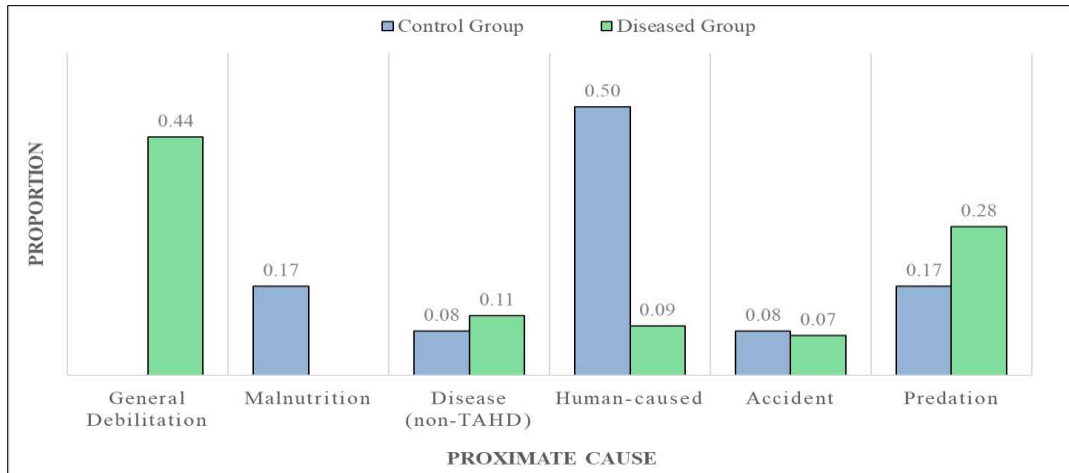


Figure 9. Proportion of deaths by proximate cause for adult female elk that were affected by treponeme-associated hoof disease (Diseased Group) or had no visible signs of being affected by TAHD (Control Group) in the Mount St. Helens elk herd area, February 2015–August 2018.

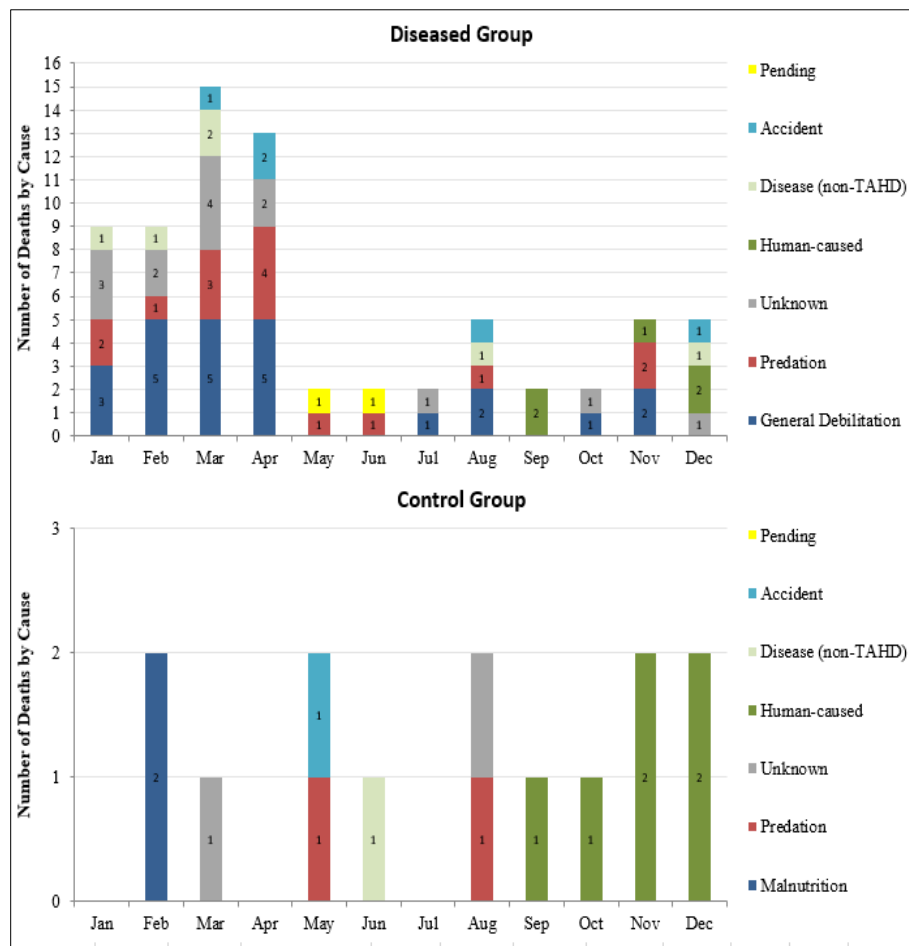


Figure 10. Number of deaths by cause and month for elk that were affected by treponeme-associated hoof disease (Diseased Group) or had no visible signs of being affected by the disease (Control Group) in the Mount St. Helens elk herd area, February 2015–August 2018.

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. 2001a. 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.

From: afa@mcn.org <afa@mcn.org>

Sent: Sunday, April 19, 2020 10:40 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>

Cc: senator.stern@senate.ca.gov

Subject: [Fwd: JAPAN TIMES - China and Wildlife Trade - comments?]

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

----- Original Message -----

Subject: JAPAN TIMES - China and Wildlife Trade - comments?

From: afa@mcn.org

Date: Sun, April 19, 2020 10:37 pm

To: afa@mcn.org

<https://gcc01.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.japantimes.co.jp%2Fopinion%2F2020%2F04%2F18%2Fcommentary%2Fworld-commentary%2Fcan-china-end-wildlife-trade%2F%23.Xp0zgJlICM8&data=02%7C01%7Cfgc%40fgc.ca.gov%7C46e101ecc9704dfa556e08d7e4ed4e18%7C4b633c25efbf40069f1507442ba7aa0b%7C0%7C0%7C637229580177766460&sdata=RRIWtpducwqOQaqusOfL5kIN7Q%2Be%2FddpRjkRUv7v7tQ%3D&reserved=0>

From: kathy Lynch <lynch@lynchlobby.com>

Sent: Tuesday, May 26, 2020 4:03 PM

To: Wildlife PIO ALL <PIOALL@wildlife.ca.gov>; FGC <FGC@fgc.ca.gov>

Cc: kathy Lynch <lynch@lynchlobby.com>

Subject: Press Release: PERC Research Fellow Testifies before Senate Natural Resources & Water Committee at Hearing on Wildlife Trade and the COVID-29 Pandemic

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

Please see the attached press release:

PERC Research Fellow Testifies before California Senate Committee at Hearing on Wildlife Trade and the COVID-19 Pandemic.

Lynch & Associates

1127 11th Street, Suite 610

Sacramento, CA 95814

Tel: (916) 443-0202

Fax: (916)-443-7353

Cell: (916) 838-6600

E-mail: lynch@lynchlobby.com

CONFIDENTIALITY NOTICE: This e-mail message and any attached files are confidential and are intended solely for the use of the addressee(s) named above. If you are not an intended recipient, then you have received this confidential communication in error. Any review, use, dissemination, forwarding, printing, copying, or other distribution of this e-mail message, and any attached file(s), is strictly prohibited and you may be liable to the sender and/or the intended recipient(s) for violating this confidentiality notice. If you have received this confidential communication in error, please notify the sender immediately by reply e-mail message or by telephoning Kathryn Lynch at (916) 443-0202, and permanently delete the original e-mail message, and any attached file(s), and all electronic or paper copies.

<https://www.perc.org/2020/05/26/perc-research-fellow-testifies-before-california-senate-committee-at-hearing-on-wildlife-trade-and-the-covid-19-pandemic/>

May 26, 2020

News for Immediate Release

May 26, 2020

Contact: Hannah Downey, 406-587-9591, hannah@perc.org

PERC RESEARCH FELLOW TESTIFIES BEFORE CALIFORNIA SENATE COMMITTEE AT HEARING ON WILDLIFE TRADE AND THE COVID-19 PANDEMIC

Catherine Semcer testifies before the California Senate on the role of hunting in conserving wildlife habitat in Africa

(Sacramento, California)—PERC research fellow Catherine Semcer testified today before the California Senate Committee on Natural Resources and Water on [SB-1175](#) and the need to ensure that efforts to reduce future pandemics by addressing the international trade in wildlife are focused and equitable. The hearing was held by telephone, and Semcer's testimony centered on a proposal to ban the import and possession of certain African hunting trophies in California as part of the state's pandemic response policy. Semcer specifically addressed the positive contributions of hunting in Africa to conservation, discussed the role of conservation in securing public health, and highlighted the fact that the importation of hunting trophies into the United States has never been linked to an outbreak of disease.

"Africa's hunting industry creates economic incentives that conserve wildlands on a grand scale. The total area conserved by hunting in Africa is more than six times the size of the U.S. national park system," said Semcer. "Trophy import bans like those being considered by the California Senate will make it even harder for Africa's hunting industry to recover from the effects of the Covid-19 pandemic. This will undoubtedly result in African

wildlands being cleared for logging and agriculture, something scientists say we must avoid in order to prevent the next deadly pathogen from emerging. Since the importation of hunting trophies has never been linked to an outbreak of deadly disease, the California Senate would be ill advised to make it harder for African countries to use this market-based tool for keeping wildlands intact.”

Researchers with the Georgetown Center for Global Health and Science Security estimate that 60 percent of emerging human pathogens are zoonotic, and that of these, 70 percent have wildlife origins. Primates, birds, bats, and pangolins, none of which are commonly hunted for trophies, are thought to present an especially high risk of disease transmission to people. The game species covered by the hunting trophy provisions of the legislation being considered by the California Senate have not been identified as presenting a risk to human health and are nonetheless already subject to strict import controls to mitigate any risk that might arise.

Stemming the loss of wildlands in Africa and elsewhere is recognized as a critical step toward reducing the likelihood of future pandemics. Previous outbreaks of Ebola, Lassa fever, and other deadly diseases have been closely linked to the clearing of wildlife habitat for logging and agriculture, which bring groups of people into closer contact with disease-carrying wildlife. **“Africa’s hunting industry helps to keep the continent’s remote areas remote. Importantly it does so in a way that is not dependent on philanthropy or foreign aid because it turns wild areas into an economic asset. Rather than undermine the industry with trade restrictions that will do nothing to benefit conservation or public health, policymakers should appreciate the benefits the industry provides and work to amplify them,” said Semcer.**

Semcer’s testimony highlighted several key points:

- Hunting provides economic incentives and revenue critical to conserving African wildlife in a manner that is self-sustaining and resilient. This includes the conservation of large expanses of habitat and discouraging poaching and illegal wildlife trafficking.
- Hunting and photo-tourism are not interchangeable, and restrictions on hunting have a track record of undermining the conservation of ecosystems and wildlife.

Catherine Semcer’s full written testimony is available [here](#).

From: PETER FLOURNOY 2 [REDACTED]
Sent: Tuesday, June 9, 2020 4:30 PM
To: FGC <FGC@fgc.ca.gov>
Subject: LETTER TO FISH AND GAME COMMISSIONERS ON BEHALF OF ADAM ALIOTTI

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

Good Afternoon Melissa:

Thank you for your letter yesterday accompanying my public records request documents.

This is an entirely different matter. I have attached as a word document an unsigned letter to the Commissioners as well as a pdf of the signed letter. Unfortunately, my scanner at home apparently put an unsightly line down the center of the signed letter.

I think either one would suffice to bring my request to the Commissioners, if you could distribute it.

I hope you and your loved ones are all safe and healthy and staying away from the COVID 19 outbreak!

Thank you, Pete

Peter H. Flournoy CalBar: 43352
International Law Offices of San Diego
740 North Harbor Drive
San Diego, CA 92101
Cell: 619-203-5349
Fax: 619-923-3618
www.international-law-offices.com

Confidentiality Notice: This e-mail message is intended only for the named recipients. It contains information that may be confidential, privileged, attorney work product, or otherwise exempt from disclosure under applicable law. If you have received this message in error, are not a named recipient, or are not the employee or agent responsible for delivering this message to a named recipient, be advised that any review, disclosure, use, dissemination, distribution, or reproduction of this message or its contents is strictly prohibited. Please notify us immediately at 1-619-203-5349 that you have received this message in error, and delete the message.

INTERNATIONAL LAW OFFICES OF SAN DIEGO

TELEPHONE
619.232.0954
CELLULAR
619.203.5349

**740 NORTH HARBOR DRIVE
SAN DIEGO, CA 92101-5806
*established 1989***

FACSIMILE
619.923.3618

PETER H. FLOURNOY

June 9, 2020

California Fish and Game Commission
President Eric Sklar
1416 Ninth Street, Suite 1320
Sacramento, CA 9581

Sent by Email Only to: <https://fgc.ca.gov/>

Re: **Adam Robert Salvatore Aliotti, (No. 17 ALJ04-FGC,
July 12, 2018) and Alecia Dawn, Inc. (N0.17 ALJ-FGC,
July 12, 2018), Aliotti, et al. v Fish and Game Commission
(Sup. Ct. Case No. 19(CV001590))**

Dear Commissioners:

This is an unusual request made because of the uncertain times we are living in and because of the devastating impact that COVID 19 has had on all of California's commercial fishermen, and in particular Adam Aliotti. As you know his commercial fishing license is under suspension until October of 2021 pursuant to a settlement agreement. We request that in accordance with following the fundamental principles of fairness in the Commissioners' Code of Conduct that Adam's license suspension be lifted now.

There is no intention to challenge the administrative law judge's decision, nor the Commission's decision. There is no request to overturn the settlement agreement signed on September 11, 2019 in the Superior Court. Rather, this request is made based on the unusual circumstances Adam faces in this time of a pandemic which has caused the shuttering for months of California restaurants leading to a 65 to 80 percent drop in the businesses to which commercial fishermen sell their catch. Adam's spot prawn permit was restored two months before the 2019-2020 season closed, but that was of no benefit or solace given the COVID 19 closures.

The Department of Fish and Wildlife, recognizing this coastal tragedy is starting to develop a program for dispersing the millions of dollars California has received for its commercial fishermen. While from what I have learned this will be a very generous program, however, it will be keyed to those fishers who have suffered 30% losses in 2020 over their 2019 incomes and who have spent money on licenses and permits. This also does not help Adam since his fishing license and permits were suspended in 2019.

We are asking you to exercise your discretion and in fairness during this unprecedented time to restore Adam's fishing license now. He will still be on probation through March 1, 2024 and under the terms of probation under the settlement agreement if he is found to have committed any fisheries violation

he has waived his right to appeal such a finding. The Commission will still have a hammer over Adam's head when you reduce the time of his fisheries license suspension.

Sincerely,

Peter H. Flournoy

California Fish and Game Commission

Staff Report on Staff Time Allocation and Activities

June 15, 2020

Commission staff time is a tangible and invaluable asset. Especially since the Commission's staff is so small, where and how staff members spend their time is important. This report identifies where Commission staff allocated time to general activity categories and to specific activities during April and May 2020.

A large increase in this reporting period for the commission/committee meetings category represents the work that was necessary to prepare for April's three meetings in a virtual setting. In one case the meeting was hosted by a third-party vendor, yet a significant amount of staff time was required to assign staff roles, conduct test runs, develop instructional materials for attendees, and coordinate with commissioners and participants from the California Department of Fish and Wildlife. Three different technical platforms were used for the meetings and staff necessarily had to quickly become versed in each.

Beginning in April, increases in the administration category were a direct result of a multitude of responsibilities related to the COVID-19 pandemic, such as high-priority requests and guidance from other state agencies (i.e., California Department of Human Resources, California Department of Public Health, California Department of Finance, California Natural Resources Agency), information-gathering, lost efficiencies from teleworking, creating telework and equipment agreements, creating new processes and procedures for a telework environment, learning new technologies and online tools, and the recent COVID-19 contact tracing reassignment. In addition, training several new staff members is also captured in administration.

In May, an analysis of changes proposed by the California Law Revision Commission to the California Fish and Game Code resulted in a large increase in the legal category. Finally, the drop in unfilled positions in both months reflects the recent successful hiring efforts that began in December.

General Allocation

Task Category	April Staff Time	May Staff Time
Regulatory Program	14%	8%
Non-Regulatory Program	2%	4%
Commission/Committee Meetings	39%	15%
Legal Matters	4%	11%
External Affairs	6%	6%
Special Projects	7%	12%
Administration	23%	32%
Leave Time	7%	13%
Unfilled Positions	12%	6%
Total Staff Time ¹	113%	107%

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

Sample of Activities for April 2020

- 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 daily and weekly COVID-19 task force calls with CNRA and directors of other state agencies in the natural resource family
- Prepared for and conducted three publicly noticed meetings (April 9 Commission, April 15-16 Commission, April 29 Marine Resources Committee)
- Began preparations for two publicly noticed meetings (May 14 Commission, May 14 Wildlife Resources Committee)
- 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 deputy executive director and staff services analyst
- Began onboarding new regulatory analyst
- Participated in training for digital document accessibility and various technical platforms for hosting meetings
- Participated in managers and supervisors update meeting and all-CDFW staff broadcast meeting with CDFW director
- Continued analysis of California Law Revision Commission's proposed changes to California Fish and Game Code
- Conducted bullfrog stakeholder meeting
- Participated in MPA Statewide Leadership Team meeting

Sample of Activities for May 2020

- 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
- Developed COVID-19 stay-at-home modification plan for Commission office
- Implemented new office procedures to ensure the safety of staff working in the office during the COVID-19 pandemic
- Prepared for and conducted three publicly noticed meetings (Mar 5 Wildlife Resources Committee, Mar 17 Resources Committee)
- Coordinated with audio-visual and webcast contractors, and California Department of Fish and Wildlife (CDFW Marine) and California Natural Resources Agency (CNRA) staff to develop and implement new protocols for hosting meetings remotely
- Participated in three-day Administrative Procedure Act training from the Office of Administrative Law
- Continued onboarding new deputy executive director, staff services analyst, and regulatory analyst

- Participated in training for various technical platforms for hosting meetings and collaborating online
- Continued analysis of California Law Revision Commission's proposed changes to California Fish and Game Code
- Participated in aquaculture coordination meeting with the California Ocean Protection Council and CDFW
- Participated in update for commercial marine algae survey with CDFW

General Allocation Categories with Sample Tasks (Pre-COVID-19)

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

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

California Fish and Game Commission

Staff and Contractor Biographies

June 2020

Executive Director (Commission appointee): *Melissa Miller-Henson*

Melissa began her work at the Commission in 2012 focused on organizational effectiveness and efficiency, and then became the program manager where she managed appeals, oversaw the rulemaking program, and provided program and policy advice to the executive director and Commission as well as general administrative direction and supervision for staff. She was also the deputy executive director and then the acting executive director until appointment by the Commission as executive director in September 2019. She is responsible for creating an environment where the public, scientists, government agencies, and tribal nations can work with the Commission to realize sound stewardship of California's fish and wildlife resources.

In the first part of her career, Melissa worked with the California Natural Resources Agency on various natural resource management issues, including seven years managing the Marine Life Protection Act Initiative, and a year managing the California Fish and Wildlife Strategic Vision Project. Melissa's experience includes policy analysis, facilitating multi-disciplinary teams, project management, media and stakeholder communications, translating science for policy-makers, strategic planning, and ecosystem-based conservation and management.

Melissa received a bachelor of science degree from UC Davis in environmental policy analysis and planning. Her master's in business administration work, also completed at UC Davis, emphasized public sector and human resources management. In her spare time, she is a professional whitewater raft guide and loves spending time outdoors.

Deputy Executive Director (career executive assignment): *Rachel Ballanti*

Rachel joined the Commission in March 2020 as the deputy executive director where she focuses on advising the executive director in resolving administrative issues, implementing administrative priorities, aiding the executive director in strategic planning, overseeing Commission meeting preparation, and directing the activities of a professional staff.

Prior to joining the Commission, Rachel served as a section chief and program manager for the California Department of Water Resources' (DWR) Financial Assistance Branch, managing the Integrated Regional Water Management Implementation Grant Program and the Water-Energy Grant Program. Previously, she held several positions at the California Water Commission including assistant executive officer and acting executive officer. At the Water Commission, she worked in the areas of policy and program development, inter-agency coordination, and tribal and stakeholder involvement for programs, including the Water Storage Investment Program. She also held several positions within DWR, including as advisor to the chief deputy director. She holds a bachelor's degree from UC Irvine and master of public administration from University of Southern California.

Legal Counsel (attorney IV assigned to commission): *Michael Yaun*

Mike became the Commission's legal counsel in 2015. He provides legal advice to the Commission in both open and closed sessions of all regular, special and emergency meetings. He conducts legal research and provides advice to the commissioners, the executive director, and other Commission staff members on issues before the Commission to help implement direction from the Commission and prepare for Commission meetings. He also coordinates with litigation counsel provided by the California State Attorney General's office.

Prior to working for the Commission, Mike worked for almost 14 years as an attorney for the Florida Fish and Wildlife Conservation Commission. In various roles at the Florida commission, he worked on a wide variety of issues dealing with both state and federal regulation of fish and wildlife; his focus was on state- and federally-listed species.

Mike has a bachelor's degree from University of Florida and a law degree from Florida State University. When he's not working, Mike loves to explore nature with his wife usually by trail running, mountain biking, and whitewater kayaking.

Marine Advisor (senior environmental scientist – specialist): *Susan Ashcraft*

Susan joined the Commission in February 2014 as a senior environmental scientist, where she provides independent guidance and recommendations on a wide range of marine policy and management issues; supports the activities of the Marine Resources Committee; conducts scientific, regulatory and policy review and analysis; and is the Commission's liaison to partners, stakeholders, and the California Department of Fish and Wildlife (CDFW) Marine Region. In 2019 she served as the acting deputy executive director for 12 months, a responsibility she also held in 2016 for 12 months.

Prior to joining the Commission, she worked for the CDFW Marine Region for over 16 years on a range of marine fisheries and resource management projects with state and federal agencies and stakeholders, served as a California representative on the Pacific Fishery Management Council Groundfish Management Team, and supported the marine protected areas planning project as supervisor and specialist under the Marine Life Protection Act Initiative. Her many years of service with the Marine Region provide a unique foundational working relationship among Commission and department leadership, project staff, and stakeholders.

Susan received a bachelor's degree from UC Santa Cruz in biology, with an emphasis in marine biology, and completed master's work in marine science at Boston University's Marine Program in Woods Hole, Massachusetts.

Wildlife Advisor (senior environmental scientist – specialist): *Ari Cornman*

Ari joined the Commission staff in May 2018 and functions as the staff expert on terrestrial wildlife and inland fisheries for issues throughout the state. Previously, Ari worked on wildlife issues for a tribe in Michigan and worked at the Attwater Prairie Chicken National Wildlife Refuge in Eagle Lake, Texas, where he helped restore endangered bird populations and their habitat. He also worked in the U.S. Fish and Wildlife Service Colorado Field Office and the Mountain-Prairie Regional Office on wetlands, endangered species, waterfowl, wildfire, and regulations. He has studied and coauthored papers on carnivore biology and human-wildlife

interactions. He teaches and facilitates conservation planning and adaptive management using the Open Standards for the Practice of Conservation as a member of the international Conservation Coaches Network.

Ari earned a bachelor of science degree in ecology and philosophy (dual major) from Juniata College in Pennsylvania and an M.S. in biology from Truman State University in Missouri.

Program Manager (staff services manager I): *David Thesell*

David began with the Commission in November 2017 and serves as a member of the executive leadership team, oversees general administrative functions to ensure the Commission's daily office operations promote accountability, effectiveness and efficiency; administers a statewide regulatory program to meet statutory mandates; renders management advice that impacts Commission programs and policies; oversees development of materials for all Commission meetings; manages special projects; ensures timely response to Public Records Act requests; oversees records management; and provides direction and supervision of regulatory staff.

Previously, David worked for the California Department of Conservation (DOC) for over ten years. He served as deputy chief for the DOC Division of Land Resource Protection, where he was the administrative chief overseeing daily operations and programs dedicated to preserving farmland. In 2012, David was named program manager for the division's various grant programs, which included the department's popular watershed coordinator program, a statewide, bond-funded program to improve natural resource conditions on a watershed basis. He also served as program manager and liaison to the California Strategic Growth Council, to issue grant funds to assist local agencies in adopting sustainable and climate-friendly strategies into their planning updates. Prior to joining the state, David was a grants and financial manager for a private family foundation in San Francisco.

David earned his bachelor of science degree in business administration from California State University, Sacramento. A Sacramento native, he enjoys camping with his wife and two daughters, long-distance trail running, and volunteering as a ski patroller with the Eldorado Backcountry Ski Patrol. Since 2011, he serves as an advisory council member for Save the American River Association, a local grassroots environmental organization.

Regulatory Analyst and Administrative Officer (associate governmental program analyst): *Sherrie Fonbuena*

As the second most senior staff member, Sherrie joined the Commission staff in 1998. She reviews, analyzes and develops regulatory documents, with a general focus on marine issues; consults with Office of Administrative Law staff attorneys regarding, and provides research related to, rulemaking files; serves as the administrative officer for the Commission, coordinating with and advising the executive director on personnel, budget/fiscal and business service activities, and recommending solutions to administrative problems; administers the Commission website; assists in developing regulatory training materials and providing training to other staff; and researches and responds to correspondence.

Regulatory Analyst (associate governmental program analyst): *Craig Castleton*

Craig moved to California from Scotland in 2015 and began his career in Sacramento by volunteering in the visitor office and archives of the Historic City Cemetery. He also worked as a visitor services associate at the California Museum, and started working for the State of California in 2016 as a park interpretive specialist with the California State Railroad Museum Library and Archives. In 2017, Craig became a staff services analyst with the California Conservation Corps, where he worked for human resources in hiring and position control. Craig joined the Commission staff in August 2018, and reviews, analyzes and develops regulatory documents, with a general focus on sport and commercial fishing; consults with Office of Administrative Law staff attorneys regarding, and provides research related to, rulemaking files; assists in editing the Commission website; prepares materials for Commission meetings and administers the Commission's records management system.

Craig graduated from the University of Aberdeen with a bachelor of science degree in archeology and geography (joint major), and has taken classes in geographic information systems at American River College. Craig now lives in Sacramento with his wife, Fiona, their new baby, and two cats, and is proud to call the city home. He enjoys camping, hiking, and exploring the diverse landscapes of California, and is a keen long-distance runner.

Regulatory Analyst (associate governmental program analyst): *Jon Snellstrom*

Jon began his state service in 1991 with what was then known as the California Department of Fish and Game License and Revenue Branch and then joined the Commission staff in 1992. As the most senior staff member and unofficial historian, Jon works primarily with sport fish and hunting general regulations, emergency regulations, and regulations that are non-substantive or that have no regulatory effect by reviewing, analyzing and developing regulatory documents; consults with Office of Administrative Law staff attorneys regarding, and provides research related to, rulemaking files, maintains the Commission's rulemaking timetable and reports annual regulatory expectations to the Office of Administrative Law; develops and maintains regulatory training materials for new California Department of Fish and Wildlife and Commission staff; and tracks, researches and responds to correspondence. He is also the Commission's talented in-house artist and graphic designer.

Regulatory Analyst (associate governmental program analyst): *Jenn Greaves*

Jenn joined the Commission in April 2020. In addition to managing a suite of rulemakings, she reviews, analyzes and develops regulatory files related to threatened and endangered species, as well as other subjects related to hunting and commercial and recreational fishing, and consults with Office of Administrative Law staff attorneys regarding, and provides research related to, rulemaking files. She also reviews and processes petitions for listing threatened, endangered and other protected species, and prepares administrative records of regulatory and petitioned actions for court challenges.

Jenn graduated from Sacramento State University with a bachelors in psychology and criminal justice, and a certificate in applied behavioral analysis. She worked for many years as a behavioral therapist, teaching autistic adolescents school curriculum, social, and life skills. She returned to school to earn a masters degree in justice and security. Most recently, Jenn worked as data analyst at the California Department of Social Services.

Jenn volunteered for many years at the Folsom Zoo and Sanctuary assisting with animal rehabilitation and conducting educational outreach. Her fiancé and she are the proud parents of three non-human boys (two dogs and red-tailed boa). They enjoy spending time outdoors, traveling, and checking off their national park bucket list.

Executive Assistant (staff services analyst): *Cynthia McKeith*

Cynthia joined the Commission in March 2020 and performs a wide variety of analytical, administrative, consultative, and executive-level support duties. Cynthia provides support to the executive director, deputy executive director, Commission president and members, and staff. She also arranges travel itineraries, completes commissioner expense claims, and facilitates site management for all Commission meetings, including making reservations for meeting sites and travel arrangements for commissioners and staff.

Cynthia completed two years at UC Berkeley with concentrations in math and science and then transferred to Scripps College, graduating with a bachelor of science degree in fine art. She has a great love of the outdoors and is a certified California Naturalist, an active member of the Sierra Club, and a regular contributor to a number of citizen science projects. She enjoys volunteering for the American River Parkway Foundation and Sacramento SPCA, hiking, kickboxing, and mountain biking.

Sea Grant State Fellow 2020 (contractor): *Rose Dodgen*

Rose joined the Commission in February 2020 for a 12-month fellowship under the California Sea Grant State Fellows Program. She is assisting with Commission and committee meeting preparations and is working on multiple projects, including one to highlight and address the challenges faced in California's coastal fishing communities based.

Rose received her bachelor of science degree in biological sciences in 2016 from UC Santa Barbara and completed her master's in biological sciences at California Polytechnic State University, San Luis Obispo in early 2020. Her thesis focused on differences in assessment metrics of rockfish species in fisheries-independent and fisheries-dependent data from the central coast of California. She is hoping that her research will help determine how best to potentially incorporate fisheries-independent data into stock assessments of rockfish. Rose is passionate about providing the best available science for assessing and protecting marine species.



Department of Fish & Wildlife Legislative Report

June 2020

(as of June 16, 2020)

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: 1/28/2020-In Senate. Read first time. To Com. on RLS. for assignment.

Location: 1/28/2020-S. RLS.

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 664

(Cooper D) Workers' compensation: injury: communicable disease.

Introduced: 2/15/2019

Last Amend: 5/18/2020

Status: 5/18/2020-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 coronavirus

disease 2019 (COVID-19), that is the subject of a state or local declaration of a state of emergency that is issued on or after January 1, 2020. The bill would create a conclusive presumption, as specified, that the injury arose out of and in the course of the employment. 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 995

(Garcia, Cristina D) Hazardous waste.

Introduced: 2/21/2019

Last Amend: 9/6/2019

Status: 9/9/2019-Withdrawn from committee. Re-referred to Com. on RLS.

Location: 9/9/2019-S. RLS.

Summary: This bill would create the Board of Environmental Safety in the California Environmental Protection Agency. The bill would provide requirements for the membership of the board and would require the board to conduct no less than 6 public meetings per year. The bill would provide for the duties of the board, which would include, among others, reviewing specified policies, processes, and programs within the hazardous waste control laws; proposing statutory, regulatory, and policy changes; and hearing and deciding appeals of hazardous waste facility permit decisions.

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: 4/24/2020

Status: 4/24/2020-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 1561

(Rubio, Blanca D) Endangered wildlife: crocodiles and alligators.

Introduced: 2/22/2019

Last Amend: 9/6/2019

Status: 9/9/2019-Read second time. Ordered to third reading. Re-referred to Com. on RLS. pursuant to Senate Rule 29.10(c).

Location: 9/9/2019-S. RLS.

Summary: Would delay the commencement of the prohibition on importing into the state for commercial purposes, possessing with intent to sell, or selling within the state, the dead body, or a part or product thereof, of a crocodile or alligator until January 1, 2021. This bill contains other related provisions.

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: 6/11/2020-In Senate. Read first time. To Com. on RLS. for assignment.

Location: 6/11/2020-S. RLS.

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

(Aguilar-Curry D) State agencies: meetings.

Introduced: 1/30/2020

Last Amend: 6/4/2020

Status: 6/9/2020-In Senate. Read first time. To Com. on RLS. for assignment.

Location: 6/9/2020-S. RLS.

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

(Aguilar-Curry D) Wildlife habitat: Nesting Bird Habitat Incentive Program: upland game bird hunting validation: state duck hunting validation.

Introduced: 2/6/2020

Last Amend: 5/4/2020

Status: 6/9/2020-In Senate. Read first time. To Com. on RLS. for assignment.

Location: 6/9/2020-S. RLS.

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 of Fish and Wildlife for the Nesting Bird Habitat

Incentive Program, in the Nesting Bird Habitat Incentive Subaccount, which the bill would create in the California Waterfowl Habitat Preservation Account.

AB 2122

(Rubio, Blanca D) Unlawful cannabis activity: enforcement.

Introduced: 2/6/2020

Status: 6/11/2020-Read third time. Passed. Ordered to the Senate. (Ayes 78. Noes 0.) In Senate. Read first time. To Com. on RLS. for assignment.

Location: 6/11/2020-S. RLS.

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: 6/4/2020

Status: 6/9/2020-In Senate. Read first time. To Com. on RLS. for assignment.

Location: 6/9/2020-S. RLS.

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: 6/4/2020

Status: 6/9/2020-In Senate. Read first time. To Com. on RLS. for assignment.

Location: 6/9/2020-S. RLS.

Summary: Would require the Office of Planning and Research, by July 1, 2021, to convene a climate science advisory team of distinguished scientists to advise on climate planning and adaptation efforts in the state and to, among other things, provide input to improve climate adaptation and 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 and sustainable communities.

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 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: 6/9/2020-In Senate. Read first time. To Com. on RLS. for assignment.

Location: 6/9/2020-S. RLS.

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: 6/11/2020-In Senate. Read first time. To Com. on RLS. for assignment.

Location: 6/11/2020-S. RLS.

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: 6/4/2020

Status: 6/9/2020-In Senate. Read first time. To Com. on RLS. for assignment.

Location: 6/9/2020-S. RLS.

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: 6/11/2020-In Senate. Read first time. To Com. on RLS. for assignment.

Location: 6/11/2020-S. RLS.

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 288

(Wiener D) California Environmental Quality Act: exemptions.

Introduced: 2/13/2019

Last Amend: 6/3/2020

Status: 6/15/2020-Re-referred to Com. on RLS. pursuant to Assembly Rule 96.

Location: 6/15/2020-A. RLS.

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 revise and recast the above-described exemptions and further exempt from the requirements of CEQA certain projects for the institution or increase of bus rapid transit and regional rail services on public rail or highway rights of way, as specified, whether or not it is presently used for public transit, as specified, and projects for the institution or increase of passenger or commuter service on high-occupancy vehicle lanes or existing roadway shoulders.

SB 587

(Monning D) California Sea Otter Voluntary Tax Contribution Fund.

Introduced: 2/22/2019

Last Amend: 1/6/2020

Status: 1/23/2020-Read third time. Passed. (Ayes 37. Noes 0.) Ordered to the Assembly. In Assembly. Read first time. Held at Desk.

Location: 1/23/2020-A. DESK

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 899

(Wiener D) Planning and zoning: housing development: higher education institutions, nonprofit hospitals, or religious institutions.

Introduced: 1/30/2020

Last Amend: 5/27/2020

Status: 6/11/2020-Set for hearing June 18.

Location: 6/9/2020-S. APPR. SUSPENSE FILE

Summary: The Planning and Zoning Law requires each county and city to adopt a comprehensive, long-term general plan for its physical development, and the development of certain lands outside its boundaries, that includes, among other mandatory elements, a housing element. That 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. This bill would require that a housing development project be a use by right upon the request of an independent institution of higher education, nonprofit hospital, nonprofit diagnostic or treatment center, nonprofit rehabilitation facility, nonprofit nursing home, or religious institution that partners with a qualified developer on any land owned in fee simple by the applicant if the development satisfies specified criteria. The bill would define various terms for these purposes.

SB 902

(Wiener D) Planning and zoning: housing development: density.

Introduced: 1/30/2020

Last Amend: 5/21/2020

Status: 6/11/2020-Set for hearing June 18.

Location: 6/9/2020-S. APPR. SUSPENSE FILE

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: 6/11/2020-Set for hearing June 18.

Location: 6/9/2020-S. APPR. SUSPENSE FILE

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: 6/2/2020

Status: 6/9/2020-Read second time. Ordered to third reading.

Location: 6/9/2020-S. THIRD READING

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 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 1168

(Morrell R) State agencies: licensing services.

Introduced: 2/20/2020

Last Amend: 5/13/2020

Status: 6/11/2020-Set for hearing June 18.

Location: 6/9/2020-S. APPR. SUSPENSE FILE

Summary: Would require a state agency that issues any business license to establish a process for a person or business that is experiencing economic hardship as a result of an emergency caused by a virus to submit an application for deferral of fees required by the agency to obtain a license, renew or activate a license, or replace a physical license for display.

SB 1175

(Stern D) Animals: prohibitions on importation and possession of wild animals: live animal markets.

Introduced: 2/20/2020

Last Amend: 6/2/2020

Status: 6/11/2020-Set for hearing June 18.

Location: 6/9/2020-S. APPR. SUSPENSE FILE

Summary: Would require the Department of Fish and Wildlife to immediately suspend any authorization to import a wild animal species into the state when the evidence suggests zoonotic transmission from this species, or a closely related species, could be responsible for a novel, readily transmissible human disease in order to protect the public health. The bill would prohibit the department from authorizing the importation of any individual animals of a wild animal species that could be responsible for zoonotic transmission of a readily transmissible human disease until a robust testing protocol is implemented to ensure that all individual animals subject to an authorization are not carriers.

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: 6/11/2020-Read third time. Passed. (Ayes 39. Noes 0.) Ordered to the Assembly. In Assembly. Read first time. Held at Desk.

Location: 6/11/2020-A. DESK

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 1296

(Durazo D) Natural resources: the Nature and Parks Career Pathway and Community Resiliency Act of 2020.

Introduced: 2/21/2020

Last Amend: 6/2/2020

Status: 6/11/2020-Set for hearing June 18.

Location: 6/9/2020-S. APPR. SUSPENSE FILE

Summary: Current law establishes various environmental and economic policies and programs. This bill, upon appropriation by the Legislature, would establish the Nature and Parks Career Pathway and Community Resiliency Act of 2020, which would require state conservancies and the Wildlife Conservation Board to establish independent grant programs to fund climate mitigation, adaptation, or resilience, natural disaster, and other climate emergency projects, as specified.

SB 1320

(Stern D) Climate change: California Climate Change Assessment.

Introduced: 2/21/2020

Status: 6/11/2020-Set for hearing June 18.

Location: 6/9/2020-S. APPR. SUSPENSE FILE

Summary: Would require the Office of Planning and Research 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 every 2 years and to publish the assessment in October of each odd-numbered year. The bill would require the assessment to assess and report the impacts and risks of climate change and identify potential solutions to inform legislative policy, as provided. The bill would require the assessment to include sector-specific liability projections that assess the impacts of climate change under varied emissions scenarios for the years 2025, 2030, 2050, and 2100.

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:

Clark Blanchard, CDFW Acting Deputy Director at (916) 651-7824

Julie Oltmann, CDFW Legislative Representative at (916) 653-9772

Kristin Goree, CDFW Legislative Coordinator at (916) 653-4183

You can also find legislative information on the web at <http://leginfo.legislature.ca.gov/> and follow the prompts from the 'bill information' link.



Safari Club International

A NON-PROFIT ORGANIZATION ♦ DEDICATED TO CONSERVING WILDLIFE AND PRESERVING HUNTING



SCI CA Coalition

June 5, 2020

The Honorable Anthony Portantino, Chair
Senate Appropriations Committee
California State Senate
State Capitol Building
Sacramento, CA 95814

Position: **STRONGLY OPPOSE POLICY AND FISCAL
IMPACTS**

Location: Senate Appropriations Committee

Re: [SB 1175](#) (Stern) Animals: prohibitions on importation and possession of wild animals: live animal markets (As Amended June 2, 2020)

Dear Senator Portantino and Committee Members:

Safari Club International and Safari Club International Foundation (SCI) is a worldwide Non-Profit organization with the mission to protect the freedom to hunt and to promote wildlife conservation. SCI recognizes hunting as a valuable management tool. SCI currently has over 45,000 members and approximately 4,000 members in California. SCI also has 30,000 California Affiliates, 950,000 U.S. Affiliates and over 7,000,000 International Affiliates. SCI spends millions annually for Wildlife Conservation, Research and Education.

The Safari Club International CA Coalition (SCI CA) continues to oppose SB 1175, as amended June 2, 2020. SCI CA is comprised of the California chapters of Safari Club International (SCI). Please see the attached letter focused on policy objections filed with the Senate Natural Resources and Water Committee on May 14, 2020, SB 1175 is so fiscally irresponsible concerning the use of valuable California resources for wildlife that this separate fiscal letter is needed to highlight the fiscal issues and consequential impact on our own wildlife.

First, SB 1175 is an **expanded** version of [SB 1487](#), vetoed in 2018 by Governor Brown. It will lead to **fruitless litigation** for the state as occurred in New Jersey in 2016 under the Obama Administration. That law was challenged in federal court under the Endangered Species Act (ESA). After New Jersey realized its law was plainly in violation of the ESA, it entered into a consent decree with the plaintiffs. New Jersey agreed that its law was illegal and preempted to the extent it applied to wildlife for which the U.S. Fish and Wildlife Service (USFWS) granted import permits or authorizations. Order and Judgment, *Conservation Force v. Porrino*, Case No. 16-4124 (D.N.J.), ECF 18 *August 29, 2016) (“the State recognizes the Act would be preempted and unenforceable against a person or entity for activities which are authorized by a permit or exemption provided for in the ESA or in any regulation which implements the ESA....”); *see also Conservation Force v. Porrino*, No. CV1604124FLWLHG, 2017 WL 1488129, at *1 (D.N.J. Apr. 25, 2017) (describing earlier ruling in case as “this Court’s August 29, 2016 entry of a consent Order and Judgment finding elements of N.J.S.A. 23:2A-6.1 (the “Act”) to be preempted under the Endangered Species Act of 1973, 16 U.S.C. §§ 1531-1543). **California should not enact a law that is contrary to federal law and that will expose it to the expense of defending inevitable and unwinnable legal challenges.**

This bill combines several different topics in one bill and creates confusion by comingling live animal markets with legitimate hunting experiences, requiring **multiple agency regulatory engagement** such as the California

Department of Food and Agriculture, Department of Fish and Wildlife, and likely the Department of Justice and, of course, local enforcement entities including the Judiciary.

The game species covered by these provisions have not been identified as presenting human health risk, but primates, birds and bats do seem to be the origins of the majority of pathogens as stated by major global health and security experts. **Science and facts matter** as we have learned **in discussion of pandemics**, and it is **irresponsible** to use a pandemic as a shield to smear and promote anti-hunting measures in the name of public health and safety. There are strict import controls in place currently, and the African species referenced in this bill have never been linked to an outbreak of a disease.

The Department of Finance in 2018 indicated costs for SB 1487, a pared-back version of SB 1175, would have required, if enacted, 12 new positions and **\$3 Million** from the **General Fund** for startup and \$2.8 Million of **General Fund** ongoing to support enforcement activities and develop protocols for testing and handling species. It is important to note this bill **expands on the definition** of Iconic African Species to add pangolin and baboons, to name a few, thus **increasing the fiscal impacts** even more. This, of course, does not anticipate the addition of the new policy included which regulates live animal markets. While we do not oppose these live animal provisions on policy, the fiscal impacts need to be evaluated and calculated. **None of this was anticipated in the Fiscal Year 2020-21 Budget proposal.**

The Legislature in 2018 adopted trailer bill language in the Budget to require the Department of Fish and Wildlife (DFW) to undergo an **independent service-based budget review** to evaluate its revenue structure and programs. Many stakeholder organizations have been participating in that activity, and SB 1175 **undermines** that work and layers new programs on top of a **struggling agency**, thus adding increased burdens to **overly stressed law enforcement** personnel while limiting their efforts to manage our own resources in the state.

The May Revise of the FY 2020-21 Budget acknowledges the impact of our current fiscal situation on the DFW. While the budget process is pending, it is clear the Department is financially strained, and it is proposed that the General Fund expenditure be reduced by **\$33.7 Million**, anticipating that the federal government will backfill these losses. **It is not lost on observers that SB 1175 is attempting to pre-empt federal and international laws and procedures to regulate other countries' wildlife while, at the same time, the state is asking for federal financial assistance to support and backfill our own wildlife in California.**

The Legislature, in its June 4, 2020 Floor Report response to the May Revise, appropriately rejected the reduction of this important funding, and the obligation to existing programs and implementation of statutes need to be completed before piling on an additional workload to a department that was undergoing financial challenges heading into the budget year.

A few observations on the impact on our resources and current programs and prior obligations with taxpayer dollars outlined in the May Revise below. These should be prioritized before considering new programs:

- 1) 3600, issue 222 adds \$757,000 to the Fish and Game Preservation Fund to **align** expenditures and revenues for 12 dedicated accounts. This glaringly demonstrates the current Department revenues are already less than needed to manage existing programs
- 2) 3600, Issues 331-341 **would delete \$9.3 Million** from the Department's **service based programs** which includes modernization, biodiversity and regulatory efficiencies to protect and preserve California's natural resources
- 3) 3600, Issue 335, would delete \$2.742 million originally budgeted to pay for a **bobcat population** assessment and management plan and the plan's implementation. This is part of the obligation of prior legislation. The Legislature, in its June 4, 2020 Floor Report response to the May Revise, appropriately approved the continuation (rather than deletion) of this important funding

The State of California is consistently among the top states benefiting from the receipt of federal excise taxes via the [Pittman-Robertson Federal Aid in Wildlife Restoration Act](#) and the [Dingell-Johnson/Wallop-Breaux Federal Aid in Sport Fish Restoration Act](#).

These federal excise taxes collected in each state and U.S. Territory on the sale of hunting and fishing licenses and equipment, including shooting equipment and boat fuel, are returned to the state on a pro-rata basis in the form of grants that support state conservation programs.

As California sportsmen and women, we are proud of the level of financial ranking we have generated for conservation and our resources. In this year's [ranking](#) released by the **Department of Interior**, California ranked **third** overall in funding grants received.

In 2020, California received \$17,703,209 for sportfish restoration and \$19,541,968 for wildlife restoration for a total of \$37,245,177. This **is equivalent to a third of the entire proposed Fish and Game Preservation Fund Budget** for FY 2020-21, and more will be generated as the year progresses.

SB 1175, by decreasing hunting opportunities, will be decreasing revenue to our state for conservation programs both directly into the state coffers and through the federal excise tax program discussed above. This is very counterproductive to the state's resources. Additionally, the Department's important [R3 program](#) (Recruitment, Retention, Reactivation) that seeks to increase and retain sportsmen's and sportswomen's numbers and thus excise tax revenue is **undermined by SB 1175** goals and the author's statement that he questions the "efficacy" of hunting in general.

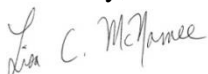
Africa's resource and conservation programs are best managed by their experts and by international well-established standards. While perhaps well-intentioned, bills like SB 1175 **undermine Africa's wildlands programs** as expressed by numerous African countries. The unintended consequence will be wildland clearing for development, something that works **counter to climate change** goals, and we should be supporting their efforts to preserve African wildlands. Maintenance and management of their resources and open spaces as wildlands assist in preventing further pandemics as documented by Ebola and other deadly diseases.

Several African countries have weighed in asking California to **respectfully not interfere** in their economies, wildlife and conservation decisions. A few of the countries that have weighed in with formal communication include, but are not limited to, the **United Republic of Namibia**, the **United Republic of Tanzania**, the **Republic of Zambia**, and the **Republic of Zimbabwe**. SB 1175 directly interferes in their community vitality, social programs and partnerships.

For these reasons, SCI CA opposes the enactment of SB 1175 as currently amended on policy and fiscal grounds.

Should you have any questions, please contact our legislative advocate, Kathryn Lynch, at (916) 443-0202 or lynch@lynchlobby.com.

Sincerely,



Lisa C. McNamee
Co-Legislative Coordinator
SCI CA Coalition



Don Giottonini
Co-Legislative Coordinator
SCI CA Coalition

cc: Ms. Rachel Wagoner, Deputy Legislative Secretary, Governor's Office
Ms. Ashley Ames, Consultant, Senate Appropriations Committee

Ms. Emilye Reeb, Consultant, Senate Republican Caucus
Senate Appropriations Committee Members
Resources Unit, Department of Finance
Senator Toni Atkins, Senate pro Tempore
Senator Shannon Grove, Minority Leader
Mr. Charlton Bonham, Director, Department of Fish and Wildlife
Ms. Melissa Miller-Henson, Executive Director, Fish and Game Commission
Ms. Kathryn Lynch, Legislative Advocate
SCI CA Coalition

Attachments: SCI CA Coalition Letter to Senate Natural Resources & Water Committee, filed May 14, 2020
SCI Letter to Legislature re Sportsmen's Contributions to Conservation Programs



Safari Club International

A NON-PROFIT ORGANIZATION ♦ DEDICATED TO CONSERVING WILDLIFE AND PRESERVING HUNTING



SCI CA Coalition

May 14, 2020

The Honorable Henry Stern
California State Senate
State Capitol Building
Sacramento, CA 95814

Position: Oppose

Location: Senate Natural Resources and Water Committee

Re: SB 1175 (Stern) Animals: prohibitions on importation and possession of wild animals: live animal markets (As amended May 13, 2020)

Dear Senator Stern:

Safari Club International and Safari Club International Foundation (SCI) is a worldwide Non-Profit organization with the mission to protect the freedom to hunt and to promote wildlife conservation. SCI recognizes hunting as a valuable management tool. SCI currently has over 45,000 members and approximately 4,000 members in California. SCI also has 30,000 California Affiliates, 950,000 U.S. Affiliates and over 7,000,000 International Affiliates. SCI spends millions annually for Wildlife Conservation, Research and Education.

The Safari Club International CA Coalition (SCI CA) continues to oppose SB 1175, as amended May 13, 2020. SCI CA is comprised of the California chapters of Safari Club International (SCI).

SCI CA's **opposition** is **specific** to **Section 1(b) and Section 3** of the bill, the Iconic African Species Protection Act.

SB 1175 is lacking any scientific basis. Contrary to the representation in Section 1(b), the world's largest populations of elephants, lions, black and white rhinos, and other species exist in the countries where they are hunted. Despite the lack of scientific support and despite the existence of clear evidence that hunting benefits both conservation and local community livelihoods, the bill would prohibit the importation into and possession in California of several specified species, and parts thereof, of game animals lawfully taken by hunters in African countries. The apparent goal of the legislation is to discourage residents of California from hunting these species in Africa.

The bill, if enacted, would be contrary to the federal Endangered Species Act (ESA), and therefore invalid and preempted with regard to its coverage of most of the covered species. The ESA provides that:

Any State law or regulation which applies with respect to the importation or exportation of, or interstate or foreign commerce in, endangered species or threatened species is void to the extent that it may effectively (1) permit what is prohibited by this chapter or by any regulation which implements this chapter, or (2) prohibit what is authorized pursuant to an exemption or permit provided for in this chapter or in any regulation which implements this chapter.

16 U.S.C. § 1535(f) (emphasis added).

Federal courts in California have relied on this provision to invalidate State laws that sought to restrict trade in federally listed species. *Man Hing Ivory & Imps., Inc. v. Deukmejian*, 702 F.2d 760, 761 (9th Cir. 1983); *Fouke Co. v. Brown*, 463 F. Supp. 1142 (E.D. Cal. 1979).

Other courts have also relied on the ESA to preempt State laws that applied to hunting trophy imports. The State of New Jersey enacted a law similar to SB 1175 in 2016. That law was challenged in federal court under the ESA. After New Jersey realized its law was plainly in violation of the ESA, it entered into a consent decree with the plaintiffs. New Jersey agreed that its law was illegal and preempted to the extent it applied to wildlife for which the U.S. Fish and Wildlife Service (USFWS) granted import permits or authorizations. Order and Judgment, *Conservation Force v. Porrino*, Case No. 16-4124 (D.N.J.), ECF 18 *August 29, 2016) (“the State recognizes the Act would be preempted and unenforceable against a person or entity for activities which are authorized by a permit or exemption provided for in the ESA or in any regulation which implements the ESA....”); *see also Conservation Force v. Porrino*, No. CV1604124FLWLHG, 2017 WL 1488129, at *1 (D.N.J. Apr. 25, 2017) (describing earlier ruling in case as “this Court’s August 29, 2016 entry of a consent Order and Judgment finding elements of N.J.S.A. 23:2A-6.1 (the “Act”) to be preempted under the Endangered Species Act of 1973, 16 U.S.C. §§ 1531-1543). California should not enact a law that is contrary to federal law and that will expose it to the expense of defending inevitable and unwinnable legal challenges.

This bill ignores the tremendous conservation benefits of regulated and sustainable hunting in Africa (and around the world). As recognized by the USFWS, the Convention on the International Trade in Endangered Species (CITES), the International Union for the Conservation of Nature (IUCN), the range countries in Africa, and many organizations, hunting of African species supports conservation and anti-poaching efforts. The revenue from hunts by U.S. citizens supports not only the range countries’ management efforts through fees and licenses but is shared with the local communities and residents who must co-exist with these animals. When the animals are seen as valuable, the local community members support conservation and management efforts, to the benefit of the species. In addition, guides and outfitters have the revenue—and incentive—to protect the animals against poachers. Finally, the mere presence of hunters and their guides in the field provides law enforcement against poachers.

African countries take very seriously the management and conservation of their native wildlife. They understand that if they do not properly manage their wildlife, they will lose an important and valuable natural resource. They set quotas that are sustainable. As explained above, the revenue from sport hunters helps these efforts. Consequently, the bill would actually undermine efforts that are designed to and have proven effective at enhancing the conservation of the identified wildlife the bill purports to protect.

SCI members and others harvest the species that would be banned by SB 1175 for their own personal use, not for commercial purposes. Other California laws that address wildlife outside of California focus on regulating the sale of such wildlife. Penal Code § 653o. SB 1175 goes way beyond that to prohibit mere possession of the enumerated species.

For non-ESA listed species on the list, the State can point to no valid scientific reasons to ban their importation and possession. For listed species, the USFWS has determined and will continue to determine, based on scientific research and on-the-ground data, when importation into the United States benefits the conservation of the species. The USFWS relies on import permitting as its primary tool to influence and encourage conservation policy in other countries. California, which lacks expertise to make these determinations, should not adopt legislation that second-guesses and/or contradicts the USFWS.

The bill proposes the imposition of severe criminal and administrative penalties for activities that involve the legal harvest of animals and are sanctioned or not prohibited by the USFWS. It would result in the undue deprivation of lawful pursuits by California citizens, in violation of 42 U.S.C. § 1983.

Furthermore, in subdivision (c) of the amended bill's findings and declarations (Section 1), SB 1175 urges the legislature to "...provide protection in the California Endangered Species Act...". Although it is not specific relative to its intended application, presumably this is in reference to Sec. 3, the Iconic African Species Protection Act.

It should be noted that the California Endangered Species Act is specific to native species only. Non-California species, such as African species, are not included within its scope.

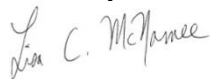
In view of the foregoing, it is requested that the bill be amended to include only the sections (Section 2 and Sections 4 through 7) that apply to preventing diseases that are carried by, and can be transmitted by, imported live wild animals and through those sold in live animal markets. Those sections represent an appropriate response to concerns related to the COVID-19 pandemic and transmission of zoonotic diseases. However, SCI CA respectfully requests amendments to Section 2(c)(1) to (3), to clarify that the California Department of Fish and Wildlife has authority to suspend imports of live specimens of wild animal species. This amendment would be consistent with the language of existing law.

If amended to delete Section 1 (b) ,Section 3 and clarify Section 2 (c)(1) to (3) as recommended above SCA CA would withdraw its opposition to the bill.

For these reasons, SCI CA opposes the enactment of SB 1175 as currently amended.

Should you have any questions, please contact our legislative advocate, Kathryn Lynch, at (916) 443-0202 or lynch@lynchlobby.com.

Sincerely,



Lisa C. McNamee
Co-Legislative Coordinator
SCI CA Coalition



Don Giottonini
Co-Legislative Coordinator
SCI CA Coalition

cc: Ms. Rachel Wagoner, Deputy Legislative Secretary, Governor's Office
Ms. Katharine Moore, Consultant, Senate Natural Resources and Water Committee
Mr. Todd Moffitt, Consultant, Senate Republican Caucus
Ms. Kathryn Lynch, Legislative Advocate
SCI CA Coalition



Safari Club International

A NON-PROFIT ORGANIZATION ♦ DEDICATED TO CONSERVING WILDLIFE AND PRESERVING HUNTING



SCI CA Coalition



March 31, 2020

To: The Honorable Members of the California Legislature

Re: Sportsmen's/Sportswomen's Contributions to State Wildlife Management, Wildlife Habitat Restoration and Preservation, and Conservation -- U.S. Department of the Interior Releases Sportsmen's/Sportswomen's Contributions to the State's Resources – California Ranked #3 in Revenue

Dear Members of the California State Legislature:

America's sportsmen and sportswomen generated nearly \$1 billion in federal excise taxes last year via the [Pittman-Robertson](#) Federal Aid in Wildlife Restoration Act and the [Dingell-Johnson/Wallop-Breaux](#) Federal Aid in Sport Fish Restoration Act.

These funds, which are generated through federal excise taxes collected in each state and U.S. territory on the sale of hunting and fishing licenses and equipment, shooting equipment, and boat fuel by the U.S. Fish and Wildlife Service, are returned to the states and territories on a pro-rata basis in the form of grants that support state conservation programs.

As sportsmen and women in California, we are proud of the level of the financial ranking we generate for conservation and California's resources. In the newly released press release from the Department of the Interior, California ranked **third highest** among the states and territories in funding grants received from revenues generated through the excise taxes. Please see the ranking by state in the attached [document](#) from the Department of the Interior.

In 2020 to date, California has received \$17,703,209 for sportfish restoration and \$19,541,968 for wildlife restoration, making the total amount received so far this year \$37,245,177.

This is equivalent to a third of the entire proposed Fish and Game Preservation Fund Budget for 2020-2021, and even more federal excise tax funds will be generated from sportsmen's and sportswomen's purchases for Department of Fish and Wildlife (DFW) programs as the year progresses.

The Governor's current State Budget Proposal for 2020-2021 would provide total funding for the State Department of Fish and Wildlife in the amount of \$659,362,000.

There is also the Department's important [R3](#) program (Recruitment, Retention, Reactivation) that seeks to increase and retain sportsmen's and sportswomen's numbers and thus excise tax

revenues from their purchases of hunting and fishing licenses and equipment, shooting equipment and boat fuel.

Since the Federal excise taxes are paid almost entirely by sportsmen and sportswomen, any state governmental action that adversely affects them also dramatically affects the budget of the department because DFW receives a major portion of its funding from the federal excise tax grants. All of this money is dedicated to our resources in California, and that benefits all Californians.

Attachment 1: U.S. Department of the Interior Press Release, Sportsmen and Sportswomen
Generate Nearly \$1 Billion in Conservation Funding
Attachment 2: California Proposed Legislation that Hurts Our Resources and Is Anti-
Conservation

cc: The Honorable Gavin Newsom, Governor
Department of Finance
Legislative Analyst's Office
Department of Fish and Wildlife
Fish and Game Commission

Safari Club International and Safari Club International Foundation (SCI) is a worldwide Non-Profit organization with the mission to protect the freedom to hunt and to promote wildlife conservation. SCI recognizes hunting as a valuable management tool. SCI currently has over 45,000 members and approximately 4,000 members in California. SCI also has 30,000 California Affiliates, 950,000 U.S. Affiliates and over 7,000,000 International Affiliates. SCI spends millions annually for Wildlife Conservation, Research and Education.

California Fish and Game Commission

Delegations to the Executive Director

June 12, 2020 DRAFT

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 21081 of 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.

Outdoor CALIFORNIA

March - April 2020

Volume 81 No. 2 \$2.50



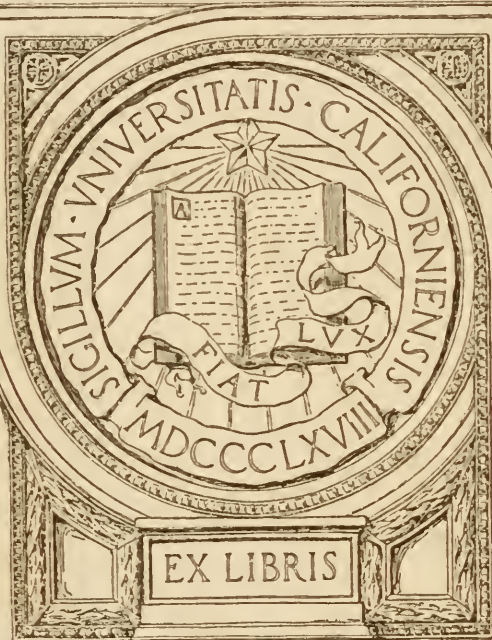
SK
373
A73

UC-NRLF



B 3 144 782

GIFT OF



EX LIBRIS

PAT. JAN. 21, 1908

GIFT

NOV 9 1915



OF THE
UNIVERSITY
OF CALIFORNIA
Conservation
THROUGH
Education

Stamps
1917

To the Reader-

If this little booklet will but inspire one citizen of our State to use his or her efforts toward promoting the conservation of our wild life its purpose will be accomplished.

California Fish and
Game Commission

JIT

TO THE
MEMBERS OF THE
CALIFORNIA FISH AND GAME COMMISSION



Lest We Forget

That fifty years ago there were hundreds of thousands of Bison roaming our hills and plains, while today there are less than 500 in the entire country.

393225



PASSENGER PIGEON

Not many years ago the market hunters of the Middle States killed millions of these beautiful birds each year.

Today one may travel from the Gulf to the Great Lakes without so much as seeing one.

The last known Passenger Pigeon died in the Cincinnati Zoo on January twenty-first, Nineteen hundred and fifteen.

SHALL OUR UPLAND BIRDS AND WATER-
FOWL SUFFER THE SAME
UNTIMELY FATE?



Could there be a more pitiful sight than this helpless little fawn which has been robbed of its only protection through the thoughtlessness or greed of some hunter?

Let us take only what the law allows, that the next generation may enjoy the same pleasures that the fields and streams of our glorious State now afford us.

Why Save the Fish and Game?

The courts have held that wild game is the property of the people, and can be hunted, killed, possessed and disposed of only as the people direct. It is believed that this State has some of the most effective and most just laws for the purpose of protecting wild game ever enacted by a commonwealth. These laws seem to insure the perpetuation of the supply. But these laws would not serve their full purpose if they did not guarantee our people and posterity the opportunity of recreation, hunting and fishing.

The Fish and Game Commission and the Legislature of the State, ever mindful of the fact that the boy and the young man are full of the instinct for sport, have wisely framed the laws in such manner as to save to the people their inherent right to hunting. The boy that lives a natural, outdoor life, hunting, fishing and playing strenuous games is not the chap who loafes around corners shooting craps and smoking cigarettes. Furthermore, the boy who learns how to care for himself in the woods and to shoot straight makes the finest soldier in the world in the time of national peril.

Is it not better to train our soldiers this way, than to destroy the game and the incentive to hunting—and then raise an army by conscription—and at that an army that cannot shoot straight!

Game conservation is more than a masculine problem; it is a national question, in which every girl and every woman is vitally concerned.



INTERIOR OF ONE OF THE HATCHING BUILDINGS AT STATE HATCHERY, SISSON, CAL.



BIRDSEYE VIEW OF ONE SECTION OF HATCHERY AND
FINEST IN THE WORLD. MO

CALIFORNIA



HOUSES AT SISSON, CAL. ONE OF THE LARGEST AND
SHASTA IN BACKGROUND.



RAINBOW TROUT

California's native trout, abounding in every mountain stream in the State. It is through the tireless efforts of the authorities in charge of fish propagation that the sportsman of today enjoys finer sport than he of a generation past.



LOCH LEVEN TROUT

Until a few years ago a stranger in our waters, these gamey fish have been generously planted and carefully protected until today they are found in nearly all of our larger lakes and streams.

A SPLENDID EXAMPLE OF ACCLIMATIZATION



EASTERN BROOK TROUT

There are hundreds of streams and lakes in the State where the fisherman may daily enjoy the thrills of a struggle with this Easterner. He has been introduced into suitable waters all over the State.

Fish Facts.

Do you know that California is one of the greatest fishing regions of the world?

When white men first came here they found fish only in the oceans, bays and in streams up to the first waterfalls and of comparatively few species. Since then the Federal and State authorities have introduced many valuable and interesting varieties, have artificially propagated hundreds of millions at the hatcheries and have "planted" and "transplanted" almost every species, so that today fishing is enjoyed in practically every bit of living water in the State.

In 1914 the State Fish and Game Commission propagated at its seven hatcheries and distributed in public waters 30,000,000 salmon and 18,000,000 trout. These fish if placed end to end would reach from San Francisco to a point 150 miles east of Denver. They would fill four standard freight trains of 43 cars each, weighing over 4000 tons. The total would provide each man, woman and child in the State with 16 fish.

There is no locality in the civilized world that offers a greater variety of sport than the mountains, valleys and waters of the State of California.

For instance, the business man of centrally located San Francisco can board an evening train and at dawn of the following morning cast his fly upon the snow-fed waters of a Sierra stream, returning in the evening with a limit basket.

Intense propagation and conscientious protection is the one thing that make such ideal conditions possible.

The entire cost of rearing, distributing and protecting fish in this State is borne by the market and pleasure fishermen. Not one cent is contributed by the taxpayer through legislative appropriation.

Four thousand people are engaged in catching fish for the market. Their "catch" sells to the consumer for around \$10,000,000 each year.

Just A Few Facts and Figures.

The "Closed Season" laws are the most important of all. They protect birds, animals and fishes during and after the breeding periods. The killing of the female during such times means the loss of an entire family. Besides, all breeding animals and certainly their young are practically defenseless and need all the protection man can give them.

The "Limit Laws" curb the thoughtless and selfish and guarantee the decent hunter and fisherman his share in the sport and its product. Certainly such laws are most American in spirit.

America is one of the few populous countries in which the "common people" enjoy the hunting privilege. Furthermore this country has few big preserves and consequently little game is raised by wealthy people for their own enjoyment. Here everyone hunts and fishes, with few exceptions on an equal basis and a great deal of fish and game is killed. The private preserve system would give us more game, but the wealthy classes would get all the benefits.

Probably 20,000 deer are killed in this state each year.

The annual kill of wild ducks is around 1,000,000 and of wild geese about 200,000. The stock need not be exterminated however as the wild-fowl that winter here have most of the northern regions for their nesting grounds.

The California valley quail is said to be the finest "upland" game bird in the world. This bird is found everywhere in the state but has been over-hunted badly. Unless the killing is greatly reduced this bird will disappear.

The only game bird ever successfully reared extensively in captivity is the English, known also as the Chinese and ring-necked pheasant. Thousands of these birds have been raised at the State Game Farm and liberated in the moist coast region.

The State Fish and Game Commission is entirely self-supporting, receiving its annual revenue of about \$300,000 from the sale of hunting and fishing licenses and from fines collected from violators of the laws. The Commission has four business offices and about 120 employees. Realizing the necessity of giving important duties into the care of competent assistants, the Commission employs only highly trained, energetic and conscientious wardens. Every department of the Commission is under the strictest of civil service control.

For further information relative to fish and game in California or to the work of the Fish and Game Commission inquire of any of its officers or at the offices at San Francisco, Los Angeles, Sacramento or Fresno.



THIS BOOKLET IS ISSUED BY
THE
FISH AND GAME COMMISSION
OF THE
STATE OF CALIFORNIA

COMMISSIONERS
F. M. NEWBERT, PRESIDENT
M. J. CONNELL
CARL WESTERFELD

ERNEST SCHAEFFLE
EXECUTIVE OFFICER

EXECUTIVE OFFICES
MILLS BUILDING, SAN FRANCISCO

393225

YB 15893

UNIVERSITY OF CALIFORNIA



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.

cc: Stafford Lehr, Deputy Director
Wildlife and Fisheries Division
Stafford.Lehr@Wildlife.ca.gov

Craig Shuman, D. Env.
Regional Manager
Marine Region
Craig.Shuman@Wldlife.ca.gov

Mary Loum, Attorney
Office of General Counsel
Mary.Loum@Wildlife.ca.gov

John Ugoretz
Environmental Program Manager
Marine Region
John.Ugoretz@wildlife.ca.gov

**State of California
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 15-16° 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).

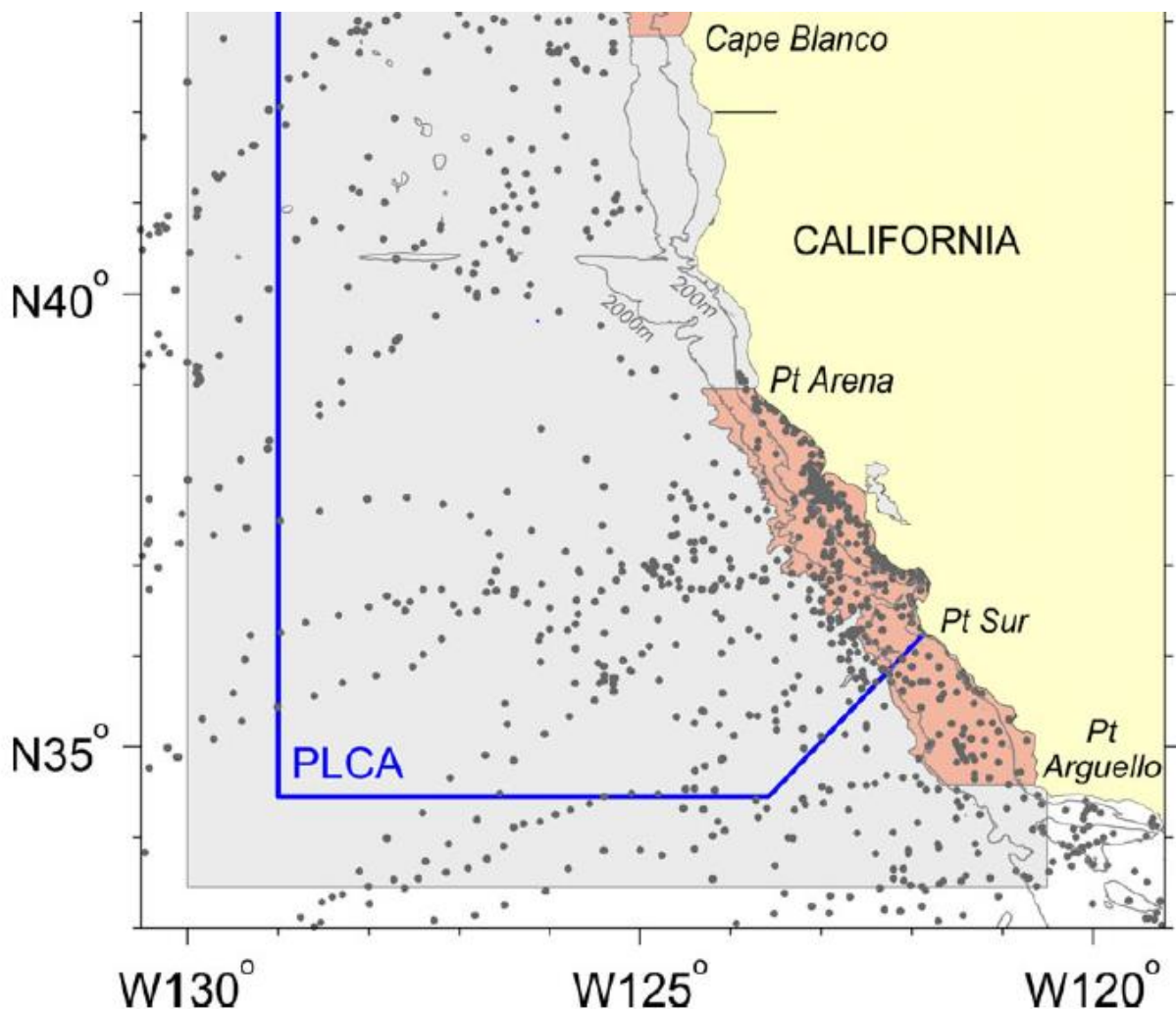


Figure 1. Pacific leatherback sea turtle distribution map from the Petition. Black dots are leatherback sea turtle telemetry data. Pink area indicates the leatherback sea turtle critical habitat designation in California. “PLCA” is the Pacific Leatherback Conservation Area that excludes the drift gillnet 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).

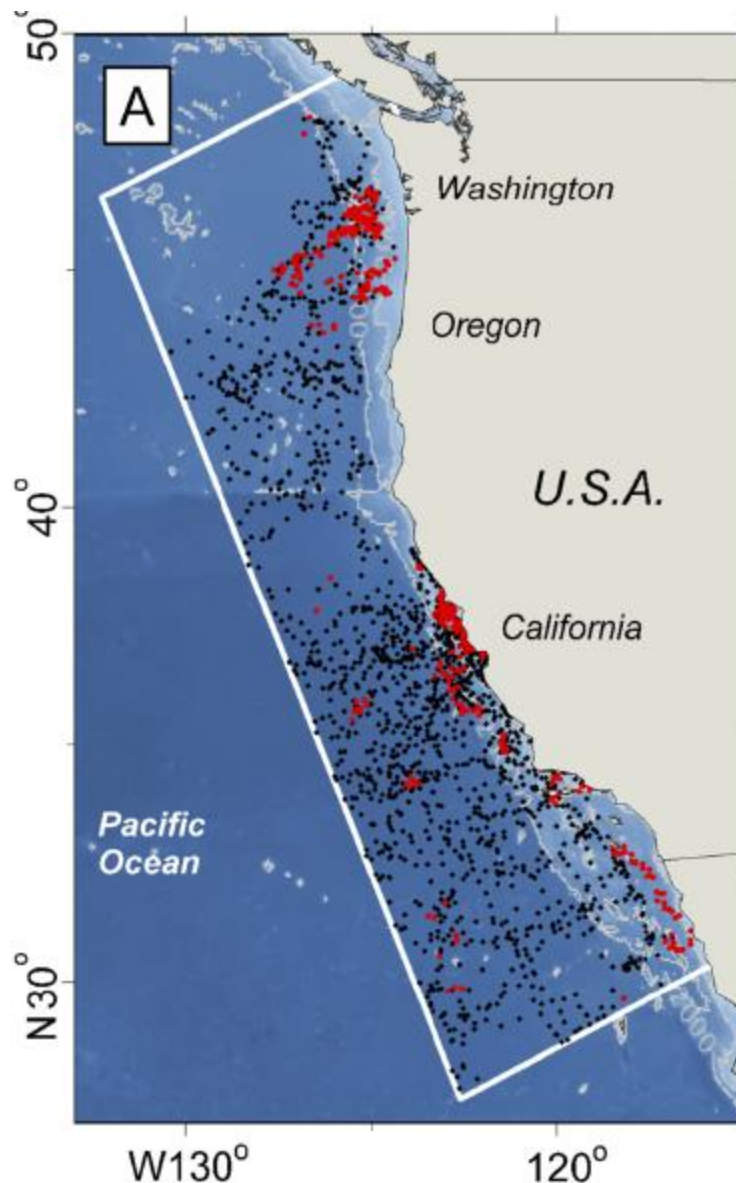


Figure 2. Distribution of western Pacific leatherback sea turtles based on telemetry data of 40 individuals. Red dots represent area restricted search (ARS), the behavior of remaining in an area once an animal encounters prey. Black dots represent transit. (From Benson et al. 2011).

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 15-16° 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; PPMC & 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 CO₂ emissions globally. As the global oceans uptake the excess of CO₂, 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)

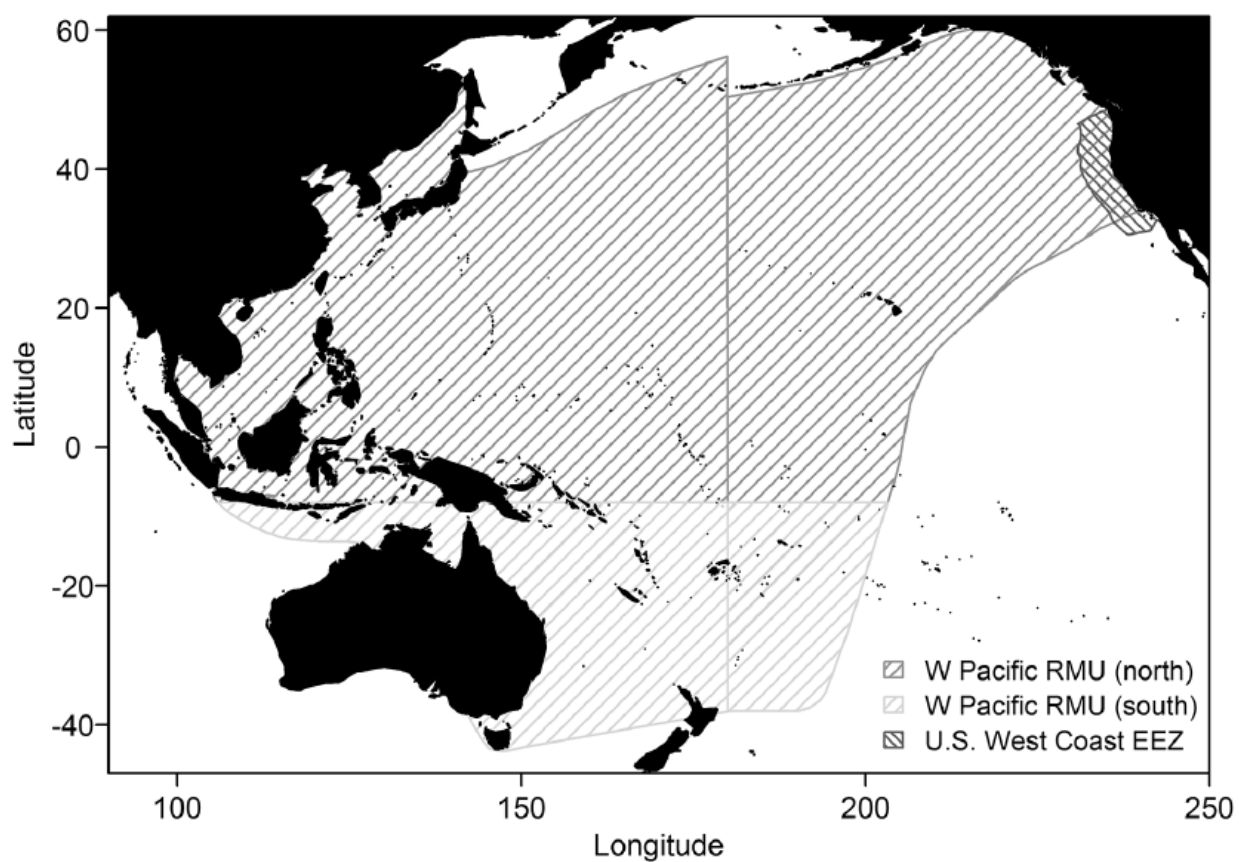


Figure 5. World distribution of western Pacific leatherback sea turtles. Figure taken from Curtis et al. 2015.

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 CO₂ 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. Bakarbesy. 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.pccouncil.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.wvu.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. Bakarbesy. 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 coast 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. Pacific 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.

From: Christopher Miller [REDACTED]
Sent: Sunday, June 7, 2020 10:41 AM
To: FGC <FGC@fgc.ca.gov>
Subject: Leatherback Turtle State ESA petition.

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

Dear Commissioners,

The turtle populations have declined in roughly the same proportion to the loss of their nesting sites in South East Asia. We can be more creative with how we look at this in a social ecology framework that could provide an alternative to the tragedy of the commons.

This would be a new way to look at mitigation under the ESA framework that could create cultural synthesis for environmental justice.

There is a connection I see in outsourcing our tuna fleets infrastructure to Western Samoa at the same time as our population started to grow in the 1970's . We are in the same boat as the turtles

In our investigation into actions that could transform our reality we are at the first moment where fishermen can seek common ground with actions that establish a climate of creativity.

Lets ask how we can generate connectivity in marine life protection with public health and nutritional value of sea food to deal with mitigation across scales that benefits poorest and the hardest working in our society.

Can we make an equation where the marginalized people who call themselves the rainbow coalition are included is seafood harvest as preventative health care stakeholders.

For starters I suggest look at the ESA listing as a political economy of precaution and ask why only the rich can afford fresh seafood and we have also lost all our canning facilities that can serve us in food security for people who really need it. Why we continue in the failed permit banking theories of neo-liberal economics that is the colonist mind set.

I apologize for this being a very roughed out model of the elements of how Marine Protected Areas work as tools in ecosystem based management. The idea that we need to protect marine life based on monitoring our total areas in protection will help in the future to practice with our core values for harvesting seafood to feed people with the appropriate technology.

It could make our fishing community more resilient to design our own experimental management in the future if we explore mitigation as a social ecology network in turtle nesting site connectivity.

Chris Miller
Santa Barbara Trappers
[REDACTED]

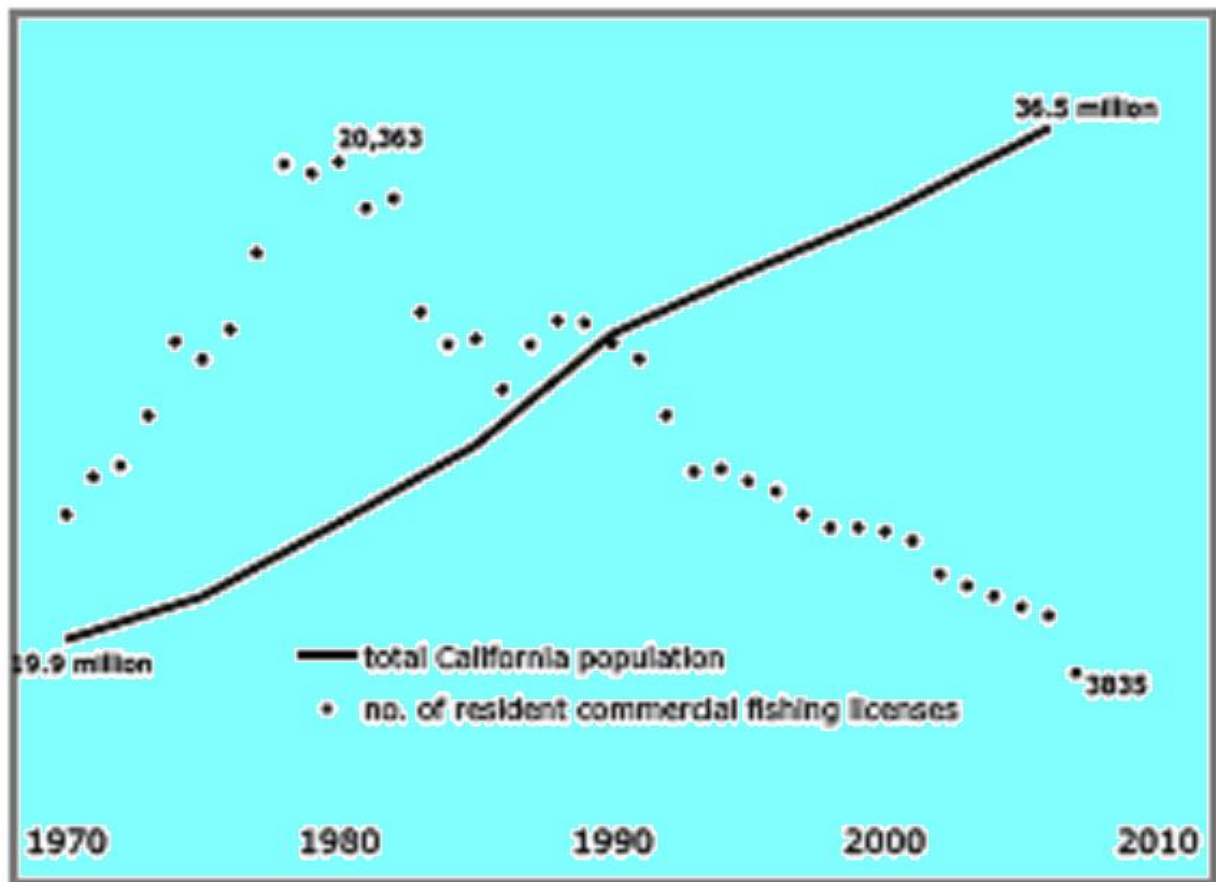


Figure 1. California Department of Fish & Game licensing data show a peak in the number of resident commercial fishing licenses in 1980 followed by a steady decline to the lowest point in 2007 since data were collected. The state's population has climbed steadily during the same period.

Memorandum

Date: May 28, 2020

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

From: Charlton H. Bonham
Director

Subject: **Agenda Item for the June 24-25, 2020 Fish and Game Commission Meeting,
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 will recommend recreational fishing regulations for federally managed groundfish species for the 2021-2022 management cycle at its June 10-19, 2020 meeting. This action will require amendment of several state regulations to maintain consistency. In addition, the Department of Fish and Wildlife (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, the Department requests the Fish and Game Commission authorize publication of notice of its intent to amend recreational and commercial fishing regulations for federally managed groundfish species at its June 24, 2020 meeting. Approval of this request will allow for discussion and possible adoption at the August 19-20, 2020 and October 14-15, 2020 Commission meetings, respectively.

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, Laura Ryley, as the Department's point of contact for this rulemaking. Her contact information is (831) 649-7142 or Laura.Ryley@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

Melissa Miller-Henson, Executive Director
Fish and Game Commission
May 28, 2020
Page 2

Michelle Selmon
Regulations Unit Program Manager
Wildlife and Fisheries Division
Michelle.Selmon@wildlife.ca.gov

Marci Yaremko, Program Manager
State and Federal Fisheries
Marine Region (Region 7)
Marci.Yaremko@wildlife.ca.gov

Robert Puccinelli, Captain
Law Enforcement Division
Robert.Puccinelli@wildlife.ca.gov

Garrett Wheeler, Staff Counsel
Office of General Counsel
Garrett.Wheeler@wildlife.ca.gov

Ona Alminas, Sr. Environmental Scientist
Regulations Unit
Ona.Alminas@wildlife.ca.gov

Kevan Urquhart, Sr. Environmental Scientist
Marine Region (Region 7)
Kevan.Urquhart@wildlife.ca.gov

Laura Ryley, Environmental Scientist
Marine Region (Region 7)
Laura.Ryley@wildlife.ca.gov

CDFW Announces Publication of Rules for Ocean Salmon and Pacific Halibut

May 8, 2020

New annual federal regulations for ocean salmon and Pacific halibut fisheries for waters off California have taken effect. Federal regulations for Pacific halibut were published in [85 Federal Register 25317](#) on May 1, 2020 and were effective April 30, 2020, and ocean salmon regulations were published in [85 Federal Register 27317](#) on May 8, 2020 and were effective as of May 6, 2020.

Pursuant to California Code of Regulations Title 14, section 1.95, ocean salmon and Pacific halibut sport fishing regulations in state waters automatically conform to these new federal regulations.

Both the ocean salmon fishery and the Pacific halibut fishery opened on May 1. Anglers are reminded to abide by all state and local health guidelines regarding non-essential travel and physical distancing. Anglers are also advised to check with local authorities on the status of harbor and access points as site closures and access restrictions may change daily.

The 2020 recreational ocean salmon season dates for the California coast are as follows:

- In the Klamath Management Zone, which is the area between the Oregon/California state line and Horse Mountain (40°05'00" N. latitude), the season will open June 6 and will continue through Aug. 9.
- The Fort Bragg and San Francisco areas, which extend from Horse Mountain to Point Arena (38°57'30" N. latitude) and Point Arena to Pigeon Point (37°11'00" N. latitude), respectively, opened May 1 and will continue through Nov. 8.
- The Monterey area between Pigeon Point and the U.S./Mexico border opened on May 1 and will continue through Oct. 4.

The minimum size limit is 20 inches total length in all areas north of Pigeon Point. In the Monterey area the minimum size limit is 24 inches total length. The daily bag limit is two Chinook salmon per day. No more than two daily bag limits may be possessed when on land. On a vessel in ocean waters, no person shall possess or bring ashore more than one daily bag limit. Retention of coho salmon (also known as silver salmon) is prohibited in all ocean fisheries off California.

Next year's April recreational ocean salmon season has also been determined at this time. In 2021, the recreational ocean salmon season will open April 3 south of Horse Mountain. The minimum size limit is 20 inches total length in the Fort Bragg management area and 24 inches

total length south of Point Arena. The daily bag limit is two Chinook salmon per day. The remainder of the 2021 ocean salmon season will be decided in April of next year.

The 2020 Pacific halibut season is scheduled to be open statewide seven days per week from May 1 through Oct. 31, or until the quota has been met, whichever is earlier. There is no minimum size limit for this species. The daily bag and possession limit is one fish. Again this year, the public can follow the progress of catch through the season on the California Department of Fish and Wildlife (CDFW) [Pacific halibut web page](#); however, updates to catch information may be offered less frequently than in prior years.

Public notification of any in-season change is made through the National Marine Fisheries Service (NMFS) Ocean Salmon and Pacific Halibut Hotlines. Before engaging in any fishing activity for these species, please check one of the following resources for the most up-to-date information:

Ocean Salmon Resources:

- CDFW website, wildlife.ca.gov/oceansalmon
- NMFS Ocean Salmon Hotline, (800) 662-9825
- CDFW Ocean Salmon Hotline, (707) 576-3429

Pacific Halibut Resources:

- CDFW Pacific Halibut web page, wildlife.ca.gov/conservation/marine/pacific-halibut
- NMFS Halibut Hotline, (800) 662-9825
- CDFW Recreational Groundfish and Pacific Halibut Regulations Hotline, (831) 649-2801

###

Media Contacts:

[Marcy Yaremko](#), CDFW Marine Region, (858) 442-3004

[Jordan Traverso](#), CDFW Communications, (916) 654-9937

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.

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 12, 2020

Topic / Goal	Type / Lead	Jan 17, 2020 Los Alamitos	Aug 18, 2020 Fortuna	Nov 9, 2020 Monterey
Special Projects				
Co-management: Develop definition and potentially amend	TC Project	X/R	X	X/R
Coastal Fishing Communities Project: Updates and guidance	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
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

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
P.O. Box 944209
Sacramento, CA 94244-2090
(916) 653-4899
fgc@fgc.ca.gov
www.fgc.ca.gov

MARINE RESOURCES COMMITTEE

Committee co-chairs: Commissioner Silva and Commissioner Murray

March 17, 2020 and April 29, 2020 Meeting Summary

Following is a summary of the California Fish and Game Commission (Commission) Marine Resources Committee (MRC) meeting as prepared by staff. The meeting was held on March 17 as originally noticed but, due to technological and time constraints, was continued to April 29 to complete agenda items not covered on March 17. An audio recording is available upon request.

DAY 1 – MARCH 17, 2020

Call to order

The meeting was conducted in-person with staff at the Justice Joseph A. Rattigan Building in Santa Rosa with the committee co-chairs and additional staff participating via webinar and teleconference. The meeting was called to order at 9:10 a.m. by Co-Chair Murray, who confirmed that she and Co-Chair Silva were in attendance at separate, remote locations. The remote participation option was added pursuant to Governor Newsom's March 12, 2020 executive order allowing state bodies to hold meetings via teleconference and to make meetings accessible electronically.

Susan Ashcraft gave welcoming remarks and outlined meeting procedures and guidelines for participating in Committee discussions, noting that the Committee is a non-decision-making body that provides recommendations to the Commission on marine items. She described how the conversations would be managed given the new webinar format. The following Committee member(s), Commission staff, Department staff, and invited speakers participated from various locations:

Committee Co-Chairs

Peter Silva	Present
Samantha Murray	Present

Commission Staff

Melissa Miller-Henson	Executive Director
Susan Ashcraft	Marine Advisor
Craig Castleton	Staff Program Analyst

Sherrie Fonbuena
Rose Dodgen

Staff Program Analyst
Sea Grant State Fellow

Department Staff

Mike Stefana	Assistant Chief, Law Enforcement Division
Bob Puccinelli	Captain, Law Enforcement Division
Randy Lovell	Statewide Aquaculture Coordinator
Craig Shuman	Regional Manager, Marine Region
Sonke Mastrup	State Managed Marine Invertebrates Program Manager, Marine Region
Kirsten Ramey	State Managed Marine Finfish Program Manager, Marine Region
John Ugoretz	Pelagic Fisheries and Ecosystem Program Manager, Marine Region
Marci Yaremko	State and Federal Marine Fisheries Program Manager, Marine Region
Tom Mason	Senior Environmental Scientist Supervisor, Marine Region
Rebecca Flores-Miller	Environmental Scientist, Marine Region

Invited Speakers

Jenn Eckerle	Deputy Director, California Ocean Protection Council
Alexis Jackson	Fisheries Project Director, The Nature Conservancy

1. Approve agenda and order of items

The Committee approved the agenda in the order listed; however, Agenda Item 11, Future Agenda Items, was heard out of order, following Agenda Item 6. For purposes of the meeting summary, items are listed in the order of the published agenda.

Note that due to time and technology constraints on March 17, item 7 was not completed in its entirety, and items 8 through 10 were not heard; incomplete items were continued to April 29.

2. General public comment for items not on agenda

Public comments included concerns about the Committee's ability to foster the public process in light of the webinar and teleconference format, and a request to schedule a discussion of the Department's California "R3" [i.e., hunting and fishing recruit retain reactivate] plan and the statewide R3 implementation plan released in December 2019 for a future meeting.

3. Staff and agency updates

(A) California Ocean Protection Council (OPC)

Jenn Eckerle provided an update on the recently-adopted 2020-2025 OPC strategic plan to protect California's coast and oceans, including an outline of select components of the plan. She also provided an update on the outcomes of the February 2020 OPC meeting and highlighted a few key ongoing OPC projects relevant to the Commission's work, including developing a tribal coast and ocean monitoring program, offshore wind energy development, collaboration with officials from Baja California on coastal and ocean conservation, entanglement risk mitigation, and a pilot project to test pop-up trap fishing gear as a means of reducing whale entanglement risk. Paige Berube provided more information on the timing of the pop-up gear project.

Discussion

A representative from an environmental non-governmental organization (NGO) expressed support for the pop-up fishing gear project. A member of the public expressed concern about derelict gear and debris as an additional consequence of lost crab fishing gear. Jenn clarified that recovery of lost fishing gear was a priority for OPC.

The committee requested an update on the pop-up gear project from OPC at the next MRC meeting.

(B) Department

I. Marine Region

Marci Yaremko provided an update on the recent Pacific Fishery Management Council (PFMC) meeting and the biennial specifications and management process for managing California groundfish. Stock assessments from 2019 are being incorporated into new regulations to take effect in 2021. Notably, cowcod stocks south of Cape Mendocino have been rebuilt ahead of schedule. Other important potential regulation changes include changes in the depth of the groundfish rockfish conservation area (RCA) lines and changes to sub-bag limits, including potential introduction of a sub-bag limit for vermilion rockfish.

Discussion

Comments supported the stakeholder engagement at the recent PFMC meeting. A participant asked whether the movement of the RCA lines would apply to the non-trawl open access commercial sector; Marci confirmed they should.

MRC Direction

The committee requested to schedule a more detailed presentation and discussion of the change in cowcod stock status in California for the July MRC meeting.

II. Law Enforcement Division

Bob Puccinelli provided an update on a gear retrieval program that will be coming online at the end of this crab season to assist with derelict gear. Bob also provided an update on various marine citations including failure to report landings, illegal crab holding, undersized Pismo clams, illegal dumping of cadaver remains, e-tix violations, and license revocations.

Discussion

Comments included a request that a gear removal program be active during the season to remove gear that is abandoned, damaged, or lost at the beginning of the recreational season, not just to remove derelict gear at the end.

III. Other – State aquaculture program

Randy Lovell introduced Jessica Girardot, the new aquaculture program administrator; this new position will increase capacity for the program.

(C) Commission staff

Susan Ashcraft provided an update on new Commission staff, including new Deputy Executive Director Rachel Ballanti and new Staff Services Analyst Cynthia McKeith, and introduced its new Sea Grant State Fellow, Rose Dodgen.

4. Recreational red abalone fishery management plan (FMP)

Alexis Jackson of The Nature Conservancy presented on behalf of the red abalone management integration administrative team. She provided an overview of the results of the recent draft final report from the administrative team, and Sonke Mastrup provided additional comments. The overview included a synthesis of the results of the modeling team regarding length of time until a fishery was projected to be viable under various conditions; it also summarized eight recommendations for potential inclusion in a revised draft red abalone FMP.

Discussion

Comments included input from representatives of several tribes who requested more involvement in the decision-making process. The commenters emphasized that tribal rights to abalone as a resource and engagement with tribes need to take precedence in this discussion, that tribal take should not be a sub-category of recreational take, and that the Commission should not move forward with any FMP until it has completed tribal consultations. A representative from Trinidad Rancheria also suggested collecting additional information from tribes about how much abalone they need to gather for subsistence purposes to understand what level of tribal harvest would be necessary. In response, the committee requested that the Department consider options for how to further engage with tribes on these concepts.

Several members of the recreational fishing community spoke in support of a smaller *de minimis* fishery than currently proposed in the report, arguing that it could be feasible in a shorter time frame with tight controls in place.

One former Department scientist questioned why a fishery was being considered when the population was still declining. Sonke Mastrup clarified that the project was started when a fishery was still considered a possibility but, at this point, no fishery will be considered until the population reaches recovery benchmarks. One commenter suggested that red abalone seed stock should be collected from the environment and maintained in aquaculture facilities until the urchin population declines and kelp, abalone's food source, is restored.

MRC Recommendation

Following discussion, the Committee recommends to the Commission:

- a. Support finalizing the red abalone administrative team report, *Summary of the Management Strategy Integration Process for the North Coast Recreational Red Abalone Fishery Management Plan*;
- b. continue a discussion of the report and recommendations to the July 2020 committee meeting and request that the Department be prepared to clarify decision points;
- c. recommend that the red abalone administrative, project, and modeling teams be formally disbanded having met their charges once the administrative team report is finalized; and
- d. request that Department staff develop a process for how to engage with tribes to add to the July discussion.

5. Whale and turtle protections in the recreational Dungeness crab fishery

Sonke Mastrup provided an overview of Department-proposed management measures for the recreational Dungeness crab fishery and recommendations for:

- a. Gear marking,
- b. a trap limit of 10 crab per angler November 1 through March 31 and 5 per angler April 1 through end of season,
- c. a service interval of 9 days,
- d. a validation stamp for every angler to assist with data gathering on the fishery,
- e. Department director authority for the delay or early closure of the fishing season,
- f. two options for note fishing authorization,
- g. a fair start provision of no less than five days prior to commercial fishery pre-soak, and
- h. specific surface gear requirements.

Discussion

The committee members asked about how the California Dungeness crab fishery compares to that of neighboring states, and requested clarification about triggers for a potential severe weather extension for the service interval requirement. Sonke explained there are much lower trap limits in Oregon and Washington and that they are generally not considered comparable, and that there are several options for triggers for a severe weather extension, such as a small craft advisory issued by the National Oceanic and Atmospheric Administration (NOAA). Bob Puccinelli provided further explanation on the current status of note fishing relative to the current allowance.

Representatives of two environmental NGOs support the regulations, request to add a measure authorizing recovery of lost and derelict recreational gear, and shared the perspective that Department director authority is critical as NOAA fisheries confirmed a whale entanglement in recreational gear last year while the commercial fishery was closed.

A member of the public echoed concerns about pollution from gear debris, some of which may result from gear conflicts with the salmon fishery, and requested that the committee support a small marker buoy and possibly introduce an easily identifiable recreational buoy-marking technique to help prevent plastic waste.

Several representatives of the recreational fishing community spoke in opposition to or requested clarification on several of the proposed measures, expressing particular concern that management measures would be disproportionate to recreational fishing entanglement risk relative to commercial gear entanglement risk.

Sonke Mastrup clarified that the commercial fishery is indirectly impacted by recreational gear entanglements as the commercial fleet is penalized for unidentified entanglements, some of which could be recreational. He further explained that the fair start is being reduced for times when a season delay is needed to protect marine life while avoiding penalizing the commercial fishery for conditions outside its control during an important economic time frame. He also added that, if the Commission supports the measures, the Department would be willing to work with stakeholders to develop options for the recreational fishery which may not be as onerous. Bob Puccinelli added that the Department Law Enforcement Division does not foresee an enforcement issue with a mid-season change in pots. Commissioner Murray also added that Department director authority will provide a faster reaction for risk mitigation than the

Commission could.

Susan Ashcraft noted that removing recreational derelict gear may be outside of current Commission authority but could be investigated further. Sonke agreed that it is not clear whether there is authority to seize property after close of season, but also offered to explore the options further.

MRC Recommendation

Based on the discussion, MRC developed two recommendations for the proposed management measures:

- Advance to a rulemaking, commencing with a notice hearing in June 2020, proposed management measures to minimize the risk of whale and turtle entanglements in the recreational Dungeness crab fishery as recommended by the Department with the following specific provisions:
 - (a) enhanced gear marking with small buoys or unique floats;
 - (b) a trap limit of 10 traps per angler from November 1 to March 31 and 5 traps from April 1 to season end;
 - (c) a service interval of 9 days, with an option for severe weather extension;
 - (d) a validation stamp for all participating anglers, with an option to sunset in 5 years;
 - (e) surface gear requirements for buoys and line length as proposed by the Department;
 - (f) 'note fishing' that may be authorized by text and allows rebaiting of traps;
 - (g) a fair start provision with an options range of no less than 5 to 9 days before commercial pre-soak; and
 - (h) grant the Department director authority to delay the season's start or close the season early when entanglement risk is high based on triggers yet to be defined, with a zonal option and required Commission notification.
- Request that the Department develop draft criteria to determine when a severe weather extension to service interval would be granted, and develop draft criteria for triggering action under Department director authority.

6. Regulations governing commercial harvest of wild kelp and algae

Rebecca Flores-Miller provided an overview of proposed regulation changes, including harvest limits for six edible seaweed species, and a summary of results of the Department's commercial harvester survey.

Discussion

Concerns were raised that there was not enough time to discuss the topic due to the webinar format; requests were made for additional opportunities to discuss and provide comment. Several commercial kelp harvesters expressed a desire for increased stakeholder discussion and input and requested that the Department lay out a clearer purpose and objective for the regulation changes. They further spoke in opposition to the harvest limits, stating that no new

harvesters should be allowed under these limits, that low limits might endanger harvesters attempting to gather kelp too early in the season, and that numeric goals should be in a kelp management plan rather than in regulations. Stakeholders also requested that the Department explore the possibility of harvest distribution by block and expressed an interest in how data presented was distributed between different blocks.

Several representatives of various tribes expressed that kelp should be managed more holistically and raised concerns that the rulemaking should be delayed until harvest limits can account for tribal take and tribal consultations regarding co-management have occurred. A representative from Pew Charitable Trusts spoke in support of a statewide closure of bull kelp and increased sea otter protections in any new regulations.

Following discussion, the co-chairs suggested that additional outreach to affected parties may be beneficial to explore before MRC makes a specific recommendation. Craig Shuman offered to discuss these proposed regulations with the affected community. He requested that harvesters who have offered to help come to him with ideas, but cautioned that localized management would be more difficult for the Department. Susan Ashcraft agreed to engage with the Department on this topic.

MRC Recommendation

MRC recommends that the Commission request that the Department conduct additional outreach with affected commercial harvesters, tribes and other interested parties and continue the item to the July 2020 MRC meeting.

7. Marine aquaculture in California

(A) *Receive Department informational report on marine aquaculture in California, discuss status of the programmatic environmental impact report, and consider proposed next steps*

Randy Lovell presented an overview of the Department's current plan of action for aquaculture in California and a newly-completed aquaculture information report (AIR) intended to build a common understanding of the status of aquaculture in the state to help move the action plan forward. The AIR was delivered to the Commission office the preceding day and has now been posted to the Department and Commission websites. Craig Shuman recommended that the AIR be provided to the Commission at its April meeting due to the broad interest on the topic.

(B) *Discuss possible recommendation for a hiatus in considering new applications for state water bottom leases for the purpose of aquaculture (except three previously received applications currently under consideration)*

Susan Ashcraft provided an overview of the rationale for the staff recommendation to consider a short-term hiatus. Melissa Miller-Henson provided further clarification of the intent and the temporary nature.

Discussion

A representative from the Port of San Diego requested that entities such as the port, which have internal capacity to complete necessary environmental review and could

take administrative weight off the Commission and Department, be exempted from any hiatus. Time did not allow for additional public comment or discussion.

MRC direction

MRC supported providing the Department's aquaculture information report to the full Commission at its April meeting. The committee members acknowledged that there was significant interest on the topic, expressed appreciation that stakeholders had persisted through the long meeting to participate in the topic, and acknowledged that additional time was needed for discussion and robust public input. MRC concluded that a substantive recommendation could not be made on this topic today due to time constraints, and directed staff to continue the topic to a future meeting.

Recess

Commissioner Silva clarified that the meeting must end at 6:00 p.m., when recording of the proceedings was scheduled to end. MRC acknowledged that agenda items 7-10 would need to be continued to a future MRC meeting, and directed staff to identify an additional date to complete the agenda items.

The meeting was recessed at 6:00 p.m.

DAY 2 – APRIL 29, 2020

Call to order

The meeting was held via webinar and teleconference and the committee co-chairs and staff participated from independent, remote locations. Day 2 of the meeting was called to order at 9:02 a.m. by Commissioner Silva, who confirmed that Commissioner Murray was in attendance.

Susan Ashcraft gave welcoming remarks and highlighted that the meeting was a continuation of the March 17 meeting; as such, only agenda items not completed on that day (i.e., agenda items 7 through 10) were scheduled to be heard. The following Committee member(s), Commission staff, and Department staff participated:

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
Ari Cornman	Wildlife Advisor
Rose Dodgen	Sea Grant State Fellow
Cynthia McKeith	Staff Services Analyst

Department Staff

Mike Stefanak	Assistant Chief, Law Enforcement Division
---------------	---

Bob Puccinelli	Captain, Law Enforcement Division
Randy Lovell	Statewide Aquaculture Coordinator
Craig Shuman	Regional Manager, Marine Region
Kirsten Ramey	State Managed Marine Finfish Program Manager, Marine Region
John Ugoretz	Pelagic Fisheries and Ecosystem Program Manager, Marine Region
Tom Mason	Senior Environmental Scientist Supervisor, Marine Region

7. Marine aquaculture in California *(continued from March 17)*

Susan Ashcraft introduced the topic, which was continued from the March 17 meeting. She noted that discussion at the March meeting was limited to a Department presentation with minimal dialogue and time for just one public comment.

(A) Receive Department informational report on marine aquaculture in California, discuss status of the programmatic environmental impact report, and consider proposed next steps

Randy Lovell provided an abbreviated version of the presentation he gave on March 17, and provided updates since the last discussion related to the draft aquaculture informational report (AIR). The Department intends to integrate feedback received from the committee and public at this meeting into the draft AIR, and transmit a final AIR to the Commission in June. The Department is planning to use the AIR as a foundation to develop an aquaculture action plan in line with the Ocean Protection Council's strategic plan and Fish and Game Code guidelines for aquaculture. The Department is requesting that the Commission assist with convening a public discussion to identify needs to consider within an action plan.

At the request of the committee members, Randy clarified that this is not intended to replace the CEQA review planned for a Programmatic EIR, but to better establish an understanding of the needs of aquaculture, which can then be used to build a management framework for later CEQA review. He further clarified that, while offshore finfish aquaculture is not currently present in California and not currently being considered, the Department does not believe it should be precluded from public discussion.

Discussion

There was a diversity of public comment and several viewpoints were expressed. Several NGO representatives and environmental advocates spoke in support of the Department's desire to take a careful approach to aquaculture, expressed concerns about authorizing water bottom aquaculture in delicate intertidal environments and about risks associated with offshore finfish aquaculture. One commenter requested that the aquaculture best management practices (BMPs) discussed by MRC over the past few years be incorporated into the process.

The committee asked Jenn Eckerle to provide additional information about OPC's current plan for supporting informed aquaculture development, as reflected in its strategic plan. Jenn highlighted steps they envision taking after Commission receipt of the AIR at its June meeting. OPC intends to convene agency leaders to develop a set of principles to guide sustainable aquaculture management and development in California related to marine seaweed and shellfish culture and land-based finfish culture. These

principles will include a variety of measures to minimize detrimental impacts. They will present OPC with a proposal to fund development of a statewide aquaculture initiative at the September meeting. The grantee's work would include development of a draft action plan, followed by extensive stakeholder engagement.

(B) *Discuss possible recommendation for a hiatus in considering new applications for state water bottom leases for the purpose of aquaculture (excepting three previously-received applications currently under consideration).*

Susan Ashcraft provided more information on the staff-proposed, short-term hiatus on accepting new lease applications. Completing the review process for current lease applications is challenging based in part on lack of dedicated staff or funding. She noted that some commenters expressed support for excepting from hiatus the two offshore lease applications for which the Commission has already made a public interest determination, but not the third from Tomales Bay for which that determination has not yet been made. She highlighted that FGC had previously supported moving all three applications forward for review, and efforts were underway.

Melissa Miller-Henson emphasized that the Commission's staffing situation is exacerbated by the COVID-19 crisis. As the three current lease applications are the first received in over 25 years, they also present a process challenge; no current staff members participated in previous lease consideration processes. There is a need to expand the Commission's resources, but this is unlikely to happen right now given statewide budget concerns resulting from the economic impacts of the epidemic.

Discussion

Representatives of research institutions spoke in support of exploring restorative shellfish and algae aquaculture and potential sustainable offshore finfish aquaculture. Several representatives from the aquaculture industry spoke on the need to supply California's growing population with sustainable and locally-produced seafood, spoke against a hiatus, and requested representation in the development of the Department's action plan.

The Port of San Diego specifically requested that institutions able to provide their own resources and environmental review be exempt from any hiatus. Susan Ashcraft noted that the port has been collaborative and has reached out repeatedly to invite Commission staff to participate in meetings where fishing interests were involved. She suggested that the Commission may want to consider the port's request in spite of staffing limitations, as the port has already facilitated a robust planning and stakeholder engagement process, and offers its capacity and resources to support review of a lease application.

The Committee co-chairs discussed factors to consider regarding a potential short-term hiatus, and if recommended, what duration would balance staff and administrative needs with interests of potential lease applicants. Craig Shuman pointed out that leases should not be considered without a solid foundation, and long-term decisions about leases should not be considered before an action plan is in place. He specifically highlighted written comments received prior to the meeting from Bernard Friedman of Santa Barbara Mariculture, as worth considering in the action plan.

MRC Recommendation

Following discussion, the Committee recommends that the Commission:

- Accept the Department's updated aquaculture information report in June as the final report, and request that the Department return to the Marine Resources Committee in July with proposed next steps for developing an aquaculture action plan following coordination with Ocean Protection Council and Commission staff; and
- Approve a six-month hiatus on considering new state water bottom lease applications not already received by FGC, schedule a follow-up discussion for the November Marine Resources Committee meeting to evaluate whether to end or continue the hiatus, and authorize staff to engage in dialogue with the Port of San Diego concerning a potential lease application and review process during the hiatus.

8. Experimental Fishing Permit (EFP) Program, phase II

Susan Ashcraft introduced the topic, which is to receive a Department update on progress developing an EFP program and the public outreach efforts that the Department has recently undertaken.

Tom Mason presented the Department's current plan for the structure of an EFP program, including the potential application process, standard terms and special conditions for approving a given EFP, grounds for denial, and a potential tiered permit fee approach depending on Department support requirements. During a public stakeholder workshop hosted by Department and Commission staff in January, public input was solicited on program elements; the structure as presented by Tom incorporated input from the workshop.

Items flagged for further discussion included what application cycle would be followed (e.g., open versus semi-annual) and cost recovery structures.

Discussion

Co-Chair Murray asked clarifying questions regarding considerations for the fee structure and inquired about interest in program participation thus far. Tom explained that there is a lot of interest in the program, notably for testing alternate gear for the Dungeness crab trap fishery to reduce entanglement risks for whales and turtles.

Several commenters provided detailed input. A representative of commercial fishing interests in San Diego expressed concern that the Department's limited staff capacity would prevent the research required by the program and expressed support for additional program funding. He requested flexibility on timing of permit applications due to fishery seasonality. He also requested quick program implementation, noting the slow turnaround on phase I of this program led to a raffle for permit issuance, which resulted in key individuals that had initiated the program's development being excluded from participating.

Representatives from two NGOs spoke in support of the new EFP program, as it will allow experimentation and adaptability for responding to concerns such as bycatch, entanglement, and climate change, and it enhances stakeholder involvement in addressing these concerns. One of the representatives expressed concern about a lack of safeguards and requested more restrictions to inhibit potentially destructive gear use in the program, which has presented an issue in the federally-equivalent program.

A graduate student from the Scripps Institute of Oceanography at UC San Diego shared her contact information as she is gathering information for the Department from fishermen who have specific ideas for EFPs they would like to pursue in the program.

MRC Recommendation

Following discussion, the Committee recommends the Commission request that the Department refine options and criteria for the EFP permit fee structure, and schedule the topic for discussion and recommendation at the July MRC meeting.

9. Recreational swordfish

Susan Ashcraft introduced this topic, which was referred to MRC at the Department's request in response to recent increases in recreational take of swordfish in southern California.

John Ugoretz provided an overview on behalf of the Department. An increase in recreational use of "deep drop" gear has increased success in the recreational fishery, which has led to concerns about the potential for waste, gear conflicts, and unverified reports of commercialization. Several management responses have been discussed with stakeholders, including lowering the bag limit, requiring report cards, and setting gear restrictions. Thus far, there has been general support for a bag limit reduction, but opposition from commercial passenger fishing vessels (CPFVs) on reduced boat limits. John suggested that a possible rulemaking to change the current bag limit merits discussion.

Discussion

The discussion focused on concerns about possible commercialization (i.e., reports of fish caught on non-commercially licensed boats and sold to restaurants or consumers), which could result in underselling commercial fishermen by offering product at a lower price than a licensed operation could. Assistant Chief Stefanak confirmed that commercialization is an enforcement concern. While the Department's Law Enforcement Division has followed up on reports, they have not collected any conclusive evidence of commercialization in recreational swordfish.

There was general agreement that an improved tracking and data collection system to estimate effort and total take is needed as there is not currently a good data stream for highly migratory species such as swordfish. Improved data collection methods would help establish a baseline understanding of take, and the Department suggested collaborating with stakeholders to improve monitoring to support the Department's ability to respond to issues like this one.

A representative of an environmental NGO spoke in support of the bag limit and requested that the Department consider exploring recreational gear requirements that would mimic the commercial gear requirements.

A representative of the recreational fishing industry expressed opposition to changing boat limits for CPFVs, arguing that the need for such a change could not be substantiated without a stock assessment suggesting the stock is at risk.

The Department confirmed for the co-chairs that risk to the swordfish stock is not currently a concern. Their concerns are reducing risk of commercialization, reducing waste, and improving data streams and understanding of catch levels.

MRC Recommendation

Based on the discussion, MRC recommends that the Commission request the Department explore options to revise the recreational swordfish daily bag limit and improve data collection methods through regulation change, and schedule this topic for discussion in July 2020.

10. Marine Life Management Act master plan implementation

Susan Ashcraft provided introductory comments, recapping that the Commission had received an updated implementation work plan from the Department at MRC's February 2020 meeting. The work plan identified developing a California halibut fishery management plan (FMP) as a next implementation step.

Kirsten Ramey provided a verbal overview of initial Department preparation for a California halibut FMP, including a stock assessment underway. The stock assessment will be peer reviewed through the California Ocean Sciences Trust and is anticipated to be ready for public review later this year.

Discussion

Environmental NGO representatives expressed support for using the tools adopted in the master plan, such as the "data-limited toolbox" for evaluating data-limited stocks, and the bycatch evaluation framework developed through the bycatch working group. Comments about a California halibut FMP focused on evaluating levels of bycatch and discard, especially in the trawl sector, and on considering the multi-species target assemblage with some halibut gears where other targeted species may be a high priority for the Department. There was a request that a proposed roadmap for the halibut FMP be brought to the July 2020 MRC meeting, including a scoping process and a bycatch inquiry using the bycatch evaluation framework.

Co-Chair Murray asked whether bringing an FMP framework to the July MRC meeting was realistic, considering staff resource constraints. Craig Shuman advised that the request was not feasible, and that the Department already had to put the scoping process for an FMP on hold. The committee responded that it understood that a timeline would need to remain open for the time being.

No formal recommendation was made.

11. Future agenda items (This topic was heard immediately following item 6 on March 17).

(A) Review work plan agenda topics and timeline

Susan Ashcraft highlighted that no available meeting space has been located in San Clemente for the July 21 MRC meeting; there is meeting space available on July 29.

MRC Recommendation

The MRC recommends that the July 2020 MRC meeting be rescheduled for July 29 in San Clemente.

(B) *Potential new agenda topics for Commission consideration*

Two sport fishing association representatives requested to discuss the Department's R3 initiative at the April FGC meeting, in conjunction with potential 365-day sport fishing license legislation.

A former Pacific herring FMP steering committee member requested to add lessons learned from the Pacific herring FMP. Susan asked that the requestor confer with the Department first before MRC consider adding the topic.

Adjourn

Susan Ashcraft reminded attendees that the next MRC meeting is scheduled for July 29, 2020 in San Clemente.

The meeting adjourned at 12:46 PM.

Memorandum

Date: May 29, 2020

Received by FGC on June 17, 2020
Original signature on file

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

From: Charlton H. Bonham
Director

Subject: **Agenda Item for the June 24, 2020 Fish and Game Commission Meeting
Regarding the Commercial Marine Aquaculture Informational Report**

The Department of Fish and Wildlife (Department) is submitting the final commercial marine Aquaculture Informational Report (AIR) to the Fish and Game Commission (Commission) for their June 24, 2020 meeting. The AIR was prepared as a step toward providing a common understanding of existing marine aquaculture activities in the state, the potential impacts of those activities, and future considerations of expansion. The AIR describes the primary marine aquaculture species and culture methods approved for use, physical setting and potential impacts, the current management context including primary policies and management authorities, and expected opportunities and challenges facing the future development of marine aquaculture.

The draft AIR was presented at the March 17 and April 29 Marine Resources Committee (MRC) meetings. The MRC recommended the AIR be presented to the Commission at their June 24, 2020 meeting. The Department has addressed public comments received in response to the draft as well as corrected inaccuracies and/or inconsistencies. Additional feedback received during the public review process that was outside the scope of the AIR has been documented for consideration during the development of a statewide Marine Aquaculture Action Plan (Action Plan) described below.

The Ocean Protection Council has identified in their Strategic Plan 2020-2025, the need to develop a statewide Action Plan in partnership with the Department, focused on marine algae, shellfish, and land-based finfish operations. The Action Plan will be used to identify approaches to avoid and minimize impacts to habitat, biodiversity, fisheries, and other ocean users, including minimum project criteria to help advance the development of sustainable aquaculture.

The Department recommends the AIR be submitted to the Commission to build momentum towards developing the Action Plan and to provide a foundation for

Melissa Miller-Henson, Executive Director
Fish and Game Commission
May 29, 2020
Page 2

discussion around commercial marine aquaculture management within California moving forward.

Please direct any inquiries to Kirsten Ramey at Kirsten.Ramey@wildlife.ca.gov or (707) 445-5365.

cc: 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

Randy Lovell
State Aquaculture Coordinator
Wildlife and Fisheries Division
Randy.Lovell@wildlife.ca.gov

Kirsten Ramey, Program Manager
Marine Region
Kirsten.Ramey@wildlife.ca.gov

Adam Frimodig
Senior Environmental Scientist
Marine Region
Adam.Frimodig@wildlife.ca.gov

Kathryn Johnson, Environmental Scientist
Marine Region
Kathryn.Johnson@wildlife.ca.gov

THE STATUS OF COMMERCIAL MARINE AQUACULTURE IN CALIFORNIA

**Final Report to the
California Fish and Game Commission**



**California Department of Fish and Wildlife
(May 2020)**

Table of Contents

1	INTRODUCTION	4
2	DESCRIPTION OF COMMERCIAL MARINE AQUACULTURE OPERATIONS IN CALIFORNIA.....	5
	Overview.....	5
	Cultivated species.....	10
	Shellfish.....	11
	Seaweed	15
	Finfish	16
	Cultivation methods	16
	Bottom Containers	16
	Embedded Clam Culture	17
	Rack Culture	18
	Intertidal Longline.....	19
	Subtidal Longline.....	20
	Raft Culture	22
3	DESCRIPTION OF HABITATS AND INTERACTIONS WITH AQUACULTURE	24
	Physical Setting and Wildlife Habitats.....	24
	Oceanography.....	24
	Benthic Habitats	26
	Coastal Habitat.....	27
	Effects of Climate Change on the Environment.....	29
	Potential Impacts of Commercial Aquaculture Development	29
	Impact Mitigation and Avoidance	30
4	MANAGEMENT CONTEXT.....	32
	Policies and Management Authorities.....	32
	National Policy	32
	State Policies	32

	Regulatory Overview.....	35
5	LOOKING AHEAD	40
	Siting Analysis, Best Management Practices, and Adaptive Management	40
6	REFERENCES	44

1 INTRODUCTION

Aquaculture is a form of agriculture devoted to the propagation, cultivation, maintenance, and harvesting of aquatic plants and animals in marine, brackish, and freshwater. California Public Resources Code (PRC) Section 828 defines aquaculture as the culture and husbandry of aquatic organisms, including, but not limited to, fish, shellfish, mollusks, crustaceans, kelp, and algae. Aquaculture does not include species of ornamental marine or freshwater plants and animals not used for human consumption or bait purposes that are maintained in closed systems for personal, pet industry, or hobby purposes (California Food and Agriculture Code Section 25.5, California Fish and Game Code [FGC] Section 17).

This aquaculture informational report (AIR) focuses on the current status of commercial marine aquaculture in California and environmental conditions within state waters and does not include federally administered waters beyond three nautical miles (nm) offshore. Artificial propagation, rearing, and stocking projects for the purpose of recovery, restoration, or enhancement of native fish stocks carried out under a valid Scientific Collecting Permit issued by the California Department of Fish and Wildlife (CDFW), or the Ocean Resources Enhancement and Hatchery Program (OREHP) are not included here; these types of activities are addressed through separate regulatory programs. Although there are a small number of land-based hatchery and production facilities, commercial marine aquaculture currently occurs primarily in sheltered and protected bays and estuaries, and, to a lesser extent, in the nearshore and offshore environment in California state waters.

A California marine aquaculture program, or framework, can be broadly conceptualized to include all the policy, management, and regulatory components spread throughout multiple agencies, at all levels of local, state, and federal government, having roles in managing marine aquaculture in the state. CDFW and the California Fish and Game Commission (Commission) are the principal state government entities responsible for the management, protection, and conservation of the state's fish and wildlife resources. As part of that responsibility, the Commission has the authority to regulate certain aspects of commercial marine aquaculture on state lands or in state waters, while CDFW has management responsibility.

This report is intended to serve as a foundation to build a common understanding of existing California commercial marine aquaculture activities and identify areas that need further refinement and consideration. This information will be used to inform a Statewide Aquaculture Action Plan (Action Plan) to guide sustainable marine aquaculture development in California (see further discussion in Chapter 5).

2 DESCRIPTION OF COMMERCIAL MARINE AQUACULTURE OPERATIONS IN CALIFORNIA

The following chapter provides a summary of the status of current commercial marine aquaculture operations in California and includes a description of the primary species and culture methods.

Overview

Commercial marine aquaculture of shellfish and seaweed occurs throughout the state of California in both coastal waters and private land-based facilities (Figure 2-1 and Table 2-1). Although the majority of operations are within coastal waters, there are three active land-based facilities growing shellfish and/or seaweed for commercial sale and consumption, with a fourth long-standing operation in Cayucos closing business in early 2020. A total of 5,740 acres of California public tidelands are leased for marine aquaculture, by the Commission via a state water bottom lease, unless the tidelands are previously granted or privately owned by other entities. Typically, only a portion of the lease is actively used for aquaculture due to limitations in suitable growing areas, presence of sensitive habitats such as eelgrass, or other considerations. The operational footprint for all tideland leases combined is estimated at approximately 13% of the total acreage leased within the state (Table 2-1).



Figure 2-1. Locations of commercial marine aquaculture facilities in California. Open circles show locations with facilities in state waters and closed circles show land-based facilities. Many facilities within state waters also have associated land-based facilities.

Table 2-1. Current commercial marine aquaculture activities in California waters (from north to south).

Location	Total Number of Operators	Total Acreage of Operations	Acreage in Use (estimated)	Tideland Manager	Primary Species	Culture Methods
Humboldt Bay	7	4,825	300	Humboldt Bay Harbor, Recreation, and Conservation District; City of Arcata; City of Eureka	Pacific and Kumamoto Oysters, Mediterranean Mussels, Algae, Manila Clams	Intertidal longlines, stakes, hanging baskets, rack-and-bag, and floating-upweller system (FLUPSY)
Tomales Bay	7	520	152	Fish and Game Commission (state water bottom leases)	Pacific, Kumamoto, Eastern, and European Flat Oysters; Manila Clams; Mediterranean, California Sea, and Bay Mussels	Bags on groundline, rack-and-bag, rack-and-tray, intertidal longlines, stakes and wires, rafts, floating longlines, and in-ground culture with net cover
Monterey Bay	1	2	1	City of Monterey	Red Abalone	Cages on rafts and cages under pier
Morro Bay	2	290	90	Fish and Game Commission (state water bottom leases)	Pacific Oysters and Manila Clams	Longlines, barge, bottom bags, and stakes
Santa Barbara	2	97	25	Fish and Game Commission (state water bottom leases)	Mediterranean Mussels and Pacific Oysters	Subtidal longlines
Agua Hedionda Lagoon	1	5	5	Private	Pacific, Kumamoto, and Olympia Oysters, Green Abalone, Calico and Rock Scallops, Algae, Manila Clams and Mediterranean Mussels	Subtidal longlines, FLUPSY
San Diego Bay	2	<1	<1	San Diego Unified Port District	Seaweed and shellfish seed	Subtidal longlines and FLUPSY

As of early 2020, CDFW manages 17 active state water bottom leases for marine aquaculture totaling 907 acres (Table 2-2), of which approximately 267 acres are currently used. At the time of publication, the Commission has received and is considering three applications for additional state water bottom leases in California state waters. Existing leases range in size from 5 to 156 acres, with an average size of 53 acres. State water bottom leases managed by CDFW are located within Tomales Bay, Morro Bay and the Santa Barbara Channel. The greatest number of state water bottom leases are held in Tomales Bay with a total of 12 leases, operated by seven different businesses. Out of a total of 520 acres leased in Tomales Bay, only 152 acres are currently used. In Morro Bay, two operators occupy three leases in the area, utilizing 90 of their total leased acreage of 290. Two leases in Santa Barbara run by two operators account for 97 acres of leased tidelands, of which only 25 acres are currently used.

Table 2-2. Active state water bottom leases by lessee, location and lease acreage.

Lease Number	Lessee	Location	Number of Acres
M-430-02	Marin Oyster Company	Tomales Bay	5
M-430-04	Charles Friend Oyster Company	Tomales Bay	62
M-430-05	Tomales Bay Oyster Company	Tomales Bay	156
M-430-06	Cove Mussel Company	Tomales Bay	10
M-430-10	Hog Island Oyster Company	Tomales Bay	5
M-430-11	Hog Island Oyster Company	Tomales Bay	5
M-430-12	Hog Island Oyster Company	Tomales Bay	30
M-430-13	Point Reyes Oyster Company	Tomales Bay	25
M-430-14	Point Reyes Oyster Company	Tomales Bay	5
M-430-15	Hog Island Oyster Company	Tomales Bay	128
M-430-17	Point Reyes Oyster Company	Tomales Bay	62
M-430-19	Marin Oyster Company	Tomales Bay	25
M-614-01, parcel 1	Grassy Bar Oyster Company	Morro Bay	143
M-614-01, parcel 2	Morro Bay Oyster Company	Morro Bay	134
M-614-02	Grassy Bar Oyster Company	Morro Bay	15
M-653-02	Santa Barbara Mariculture	Santa Barbara	72
M-654-03, parcels 1 & 2	PharmerSea LLC	Santa Barbara	25

Aquaculture operations without state water bottom leases issued through the Commission, include leases that are managed by city or local government or operate on private tidelands within Humboldt Bay, Monterey Bay, Agua Hedionda Lagoon, and San Diego Bay. These leases total approximately an additional 4,830 acres managed for marine aquaculture in California waters; though, as is the case for CDFW-managed state water bottom leases, not all acreage is operational. In Humboldt Bay, leases are granted to the operators by the Humboldt Bay Harbor, Recreation, and Conservation District; the City of Arcata; the City of Eureka, or through private ownership. These tidelands are held in the public trust by these lessors. Coast Seafoods Company (recently purchased by Pacific Shellfish) leases and/or owns approximately 4,300 acres but farms approximately 280 acres of its lease (CCC 2017). Other companies hold smaller leases ranging from approximately 10 to 350 acres. In Monterey Bay, one operator uses one acre of the two acres leased from the City of Monterey. In San Diego County, five acres of private tidelands are leased to one aquaculture operator in Agua Hedionda Lagoon and less than one acre is split by two operators in San Diego Bay.

Total shellfish production reported to CDFW¹ in 2018 (January through December) was 495.2 metric tons (mt) all species combined (Figure 2-2). This resulted in a value of \$15.3 million². Shellfish production has been on the decline since peaking between 2010 and 2014. The decrease in statewide production after this time period is the result of the Drakes Bay Oyster Company (DBOC) ending their operations within Drakes Estero in late 2014. Historically, DBOC accounted for approximately one-third of the shellfish production in the state. Production in 2018 is similar to levels seen prior to 2010. The culture of Pacific Oysters represented the largest production for the industry, resulting in 57% of total shellfish production, and 53% of the total value in 2018. By location, Humboldt Bay produced 50% of the oysters in California in 2018, followed by Tomales Bay which made up 43% of oyster production. Four and three percent came from Morro Bay and Agua Hedionda Lagoon, respectively. In mussel production, 59% came out of Agua Hedionda Lagoon, followed by 34% from Santa Barbara and 6% from Tomales Bay. In 2018, clams were only reported from Tomales Bay, which produced a half ton of clams and \$5,120 in revenue. No information on abalone production in 2018 was received. Production amounts for seaweed cultivated in

1 Production reports are required as a condition of state water bottom leases. Production reports from facilities outside of state water bottom leases is voluntary to CDFW and not always provided. However, in 2013, the California Department of Public Health (CDPH) implemented mandatory reporting of harvest amounts for all non-state leases to CDPH in addition to the already required reporting for state water bottom leases. Thus, historically, production amounts are likely underestimates; however, beginning in 2013 have been complete.

2 Oyster value based on an average retail/wholesale price per shell for the state (\$0.65). Clam value based on \$5 per pound. Mussel value based on \$3 per pound.

California for commercial sale and consumption are unknown but presumed to be de minimis at this time. Harvests of wild kelp and edible seaweeds are regulated separately and are not within the scope of this report.

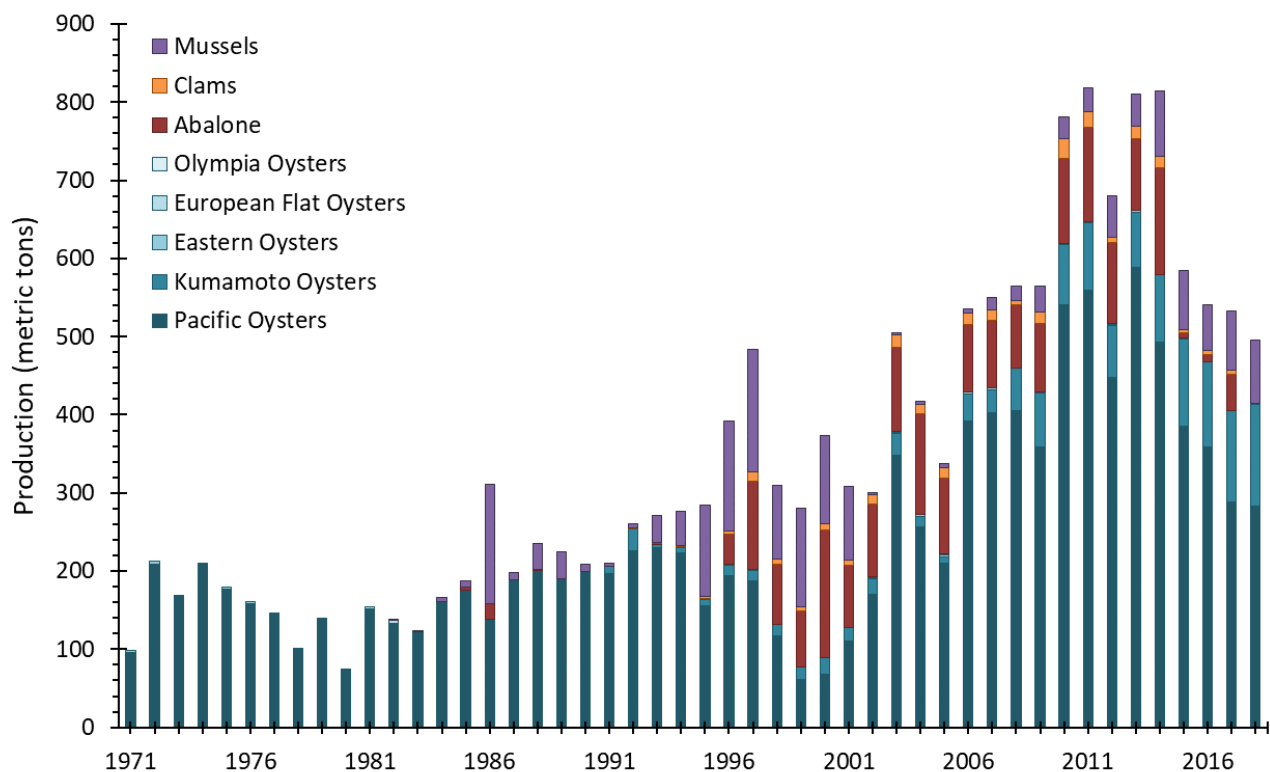


Figure 2-2. California commercial production of mussels, Manila Clams, Red Abalone, Kumamoto Oysters, Pacific Oysters, Olympia Oysters, European Flat Oysters, Eastern Oysters from 1971-2018. The following rates were used to convert reported numbers of oysters into gallons before converting into metric tons: 170 Pacific Oysters/gallon, 300 Kumamoto Oysters/gallon, 300 Eastern Oysters/gallon, 140 European Flat Oysters/gallon.

Cultivated species

California's commercial marine aquaculture industry consists of the production of oysters, mussels, clams, abalone and seaweed. Operators are restricted to growing the species that are approved on their lease. Additionally, each aquaculture facility must register the species they wish to culture in an annual aquaculture registration with CDFW. The species approved for culture by CDFW in 2019 are shown in Table 2-3.

Table 2-3. Number of registered aquaculture facilities for each marine species cultivated in California in 2019.

Species	Number of Registered Aquaculture Facilities
Pacific Oyster (<i>Crassostrea gigas</i>)	17
Kumamoto Oyster (<i>Crassostrea sikamea</i>)	11
Olympia Oyster (<i>Ostrea lurida</i>)	4
Eastern Oyster (<i>Crassostrea virginica</i>)	3
European Flat Oyster (<i>Ostrea edulis</i>)	3
Manila Clams (<i>Venerupis philippinarum</i>)	11
Mediterranean Mussel (<i>Mytilus galloprovincialis</i>)	10
Bay Mussel (<i>Mytilus trossulus</i>)	2
California Sea Mussel (<i>Mytilus californianus</i>)	1
Red Abalone (<i>Haliotis rufescens</i>)	5
Green Abalone (<i>Haliotis fulgens</i>)	1
Ogo (<i>Gracilaria</i> spp.)	5
Sea Lettuce (<i>Ulva</i> spp.)	5
Dulse (<i>Palmaria palmata</i>)	2
Giant Kelp (<i>Macrocystis pyrifera</i>)	2
Bladderwrack (<i>Fucus</i> spp.)	1
Nori (<i>Porphyra</i> spp.)	1
Kombu (<i>Laminaria farlowii</i>)	1
Turkish Towel (<i>Chondracanthus exasperatus</i>)	1

Shellfish

Generally, the term shellfish refers to marine invertebrates including many species of mollusks, crustaceans, and echinoderms that are used as food and have hard exoskeletons. The

dominant cultured species for commercial marine aquaculture production in California are shellfish including several species of oysters, mussels, clams, and abalone. Shellfish operations occur primarily in estuarine and intertidal state waters, although some production also occurs offshore and in land-based facilities. Further, most shellfish culture operations have some land-based facilities that can be used for hatching, early rearing, and processing of shellfish. As shown in Figure 2-1 and Table 2-1, most shellfish operations in California are located in Humboldt Bay, Tomales Bay, and Morro Bay.

There has been some debate about naturalized populations of nonnative shellfish cultured in California and the question of whether they are invasive. U.S. Presidential Executive Order 13112 (Clinton 1999) defines an invasive species as “an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health.” The National Invasive Species Council describes invasive species as “a non-native species whose introduction does or is likely to cause economic or environmental harm or harm to human, animal, or plant health” (ISAC 2006). The National Invasive Species Management Plan (NISMP) further indicates that the National Invasive Species Council will focus on “non-native organisms known to cause or likely to cause negative impacts and that do not provide an equivalent or greater benefit to society.” The NISMP provides further policy guidance and notes that many established nonnative species “are non-invasive and support human livelihoods or a preferred quality of life.”

Determining relative impacts resulting from naturalized populations of nonnative species is often a subjective, value-driven decision, and impacts can vary from one region to another and over time, particularly under changing ocean conditions. Some nonnative species are considered harmful and therefore invasive by some, while others consider them beneficial. This typifies the discussion of naturalized shellfish populations in California. Various nonnative shellfish species have been approved for cultivation and importation into California, through registrations, permits, and lease conditions that are subject to ongoing adaptive management over time. In this report, the term “nonnative” is used.

Oysters

Five oyster species are cultured in the California shellfish industry. Four of the five species grown are nonnative species. The Pacific Oyster (*Crassostrea gigas*), originally from Japan, is the principal species on the U.S. Pacific coast. The Kumamoto Oyster (*Crassostrea sikamea*), also from Japan, is the second most grown oyster species in California estuaries. The Eastern Oyster (*Crassostrea virginica*), grown on the Atlantic and Gulf coasts, accounts for most U.S. oyster landings but is just a small percentage of the oyster production in California. Two brooding oyster species are cultivated to a lesser extent: the European Flat Oyster (*Ostrea edulis*) and the Olympia Oyster (*Ostrea lurida*), the latter of which is native to the Pacific coast. Figure 2-3 below shows most of the cultured oyster species in California.



Figure 2-3. Species of oysters grown in California. Left, Pacific Oyster; center, Eastern Oyster; upper right, Kumamoto Oyster; lower right, Olympia Oyster (Photo: CDFW).

The first commercial oyster beds were established in San Francisco Bay in about 1851 when mature native (Olympia) oysters were shipped from Shoalwater Bay, Washington (Willapa Bay) and later from other bays in the U.S. Pacific Northwest and Mexico. Market demand for a larger half-shell product stimulated experiments in transporting the Eastern Oyster from the Atlantic states to the Pacific coast. Cool summer water temperatures, however, prevented successful natural reproduction of the Eastern Oyster. Soon after completion of the transcontinental railroad in 1869, shipments of Eastern Oyster seed were made and transplanted in San Francisco Bay for further growth, marking the beginning of actual oyster raising in California. However, with California's population and industrial growth came a degradation of water quality in San Francisco Bay, and by 1939 the last of the San Francisco Bay oysters were commercially harvested (Barrett 1963).

The commercial oyster industry and CDFW began conducting earlier experimental plantings using the Pacific Oyster in Tomales Bay, Elkhorn Slough, Drakes Estero, Bodega Lagoon, and Morro, Newport, and San Francisco bays during the 1930s. Several Pacific Oyster plantings proved successful, demonstrating that imported Pacific Oyster seed could be grown commercially in California. Commercial oyster culture is now centered on five major growing areas: Humboldt Bay, Tomales Bay, Morro Bay, Santa Barbara Channel, and Agua Hedionda

Lagoon. The highest production of commercial oysters occurs in Humboldt Bay, followed by Tomales Bay, Morro Bay, Agua Hedionda Lagoon and the Santa Barbara Channel, respectively. The primary methods of oyster culture employed by California growers are intertidal and subtidal longline culture, rack-and-bag, and bottom bags.

Mussels

There are three primary species of wild mussels along the California coast, the Mediterranean Mussel (*Mytilus galloprovincialis*), the California Mussel (*Mytilus californianus*) and the Bay Mussel (*Mytilus trossulus*). Experiments in the 1980s culturing wild mussel seed stock and in developing hatchery and growout methods have greatly increased the importance of commercial mussel production, particularly the Mediterranean Mussel, which occurs primarily in southern and south-central California. A related species, the Bay Mussel, occurs in northern California and hybrids of the two species are commonly found between Cape Mendocino and Monterey Bay.

Most mussel production in California comes from naturally set Mediterranean Mussel or Bay Mussel seed. However, some growers acquire Mediterranean Mussel seed from U.S. Pacific Coast hatcheries, the same species that is cultured in Spain and most of Europe. Currently, several operations within California actively culture and harvest mussels (primarily Bay and Mediterranean Mussels). The primary methods of mussel culture employed by these growers are submerged longlines and bag culture. Agua Hedionda Lagoon, Santa Barbara Channel, and Tomales Bay are the primary growing areas of mussels in California. Agua Hedionda produced 47.80 mt, \$316,167, Santa Barbara produced 27.78 mt, \$183,753 and Tomales Bay produced 5.22 mt, \$34,545 in 2018.

Clams

Currently, the Manila Clam (*Venerupis philippinarum*) is the only clam species grown commercially in California. The Manila Clam is a nonnative clam introduced to the U.S. Pacific Coast from Japan with Pacific Oysters in the 1930s (Talley et al. 2015). While locally abundant in protected-water areas of California from Elkhorn Slough north (Frey 1971), no commercial fishery exists on local stocks. The commercial culture of clams in California began in 1981, but production levels were relatively low until the mid-1990s. Commercial growers purchase artificially reared clam seed for grow out. Because of its preferred distribution in the upper tidal zone, it is not believed to have displaced any native species (Bourne 1982). The Manila Clam often occurs with Pacific Littleneck Clam (*Protothaca staminea*), Soft Shell Clam (*Mya arenaria*), *Macoma* spp. clams, and other estuarine infauna (NOAA 1989).

Currently, approximately half of the registered shellfish operations in California are actively culturing and harvesting clams. The areas with the highest clam production are Tomales Bay, and Humboldt Bay. The primary methods of clam culture employed by these growers has

historically been direct-seeding to the substrate under protective netting, tethered bags on groundlines, and seed culture in trays hung from floating rafts.

Abalone

Currently, there are three remaining commercial facilities in California raising abalone for sale locally and abroad, while some additional facilities are engaged in research. Abalone are primarily cultured in land-based tanks, but one operation cultures abalone in California waters using cages suspended from floating rafts and under a wharf. The primary species cultured is Red Abalone (*Haliotis rufescens*) and, to a much lesser extent, Green (*Haliotis fulgens*) and Pink Abalone (*Haliotis corrugata*). The White (*Haliotis sorenseni*) and Black Abalone (*Haliotis cracherodii*), federally listed as endangered, are the object of research and/or recovery activities.

Pioneering efforts to mass cultivate abalone in California began about 45 years ago, with a peak in abalone production in 2000. Participation in the industry has declined since that time, which was due in part to disease impacts. However, interest in abalone aquaculture remains high, prompted in part by the closure of the commercial abalone fishery in 1997. Presently, the commercial culture of Red Abalone occurs in three main coastal areas: the Santa Cruz area, Monterey Bay, and Santa Barbara. As of early 2020, a long-standing abalone farm in San Luis Obispo County was closing operations.

Seaweed

While California has a long history of wild harvest of seaweed (also called macroalgae, or large marine algae), interest in seaweed aquaculture has been a more recent development. Early cultivation of seaweeds was done in land-based tanks to support abalone aquaculture operations, though in recent years abalone farmers have started selling the cultivated seaweed to meet a growing market for edible seaweed. In the last few years, the first land-based aquaculture facility devoted entirely to edible seaweed cultivation began operating in Moss Landing. There are currently no operating commercial seaweed aquaculture farms in California waters, although two farms are in the process of starting operations in the Santa Barbara Channel and San Diego Bay. However, several existing aquaculture farms sell seaweed opportunistically harvested from their shellfish cultivation gear, where regulations allow. There is growing interest in culturing a variety of seaweeds in intertidal and offshore waters, and several small scale or research and development projects focused on seaweed aquaculture are in progress.

Currently grown or proposed species include Ogo (*Gracilaria spp.*), Sea Lettuce (*Ulva spp.*), Dulse (*Palmaria palmata*), Giant Kelp (*Macrocystis pyrifera*), Bladder Wrack (*Fucus spp.*), Nori (*Porphyra lanceolata*), Kombu (*Laminaria farlowii*, *Laminaria setchellii*), and Turkish Towel (*Chondracanthus exasperatus*).

Microalgae, or microscopic algae, are raised primarily as feed for hatchery operations and other market applications (e.g., pharmaceutical, bioenergy). Microalgae cultivation primarily occurs on land in contained vessels, tanks, or ponds and is not included within the scope of this report.

Finfish

Currently, there is no commercial aquaculture of marine finfish in California. The only related finfish activity is limited to the OREHP's land-based hatchery and intertidal nursery cage operations that are research oriented and in support of stock enhancement.

Cultivation methods

Aquaculture in California consists of both land-based operations and operations within coastal waters. Land-based facilities can include tanks, raceways, or ponds and related administrative or support structures. Water used for land-based facilities can be municipally supplied and discharged to sanitary sewers or can be drawn from and discharged to the marine environment. Certain marine species may be cultured in inland locations, in full-strength seawater, brackish water, or nearly freshwater. Additionally, land-based facilities may house nursery or hatchery operations which supply grow-out facilities in coastal waters or depuration tanks for removing contaminants or physical impurities.

Aquaculture facilities within state waters utilize a variety of culture methods depending on species, environmental conditions, and logistical considerations. Individual farms will often use several methods and grow several species simultaneously. Culture techniques have evolved over time; many culture methods that were more environmentally harmful have been phased out in favor of methods that are more compatible with resource protection goals. Now, most culture methods used in California place species off the bottom using containers or by suspending them in the water column to avoid additional substrate disturbance. New and innovative techniques continue to be developed to grow species in a wide range of depths and conditions, ranging from shallow estuarine to deeper offshore environments.

Bottom Containers

Methods Included: Bag-on-bottom (aka bags, bottom bags), bags on groundline, cage-on-bottom, tray-on-bottom

Species Cultured: Oysters

Description: Shellfish are placed into a fabricated container which is then placed on the seafloor (Figure 2-4). Most commonly this container is a bag made of Vexar polyurethane mesh. Bottom containers may be either tethered or untethered in place. Tethered containers are typically attached with hooks to a long rope (groundline) anchored at either end with screw

anchors. Hooks are usually made of coated wire, halibut hooks, or another custom design. Untethered containers rely on their larger size and weight to remain in place. Long parallel rows of bottom containers are separated by spaces to walk between lines and to periodically flip bags over to the other side of the line to reduce fouling of the bag, prevent burial, and tumble the shellfish. There are two common spatial designs: one-sided design where bags are all laid on one side, and double-sided design where bags are laid on both sides of the line in an alternating, checkerboard pattern.

This culture method dominates oyster production in California due to its suitability to the extensive intertidal areas in most leases and its low-cost relative to culture methods which require more structural components. Oysters grow well, are relatively easy to handle, allow boats to pass over easily during high tide, and can be walked through relatively easily during low tide.



Figure 2-4. Bags on bottom attached to staked lines; bags are attached to lines using coated wire and closed using zip ties (Photos: CDFW).

Embedded Clam Culture

Methods Included: In-ground culture, clam bags, clam roll

Species Cultured: Manila Clams

Description: Because clams are infaunal species, living in the sediment, special techniques are used to keep clams in the mud but still harvestable. Clams are grown either inside containers or directly seeded into the sediment, the latter of which is a method that is being phased out. Clam bags (typically Vexar mesh bags) are filled with pea gravel and clams are then buried in rows flush with the sediment surface (Figure 2-5). In-ground culture seeds clams directly in the sediment with predator-exclusion netting affixed to the surface. After several years of grow-out time, the bags are removed from the mud and gently shaken to remove sediment. To harvest clams that are directly seeded into the sediment, rakes or hydraulic dredges must be used. Only one company in California still uses in-ground clam culture.

Because of the increased substrate disturbance caused by harvesting with the hydraulic rake, this method will be phased out in the next few years.



Figure 2-5. Left: Embedded bottom bags used for clam culture (Photo: CDFW). Right: Clams seeded into the mud are covered with mesh netting until they can be raked out at harvest time (Photo: California Coastal Commission).

Rack Culture

Methods Included: Rack-and-bag, rack-and-tray, rack-and-cage

Species Cultured: Oysters

Description: Shellfish are placed into a fabricated container (e.g. mesh bag) designed to protect and hold organisms during the grow-out phase of production. Containers are then placed atop and may be attached to constructed racks in the intertidal zone, effectively lifting the containers 1-2 feet off the seafloor. Containers alternate between being submerged at high tide and exposed during low tide. Racks are commonly organized in parallel rows with space between rows to walk. Alternative designs of bag placement on the racks may be used, such as slightly overlapping bags to withstand greater wave energy (Figure 2-6). As with bottom containers, aquaculturists will manually flip, move or adjust the containers during low tide to prevent biofouling and influence the shell shape and strength.



Figure 2-6. Rebar racks and Vexar mesh oyster bags, suspended above substrate using PVC. Bags may be arranged in an overlapping fashion to absorb wave energy more effectively (Photos: CDFW).

This method is commonly used in California for several reasons. Logistically, the raised containers can be accessed by boat and may be easier to handle than bottom containers. In addition, the rack structure allows containers to be placed off-bottom in softer sediments where the bottom container method is not an option due to a high burial risk.

Intertidal Longline

Methods Included: Tumble culture, tip bags

Species Cultured: Oysters

Description: In the intertidal, ropes or wrapped steel cables (longlines) are hung between anchors made with hinged/flange PVC stakes or wire tension supports, with supporting posts of rebar or PVC pipe evenly spaced throughout to keep the line taut. Containers (e.g. bags, baskets) of shellfish are then attached with stainless steel wire gauge, coated wire, or halibut hooks to these lines so that they are suspended approximately 1-4 feet above the seafloor. Optionally, floats may be attached to the unattached end of the containers so that they will rotate up and down, or “tip”, as the water level changes with the tides (Figure 2-7). This replaces the need to manually flip the bags as in bottom container culture and rack culture. Shellfish will be exposed to air during low tide and, if floats are attached, will float at the surface during high tide. During low tide, if the containers are not hung high enough above the seafloor, they may touch the bottom.



Figure 2-7. Intertidally suspended lines with floating bags (top, left and right) and hanging non-floating baskets (bottom) (Photos: Michael Toussaint, Marin Oyster Company).

Subtidal Longline

Methods Included: Floating longline, submerged buoyed longline, mussel longline

Species Cultured: Oysters, mussels, seaweed (in development)

Description: Subtidal longlines are similar to intertidal longlines, but they are used in deeper areas of bays or nearshore waters where the seafloor is always submerged. The longlines are anchored at each end to the seafloor and are suspended near the water surface with a series of buoys. Containers such as baskets, trays, cages, or bags are filled with shellfish and attached to the floating longline (Figures 2-8 and 2-9). There are many variations and designs related to this culture method. To keep culture species floating at the surface, floats may be attached to individual containers. Alternatively, the containers may be suspended in the water column and never exposed to air. This submerged longline variation can include the

suspension of stacked trays or cages of shellfish that hang vertically beneath the longline (Figure 2-10). A variation of this method is used for mussels, which utilizes a specialized “fuzzy mussel rope” with a higher surface area for mussel settling and culturing. Fuzzy rope containing cultured mussels is hung in long repeating loops suspended from evenly spaced attachment points to the submerged longline. The submerged longline can be maintained at a constant water depth, approaching 30 feet deep in some nearshore farms, using a series of submerged floats and counterweights.



Figure 2-8. Subtidal longlines using bags with floats attached to keep the bags at the surface (Photos: CDFW).



Figure 2-9. View of subtidal longlines from a distance (left photo: California Coastal Commission; right photo: CDFW).



Figure 2-10. Submerged longline variations: mussel longline (left) and stacked cages hanging from a submerged longline (right) (Photos: CDFW).

Raft Culture

Methods Include: Barges, floating upwelling raft system (FLUPSY)

Species Cultured: Oysters, mussels, clams

Description: Another method of subtidal culture includes suspending a variety of species and containers from floating barges or rafts (Figure 2-11). Rafts consist of two large floats at either end covered in a plywood decking with a series of poles making up the center of the raft and are anchored to the seafloor. From the poles, containers such as baskets, stacks of trays, or mussel rope can be suspended. Rafts offer a secure structure from which shellfish culture can operate; attachment of containers is reliable and generally holds up well under storm conditions. Rafts allow for operational ease, and large volumes of product can be processed readily with the use of winches and other machinery which lift containers from the water. Interest is growing in this method for growers who are already maximizing use of the intertidal portions of their lease(s) or do not have access to intertidal areas.



Figure 2-11. View of rafts at a distance (left) and up close (right) (Photos: CDFW).

A popular modification of this method, the floating upwelling raft system (FLUPSY), is used to grow shellfish seed quickly to the appropriate size for planting. On a FLUPSY, a series of containers hold small oyster seed while an underwater paddle wheel circulates algae and nutrient-rich waters through the screened bottoms of each container, simulating upwelling (Figure 2-12). Floating rafts support the upwelling containers and keep the shellfish several feet below the water surface. FLUPSYs are typically installed adjacent to piers and held in place using mooring lines and chain as well as anchored to the seafloor.



Figure 2-12. Raft modification: floating upwelling raft system. Upwelling containers hang in compartments on floating rafts (left) with a large paddle wheel directing nutrient rich water through containers (right) (Photos: CDFW).

3 Description of Habitats and Interactions with Aquaculture

A sustainable aquaculture industry depends on the ability to operate within the environmental framework and philosophy of natural resource management. Immediate environmental concerns relative to shellfish culture are the potential biological and physical impacts of culture technology on sensitive components of the marine ecosystem. These sensitive components include eelgrass as essential habitat for salmonid and other finfish, and the invertebrate assemblage present on and within the substrate that is essential to the food web of birds and other marine species. Also included are the impacts on the life habits of birds and marine mammals and on the physical structure of the habitat itself. It is essential that aquaculture activities not have significant impacts upon the health of the ecosystem on which it also depends.

Physical Setting and Wildlife Habitats

The following sections provide brief descriptions of oceanographic conditions, the types of habitats and species that inhabit them, and some of the effects of changing environmental conditions along the coast of California.

Oceanography

Oceanographic conditions such as currents, water masses, and temperature strongly influence marine biodiversity. Variations in oceanographic factors determine areas of productivity where krill, squid, anchovy, seabirds, and marine mammals congregate in the pelagic ecosystem (Yen et al. 2004). Features such as eddies, upwelling plumes, currents, recirculation cells and river outflow plumes can be associated with high marine biodiversity, and transport patterns created by these features can significantly affect recruitment patterns of fish and invertebrates in intertidal nearshore communities (Farrell et al. 1991, Wing et al. 1995, Mace and Morgan 2006). Oceanographic patterns also strongly influence growth, fecundity and survivorship of many species, and well as dispersal and recruitment patterns of sedentary species that have planktonic phases.

The California coast represents a tectonically active continental margin, dominated by processes such as uplift, erosion, and seismic activity, much of which is associated with transform plate movement along the San Andreas Fault. Consequently, the coast in most areas drops quickly into deep water. Generally, the continental shelf is only a few miles wide, although in some parts of the Southern California Bight south of Point Conception it becomes substantially wider. Ocean circulation along the whole coast is dominated by the California Current, an ocean current that sweeps south along the entire west coast of North America from southern British Columbia to southern Baja California (Hickey and Banas 2003).

The California Current is part of the North Pacific Gyre, which swirls clockwise within the northern basin of the Pacific Ocean. The California Current is made up of southward-flowing surface waters extending more than a hundred miles offshore; these waters are cooler than the waters farther offshore. This cold water results in upwelling, which brings nutrient-rich sediments to the ocean surfaces and produces highly productive conditions for wildlife such as whales, seabirds, and fish. Two large countercurrents also influence conditions along the California coastline, including the northward-flowing subsurface Davidson Countercurrent and Southern California Countercurrent. During the winter, the California Current tends to “move” offshore, allowing the inshore countercurrents to dominate in the nearshore surface waters (Reid et al. 1958).

Two large-scale atmospheric processes also influence the California Current system: El Niño-Southern Oscillation (ENSO) events and Pacific Decadal Oscillations (PDO). ENSO events generally reduce upwelling of cold, nutrient-rich waters, increase onshore and northward flows, and increase sea surface temperatures. ENSO events typically occur every several years, and generally result in declines of zooplankton and reductions in productivity that can affect fish, seabird, and marine mammal populations. PDO events occur over much longer timescales (20–30 years) and have large-scale impacts on zooplankton and fish productivity throughout the North Pacific.

North of Point Conception, the California Current sweeps slowly south along the shoreline, and the cool, low-salinity waters of the current are responsible for the cold water temperatures and frequent coastal fogs that characterize this part of the California coast. Also, the prevailing northwesterly winds drive surface water to the right of the wind flow (offshore), and this phenomenon drives coastal upwelling. Upwelling brings cold, nutrient-rich bottom water to the surface where the abundant nutrients support high plankton productivity and, by extension, much of the marine food web, from anchovies to whales. This productivity is at the root of California’s commercial ocean fisheries and shellfish industries, and potentially could support a substantial aquaculture industry. However, the upwelling process is highly variable on both seasonal and inter-annual timescales. When the California Current is slowed or disrupted, as happens during the winter months and during El Niño years (and sometimes at other times), this results in reduced upwelling rates and a sharp decline in plankton production (Hickey and Banas 2003). Consequences include failed or reduced fisheries, and sharp declines in seabird and marine mammal populations as breeding decreases and animals starve or migrate elsewhere to find food.

South of Point Conception, in the waters of the Bight, the shoreline cuts sharply eastward and the California Current moves offshore of the Channel Islands. A counter-clockwise countercurrent is generated, moving generally from south to north along the shoreline from northern Baja California to Point Conception, and producing a very large eddy within the Bight. The Southern California Countercurrent (SCC) is also variable over time, being strongest in

summer and fall and weakest in winter and spring. Upwelling is usually a minor process in the Bight, but strong offshore winds can result in nearshore upwelling and a sharp drop in water temperatures. Water movement through the eddy carries upwelling waters and plankton as well as pollutants and sediments from terrestrial rivers into the Bight. Compared with the coastline north of Point Conception, the waters along the coastlines around the Bight have fewer nutrients, warmer water, and are mixed less with waters of the open ocean. Mixing within the Bight typically results in efficient dispersion of suspended particles, however smaller eddies and wakes formed around islands can temporarily isolate some areas (Mitarai et al. 2008). The coastal waters of the Bight, specifically within 3 nm of the shore, are also relatively sheltered from the prevailing northwest winds by Point Conception and the Channel Islands. This location results in substantial reductions in wave height and energy compared to the coast north of Point Conception (Hickey and Banas 2003).

Benthic Habitats

Benthic (seafloor) habitat in California varies geographically but is typically characterized by either hard (rocky or reef) substrate or soft (sand or mud) substrate. The locations of each benthic substrate type vary within each biogeographic region based on several factors, including the geology of the shoreline. Both substrates provide habitat for numerous invertebrate and fish species. Rocky areas provide hard substratum to which kelp and other algae attach in waters up to approximately 100 feet deep, while in deeper water, hard substratum provides attachment substrate for many species of deep-water invertebrates. In addition to attached organisms, the structural complexity of rocky areas provides habitat and protection for mobile invertebrates and fishes.

Soft-bottom environments range from flat expanses to slopes and basin areas. Soft-bottom habitats lack the complex, three-dimensional structure of hard-bottom substrata, and are somewhat less diverse in species assemblages than rocky reefs, depending on the compositional sediment type. Soft bottom species are generally bottom-dwelling invertebrates and fishes, and many have special adaptations for the habitat such as flattened bodies and concealing coloration (Allen et al. 2006). Soft-bottom habitats can be highly dynamic in nature as sediments shift due to wave action, bottom currents, and geological processes. Shallow, sandy, soft-bottom benthic habitat is found in areas along the coast that are subject to constant tide, wave, and shoreline processes, resulting in a highly changing and low-productivity region. Sandy benthic habitat generally extends to water depths of approximately 300 feet. Muddy sediment bottoms are typically found in water depths greater than 300 feet along the shelf but also occur in estuaries and lagoons.

Coastal Habitat

The coast of California is composed of sandy beaches, rocky headlands, sea cliffs, and lagoons in the intertidal and nearshore environment. Generally, the coastline north of Point Conception is rugged, with prominent headlands, stretches of sea cliffs, and small sandy beaches. South of Point Conception, the shoreline is typically adjacent to coastal plains and marine terraces; and long sandy beaches are common. Tidal flats, sandy or muddy expanses that become exposed at low tides and are associated with coastal rivers as well as bays and estuaries, are distributed along the California coast. Beds of mussels (*Mytilus* spp.), seagrass beds, and algal assemblages from turfs (e.g., *Endocladia muricata*) to low canopies of leathery kelp and stalked algae species (e.g., *Pterygophora californica*, *Postelsia palmaeformis*) are distributed in patches throughout rocky shoreline habitat along the coast.

Estuarine and wetland habitat

Estuarine and wetland habitats encompass soft-sediment habitats, including tidal mudflats, eelgrass beds and areas of open water. Habitat formed by eelgrass and other plants plays an important functional role as foraging and nursery areas for a diverse range of fish and invertebrate species, many of which inhabit estuaries as juveniles before moving to kelp and other offshore habitats as adults. Estuaries, coastal bays and beaches are also an important part of the Pacific Flyway and host millions of migrating and provide important foraging and nesting area for resident bird populations (CDFW 2009; Senner et al. 2016).

Seagrass habitat

Seagrass habitats support an abundant and biologically diverse assemblage of aquatic wildlife species. The most common type of seagrass in estuaries and sheltered coastal bays in California is Common Eelgrass (*Zostera marina*). A second variety of eelgrass, *Zostera pacifica*, is found mainly along the open coast of southern California. Eelgrass beds provide refuge, foraging, breeding, or nursery areas for a variety of invertebrates, fish and birds. The most common type of seagrass along the open coast of California is Surfgrass (*Phyllospadix* spp.), which forms beds that fringe nearly all the rocky coastline at the zero-tide level down to several meters below the zero-tide level.

Kelp forest habitat

Kelp forests are an important component of California's marine ecosystems that provide shelter for both juvenile and adult species of fish, provide important nursery habitat for Southern Sea Otters (*Enhydra lutris nereis*), offer vertical and horizontal substrate for a variety of marine organisms, and account for a large portion of the primary productivity in the nearshore communities. In California, there are two primary canopy-forming kelp species: Giant Kelp (*Macrocystis pyrifera*) and Bull Kelp (*Nereocystis luetkeana*). In addition, intertidal boulders, platforms and cliffs, as well as tidepools, are home to many species of snails,

barnacles, anemones, crabs, sea stars, and fishes. Kelp forests grow along rocky coastlines and typically remain nearshore in subtidal communities.

Offshore rocks and islets

Many offshore rocks and islets are present along California's rocky coastlines, which provide habitat for many species of pinnipeds (i.e., seals and sea lions) and seabirds. Many seabird species occur and nest in colonies on these features along the California coast. In addition, many marine mammal species, which are protected under the federal Marine Mammal Protection Act (MMPA), are known to occur within the nearshore environment along the California coast.

Wildlife Corridors and Nurseries

The marine environment provides migration corridors for many wildlife species, and the spatial and temporal scales of these migrations vary based on the specific marine environment (e.g., nearshore, pelagic). Wildlife movement within the marine environment includes nearshore migration of Gray Whales between Baja California and the Bering Sea, seasonal movements of juvenile salmon out of rivers and along the shoreline, and daily movements of pinnipeds between haul-outs and foraging grounds. Larval dispersal from marine invertebrate and fish species occurs over long distances and is important when considering connectivity of populations. Migratory birds utilize the Pacific Flyway, which extends along the entire Pacific coast, because of its unique biological characteristics.

Nearshore pelagic habitat

The nearshore pelagic habitat supports planktonic organisms that float or swim in the water, as well as fish, marine birds, and marine mammals. The pelagic community is composed of microorganisms such as phytoplankton (e.g., diatoms, dinoflagellates) and zooplankton (e.g., protozoans, radiolarians, copepods, amphipods), and other organisms like worms, mollusks and jellyfish. Many pelagic fish species, seabirds, cetaceans, and sea turtle species occur off the coast of California or are associated with nearshore habitat.

Submarine Canyons

Submarine canyons are submerged steep-sided valleys that cut through the continental slope and occasionally extend close to shore. These features exhibit bathymetric complexity, support unique deep-water communities, and affect local and regional circulation patterns. Canyons provide habitat for young rockfish and flatfish that settle in nearshore waters to grow and move offshore as adults. Canyons also attract concentrations of prey species and provide important foraging opportunities for seabirds and marine mammals (Yen et al. 2004).

Effects of Climate Change on the Environment

According to the Intergovernmental Panel on Climate Change, which was established in 1988 by the World Meteorological Organization and the United Nations Environment Programme, global average temperature is expected to increase by 3–7 degrees Fahrenheit (°F) by the end of the century, depending on future GHG emission scenarios (IPCC 2014). According to California's Fourth Climate Change Assessment, temperatures in California are projected to increase by 5.6 to 8.8°F by 2100 (OPR et al. 2018a).

Water resource–related vulnerabilities also include potential degradation of watersheds, alteration of ecosystems and loss of habitat, impacts on coastal areas, and ocean acidification (CNRA 2018a). The ocean absorbs approximately one-third of the CO₂ released into the atmosphere every year from industrial and agricultural activities, changing the chemistry of the ocean by decreasing the pH of seawater. Ocean acidification affects many shell-forming species, including oysters, mussels, abalone, crabs, and the microscopic plankton that form the base of the oceanic food chain (Kroeker et al. 2010, 2013). In addition, significant changes in the behavior and physiology of fish and invertebrates attributable to rising CO₂ and increased acidity have already been documented (OPR et al. 2018a).

California's ocean supports a vast diversity of marine life, as well as fishing communities that depend on fish and shellfish for their livelihoods and that provide a diverse supply of seafood to the state and for export. In the last few years, California has experienced an unprecedented marine heat wave, resulting in closures of fisheries and a significant loss of northern kelp forests. There is increasing evidence that sea-level rise, ocean acidification, and ocean warming associated with climate change are transforming and degrading California's coastal and marine ecosystems (OPR et al. 2018b).

Potential Impacts of Commercial Aquaculture Development

While the scope of this report does not include an analysis of environmental impacts and this list is not exhaustive, the following potential issues and areas of concern have been identified regarding commercial marine aquaculture development:

- Escape of cultured organisms and subsequent genetic, disease transmission, and competition effects, including past and present impacts and ecosystem-level impacts;
- Impacts associated with a potential increase in disease vectors;
- Impacts of predator control activities and devices on nontargeted species;
- Pathway for aquatic nuisance species;

- Impacts of cultured species on protected and sensitive species;
- Water quality concerns, including pollution and eutrophication from aquaculture operations;
- Disturbance impacts to birds, mammals, and other wildlife from aquaculture activities;
- Impacts to the ecological carrying capacity;
- Modification of local water circulation patterns and current speeds from aquaculture infrastructure;
- Marine debris resulting from aquaculture gear loss;
- Physical impacts from aquaculture activities and infrastructure on the seafloor and substrate affecting biological resources, such as sensitive marine habitats and species;
- Ecosystem and public health impacts related to the use of fish meal and fish oils and aquaculture discharges into the water;
- Hazardous materials concerns related to the use of chemicals;
- Impacts to coastal aesthetic values;
- Impacts to tribal and/or cultural resources;
- Conflict with existing uses and navigation, including fishing grounds, recreation areas, public access, consumptive and non-consumptive uses, and natural preserves; and
- Contribution of anthropogenic impacts to global climate change.

Some potential positive impacts of commercial marine aquaculture development on the environment have also been identified:

- Improved water quality and bioremediation of polluted waters;
- Habitat provision; and
- Carbon sequestration and local mitigation of ocean acidification.

Impact Mitigation and Avoidance

Many of the potential impacts to biological resources can be minimized and/or avoided through the establishment of siting criteria, best management practices, and adaptive management.

For example, potential impacts to tribal cultural resources, land use, aesthetics, recreation, and navigation or traffic may be reduced and/or avoided following discretionary review processes that would require projects be consistent with applicable policies, regulations, and local plans. Chapter 5 provides a brief overview of potential siting, best management practices, and adaptive management measure for current and potentially future marine aquaculture operations and activities that may occur within state waters.

4 MANAGEMENT CONTEXT

This chapter provides a brief overview of current primary national and state policies and management authorities for current marine aquaculture operations and activities that may occur within state waters.

Policies and Management Authorities

National Policy

In the National Aquaculture Act of 1980, the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) stated, “It is, therefore, in the national interest, and it is the national policy, to encourage the development of aquaculture in the United States.” U.S. aquaculture is governed by environmental laws such as the MMPA, Clean Water Act (CWA), Endangered Species Act (ESA), and Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

A primary objective of the federal aquaculture policy is to develop more efficient permitting processes to promote industry development while setting standards for environmentally safe operations. Federal support, engagement and authorities span several agencies: the U.S. Food and Drug Administration (FDA), U.S. Environmental Protection Agency, U.S. Army Corps of Engineers (USACE), U.S. Fish and Wildlife Service (USFWS), and U.S. Department of Agriculture. Interagency collaboration and cooperation can help promote the development of new technologies that improve sustainability as well as improve the efficiency of the permitting pathways.

State Policies

California has a long history of marine legislation, policy, management, and regulatory measures (CDFW 2016). With respect to marine aquaculture in California more specifically, the Aquaculture Development Act (PRC Sec. 825 et seq.) provides state policy direction encouraging the practice of aquaculture to augment food supplies, expand employment and economic opportunities, increase native fish stocks, enhance commercial and recreational fishing, and protect and better use the land and water resources of the state. Further, FGC Section 1700 declares a statewide policy to encourage the conservation, maintenance and utilization of the ocean and waters under the jurisdiction of the state for the benefit of the state citizenry and development of fisheries, including commercial aquaculture. In providing oversight of marine aquaculture development, the state is also directed to provide regulatory

and administrative efficiency and effectiveness (Assembly Joint Resolution 43 (2014 Chesbro); FGC Sections 15100, 15702; and Government Code 65920 et seq.).

CDFW and the Commission are the principal state government entities responsible for the management, protection, and conservation of the state's fish and wildlife resources. As part of that responsibility, the Commission has the authority to regulate certain aspects of commercial marine aquaculture on state lands or in state waters, while CDFW has management responsibility. Specifically, the FGC provides CDFW and the Commission the authority to regulate marine aquaculture in four ways:

- registration of aquaculture facilities and species cultured within the state;
- lease of state water bottoms and water column for the purpose of aquaculture;
- permitting and licensing of various aquaculture-related activities, including stocking, broodstock collection, and importation; and
- detection, control, and eradication of disease in aquaculture facilities.

Although CDFW and the Commission are primarily responsible for marine aquaculture, the following federal, State, and local entities, among others, also play important roles: U.S. Army Corps of Engineers, NOAA National Marine Fisheries Service, California Department of Food and Agriculture, California Department of Public Health, California State Lands Commission, California Coastal Commission, State Water Resources Control Board and regional water quality control boards, and local zoning agencies (Table 4-1).

California Environmental Quality Act

California requires state and local agencies to perform environmental impact analyses when granting permits. Potential environmental impacts are addressed primarily through the California Environmental Quality Act (CEQA) review of the proposed project. Although not a permit, CEQA compliance is mandatory for state, local, and other agencies subject to the jurisdiction of California to evaluate the environmental implications of their actions. For aquaculture lease requests on state water bottoms or the water column, the Commission functions as the Lead Agency responsible for carrying out or approving the project under CEQA. CDFW may play various roles under the CEQA process. CDFW is always a Trustee Agency, but under certain circumstances it may also be a Lead Agency or a Responsible Agency. The lead agency determines whether a negative declaration or environmental impact report (EIR) will be prepared (CEQA Statutes, Sections 21080.3 and 21104.2; Guidelines, Sections 15050 and 15367). Pursuant to FGC Section 15400 and as evaluated under CEQA, a lease shall not unreasonably interfere with fishing or other uses or public trust values, unreasonably disrupt wildlife and marine habitats, or unreasonably harm the ability of the

marine environment to support ecologically significant flora and fauna. Additionally, a lease shall not have significant adverse cumulative impacts.

California Fish and Game Code Sections 15000–15703—Aquaculture

FGC Sections 15000 through 15703 (Division 12) provide a framework for regulation of aquaculture operations in California. FGC includes regulations for broodstock acquisition, leasing of state water bottoms, disease control, and importation of shellfish and finfish. Pursuant to FGC Section 15400, the Commission may lease state water bottoms or the water column to any person for aquaculture, including, but not limited to, marine finfish aquaculture. No state leases shall be issued, unless the Commission determines that the lease is in the public interest in a public hearing conducted in a fair and transparent manner, with notice and comment, in accordance with commission procedures. In addition, pursuant to Section 15411 lessees may not unreasonably impede public access to state waters for purpose of fishing, navigation, commerce, or recreation. The lessee may, however, limit public access to the extent necessary to avoid damage to the leasehold and the aquatic life culture therein.

Title 14, California Code of Regulations

Title 14 of the California Code of Regulations (CCR) provides implementing regulations under this authority. In addition, 14 CCR Section 15386 identifies CDFW as a trustee agency which has jurisdiction by law over natural resources affected by a project that are held in trust for the people of the state of California.

Senate Bill 201 and the Marine Aquaculture Programmatic Environmental Impact Report

The abovementioned authorities to regulate marine aquaculture were modified when the California Legislature passed the Sustainable Oceans Act, also known as SB 201, in 2006. This act added FGC Sections 54.5 and 15008 and amended FGC Section 15400 and PRC Section 30411. As amended by SB 201, leases and regulations adopted by the Commission for marine finfish aquaculture shall meet, but are not limited to, the standards pursuant to FGC Section 15400(b). This law has three major implications:

- It provides that “the commission may lease state water bottoms or the water column to any person for aquaculture, including, but not limited to, marine finfish aquaculture” (FGC Section 15400) under certain conditions and with certain restrictions (see Chapter 5: SB 201 factors).
- It requires that “the department [CDFW] shall, in consultation with the Aquaculture Development Committee, prepare programmatic environmental impact reports for existing and potential commercial aquaculture operations in both coastal and inland areas of the state” (FGC Section 15008[a]) if funds are appropriated to CDFW and matching funds are provided by the aquaculture industry.

- If a final programmatic EIR (PEIR) is completed, it “shall provide a framework for managing marine finfish aquaculture in an environmentally sustainable manner” (FGC Section 15008[b]) “so as to avoid adverse environmental impacts, and to minimize any unavoidable impacts” (FGC Section 15008[b][10]).

For over thirteen years, CDFW has attempted to reconcile the CEQA framework and substantive considerations mandated by SB 201 with the delivery of a draft PEIR that addresses a new marine aquaculture management framework that is in accord with stakeholders throughout the state. Rather than engaging in this important policy and planning effort within the constraints of a CEQA document as a starting point, CDFW is coordinating steps with the Commission (with guidance and support from the California Ocean Protection Council (OPC)) toward the development of a refined management framework through an Action Plan for marine aquaculture development in California (see further discussion in Chapter 5).

CDFW Tribal Consultation Policy

The CDFW Tribal Communications and Consultation Policy provides the foundation for CDFW to work cooperatively, communicate effectively, and consult with Tribes. Pursuant to this policy, CDFW seeks to establish and maintain respectful and effective communications and consultation with Tribes with respect to current and proposed future aquaculture activities.

Regulatory Overview

There are numerous other federal, state, and local agencies that also provide approvals or permits for aquaculture activities in the state. Depending upon the location and the nature of the activity, regulatory approvals or permits may be required from the agencies listed in Table 4-1. Each of these agencies and its general regulatory authority is discussed briefly below.

Table 4-1. Federal, state, and local involvement in state waters.

Agency	Jurisdiction	Permit or Statutory Authority	Subject
U.S. Army Corps of Engineers (USACE)	Waters of the United States	Section 404, Clean Water Act Nationwide Permit 48, Existing Commercial Shellfish Aquaculture Activities	Placement of dredge or fill material, including structures, in jurisdictional waters of the United States
USACE	Waters of the United States	Section 10, Rivers and Harbors Act	Placement of materials in navigable waters
USACE	Federally listed wildlife and plant species	Federal Endangered Species Act (ESA)	Section 7 consultation regarding harm to or take of listed wildlife and plant species, including certain marine species
NOAA National Marine Fisheries Service (NMFS)	Federally listed marine and anadromous fish, sea turtles and marine mammals	ESA	Section 7 consultation regarding harm to or take of listed species
NMFS	Federally listed marine and anadromous fish, sea turtles and marine mammals	Marine Mammal Protection Act	Incidental harassment authorization or letter of authorization regarding harm of marine mammals
NMFS	Federally listed marine and anadromous fish, sea turtles and marine mammals	Magnuson-Stevens Fishery Conservation and Management Act	Designates and protects Essential Fish Habitat via a requirement for interagency consultation Issue exempted fishing permit or other authorization to grow federally managed species in the exclusive economic zone
NOAA National Ocean Service	National marine sanctuaries	National Marine Sanctuaries Act	Consultation requirement (similar to ESA Section 7) regarding management and trust responsibilities for National Marine Sanctuaries

Table 4-1. Federal, state, and local involvement in state waters.

Agency	Jurisdiction	Permit or Statutory Authority	Subject
U.S. Coast Guard	Navigable waters of the United States	Private Aids to Navigation Permit	Responsible for obstructions or aids to navigation in waters of the United States, including requiring aquaculture-related structures located in navigable waters be marked with lights and signals to ensure navigational safety
California Fish and Game Commission	State water bottoms	Lease of State Water Bottom, Fish and Game Code	Use of state-owned tidelands (Sovereign Lands)
California Department of Fish and Wildlife (CDFW)	Fish and wildlife	Aquaculture Registration, Fish and Game Code	Registration of aquaculture facilities
CDFW	State-listed fish and wildlife species	California Endangered Species Act (CESA)	Take of state-listed species
CDFW	Fish and wildlife	Letter of Authorization	Placing or planting of any live fish, fresh or saltwater animal, or aquatic plant within a water of the state
CDFW	Fish and wildlife	Standard Live Importation Permit	Importation of most live aquatic species
CDFW	Fish and Wildlife	Long-Term Live Importation Permits	Importation of aquatic species on an ongoing basis that do not represent a significant concern for potential impacts on state wildlife resources Importation of aquatic species
CDFW	Fish and wildlife	Health Certificate by appropriate out-of-state agency	Generally required for aquaculture products stocked in the state, except for sales between aquaculturists registered with CDFW for the species in question
CDFW	Fish and wildlife	Wild Broodstock Collection Permit	Permission to collect wild stock for use in developing a domestic broodstock

Table 4-1. Federal, state, and local involvement in state waters.

Agency	Jurisdiction	Permit or Statutory Authority	Subject
CDFW	Fish and wildlife	Restricted Species Permit	Certain species identified in FGC Section 2118 that are not established in California or listed as detrimental
CDFW	Fish and wildlife	Addition of species to individual certificates of registration	Adding species to current registration list
CDFW	Fish and wildlife	Aquarium Dealers Permit	Aquarium dealers wishing to sell certain species of fish; must be obtained from registered aquaculturists and sold as pets
CDFW	Fish and wildlife	Marine Life Protection Act	Designates Marine Protected Areas; develops plans for their management; reviews proposed developments for consistency
California Coastal Commission (CCC)	Coastal zone	Coastal Development Permit (CDP), California Coastal Act	Development activities within the California coastal zone
CCC	Federal waters beyond coastal zone	Coastal Zone Management Act, federal consistency determination or certification (in the case of a federal activity)	Development activities beyond the coastal zone
Regional Water Quality Control Boards (RWQCBs) and California State Water Resources Control Board (SWRCB)	Waters of the state	Section 401 Water Quality Certification, Clean Water Act (CWA)	As part of Section 404 permit process, ensure that project would meet state water quality standards
RWQCBs and SWRCB	Waters of the state	Section 402 National Pollutant Discharge Elimination System (NPDES) Permit, CWA	Discharges to waters of the United States
RWQCBs and SWRCB	Waters of the state	Waste Discharge Requirements, Porter-Cologne Water Quality Control Act	Discharges to waters of the state

Table 4-1. Federal, state, and local involvement in state waters.

Agency	Jurisdiction	Permit or Statutory Authority	Subject
RWQCBs and SWRCB	Waters of the state	Approvals specific to Areas of Special Biological Significance	Areas of Special Biological Significance are 34 ocean areas monitored and maintained for water quality by SWRCB. Within these areas, NDPES permits are not issued unless the RWQCB grants a special exemption.
California Department of Public Health (CDPH)	Health of California residents	Certification of Growing Water	All shellfish harvested commercially for human consumption
CDPH	Health of California residents	Shellfish Handling and Marketing Certificate	Shellfish dealers
California Department of Food and Agriculture	Agricultural operations	Weighmaster Registration	Those selling aquaculture products by weight
California State Lands Commission (CSLC)	State-owned submerged tidelands	Review of CDFW leases	Ensure lands leased by CDFW for aquaculture are not otherwise used
California State Historic Preservation Office	Historic structures	Compliance with Section 106 of National Historic Preservation Act (NHPA) as part of USACE Section 404 permit	As part of Section 404 permit process, ensure that project would not adversely affect historic properties
Cities, Counties, Special Districts	Project area	Land Use Permit and/or CEQA review	Compliance with local regulations and state environmental review requirements Type of approval varies by planning area

5 LOOKING AHEAD

This report is designed to build a common understanding of existing marine aquaculture and its management framework, pointing to areas that need further consideration for potential future marine aquaculture development. Building on the management context review in Chapter 4, this section discusses known unresolved issues to facilitate discussions on sustainable current and future development of marine aquaculture in California.

In general, it is difficult to predict how commercial-scale marine aquaculture could evolve along California's coast in the future. A myriad of factors may influence the number, location, type, and size of aquaculture operations, including federal, state, and local regulations; environmental conditions; markets; technology and husbandry techniques; economics; and competition for space. Expansion of marine aquaculture would also include associated land-based and dock-side infrastructure and support facilities.

While the majority of existing shellfish operations within the state are located within intertidal areas, there is a potential for future shellfish, seaweed, and/or finfish aquaculture facilities in offshore areas. Offshore operations would require floating or submerged gear technology, tethered in some way to the bottom and sited in accordance with a variety of considerations. Support facilities, such as offices, feed storage and hatcheries on land (where applicable), as well as docks and boats, would enable the operators to conduct offshore aquaculture production. Operational visits to offshore facilities would need to be conducted in cooperation with other offshore activities to ensure safe and efficient marine transport.

Marine aquaculture expansion on land would likely occur on private property or granted state lands (e.g., often administered by ports and special harbor districts) and would not require a lease from the Commission. The lead regulatory authority for land-based aquaculture expansion is anticipated to be the CCC, either directly or through local coastal programs administered by counties after approval by the CCC, and RWQCBs with regard to discharge permitting.

Siting Analysis, Best Management Practices, and Adaptive Management

Sound management of marine aquaculture in public waters relies on a foundation of appropriate siting of operations. Some criteria for suitable siting of marine aquaculture operations originate in the existing local, state, and federal regulatory framework and the public trust doctrine; other criteria are provided by the legislative mandate of SB 201 explicitly; and still other criteria may arise from stakeholder or environmental impact concerns.

The following section describes some examples of potential mitigation or avoidance measures that may be adopted to reduce certain environmental impacts from commercial marine

aquaculture facilities and may be used during consideration of their approval or denial of an application or renewal. For example, potential criteria for siting aquaculture facilities include requirements to reduce and/or avoid impacts to resources and may include:

- minimum depth requirements;
- minimum and/or maximum current speeds or water circulation patterns;
- minimum distances from sensitive habitats such as essential fish habitat, seagrass, kelp, rocky reefs, marine protected areas, and other management areas such as areas of special biological significance or national marine sanctuaries;
- minimization of impacts to the seafloor, substrate, and sensitive species and habitats;
- avoidance of areas with harmful algal blooms;
- minimum distances from other aquaculture facilities or maximum density of facilities;
- avoidance of the range or habitat of wild populations of the same species being cultured;
- avoidance of the range or habitat of one or more special-status species; and/or
- avoidance of waste discharge points or areas that are otherwise unsafe to harvest finfish, shellfish, or seaweed for human consumption.

The use of best management practices to avoid and minimize adverse effects on wildlife might include specifications for gear, lighting, noise levels and duration (both above and underwater), and vessel speed limits. Best management practices for the commercial aquaculture industry could also include specifications on the types of monitoring, recordkeeping, and reporting requirements. For example, a Hazard Analysis and Critical Control Point Plan could outline methods to prevent the introduction and spread of aquatic invasive species and implementation measures should prevention efforts fail. A Shellfish and Finfish Disease Prevention and Response Plan could identify the methods for disease prevention and response should disease outbreaks occur. Recordkeeping, biosecurity measures, use of antibiotics, vaccines or other therapeutants may all be covered in this plan.

Environmental impact models now allow potential lessees and regulators to assess the suitability of sites, understand the potential risks and benefits of proposed operations, and estimate the limits of acceptable farm biomass before they are permitted. The National Centers for Coastal Ocean Science website provides a portal to easily access coastal planning tools designed to assist the planning of sustainable aquaculture development. For example, models such as Depomod or AquaModel may be used to examine near and far field effects of farms in the coastal shelf where nearshore or open-ocean aquaculture may develop (NCCOS 2017).

Modeling tools are useful during the initial screening of potential sites, but they do not replace the need for actual site surveys and should not be a regulatory requirement without further testing, sensitivity analyses, and validation studies.

Adaptive management is defined in FGC §13.5 as that which “improves the management of biological resources over time by using new information gathered through monitoring, evaluation, and other credible sources as they become available, and adjusts management strategies and practices to assist in meeting conservation and management goals.” Adaptive management is a systematic, decision-based approach for improving resource management by learning over time from management outcomes. A rapidly growing body of data, engineering, and management experience have been accumulating globally and form the foundation of the impact analyses and components of new aquaculture management frameworks (DeCew et al 2012, Price and Morris 2013, Rust et al. 2014). The adaptive management approach can reduce reactionary responses and strengthen the management, viability, and sustainability of marine aquaculture (IUCN 2007).

Path Forward – Action Plan

CDFW has incorporated additional information based on feedback received during the public review process of the draft AIR. Comments that were outside the scope of the AIR have been documented and will be considered during the development of the Action Plan. The AIR is intended to serve as a foundation to build a common understanding of existing California commercial marine aquaculture activities and identify areas that need further refinement and consideration for future marine aquaculture development. The AIR and ensuing discussions will inform the development of an Action Plan that identifies areas of opportunity and avoidance to minimize impacts to habitat, biodiversity and wild fisheries. OPC, in partnership with CDFW, will convene representatives from State agencies who play important roles in aquaculture, including members of the Aquaculture Development Committee, to develop a set of guiding principles for the development of the Action Plan. These guiding principles will be informed by the existing regulatory framework, the AIR, and stakeholder input.

As a starting point, the guiding principles, at a minimum, should address the following:

- measures to minimize impacts of existing and potential future aquaculture projects through permit conditions and regulatory tools that already exist;
- regulatory gaps that may require legislative or regulation changes;
- gaps in scientific understanding or technological innovation that may point to needed research & development;
- best practices for eliminating detrimental impacts of current and potential future aquaculture activities;

- siting criteria or zones where marine aquaculture might develop that minimize user conflicts and resource impacts and enhance economic opportunity within the state; and
- administrative capacity, funding and expertise.

The goal of the Action Plan will be to support the development and piloting of innovative tools and approaches to inform sustainable current and potential future aquaculture management in California (OPC 2020).

6 REFERENCES

- Allen, L.G., D.J. Ponella, and M.H. Horn. 2006. *The Ecology of Marine Fishes: California and Adjacent Waters*. University of California Press, Berkeley, California. 670 pp.
- Barrett, E.M. 1963. *The California Oyster Industry*. Fish Bulletin 123. California Department of Fish and Game.
- Bourne N. 1982. Distribution, Reproduction and Growth of Manila Clam, *Tapes philippinarum* (Adams and Reeves) in British Columbia. *Journal of Shellfish Research* 2:47–54.
- California Coastal Commission. 2017 (September 13). Staff Report: Regular Calendar: 9-17-0646, Coast Seafoods Company. W22b. 82 pp.
- California Department of Fish and Wildlife. 2009 (July 24). *California Marine Life Protection Act Initiative: Regional Profile of the South Coast Study Region (Point Conception to California-Mexico Border)*. Available: http://www.dfg.ca.gov/marine/mpa/regionalprofile_sc.asp.
- California Department of Fish and Wildlife. 2016 (August 24). California Marine Life Protection Act Master Plan for Marine Protected Areas. Adopted by the California Fish and Game Commission on August 24, 2016. Available: <http://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=112486&inline>.
- California Natural Resources Agency. 2018 (January). Safeguarding California Plan: 2018 Update. Available: <http://resources.ca.gov/docs/climate/safeguarding/update2018/safeguarding-california-plan-2018-update.pdf>.
- California Ocean Protection Council. 2020. *Strategic Plan to Protect California's Coast and Ocean 2020-2025*. Available: <http://www.opc.ca.gov/webmaster/ftp/pdf/2020-2025-strategic-plan/OPC-2020-2025-Strategic-Plan-FINAL-20200228.pdf>.
- CCC. See California Coastal Commission.
- CDFW. See California Department of Fish and Wildlife.
- Clinton, W. J. 1999 (February 8). Executive Order 13112 - Invasive Species. *Federal Register* 64(25).
- CNRA. See California Natural Resources Agency.
- DeCew, J., B. Celikkol, K. Baldwin, M. Chambers, J. Irish, M.R. Swift, and I. Tsukrov. 2012. Assessment of a Mooring System for Offshore Aquaculture.

- Farrell, T.M., D. Bracher, and J. Roughgarden. 1991. Cross-Shelf Transport Causes Recruitment to Intertidal Populations in Central California. *Limnology and Oceanography* 36:279–288.
- Frey, H.W. 1971. *California's Living Marine Resources and Their Utilization*. California Department of Fish and Game.
- Governor's Office of Planning and Research, California Energy Commission, and California Natural Resources Agency. 2018a. *California's Fourth Climate Change Assessment: Statewide Summary Report*. Available: <http://www.climateassessment.ca.gov/state/docs/20190116-StatewideSummary.pdf>.
- Governor's Office of Planning and Research, California Energy Commission, and California Natural Resources Agency. 2018b. *California's Fourth Climate Change Assessment: California's Coast and Ocean Summary Report*. Available: <http://www.climateassessment.ca.gov/state/docs/20180827-OceanCoastSummary.PDF>.
- Hickey, B. M. and N. Banas. 2003. Oceanography of the US Pacific Northwest Coastal Ocean and estuaries with application to coastal ecology. *Estuaries* 26:1010-1031.
- Intergovernmental Panel on Climate Change. 2014. *Climate Change 2014 Synthesis Report: Summary for Policymakers*. Available: https://www.ipcc.ch/site/assets/uploads/2018/06/AR5_SYR_FINAL_SPM.pdf.
- International Union for Conservation of Nature and Natural Resources. 2007. Guide for the Sustainable Development of Mediterranean Aquaculture. Interactions between Aquaculture and the Environment. Gland, Switzerland, and Malaga, Spain.
- Invasive Species Advisory Committee. 2006 (April 27). *Invasive Species Definition Clarification and Guidance White Paper*. The National Invasive Species Council.
- IPCC. See Intergovernmental Panel on Climate Change.
- ISAC. See Invasive Species Advisory Committee.
- IUCN. See International Union for Conservation of Nature and Natural Resources.
- Kroeker, K.J., R.L. Kordas, R. Crim, I.E. Hendriks, L. Ramajo, G.S. Singh, C.M. Duarte, and J.P. Gattuso. 2013. Impacts of Ocean Acidification on Marine Organisms: Quantifying Sensitivities and Interaction with Warming. *Global Change Biology* 19(6):1884–1896.
- Kroeker, K.J., R.L. Kordas, R.N. Crim, and G.G. Singh. 2010. Meta-Analysis Reveals Negative yet Variable Effects of Ocean Acidification on Marine Organisms. *Ecology Letters* 13(11):1419–1434.

- Mace, A.J., and S. G. Morgan. 2006. Larval Accumulation in the Lee of a Small Headland: Implications for the Design of Marine Reserves. *Marine Ecology Progress Series* 318:19–29.
- Mitarai, S., D. A. Siegel, J. R. Watson, C. Dong, and J. C. Mc Williams. 2008. Quantifying Connectivity in the Coastal Ocean with Application to the Southern California Bight. *Journal of Geophysical Research* 114, C10026.
- National Centers for Coastal Ocean Science. 2017. Coastal Aquaculture Planning Portal (CAPP). Available: <https://coastalscience.noaa.gov/research/marine-spatial-ecology/coastal-aquaculture-planning-portal-capp/>. Accessed November 26, 2018.
- National Oceanic and Atmospheric Administration. 1989 (February). *Life History, and Harvest Summaries for Selected Invertebrate Species Occurring off the West Coast of North America. Volume 1: Shelled Molluscs*. NOAA Technical Memorandum NMFS F/NWC-160. Available: https://repository.library.noaa.gov/view/noaa/5853/noaa_5853_DS1.pdf?.
- NOAA. See National Oceanic and Atmospheric Administration.
- OPC. See California Ocean Protection Council.
- OPR. See Governor's Office of Planning and Research.
- Price, C. S., and J. A. Morris Jr. 2013. Marine Cage Culture and the Environment: Twenty-First Century Science Informing a Sustainable Industry. NOAA Technical Memorandum NOS NCCOS 164.
- Reid, J. L., G. I. Gunnar, and J. G. Wyllie. 1958. Studies of the California Current System: Contributions from the Scripps Institution of Oceanography. *California Cooperative Oceanic Fisheries Investigations Report* 6:28–56.
- Rust, M. B., K. H. Amos, A. L. Bagwill, W. W. Dickhoff, L. M. Juarez, C. S. Price, J. A. Morris Jr., and M. C. Rubino. 2014. Environmental Performance of Marine Net-Pen Aquaculture in the United States. *Fisheries* 39:11:508–524.
- Senner, S. E., B. A. Andres and H. R. Gates (Eds.). 2016. Pacific Americas shorebird conservation strategy. National Audubon Society, New York, New York, USA. Available: https://www.fws.gov/migratorybirds/pdf/management/PASCS_final_medres_dec2016.pdf.
- Talley, D. M., T. S. Talley, and A. Blanco. 2015. Insights into the Establishment of the Manila Clam on a Tidal Flat at the Southern End of an Introduced Range in Southern California, USA. *PLoS ONE* 10(3): e0118891.

- Wing, S. R., J. L. Largier, L. W. Botsford, and J. F. Quinn. 1995. Settlement and Transport of Benthic Invertebrates in an Intermittent Upwelling Region. *Limnology and Oceanography* 40:316–329.
- Yen, P. W., W. J. Sydeman, K. D. Hyrenback. 2004. Marine Bird and Cetacean Associations with Bathymetric Habitats and Shallow-Water Topographies: Implications for Trophic Transfer and Conservation. *Journal of Marine Systems* 50:79–99.

From: Weinstein, Anna [REDACTED]
Sent: Tuesday, May 19, 2020 1:30 PM
To: Shuman, Craig@Wildlife <Craig.Shuman@wildlife.ca.gov>
Cc: FGC <FGC@fgc.ca.gov>; Ramey, Kirsten@Wildlife <Kirsten.Ramey@wildlife.ca.gov>; Lovell, Randy@Wildlife <Randy.Lovell@wildlife.ca.gov>; Ashcraft, Susan@FGC <Susan.Ashcraft@fgc.ca.gov>; Teufel, Cassidy@Coastal <Cassidy.Teufel@coastal.ca.gov>
Subject: Informal input in Aquaculture Impact Report

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

Dear Craig,

Please accept these informal comments on behalf of our organizations. Please don't hesitate to reach out with any questions or concerns. Thank you.

Regards,

Anna

Anna Weinstein
Director, Marine Conservation
National Audubon Society

[REDACTED]
[REDACTED]

Re: Aquaculture Information Report
May 19, 2020

Dear Dr. Shuman,

We are writing to provide “informal” input on the draft [Aquaculture Information Report](#) (AIR) before it is submitted to the Fish and Game Commission at its June meeting. Thank you for your invitation to the public to provide this input.

Deputy Director of Ocean Protection Council (OPC) Jenn Eckerle noted that the scope of the State’s Aquaculture Plan will be limited to marine algae and shellfish aquaculture and land-based finfish farms, and will not include marine finfish aquaculture. We agree with this focus, and that finfish aquaculture should be explored for shoreside operations only, with a focus on existing shoreside operations. We believe the primary value of an Aquaculture Plan is to provide a more comprehensive approach to managing existing state aquaculture operations, which are currently managed inconsistently and on an ad hoc basis. It would be premature to conclude that any form of aquaculture should be expanded without a robust analysis of impacts, spatial ecological mapping effort, and thorough stakeholder input. We hope to see the plan and timeline for these steps to occur as part of the Aquaculture Plan process that the MRC requested the Department provide at the July MRC meeting. We also ask that the *Looking Ahead* section of the AIR be revised to reflect the fact that there has not been a decision on future aquaculture development.

Here are our specific comments on the draft AIR:

We recommend the AIR note that the Coastal Commission, under legislative mandate, is developing “Coastal Development Application Guidance for Aquaculture” that will be subject to public review in summer or fall 2020 and will be integrated into the Aquaculture Plan.

The statement on page 4, and cited elsewhere, that “a total of 4,960 acres of California public tidelands are utilized for marine aquaculture” may lead to confusion among the public because it is not widely known that the lease areas - estimated by CDFW at 4,960 acres - are larger than the operational areas. We suggest this nuance could be clarified by using the term “leased” rather than “utilized,” and the reasons why operational areas are a smaller subset of lease areas be explained early in the document.

Another key point that would enhance public understanding is to explain that each operational area within a lease is subject to a Coastal Development Permit (CDP) under the California Coastal Act. These permits are renewed and updated at regular intervals or at the discretion of the Coastal Commission. CDPs must ensure the operation complies with the Coastal Act. Most of the time, the CDPs include Special Conditions to ensure compliance with the Coastal Act. Special conditions are written to protect eelgrass, reduce disturbance to wildlife, ensure recreational access and safety, manage marine debris, and more.

In Table 2 (page 5) and elsewhere, acreages leased and acres under operation are incorrect and sometimes inconsistent. Coast Seafoods, the largest grower in Humboldt Bay, has a 2017 CDP for 273 acre operational footprint within its lease area. According to personal communications

from the Humboldt Bay Harbor District and local DFW staff, the remaining area under operation by other growers is about 25 acres. That is a total of around 300 acres. Yet, the AIR states the total area under operation in the bay is 386 acres. It would be helpful for the AIR to check and cite its sources of this information, and to ensure accuracy and consistency throughout.

The Tideland Manager (page 4) is also the lead agency under CEQA, which is very important for public understanding. The document should include a description of the differences between areas where the FGC is tidelands lease manager and lead agency under CEQA, and where other jurisdictions are tidelands lease manager and lead agency under CEQA. The AIR should also clarify that FGC was ceded overall authority for aquaculture by the State Lands Commission, but important exceptions - especially Humboldt Bay - exist where authority was legislatively ceded to a local authority.

Similarly, statements such as these are confusing to the public: “Aquaculture facilities without state water bottom leases include operations within Humboldt Bay, Monterey Bay, Agua Hedionda Lagoon, and San Diego Bay. These facilities account for an additional 4,053 acres set aside for marine aquaculture in California waters.” This implies that 4,053 acres are available now for aquaculture, which is not the case. Numerous considerations constrain the operational footprint of these aquaculture operations. These include the infeasibility of growing oysters in certain areas due to public health, access, elevation and other issues; limited suitable growing areas; natural resource and recreational considerations; and vessel access and safety considerations.

There are millions, not thousands (page 22), of migrating and resident shorebirds on California’s coast. The best available updated information can be found in Senner et al. (2016).¹ The AIR should use the best available information on the relationship of shorebirds and waterbirds with estuarine habitats in California specifically. Stralberg (2011)² noted that over 90% of California’s historical two million hectares of wetlands has been lost. Yet in California, “estuarine habitats including eelgrass, tidal flats and tidal marsh are the most limited in spatial extent, yet support the highest densities of shorebirds and waterbirds.” The study’s lead author confirmed with us via personal communication that “these habitats can be considered the highest priority for protection from further loss of even small acreages from habitat degradation and conversion, and disturbance.”

Many impacts of intertidal and subtidal aquaculture are already documented in California (page 27). The list of known and potential impacts should be expanded to include:

- Disturbance impacts to birds, marine mammals, and other wildlife from aquaculture activities;
- Degradation or lack of access to resting and foraging habitats due to the presence of aquaculture infrastructure within eelgrass, mudflats, and tidal channels as well as routine maintenance in these areas;

¹ Senner, S. E., B. A. Andres and H. R. Gates (Eds.). 2016. Pacific Americas shorebird conservation strategy. National Audubon Society, New York, New York, USA. Available at: <http://www.shorebirdplan.org>.

² Stralberg, R. Cameron, M. Reynolds, C. Hickey, K. Klausmeyer, S. Busby, L. Stenzel, D. Shuford, G. Page. 2011. Identifying habitat conservation priorities and gaps for migratory shorebirds and waterfowl in California. *Biodiversity Conservation* 20: 19-40

- Destruction or degradation of eelgrass habitats from aquaculture infrastructure and routine maintenance, primarily in Humboldt Bay.
- Non-compliance with Coastal Development Permits (most notably, in the case of Coast Seafoods) exacerbating impacts to natural resources and other coastal users.

The “Looking Ahead” section of the AIR (page 38) is incomplete and skewed toward aquaculture expansion, and should be removed and replaced with a placeholder sentence that these ideas will be vetted with public input at the July 2020 MRC meeting and beyond. We believe that the Aquaculture Plan should address the following needs: improve management of existing operations, protect natural resources and other uses of these state water bottoms, and promote sustainable aquaculture development. We agree with the definition of “sustainable” provided by the Ocean Protection Council in its Strategic Plan.

Thank you very much for your attention to these comments, and we look forward to continued participation in this process.

Sincerely,

Anna Weinstein, Audubon California
Geoff Shester, PhD, Oceana
Gillian Lyons, The Pew Charitable Trusts

Cc:
Samantha Murray
Peter Silva
Susan Ashcraft
Randy Lovell
Kirsten Ramey
Cassidy Teufel

June 11, 2020

Dear California Fish and Game Commission,

In regards to **Agenda item 11** (Marine Resources Committee) of the upcoming June 24-25, 2020 Public Meeting, we offer the following comments:

A diverse consortium of USC researchers and Sea Grant staff would like to **express its support for a state action plan for sustainable marine aquaculture and our interest in collaborating with the Commission on this plan.**

Our USC consortium has been collaborating with industry and government partners over the past two years to support the growth of California's blue economy, with a particular focus on farming of marine seaweeds and shellfish. We believe seaweed and shellfish aquaculture in California can address key goals and objectives in OPC's strategic plan centered on protecting marine ecosystems and improving ocean health through a blue economy (OPC Goals 3 & 4). Marine farming of seaweed and shellfish in California can provide new sources of food, fuels, and animal feeds and fertilizers, while improving water quality, restoring habitat and mitigating ocean acidification.

We would like to highlight 6 examples of our solutions-oriented work that may be relevant to the development of the state aquaculture plan:

- In the Department of Biological Sciences, we are creating seed banks for native kelps and bivalves to preserve genetic diversity and identify strains optimized for habitat restoration projects or commercial farming. **(Figure 1)**
- At USC's Wrigley Marine Science Center on Catalina Island, we are developing new technologies to grow kelp at scale in the open ocean for carbon-neutral biofuel production.
- The School of Architecture is designing new forms of aquaculture farms that are aesthetically pleasing and ecologically & economically performative. **(Figures 2-3)**
- In the School of Public Policy, we are refining techniques for bringing stakeholders together to reach consensus on marine aquaculture standards, regulations, and siting.
- Economists at USC are quantifying economic benefits of aquaculture including the ways it can mitigate risks posed by coastal environmental changes.
- The Sea Grant program at USC supports sustainable aquaculture initiatives -- not only at USC, but throughout California -- by funding applied scientific research and sharing research findings with decision-makers, educators, and a diverse network of stakeholders through outreach, technical assistance, and education.

Thank you for your time and **we welcome future opportunities to share our expertise and collaborate with the Commission on crafting a state action plan for sustainable marine aquaculture.**

Sincerely yours,

¹Amalia Aruda Almada, Provost Fellow, Dornsife College of Letters, Arts & Sciences,

Maddelyn Harden, Dornsife College of Letters, Arts & Sciences, mharden@usc.edu

Sergey Nuzhdin, Dornsife College of Letters, Arts & Sciences, snuzhdin@usc.edu

Aroussiak Gabrielian, School of Architecture, aroussig@usc.edu

Marika Schulhof, USC Sea Grant, mschulho@usc.edu

William Leach, Price School of Public Policy, leachw@price.usc.edu

College of Letters, Arts
& Sciences

Biological Sciences

Molecular and
Computational Biology
Program

University of
Southern California
Molecular and
Computational
Biology 201B
Los Angeles
California 90089-2910

Tel: 213.740.5557
Fax: 213.740.8631

¹ Dr. Almada will be speaking on our group's behalf at the June 24-25th public meeting.



Figure 1. Example of a kelp “seedbank” with immortalized strains maintained in an incubator. **Photo Credit:** Alberto Lab., University of Wisconsin, Milwaukee.



Figure 2. Plan depicting proposed aquaculture and agriculture plots that infill between new urban mounds at Corte Madre in San Francisco Bay. **Photo Credit:** “Aquaculture Landscapes: Fish Farms and the Public Realm” (2020) by Michael Ezban. Tom Leader/TLS, Making Ground/Farming Water 2010.

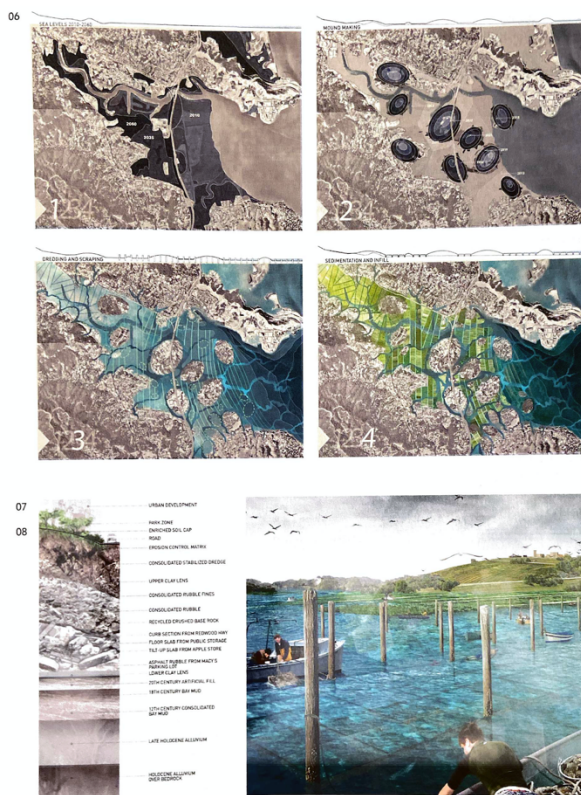


Figure 3. 6) Site plan depicting emergency and key processes 7) Urban development atop layers of detritus and geology 8) Rendering of oyster farming with a mound in the background. **Photo & Caption Credit:** “Aquaculture Landscapes: Fish Farms and the Public Realm” (2020) by Michael Ezban. Tom Leader/TLS, Making Ground/Farming Water 2009-2010.

From: Paula Sylvia <psylvia@portofsandiego.org>

Sent: Thursday, June 11, 2020 3:07 PM

To: FGC <FGC@fgc.ca.gov>

Cc: Miller-Henson, Melissa@FGC <Melissa.Miller-Henson@fgc.ca.gov>; Wildlife DIRECTOR <DIRECTOR@wildlife.ca.gov>; Lovell, Randy@Wildlife <Randy.Lovell@wildlife.ca.gov>; Smith, Robert M.

Subject: San Diego Unified Port District Comment Letters

Dear All-

Please accept the attached comment letters on behalf of the Port of San Diego in regard to the upcoming California Fish and Game Commission Meeting on June 24-25, 2020 as well as previous letters related to March 17, and April 29, 2020 California Fish and Game Commission, Marine Resources Committee meetings. We appreciate the opportunity to comment and look forward to the meeting next week.

Warm Regards,

Paula Sylvia
Program Director – Aquaculture and Blue Technology

June 11, 2020

California Fish and Game Commission
P.O. Box 944209
Sacramento, CA 94244-2090

VIA EMAIL

**RE: Agenda Item 11.A.II: Proposed Six-Month Hiatus on Receiving New
Aquaculture Lease Applications**

Dear Commissioners,

The San Diego Unified Port District (District) appreciates the opportunity to provide comments on the Fish and Game Commission's (Commission) June 24, 2020 Agenda Item 11.A.II, proposing a six-month moratorium on new aquaculture lease applications.¹ The District is a regional, public benefit agency created in 1962 through the California State Legislature's adoption of the San Diego Unified Port District Act (Port Act). Through the Port Act, the District was granted the state tidelands and submerged lands around San Diego Bay (Bay) and is entrusted with managing and protecting the tidelands and diverse waterfront uses in a manner that is consistent with the Public Trust Doctrine, promoting and balancing navigation, commerce, fisheries (including aquaculture), recreation, and environmental stewardship. In parallel with the Commission's mission, the District's mission and strategic goals include protection and improvement of the Bay's environmental resources and the District is constantly working to assess, manage, and adapt to current and future ocean and coastal opportunities and challenges.

Aquaculture is key part of the District's strategic plan. In 2015, the District created an Aquaculture and Blue Technology Program to explore environmental and economic opportunities in and around the Bay. In 2016, the District created a Blue Economy Incubator (BEI) program to assist in the creation, development and scaling of new business ventures focusing on aquaculture and blue technology. In partnership with the National Oceanic and Atmospheric Administration's National Ocean Service, National Centers for Coastal Ocean Science, the District has identified through spatial planning 10,000 acres that could be suitable for aquaculture, 8,000 acres of which would be subject to California Fish and Game leasing requirements. The District is very interested in ensuring that sustainable aquaculture can expand in California, subject to appropriate regulation and environmental review.

¹ The District also submitted comments on this agenda item to the Commission's Marine Resources Committee on March 12, 2020 and April 24, 2020. This letter is supplemental to our previous letters, which are attached hereto.

Fish and Game Commissioner

June 11, 2020

Page 2

As further described below, the District respectfully requests that the Commission refrain from imposing a moratorium on aquaculture applications. While the District strongly supports the Commission's goals of providing more transparent and predictable regulation of aquaculture, the District believes that working together we can accomplish this goal without a moratorium or hiatus.

The District is currently in the final site selection process to identify two sites for potential seaweed and shellfish aquaculture pilot projects, both of which would be ready for submission of applications within the next few months. At least one of these projects would likely be located in an area subject to Commission leasing requirements. The proposed hiatus will not only significantly delay these projects but will also make it difficult, if not impossible, for the District to solicit aquaculture companies to engage in a public-private partnership to develop these aquaculture pilot projects.

As further explained in our previous correspondence to the Marine Resources Committee, while the District understands the Department of Fish and Wildlife's and Commission's current staffing and resources limitations, we believe that the proposed hiatus is not the right solution to address those issues. It is inconsistent with the Legislature's mandate to find ways to expand sustainable aquaculture in the state and the Commission's own statutory requirements to process applications; and sends the wrong message to potential aquaculture companies that the state is not open for commerce.

In addition to the concerns detailed in our previous letters, the District is concerned that the proposed six-month hiatus, which will already significantly impact the District's projects (as well as other potential aquaculture projects throughout the state), could be extended beyond the initial six months. We understand that some commenters that would like to see this happen. If the Commission adopts a six-month hiatus, we strongly encourage that the hiatus sunset after six months with no possible extension. Any extension would exacerbate the already significant negative impacts of the proposed hiatus.

Further, if the Commission adopts the proposed six-month hiatus, the District respectfully requests that the hiatus exempt applications submitted by public agencies, including port districts. We understand the primary motivation for the recommended hiatus is the lack of Commission staffing and resources to properly address the Commission's current leases and those for which applications have already been submitted. The District, and other port districts and public agencies, are in a position to assist Commission staff in this process. Public agencies can assist with public outreach, environmental review, site planning, and development of appropriate terms and conditions to ensure that aquaculture projects are environmentally sustainable. Indeed, the District has already assisted with these tasks as part of projects already approved through its BEI Program.

Fish and Game Commissioner

June 11, 2020

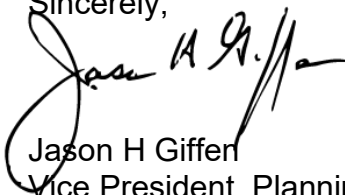
Page 3

These new pilot projects would allow both the public agency applicant and Commission staff to develop greater expertise in leasing, permitting, and managing aquaculture projects while reducing the demand on Commission staff and resources.

The District agrees with Commission staff that the State leasing process can be improved with a more transparent and predictable leasing process and additional details and regulations to guide aquaculture applicants and Commission staff, including but not limited to best management practices and/or mitigation measures, to ensure that sustainable aquaculture is carried out responsibly while minimizing potential environmental impacts. While the District does not agree with the proposed hiatus, it is fully supportive of a public process to improve the application process, and would like to partner with the Commission to achieve that goal. The District is willing to provide staff resources to assist the Commission. We also look forward to collaborating with the Commission to seek additional possible funding opportunities so that the Commission can continue to accept and process aquaculture leases in State waters. However, in the event the Commission elects to move forward with the proposed hiatus, we respectfully request that it be limited to six months with no opportunity to extend and that applications submitted by public agencies be excluded from the hiatus.

If you have any questions, please do not hesitate to contact Paula Sylvia at (619) 686-6491 or via email at psylvia@portofsandiego.org, or myself at (619) 686-6473 or via email at jgiffen@portofsandiego.org. Thank you for your time and consideration of this important matter.

Sincerely,



Jason H Giffen

Vice President, Planning, Environment & Government Relations

cc: Melissa Miller-Henson, Executive Director, California Fish and Game Commission
Chuck Bonham, Director, California Department of Fish and Wildlife
Randy Lovell, California Aquaculture Coordinator
Paula Sylvia, Program Director, Aquaculture and Blue Technology, Port of San Diego
Robert M. Smith, K&L Gates LLP

April 24, 2020

Melissa Miller-Henson
Executive Director
Fish and Game Commission
P.O. Box 944209
Sacramento, CA 94244-2090

VIA EMAIL

Re: **Marine Resources Committee April 29, 2020 Agenda Item 7: Marine Aquaculture in California**

Dear Ms. Miller-Henson,

The San Diego Unified Port District (District) appreciates the opportunity to provide comments on the Fish and Game Commission's (Commission) Marine Resources Committee (MRC) April 29, 2020 agenda items 7(A) and 7(B) regarding marine aquaculture in California.¹ The District is a regional, public benefit agency created in 1962 through the California State Legislature's adoption of the San Diego Unified Port District Act (Port Act). Through the Port Act, the District was granted the state tidelands and submerged lands around San Diego Bay (Bay) and is entrusted with managing and protecting the tidelands and diverse waterfront uses in a manner that is consistent with the Public Trust Doctrine, promoting and balancing navigation, commerce, fisheries (including aquaculture), recreation, and environmental stewardship.

In parallel with the Commission's mission, the District's mission and strategic goals include protection and improvement of the Bay's environmental resources. The District is constantly working to assess, manage, and adapt to current and future ocean and coastal opportunities and challenges. Aquaculture is a key part of the District's strategic plan to accomplish these goals. In 2015, the District created an Aquaculture and Blue Technology Program to explore environmental and economic opportunities in and around the Bay. In 2016, the District created a Blue Economy Incubator (BEI) program to assist in the creation, development and scaling of new business ventures focusing on aquaculture and blue technology.

¹ The District also submitted comments concerning these agenda items on March 12, 2020. This letter is supplemental to our previous letter.

Melissa Miller-Henson
April 24, 2020
Page Two

In partnership with the National Oceanic and Atmospheric Administration's National Ocean Service, National Centers for Coastal Ocean Science, the District has identified, using spatial planning tools, nearly 10,000 acres that could be suitable for shellfish and seaweed aquaculture, 8,000 acres of which would be subject to California Fish and Game leasing requirements. The District is very interested in ensuring that sustainable aquaculture can expand in California, subject to appropriate regulation and environmental review.

The District supports Agenda Item 7(A), including the continued development of a Programmatic Environmental Impact Report (PEIR) for marine aquaculture in California. Environmental review under the California Environmental Quality Act is a critical element of responsible and sustainable growth of aquaculture in California; however, it is currently cost-prohibitive for many aquaculture companies to conduct extensive environmental review, and rather than providing a pathway, acts as a barrier to diversifying California's aquaculture industry. Our hope is that the PEIR can evaluate many of the general environmental impacts associated with aquaculture and recommend appropriate mitigation measures, thereby significantly reducing the cost of environmental review for subsequent, specific projects.

As further described below, the District respectfully requests that the Commission refrain from imposing a hiatus on aquaculture applications. While the District strongly supports the Commission's goals of providing more transparent and predictable regulation of aquaculture, the District believes that this goal can be accomplished without a moratorium or hiatus. Further, a hiatus sends the wrong message to the industry that the State is not open for business, which can seal it off from both current and future investment in aquaculture in the State at a time when the State should be encouraging environmentally sustainable industries that can support job creation. Other progressive states, such as Washington, Hawaii, and Massachusetts, provide examples of robust State aquaculture leasing programs that do not sacrifice oversight, regulation, and environmental review. While we must design a regulatory program that works for California, we should not do so at the risk of losing the industry we are seeking to regulate.

1. A Hiatus is Not Necessary While the Commission Considers Regulatory and Program Improvements

Generally, a hiatus, or moratorium, on applications is proposed when the status quo is creating specific harms and immediate action needs to be taken to address that harm while an agency considers how to regulate it or to prohibit significant (and established) economic or environmental impacts. Examples include the State's recent moratorium on evictions on renters impacted by COVID-19, Governor Newsom's moratorium on

Melissa Miller-Henson

April 24, 2020
Page Three

fracking pending further scientific study, and local government restrictions on adult-use marijuana after it was legalized in the State. A hiatus or moratorium is traditionally viewed as an option of last resort, given that they almost always have significant economic impacts, to be utilized when no other remedy is available to prevent immediate and significant harm.

It is unclear what immediate and significant harm the Commission is seeking to avoid through imposing a hiatus. The Commission, due to the hard work of its staff, has recently approved several amendments to Commission aquaculture leases, including those for Hog Island Oyster Company in Tomales Bay and Santa Barbara Mariculture in Southern California. These were accomplished with appropriate environmental review, a robust set of mitigation measures and conditions of approval, and little opposition. While the District certainly understands the Commission's limitations concerning staff resources and budget, there does not appear to be an overwhelming number of applications that would warrant a hiatus, nor rampant illegal activity that would warrant stopping the application process.

The Commission is charged under statute to process applications for aquaculture projects. This responsibility cannot be met from the sidelines, but with diligent and direct engagement. We believe the Commission can continue to perform this function while seeking ways to improve its regulatory and application process. Indeed, one of the best ways to learn how a process can be improved is to have case studies to evaluate as examples.

The proposed hiatus can also be counterproductive towards developing new regulations or an improved application process. While such a process will benefit from input from the aquaculture industry, there will also be certain parties that generally oppose any aquaculture that may seek to delay the process so that the temporary hiatus resembles a permanent moratorium. However, a transparent public process without a hiatus removes these conflicting interests from the discussion and will likely facilitate greater cooperation and coordination between interest groups, interested government agencies, and the general public. Engagement and openness is the key to progress.

2. A Hiatus is Counterproductive and Signals California is Deterring Sustainable Aquaculture or Blue Economy Businesses

Only 3% of the seafood consumed in the United States comes from domestically produced aquaculture and 6.5% from domestic fisheries. The remaining 91% of the nation's need for seafood must be imported, regardless of cost. In economic terms, this contributes to over \$16 billion dollars in trade deficit each year. In environmental terms, the carbon footprint or energy used to import seafood far exceeds the energy and

Melissa Miller-Henson

April 24, 2020
Page Four

resources required to harvest and deliver seafood in and to U.S. seafood markets. In California alone, the current demand for seafood based upon per capita consumption exceeds 600 million pounds annually, an opportunity which represents nearly \$6 billion in total economic benefit, if California chose to harvest through sustainable fisheries and aquaculture. When compared to other forms of animal production, which rely heavily on fossil fuels, freshwater resources, and animal feed, seaweed and shellfish aquaculture deliver several environmental benefits, such as water filtration and reduction of excess nutrients.

As you know, the California Legislature recognized the importance of developing a State aquaculture industry in its unanimous approval of Assembly Joint Resolution 43 (2014), which stated that coastal “communities could greatly benefit from a coordinated effort to promote sustainable shellfish aquaculture production” that achieves both economic benefits and preserving the environment. The Legislature found that “California has an enormous opportunity to create living-wage jobs in coastal communities, improve water quality, and restore important ecosystem functions through expansion of sustainable shellfish farming and habitat restoration.” For these reasons, the Legislature supported “access to additional acreage for shellfish farming and restoration, and further supports a dialogue between industry, environmental, and federal and state agency leaders to develop an improved permitting process that is efficient and economical for both shellfish restoration, and commercial farming.” In the eyes of the Legislature, these were complementary goals that could be achieved at the same time. The Commission’s proposed hiatus is also inconsistent with the goals of Senate Bill 262 (2019), wherein the Legislature requires the California Coastal Commission to coordinate with federal and state agencies (including the Commission and Department of Fish and Wildlife) to create regulations that reduce the amount of time required to obtain a permit.

Since 2017, the District has engaged in several pilot projects to shepherd responsible development and innovation in the aquaculture industry, including the formation of a shellfish nursery in partnership with San Diego Bay Aquaculture LLC and a pilot seaweed project with Sunken Seaweed LLC. Expansion of the District’s aquaculture program will likely include proposed projects within the 8,000 acres identified as potentially appropriate for aquaculture development that is subject to Commission leasing requirements. However, the proposed hiatus will hamper these efforts, making it significantly more difficult, if not impossible, for the District to find potential partners for future aquaculture projects. This tempts a technological regression for the State, rather than inviting the scientific innovation that has marked California as a progressive global leader.

Melissa Miller-Henson
April 24, 2020
Page Five

At a time when many states, including Maryland and New York, are using shellfish aquaculture projects for environmental remediation as well as economic development and seeking additional investment from aquaculture companies, it is the wrong time to tell the industry that California state waters are not open for commerce. This is particularly true right now, where the COVID-19 pandemic is resulting in significant losses to hundreds of different California industries, including fisheries, aquaculture companies, and restaurants, and an unprecedented number of layoffs and unemployment claims.

To place a hiatus on applications will not only result in a missed opportunity for California to develop an environmentally sustainable source of food production and much-needed employment in coastal communities, it will signal that California is an unpredictable and unstable market for expansion, deferring development of best practices to other states, which would set our own sustainable environmental efforts behind for years to come. This would also foreclose additional potential lease revenue for the Commission and Department of Fish and Wildlife to help fund additional staff resources to process applications.

The District views aquaculture as a critical economic opportunity for California coastal communities over the next decade and strongly encourages MRC and the Commission to continue to receive and process applications as the Commission strives for ways to improve its review process.

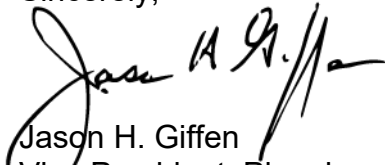
3. The District Would Like to Partner with the Commission to Improve the Permitting and Leasing Process

As noted above, the District agrees with Commission staff that the State leasing process can be improved with a more transparent and predictable permitting and leasing process. The District appreciates the assertion that additional details and regulations to guide aquaculture applicants and Commission staff, including but not limited to best management practices and/or mitigation measures, would ensure that sustainable aquaculture is carried out responsibly while minimizing potential environmental impacts. While the District does not agree with the proposed hiatus, it is fully supportive of a public process to improve the application process and would like to partner with the Commission to achieve that goal. The District is willing to provide staff resources to assist with this effort. We also look forward to collaborating with the Commission to seek additional possible funding opportunities so that the Commission can continue to accept and process aquaculture leases in State waters. We believe that embracing progress is California's story, and we hope to assist and advance those efforts with you any way possible.

Melissa Miller-Henson
April 24, 2020
Page Six

If you have any questions, please do not hesitate to contact Paula Sylvia at (619) 686-6491 or via email at psylvia@portofsandiego.org, or myself at (619) 686-6473 or via email at jgiffen@portofsandiego.org. Thank you for your time and consideration of this important matter.

Sincerely,



Jason H. Giffen
Vice President, Planning, Environment and Government Relations

cc: Chuck Bonham, Director, California Department of Fish and Wildlife
Randy Lovell, California Aquaculture Coordinator
Paula Sylvia, Program Director, Aquaculture and Blue Technology, Port of San Diego



VIA EMAIL

March 12, 2020

Melissa Miller-Henson
Executive Director
Fish and Game Commission
P.O. Box 94244-2090

RE: California Fish and Game Commission Marine Resources Committee Meeting,
March 17, 2020 Agenda

Dear Ms. Henson,

The San Diego Unified Port District (District) appreciates the opportunity to provide comments on the Fish and Game Commission's Marine Resources Committee (MRC) March 17, 2020 agenda items 7(A) and 7(B) regarding marine aquaculture in California. The District is a regional, public benefit agency created in 1962 through the California State Legislature's adoption of the San Diego Unified Port District Act (Port Act). Through the Port Act, the District was granted the state tidelands and submerged lands around San Diego Bay (Bay) and is entrusted with managing and protecting the tidelands and diverse waterfront uses in a manner that is consistent with the Public Trust Doctrine, promoting and balancing navigation, commerce, fisheries, recreation, and environmental stewardship. In parallel with the Fish and Game Commission's mission, the District's mission and strategic goals include protection and improvement of the Bay's environmental resources and the District is directly working to assess, manage, and adapt to current and future ocean and coastal opportunities and challenges.

The District is pleased to be able to provide public comment and engage with the MRC at the upcoming meeting to express our support of the MRC's work on marine aquaculture and continuing the momentum of the programmatic environmental impact report.

In response to agenda item 7(B), marine aquaculture in California, regarding the possible recommendation for a temporary hiatus in considering new applications for state water bottom leases for the purpose of aquaculture (excepting previously received applications currently under consideration), the District respectfully offers the following comments:

Economic and Environmental Importance of Aquaculture

In the U.S. only 3% of domestically produced seafood comes from aquaculture and 6.5% from fisheries, the remaining 91% is imported. In economic terms, this contributes to over \$16 billion dollars in trade deficit each year. In environmental terms, the carbon footprint or energy used to import seafood far exceeds the energy required to harvest and deliver seafood in and to U.S. seafood markets. In California alone, the current demand for seafood based on per capita consumption exceeds 600 million pounds annually, an opportunity which represents nearly \$6 billion dollars in total economic benefit, if California could harvest this through sustainable fisheries and aquaculture. In agricultural terms, California already supports the fifth largest economy in the world, which can and should be bolstered by supporting sustainable fisheries and the development of a sustainable, domestic marine aquaculture industry, inclusive of a range of land and ocean-based technologies across all species and market segments to meet the growing demand for seafood and ensure our nation's food security.

While there is a clear food production component to this demand, aquaculture offers multiple co-benefits, such as fisheries enhancement, ecosystem restoration and services, mitigation banking, bioremediation, carbon sequestration, bio-fuel/medical purposes, and education and outreach. When compared to other forms of animal production, which rely heavily on fossil fuels, freshwater resources, and animal feed, seaweed and shellfish aquaculture have several environmental benefits, such as water filtration and reduction of excess nutrients.

Recommendation: The District recommends the MRC continue to consider new applications for state water bottom leases for the purpose of aquaculture to support the growth of aquaculture in California and the economic and environmental benefits it affords.

Aquaculture and the Blue Economy

The District provides essential working waterfront infrastructure that supports vibrant commercial and recreational fisheries and the livelihoods and communities that depend on them. In 2015, the District created an Aquaculture and Blue Technology Program to explore environmental and economic opportunities in and around San Diego Bay, as well as created a Blue Economy Incubator (BEI) program to assist in the creation, development and scaling of new business ventures focusing on aquaculture and blue technology. To date, pilot projects supported through the BEI program range from shellfish nursery operations, to copper remediation technology, a drive-in boatwash, a

smart marina application, a marine debris removal vessel, and seaweed aquaculture. As the state-legislated trustee of tidelands around San Diego Bay, fostering sustainable domestic aquaculture and District-related blue tech innovation helps the District fulfill our public trust responsibility to promote fisheries and commerce, as well as aligning with our mission to enhance and protect the environment.

Ongoing Marine Spatial Planning and Port Aquaculture Pilot Projects

A strong body of scientific knowledge exists regarding aquaculture siting and science-based best management practices to reduce and/or eliminate the risk of potential environmental impacts; however, the limited number of working aquaculture farms in California presents a lack of regional and local data. To fill in some of this gap, the District has utilized coastal marine spatial planning tools to conduct a constraints and opportunities analysis for aquaculture in and around San Diego Bay with a focus on seaweed and shellfish. This work was conducted by the National Oceanic and Atmospheric Administration's (NOAA), National Ocean Service (NOS), National Centers for Coastal Ocean Sciences (NCCOS), Coastal Aquaculture Siting and Sustainability Program (CASP), which identified nearly 10,000 acres of potential area to investigate further for a variety of seaweed and shellfish opportunities, including nutrient bioextraction. Of particular note was nearly 2,000 acres were identified inside San Diego Bay with the remaining 8,000 outside the Bay, including a large area in the District's southernmost jurisdiction offshore of Imperial Beach, which is frequently water-quality impacted by the Tijuana River Watershed. Other complimentary initiatives at the District include environmental conservation projects with a focus on wetland and blue carbon mitigation banking as a tool to protect and conserve coastal environments while simultaneously allowing for economic growth. The District has also conducted a bay-wide infrastructure feasibility study to assess infrastructure capable of supporting pilot and demonstration projects. The District is taking an active leadership role in the expanding domestic aquaculture industry and facilitating early development of regional marine aquaculture projects.

Launching from the District's planning efforts, in 2017 the Board of Port Commissioners (BPC) approved a pilot project with San Diego Bay Aquaculture LLC to demonstrate a shellfish aquaculture nursery operation. The goal of this pilot project is to demonstrate the feasibility of shellfish aquaculture in San Diego Bay by growing oysters from the nursery to juvenile stage for the commercial market and to assess the environmental co-benefits of shellfish aquaculture. Since then, support from California Ports and harbors continues to grow, with organizations like the District advancing balanced, science-guided support for this industry. In 2018, the BPC approved a pilot project with Sunken Seaweed LLC

to demonstrate the feasibility and environmental co-benefits of seaweed aquaculture in the Bay. This pilot project is developing and evaluating techniques for growing culinary seaweeds and helps for a range of food and manufacturing uses as well as researching the environmental co-benefits associated with growing seaweed. The minimal resources and low investment required to farm shellfish and seaweeds presents aquaculture as a particularly sound strategy and a tool providing for multiple co-benefits and uses such as bioremediation, carbon sequestration, restoration, mitigation banking, habitat enhancement and otherwise improving water quality and ecosystem productivity. For these reasons, the District is embracing these aquaculture pilot projects and supporting the emerging shellfish and seaweed aquaculture industry in California.

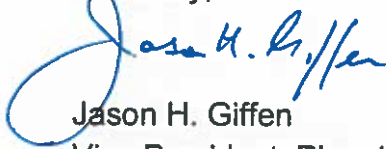
The next step for the District's experimental pilot projects is siting larger pilot operational farms to continue environmental monitoring, establish monitoring protocols, and assess best management practices, specific to California. This process would likely require a state water bottom lease and the MRC's consideration of a temporary hiatus in considering new applications for the purpose of aquaculture would delay important and informative research.

Recommendation: The District recommends the MRC facilitate establishing in-water aquaculture farms so research, environmental monitoring protocols, and science-based best management practices can be developed at the local and regional level.

The projects described above show the District's commitment to developing aquaculture in California and the District will continue to share our progress on our efforts with the MRC and we look forward to future collaboration on research, development, assessment, and implementation of new strategies and technologies for aquaculture.

If you have any questions, please do not hesitate to contact Paula Sylvia at (619) 686-6491 or via email at psylvia@portofsandiego.org, or myself at (619) 686-6473 or via email at jgiffen@portofsandiego.org.

Sincerely,



Jason H. Giffen

Vice President, Planning, Environment & Government Relations

cc: Paula Sylvia, Program Director, Aquaculture and Blue Technology, Port of San Diego

California Fish and Game Commission
Marine Resources Committee (MRC) 2020 Work Plan
Scheduled Topics and Timeline for
Items Referred to MRC
Updated June 18, 2020

Topic	Category	MAR/APR ^a 2020	JUL 2020	NOV 2020
		Santa Rosa (Mar); Teleconference/ Webinar (Mar/Apr)	Teleconference (proposed format)	Monterey
Planning Documents & Fishery Management Plans (FMPs)				
MLMA Master Plan for Fisheries - Implementation Updates	Master Plan Implementation	X	X ^c	X
Abalone FMP / ARMP Update	FMP	X/R	X/R	X
Aquaculture Program Planning (Information Report, Action Plan)	Aquaculture	X/R	X	
Regulations				
Aquaculture Lease Best Management Practices (BMP) Plan Requirements (HOLD, TBD)	Aquaculture			
Experimental Fishing Permit Program, Phase II	Fisheries	X	X	
Kelp and Algae Commercial Harvest	Kelp	X/R	(X/R) ^b	
Whale and Turtle Protections in the Recreational Dungeness Crab Fishery	Fisheries	X/R		
Update on and possible review of California Spiny Lobster FMP implementing regulations (<i>added Feb 2019; timing TBD</i>)	FMP			
California Grunion Recreational Fishing Regulations (added Apr 2020)	Fisheries		X	
Emerging/Developing Management Issues				
Aquaculture State Water Bottom Leases: Existing & Future Lease Considerations	Aquaculture			
Potential Short-Term Moratorium on New Aquaculture Lease Applications	Aquaculture	X/R		X
Kelp Restoration and Recovery Tracking	Kelp		X ^c	
Recreational Swordfish Fishery	Fisheries	X	X/R ^c	
"Maintenance of Existing Structures" within Marine Protected Areas (<i>NEW - Proposed</i>)	Marine Protected Areas		X	
Special Projects				
California's Coastal Fishing Communities	MRC Special Project		X	
Informational / External Topics of Interest				
Recovery of Cowcod Stock Status (South of Cape Mendocino)	Fishery management	X	(X) ^b	

KEY: X Discussion scheduled

X/R Recommendation developed and moved to FGC

a The March 17 MRC meeting was continued to April 29 to hear items not completed; all items are identified in this column regardless of which day heard.

b Topics are proposed by staff to be removed from agenda and delayed to a future date (TBD).

c Topics are proposed by staff to be heard as updates under "Agency Updates" (a standing agenda item) rather than a stand-alone agenda topic.

From: Ian OHollaren [REDACTED]
Sent: Thursday, May 21, 2020 6:13 PM
To: Flores Miller, Rebecca@Wildlife <Rebecca.FloresMiller@wildlife.ca.gov>; Wildlife Kelp <Kelp@wildlife.ca.gov>; FGC <FGC@fgc.ca.gov>
Subject: Proposed Regulation Comments

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

Hi Rebecca,

Thank you for putting on the webinar on Wednesday. I was hoping to speak but we ran out of time. I agree with Doug Bush, Andrew Daunis, and James Jungwirth on all of their points. Basing these proposed regulations off the last ten year average is not scientifically accurate. I appreciate the intention of the department to establish limits and closures when deemed necessary, but this is not the reality with the proposed regulations.

In my specific harvest areas, there is little to no pressure on the resource. The Giant Kelp forests off Santa Cruz have been thriving, as well as the Bull Kelp forests just north of Santa Cruz. The intertidal seaweeds, along with Postelsia, seem to be in great shape with no pressure as well. My harvest method encourages new healthy growth of each specie I take, and over the years I have witnessed little to no change in specie density. Any decline I have seen was strictly environmental, ie. large swell.

My concern and testimony for the proposed regulations are as follows:

1. Although I don't harvest much Bull Kelp, prohibiting the commercial harvest state-wide is like cutting down the whole orchard because one row is diseased. There are plenty of healthy stands of bull kelp I have seen from Half Moon Bay to Southern Big Sur. I suggest simply closing individual beds of Bull kelp as needed instead of an overall state-wide closure.

2. I am highly against establishing harvest limits as well. As was stated in the webinar, seaweeds mature and reproduce at different times throughout the year from south to north. Depending on weather conditions, swell, tides, etc throughout California, dictate not only specie availability, but time of harvest. As stewards of the resource, commercial harvesters are not in a race to harvest the most seaweed, or harvest before plants have reached maturity, or undergoing reproduction. This process in itself is self regulating regarding appropriate harvest methods, although all harvesters must harvest appropriately to ensure proper management of the resource.

-A 3,500 ton limit on Giant Kelp is scientifically unjustified. I'd imagine the aquaculture industry makes up the majority of the Giant Kelp yearly harvest. This seems like a set tonnage they require each year. My business model is based on harvesting a significant amount of Giant Kelp in the next 5 years, on the basis that it is the most abundant and regenerative perennial kelp in California and healthy kelp forests off Santa Cruz to harvest from. The versatility of Giant Kelp in the food supply chain, agriculture, cosmetic, and biofuel industries is immense. This proposed limit threatens the ability of a burgeoning industry for many new business endeavors which support California. A 3,500 ton cap can be reached with a couple more mechanical/or hand harvest operations that are working on a large scale. With no cap on licenses, this quota threatens the livelihoods of all commercial kelp harvesters and aquaculture businesses which have worked so hard to create the industry which we have today.

3. I am not familiar with the Pacific Herring spawning habitat in specific bays, but of course I would support protecting their habitat if necessary.

4. Closing the Sea Palm harvest completely seems unjustified. As stated, I have not seen a decline in Sea Palm in my harvest grounds, nor from other harvesters in their areas. Following proper harvest protocol of Sea Palm has proven successful commercially and for regeneration of each plant in order to reproduce. I don't believe seasonal harvesting is necessary because the harvest is self regulating based on environmental factors and following proper harvesting technique is sufficient.

5. I agree with streamlining the overall kelp logs and reports, regulation clarity, etc. Please push to get the kelp logs and royalty payments online!

As a small community of commercial kelp harvesters, it has taken all of us years to get to where we are at today. This is my full time job and focus. All of us have the best interest of the resource in mind and have educated ourselves, each other, and the general public throughout the years about the importance of this resource. We harvest in accordance with the tides, moons, specie

availability, and overall health. Whether someone has been harvesting for 1 year or 40 years, we are the departments best source of information because we're out there every week. Please allow scientific data to justify limits and closures. An ebb and flow in the environment is completely natural and commercial harvesters take on the responsibility in maintaining equilibrium in the areas in which we harvest. I can say that I look at the resource as my own garden, and take responsibility to conserve this precious resource. A collaboration with the department and harvesters is what I'd like to see most before any decisions are made.

All the best,

Ian O'Hollaren
Seaquoia.com



Mr. Eric Sklar, President
California Fish and Game Commission
Delivered by email: fgc@fgc.ca.gov

May 7, 2020

RE: Recreational Abalone FMP – Administrative Team’s Final Report.

Dear President Sklar and Commissioners:

I am a co-author of the Final Report from the Administrative Team tasked by the Commission to integrate the two abalone management proposals submitted by the CDFW and TNC. Given my personal involvement and familiarity with both the Final Report and the associated Management Strategy Evaluation (MSE), I am commenting as a member of the public, sharing some insights, and making a recommendation which is not a part of the report.

Because the integration process and final report were limited in both scope and time, ***I am asking the Commission to direct CDFW to include additional pragmatic alternatives to the recommended biological and de-minimis fisheries in the final abalone fishery management plan (FMP) (see suggestions below).***

The Bottom line take-away from the Final Report

The report offers 16 basic combinations of Harvest Control Rules (HCR) and Total Allowable Catches (TAC) which were evaluated using MSE modeling. Each of the 16 proposals were evaluated using two Operating Models (OM1 and OM2). OM1 assumes environmental recovery at the end of this year (2020). OM2 considers recovery at the end of 2022. At this point, it is obvious that environmental conditions will not be adequately improved by the end of this year to consider OM1, effectively leaving OM2 as the only viable operating model. In addition, the environmental conditions (Exceptional Circumstances) required for reopening have not been explicitly determined, nor have scientific mechanistic links to abalone health been established.

Applying OM2, the soonest the fishery could reopen is in 20 years (i.e. 20 years for a de-minimis fishery and 39 years for an open fishery). Additionally, given the assumptions and triggers in the proposals, it is doubtful we will ever see an open-access fishery approaching what we have enjoyed in the past. Due to the long timeframes and the quality of the data, it is likely that an FMP based on any of the recommended proposals, will be outdated before it could be implemented in a fishery.

Why are the Timeframes so Long?

The long timeframes are based on the assumptions, indicators and reference points used in the MSE modeling. We have seen how models can evolve by watching the changes in the corona virus models as newer and better information becomes available. Even though some of the information used in the abalone models comes from peer-reviewed literature, other parts are less understood. To better understand some of the information used in the models, additional research and data will be required. In the absence of reliable data and proven environmental links to abalone health, the assumptions and references used in the models are initially set very

precautious. As more and better data becomes available models can be updated to provide better forecasts.

Although there are multiple proposals, they all rely on only two indicators (density and SPR) with various triggers set for action using four levels of TACs. The reason for using only two indicators was due to the lack of better data and the scope of the project which focused on the two peer reviewed proposals submitted by the CDFW (density) and TNC (SPR). All of the proposals mandate both density and SPR requirements be met. Requiring both indicators to be met simultaneously causes the proposals to be more restrictive to fishing than either of the original proposals considered separately. This conflicts with the Peer Review's recommendation #4, to not adopt a "one-out, all-out" approach. The peer review recommended not using this approach because they recognized, "...the possibility that red abalone may adapt to some of the 'negative' indicators in the future." Anecdotally, I have observed abalones adjusting to their new environment by re-aggregating in shallow water away from the urchins in most areas.

Adding to the already restrictive density and SPR requirements in the decision tree (Part B), there are also yet-to-be defined "Exceptional Circumstances" (Part A – Environmental and Biological Conditions) which must occur before applying the decision-tree.

Suggestions for a Fishery Going Forward:

I request that the Commission ask the Department to assemble a small group of fishermen and scientists to consider mid-sized fishery alternatives for the final FMP at a level between the de-minimis and bio-fisheries proposed in the integration plan. Such a level of harvest provide data and a reasonable, but precautionary fishing opportunity. I recommend, considering a fishery between a few hundred and 5,000 abalones.

- There is an opportunity gap between those catch levels (TAC) described in the de-minimis fishery (5,000 to 40,000 abalones) and the bio-fishery (a few 100s of abalones).
- All landing sites are not in the same condition. Although some sites in Sonoma County, hard-hit by the negative environmental conditions should remain closed, there are other sites in Mendocino, Humboldt and Del Norte Counties which can support small fisheries without having a detectable impact on recovery.
- A mid-sized fishery would provide a "win-win" for both scientists and fishermen by supporting the concepts of data gathering in a bio-fishery and that of more opportunity in a larger de-minimis fishery.
- Because this level of fishery, according to MSE, will have little to no detectable impact on the health or recovery of the overall fishery, it could begin by being managed without using density or SPR data until more or better data is available, which can come from the fishery itself.
- Allowing for smaller sites, shorter fishing seasons and using the data gathered from the catches at those sites, it is possible to manage more proactively and react more rapidly to changes (i.e. season by season). This would be an improvement over the currently proposed large "fishing zones" necessitating 4 years to collect and analyze the required data for annual decision-making.

- Rotating smaller open and closed sites to spread fishing pressure along with higher size limits to protect more spawning potential were concepts suggested by the Project Team and mentioned in the MSE. Because of time, these concepts were not further explored by the modelers or developed enough to be included in the recommendations. I believe they still have merit and support from divers.

Benefits of the Integration Process

In closing, I would like to share a few of the benefits that came from the integration process. If the full benefits are to be realized, more work and input are needed before completing the final abalone FMP. The most notable benefits coming from the process were as follows:

- Everyone involved (DFW, F&GC, OST, OPC, NGOs, Tribes, academics, and the public) learned and shared ideas during the process paving the way for potentially better cooperation and communication in the future.
- The teams recognized the need for environmental indicators to anticipate changes in abalone health and reproduction. There were many different environmental indicators discussed (i.e. water temperature, kelp canopy, acidification, etc.) which seem intuitively promising but the teams agreed that their mechanistic links to abalone health are not well-established and will require more work and research to make those connections and set triggers for action.
- There was general agreement concerning the need for more and better data. This not only included data from more areas, but also the coordination of data collection and protocols among the various entities collecting it (i.e. CDFW, NGOs, Academics, and citizens). The teams recommended that the CDFW coordinate data collection and make it more readily available to the public.
- The teams recognized the need to design and coordinate data collection programs in areas where CDFW is currently not sampling, specifically in areas outside of Sonoma and Mendocino Counties. Humboldt, Del Norte (H/DN), and Marin Counties do not have the density or SPR data used in the proposals, even though they are over ½ of the coastline managed by the proposals.
- The teams provided a strawman proposal for a biological fishery for data collection, however,, more details should be outlined by CDFW, alongside stakeholders, to establish what data to collect, who and how a bio-fishery would be determined, where it might occur, and if the opportunity is enough to incentivize recreational participation.
- The modelers demonstrated that MSE is a valuable tool for comparing alternative proposals but made it clear that outcomes depend on the assumptions used and having reliable data. Thus, MSE may not perfectly predict the future.
- The teams established good “strawman” administrative procedures for tag allocation in a potential de-minimis fishery using a lottery system similar to big game hunting.

Sincerely,

Jack Likins

Email address:

From: Joshua Russo [REDACTED]
Sent: Thursday, June 11, 2020 05:47 AM
To: FGC <FGC@fgc.ca.gov>; Wildlife DIRECTOR <DIRECTOR@wildlife.ca.gov>;
Mastrup, Sonke@Wildlife <Sonke.Mastrup@wildlife.ca.gov>; Shuman, Craig@Wildlife
<Craig.Shuman@wildlife.ca.gov>
Subject: AGENDA ITEM 14

Esteemed commission,

Please add "(B) Abalone FMP" to item 14 on the commission agenda for 6/24. In the attached petition we are asking the commission to direct the department to design a management plan that begins to allow recreational take at a much lower level than the department intends to do. We need the commission to discuss this petition and give the department clear direction that this is or isn't what the commission wants in order to allow discussion on how to do this at the next MRC meeting.

Since the beginning of this process fishermen have been very clear that responsible access to the fishery is our top concern with the new FMP. Please direct the department to design a management plan that allows restricted access and lower levels of take.

Respectfully,
Joshua Russo
President, Watermen's Alliance
[REDACTED]

To: The California Fish and Game Commission and the California Department of Fish and Wildlife Delivered by email to: fgc@fgc.ca.gov and Chuck.Bonham@wildlife.ca.gov

From: The Watermen's Alliance on behalf of the undersigned interested public

Subject: Petition to Provide a Recreational Abalone Fishery in Northern California



We, the undersigned recreational abalone divers of California, write in support of the Watermen's Alliance request that California Department of Fish and Game create an opportunity for small-scale recreational harvest (between 600 to 900 abalone) to address data limitations in this fishery while creating sustainable fishing opportunities for the diving community as the resource rebuilds (also known as a biological fishery). We strongly support that this fishery be considered within the final fishery management plan for the North Coast recreational red abalone fishery.

The general public relies on the California Department of Fish and Game to design regulations to manage our shared state resources. We trust that they do this in alignment with the Marine Life Management Act which requires that a fair balance between ecosystem protection and sustainable harvest, as well as the preservation of fishing culture and economy (as outlined in its general policies within §7050).

Several years ago, we embarked on an effort to develop a new FMP for the recreational red abalone fishery. Since the beginning, fishermen have been very clear that their priority ask within this management plan is centered on the issue of access. General consensus from our community is that the department has been too restrictive with the resource under the guidance of the Abalone Recovery Management Plan (ARMP). This was reflected in our feedback provided during the initial public hearings and the mail-in surveys.

Our community has continued to be clear about what we would like – to maintain an opportunity to sustainably harvest the resource. Divers are willing to harvest less and pay more for the opportunity but simply cannot wait 20 to 30 more years for a *de minimis* or fully open fishery opportunity.

However, CDFW would now say that there are only two options for an “entry level” of take in the recreational fishery. One option is a biological fishery where recreational fishermen harvest the abalone that the department needs to provide critical data on the condition of the fishery (~100 abalone). The second option is a *de minimis* fishery with a level of take so low that it would have no effect on the recovery of the fishery (less than 10,000 to 20,000 abalone). However, recent modeling work suggests that it will take decades to reach the point where such a *de minimis* fishery could open.

We would propose that CDFW instead consider a third option for consideration by the California Fish and Game Commission (Commission) to include within the final FMP. This option would provide a level of take between the levels of harvest currently outlined in the biological fishery and those in the *de minimis* fishery. **Such a biological fishery, with a level of harvest between 600 to 900 abalone, would serve to increase the amount of data available to inform management and decision-making without putting the resource at risk.** Further, by engaging fishermen it would increase public confidence in the data. It would also provide ample opportunity to ensure that the recreational dive culture remains alive and well in California. The experts and the data have shown that this can be accomplished with minimal risk to the recovery of the fishery and no delay in the timeline for reaching the *de minimis* fishery. **Within the Administrative Team report, the modelers conducted an analysis to determine what level of data would be needed to manage a third management zone. Three hundred samples was demonstrated to provide enough statistical power to reliably manage a fishing zone, thus we would**

like to ensure that any biological fishery generates enough data to make reliable assessments on the status of the red abalone resource.

We also ask that biological fishing opportunities be distributed across each fishing zone. This could help to distribute any fishing pressure put on the resource as it recovers and acknowledges differences in the state of red abalone between counties. For instance, acknowledging that Sonoma has been hit particularly hard, the resource is further threatened by poaching activities. Poaching has been reported by Fish and Game officers and on Fish and Game's social media accounts. While any fishing pressure should be limited, the added presence of recreational divers can provide more eyes on the water to curtail poaching activities and ensure that valuable data is collected from any red abalone that leave the water. In Humboldt Del Norte, we could also explore the use of landing based (i.e. catch) data for management due naturally lower abundances of abalone in the region being a poor fit for current density surveys. This opportunity could allow the department to refine data collection and test alternative management methods at low catch levels to build confidence in the approach before reaching higher levels of take.

We are not asking for a guarantee of success each time we go out. We are simply asking for the opportunity to go out and sustainably harvest while helping in state data collection efforts. Small businesses and communities on the North Coast have been struggling since the closure of this fishery in 2017, and increased diving activities and tourism would greatly benefit them as well. We urge you to consider our proposal.

Signatures

Name Location Date

Jack Likins Gualala, CA 2020-05-11

Rich Stachowski Oakland, CA 2020-05-13

Kristine McKee Fort Bragg, CA 2020-05-13

michael wood Fairfield, CA 2020-05-13

Matthew Rice Laguna Niguel, CA 2020-05-13

Tony Rayford Georgetown, CA 2020-05-13

toby chan Sacramento, CA 2020-05-13

Regina Bianchi US 2020-05-13

Glenn Ford Sonoma, CA 2020-05-13

Shannon Anderson Napa, CA 2020-05-13

***Blank page place-holder representing 114 pages of signatures
(originals on file)***

Recipient: The California Fish and Game Commission, The California Department of Fish and Wildlife

Letter: Greetings,

Provide a Recreational Abalone Fishery in Northern California

Comments

Name	Location	Date	Comment
michael wood	Fairfield, CA	2020-05-13	"I want to be able to take my grandkids and teach them the hunt"
Timmy Conway	US	2020-05-13	"This is an important fishery."
Devin Eutsler	Yuba City, CA	2020-05-13	"The opportunity to freedive for Abalone in Northern California would be fantastic."
Matt Diestel	Walnut Creek, CA	2020-05-13	"My father taught me abalone diving and I would like to do the same with my children, in a responsible manner."
matt mattison	monte rio, CA	2020-05-13	"I fully support this as it will help gather much needed fishery info and give the people some level of fishing"
Ian Whiston	Santa Cruz, CA	2020-05-13	"I believe we can create a sustainable abalone fishery for our generation and my children's generation."
Meda Woods	San Antonio, TX	2020-05-13	"We love abalone"
Alan Engbrecht	San Francisco, CA	2020-05-13	"I am a fourth generation abalone diver and and fifth generation Californian. This coast and fishery is part of my family, soul, and heritage. I am perfectly satisfied with 1 or two abalone a year, but it would break my heart to know that my father and I have harvested our last abalone together."
Keith Chandler Chandler	Los Angeles, CA	2020-05-13	"Keith Chandler"
Tyler Benson	Moraga, CA	2020-05-13	"It would be amazing to get back in the water and contribute to the data collection."
Thomas Palmer	Santa Rosa, CA	2020-05-13	"Abalone has been a food source for generations of my family. And the exercise alone has no equal. I have looked at some of the reefs and they are full of snails. Do not see the reason to completely stop."
John Lynch	Washington, DC	2020-05-13	"Divers can make a difference."
Greg Fonts	California	2020-05-13	"Abalone diving has been in the blood of Californian divers for generations. While it may not be a "cadillac" fishery from now on, there is still a fishery that take can be fashioned around"
Michael Elliott	Concord, CA	2020-05-13	"I'd like to see the diving and hunting community to stay alive. I believe the third option would work for the recreational diver and abalone hunters. Thank you"
Isabel Silveira	Half Moon Bay, CA	2020-05-13	"I tasted my first abalone over 30 years ago when my husband, a diver in CA prepared it for me. The flavor was one of the best things I had eaten in my entire life. My husband has taught 3 sons to dive, one of them being a USA National Spearfishing Champion. Although they abide by the rules, the opportunity to continue to enjoy abalone in their lifetime, is something I hope to see in my

Name	Location	Date	Comment
			lifetime. I sure hope to eat abalone prepared by my husband for our family again... someday!"
Mark Keller	Benicia, CA	2020-05-13	"I love this fishery and am passionate about preserving it."
Lori Hofmann	Montara, CA	2020-05-13	"This was a family tradition for decades and generations. We are native Northern California fisherman and hunters and truly believe that with proper management our resources for hunting and fishing can be accessible for all forever."
Shirley Moody	US	2020-05-13	"An amazing experience."
Tracy Liller	boise, ID	2020-05-13	"I believe it is important to balance management including the wishes of those who partake in the sport. The resources belong to the people and fair representation in management needs to be part of the process while preserving a species."
nick moranda	Jacksonville, IL	2020-05-13	"Nicholas moranda"
William Chinnock	Stockton, CA	2020-05-13	"We need the state to get involved with protecting and rescuing the crisis on the California coast regarding loss of Bull Kelp, abalone fisher, and the purple urchin bloom. Allow recreational divers and Ocean users to participate in conservation efforts to save the Coast."
Alisa Carlson	Lakeport, CA	2020-05-13	"I would like the 'third' alternative proposal be considered. Everything possible should be done to help rebuild abalone populations ."
ray decker	Fresno, CA	2020-05-13	"I love abalone"
Kent Twomey	San Diego, CA	2020-05-13	"Scientific data is needed."
TRAVIS JONES	San Juan Bautista, CA	2020-05-13	"I want to enjoy the resource and I do not agree with the ban."
Luis Rosa	Modesto, CA	2020-05-13	"I'm signing because fishing is a natural resource that should be experienced by all"
Carter Jessop	Hayward, CA	2020-05-13	"Research regarding the effectiveness and benefit of fisheries regulation consistently shows that buy-in and support from the local community is vital to the success of harvest restrictions and no-take areas. In order to recover the abalone fishery and maintain both the businesses and culture that rely upon the responsible harvest of abalone on the north coast, I support this initiative and ask that you do so as well."
Michael Williams	Orland ca, CA	2020-05-13	"I want to dive like I did as a kid! Teach kids to dive! And enjoy the ocean!"
Roman Smolgovsky	South Lake Tahoe, CA	2020-05-13	"PADI Master Instructor"
Diana Theron	Auckland, New Zealand	2020-05-13	"Please stop over fishing."

Name	Location	Date	Comment
Stephen Page	San Francisco, CA	2020-05-13	"It has been part of my family tradition for a long time"
Douglas Jung	Santa Rosa, CA	2020-05-13	"Save the abalone culture"
Captain Dan Walsh	Carlsbad, CA	2020-05-13	"As a diving instructor I've been diving for over 50 years and want to be sure others can do the same for the next 50 years"
Jared Wilson	Santa Rosa, CA	2020-05-13	"Oversight overreach in government and its facilities is wrecking your wildlife and water ways. Its politicians that sign and pay for toxic dumping at these locations. I know cause the corporations are the only essential workers now payed for to the politicians that allow them to still profit. Its criminal. More people need to be out there keeping an eye on everything . Transparency. Government should spend some money on health of things vs the killing of things and bio terrorism. That's right obammer."
Tammy Willison	Redway, CA	2020-05-13	"I am signing because my grandpa, dad, brother and many friends were all ab divers. Great memories"
Sam Jacobszoon	Ukiah, CA	2020-05-13	"I believe in a managed fishery."
Shirley Simmons	Corning, CA	2020-05-13	"We need this"
Geoff Call	Santa Cruz, CA	2020-05-13	"geoff call"
Kam Chan	Pinole, CA	2020-05-13	"I'm love this game, every year have camping party over there , Enjoy the beautiful coast line and outdoor lifestyle really fun"
Ekaterina Tarasova	San Francisco, CA	2020-05-13	"I care"
Sheralyn Kirby	Gualala, CA	2020-05-13	"I am in support of small scale abalone fishing."
rich nehmer	crescent city, CA	2020-05-13	"I love the accessibility to the ocean."
Mark Mann	San Ramon, CA	2020-05-13	"support of the Watermen's Alliance request that California Department of Fish and Game create an opportunity for small-scale recreational harvest (between 600 to 900 abalone)"
Joe Surwald	Watsonville, CA	2020-05-13	"I love to dive for abalone. I used to dive here in Santa Cruz. Now it illegal 掠"
Jack Johnson	Richmond, CA	2020-05-13	"I believe that there is more than the current management system that makes sense"
Blake Patrich	Chico, CA	2020-05-13	"Blake Patrich"
Stephanie McGuire	Clifton, CO	2020-05-13	"I want limited government in everything!"
Jack Kim	San Jose, CA	2020-05-13	"I want my children to be able to experience what I live to do."
Paul Venker	Concord, CA	2020-05-13	"Open it back up."

Name	Location	Date	Comment
levi cloud	napa, CA	2020-05-13	"I grew up diving for abalone and it is a passion of mine to dive for these snails and would like my children to one day be able to enjoy this great sport as I have been able to do."
Michael Eberhardt	South San Francisco, CA	2020-05-13	"I LIVE OFF THE OCEAN. Without it, my family would not survive."
Jim Vandegrift	Santa Cruz, CA	2020-05-13	"I have been an avid abalone diver for the last 35 years and hope that some accommodation can be made that would allow the resumption of abalone diving that does not compromise the establishment of a healthy abalone population."
Jake White	Sonoma, CA	2020-05-13	"Anything is better than nothing"
Marci Colburn	Eureka, CA	2020-05-13	"I want for myself and future generations to be able to experience the love of this sport again."
Derek Cash	Ukiah, CA	2020-05-13	"I'm a diver that loves the sport and with sustained harvest in certain areas we should still be allowed to harvest abalone."
Robert Sandner	Yigo, Guam	2020-05-13	"There are way more abalone than the computers can predict. Get in the water look around you'll be surprised."
Ron Whang	San Francisco, CA	2020-05-13	"Let us dive before we die!"
james george	Lompoc, CA	2020-05-13	"southern california also needs to reopen.after taking off 15 years from diving im seeing so many abs that were never in previous areas"
Christy Ruhl	Napa, CA	2020-05-13	"Christy Ruhl"
Gabe Silveira	Half Moon Bay, CA	2020-05-13	"I am a free diving and would like the abalone season to open again"
Alan Murakami	Sebastopol, CA	2020-05-13	"I agree with a limited, controlled and measured recreational abalone harvest."
Todd Werling	Farmington, NM	2020-05-13	"Give Tim McCormick Abalone"
Christy Mang	Lompoc, CA	2020-05-13	"This was a part of my childhood. I would love to have my family enjoy as I did:)"
Benjiman Azevedo	Oroville, CA	2020-05-13	"Need to keep recreationaldiving alive!!"
charles zinser	Reno, NV	2020-05-13	"I support a limited abalone season it is very important. Total closure makes no sense and creates negative feelings of the folks that manage our recreational fisheries."
Patrick Ward	Santa Barbara,, CA	2020-05-13	"Patrick Ward"
jackie swaim	Citrus Heights, CA	2020-05-13	"We love abalone diving"

Name	Location	Date	Comment
David Gagne	Elk Grove, CA	2020-05-13	"It's not fair that there's only commercial fishing for abalone. I also a big supporter of the free diving community as well as a also being a diver."
Rogan Seamans	Oakland, CA	2020-05-13	"I love to dive"
Dustan Baker	Ladera Ranch, CA	2020-05-13	"Legal and responsible Recreational take of marine resources for consumption is an important activity. The culture of this practice should not be overlooked, but embraced."
Matthew Wright	Lakeport, CA	2020-05-13	"Because I dive"
Matt Sum	San Bruno, CA	2020-05-14	"I am signing because of people ned to have a balance of life. Have an outdoor life and ocean recreation is important to most of us as Californian."
Steven C Adams	Oxnard, CA	2020-05-14	"I believe! Let's do this..."
Mike Maher	US	2020-05-14	"There are plenty of abs out there, maybe Fish and game just need to bust those that are poaching a little better"
Sean Klinger	Sacramento, CA	2020-05-14	"Because it's the right thing to do"
Steven Clement	Sacramento, CA	2020-05-14	"Because I support the cause"
Claire De Biasio	Novato, CA	2020-05-14	"Recreational abalone divers are responsible, respectful people who hunt in a sustainable manner. They will not abuse this opportunity."
Tiffany Miller	Napa, CA	2020-05-14	"Tiffany Miller"
James O'Brien	Annandale, VA	2020-05-14	"I believe in this cause, having grown up on the Northern California coast, going abalone diving with my father as a young boy is one of my fondest memories. Keep it alive!"
Kathryn Lyons	Reno, NV	2020-05-14	"I believe in this cause."
Max Salgado	Southampton, England, UK	2020-05-14	"The ocean is for all"
Rob Flecksteiner	Penn Valley, CA	2020-05-14	"Sport Diving ensures the continued support for the environment and a controlled take of game helps to ensure good resource management and discourages poaching."
erin mcdonald	Stockton, CA	2020-05-14	"I believe this is a sound proposal to aid in protecting the abalone, gaining accurate data, and providing opportunities for the diving community."
Jocelyn Peach	Vacaville, CA	2020-05-14	"Abalone is awesome!"
Sarah Mitchel	Sebastopol, CA	2020-05-14	"I would like to dive with my son and show him how to collect abalone one day."
Pat Mathews	Fremont, US	2020-05-14	"I love fishing and abalone."

Name	Location	Date	Comment
Laura Lee Fitzpatrick	Napa, CA	2020-05-14	"Such an important hobby good for one's understanding of our seas."
Tom Caldera	Santa Maria, CA	2020-05-14	"Everyone loves abalone."
Amanda Risen	Kansas City, MO	2020-05-14	"I agree with the petition"
Jason Moreci	Novato, CA	2020-05-14	"Jason Moreci"
Sarah Olson-Saunders	Sweet Home, OR	2020-05-14	"The people who follow the rules should not be punished for poachers. This is something I grew up doing with my family, put food on the table. Don't punish the law abiding citizens, crack down hard on them disgusting poachers."
Chris Freitas	Cloverdale, CA	2020-05-14	"I love the ocean"
david currier	Ketchum, ID	2020-05-14	"Sustainability is where it's at."
Rachelle maher	Kelseyville, CA	2020-05-15	"We should support the group"
Melanie Mondo	San Francisco, CA	2020-05-15	"We love abalone"
Kathleen Bunting	Cloverdale, CA	2020-05-15	"Because my family has grownup diving and truly miss it"
Daniel Rodarte	Rocklin, CA	2020-05-15	"Abalone diving on the north coast has suffered tremendously over the past decades through poaching, mismanagement, and the purple urchin invasion. As a result, law abiding divers, dive shops, and tourism businesses have paid the price, from the Bay Area north to Humboldt County. Bring back a limited take to share the joy of diving for abalone again."
John Staggs	US	2020-05-16	"We need to fish"
Shel Barsanti	Mckinleyville, CA	2020-05-16	"Abalone season has been a fun activity for many of our family members."
Christopher Carlton	Magnolia, CA	2020-05-17	"I enjoyed collecting abalone when I used to lived in Commiefornia."
Rick Augustine	Castro Valley, CA	2020-05-17	"Its essential and I only collect fully grown alabones. Not babies ones. Its legal and hunting permit is included."
Jonathan Boykin	Lemoore, CA	2020-05-17	"Great idea."
Raymond Mori	South Lake Tahoe, CA	2020-05-17	"We all dive"
Dean August	US	2020-05-17	"I love diving and an abalone dinner"
Ben Oyle	Novato, CA	2020-05-18	"I support this idea"
Catherine Lamb	Stockton, CA	2020-05-18	"There is nothing like abalone diving in the north coast."
Mark Hamerdinger	Morro Bay, CA	2020-05-19	"I believe there is enough abundance of Abalone to harvest giving that size limits would be strictly enforced."

Name	Location	Date	Comment
Genie Minikel	Redway, CA	2020-05-19	"My family has been diving for abalone long before I was born and would like our children to be able to enjoy this lifestyle also"

Memorandum

Date: March 27, 2020

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

From: Charlton H. Bonham
Director

Subject: **Agenda item for April 15-16, 2020, Fish and Game Commission Meeting Re: Request for Notice Authorization Re: Amendments to the Commercial Pacific Herring Eggs on Kelp Regulations**

The 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 sections 163 and 164, Title 14, California Code of Regulations (CCR) for the Pacific Herring Fishery Management Plan implementing regulations concerning the commercial Pacific Herring Eggs on Kelp (HEOK) fishery. The attached Initial Statement of Reasons for Regulatory Action is provided in support of establishing the proposed regulations. The proposed amendments will cover permittee on board requirements, rinsing in the definition of processing, gear marking requirements, noise reduction measures, marine mammal deterrent devices, and weekend landings requirements.

Authorization of this request to publish notice will allow for discussion and possible adoption at the June 24-25, 2020 Commission meeting. The Department requests an effective date of October 1, 2020 for these regulations.

If you have any questions or need additional information, please contact Dr. Craig Shuman, Marine Regional Manager at (805) 568-1246. The public notice for this rulemaking should identify Environmental Scientist, Thomas Greiner, as the Department's point of contact for this rulemaking. His contact information is (707) 576-2876 or Tom.Greiner@wildlife.ca.gov.

Attachment: Initial Statement of Reasons for Regulatory Action

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

Kirsten Ramey, Program Manager
Marine Region
Kirsten.Ramey@wildlife.ca.gov

Melissa Miller-Henson
Executive Director
March 27, 2020
Page 2 of 2

Adam Frimodig, Sr Environmental Scientist
Marine Region
Adam.Frimodig@wildlife.ca.gov

Thomas Greiner, Environmental Scientist
Marine Region
Tom.Greiner@wildlife.ca.gov

Glenn Underwood, Assistant Branch Chief
License and Revenue Branch
Glenn.Underwood@wildlife.ca.gov

Stephen Hibel, Assistant Branch Chief
License and Revenue Branch
Stephen.Hibel@wildlife.ca.gov

Robert Puccinelli, Captain
Law Enforcement Division
Robert.Puccinelli@wildlife.ca.gov

Mary Loum, Staff Counsel
Office of General Counsel
Mary.Lou@wildlife.ca.gov

Michelle Selmon, Program Manager
Regulations Unit
Michelle.Selmon@wildlife.ca.gov

Mike Randall, Analyst
Regulations Unit
Mike.Randall@wildlife.ca.gov

State of California
Fish and Game Commission
Initial Statement of Reasons for Regulatory Action

Amend Sections 163 and 164
Title 14, California Code of Regulations
Re: Commercial Pacific Herring Eggs on Kelp

I. Date of Initial Statement of Reasons: March 27, 2020

II. Dates and Locations of Scheduled Hearings

(a) Notice Hearing

Date: April 15, 2020

Location: Sacramento, CA

(b) Discussion/Adoption Hearing

Date: June 24, 2020

Location: Santa Ana, CA

III. Description of Regulatory Action

(a) Statement of Specific Purpose of Regulatory Change and Factual Basis for Determining that Regulation Change is Reasonably Necessary

Unless otherwise specified, all section references in this document are to Title 14 of the California Code of Regulations (CCR).

At its October 10, 2019 meeting, the California Fish and Game Commission (Commission) adopted the California Pacific Herring Fishery Management Plan (Herring FMP) and implementing regulations, which included sections 163 and 164. Under those regulations, Pacific Herring (Herring) and Herring eggs on kelp (HEOK) may be taken for commercial purposes under a revocable permit. To fish HEOK, Giant Kelp, *Macrocystis spp.*, is suspended from rafts or cork lines in shallow areas for Herring to spawn upon. Rafts and cork lines are positioned in locations where Herring spawning is expected to occur. Suspended kelp is left in the water until egg coverage reaches a marketable amount or spawning has ended. The product of the HEOK fishery is the egg-coated kelp blades, which are processed, graded by quality, and exported to Japan. Giant Kelp is typically harvested off central California and then transported to San Francisco Bay.

During the Herring FMP and implementing regulations adoption process, the Department of Fish and Wildlife (Department) and Commission received feedback from the HEOK representative of the Director's Herring Advisory Committee (DHAC) on several new regulations proposed for the HEOK fishery. The Department agreed to review and consider changes to the Herring FMP implementing regulations that affect the HEOK fishery, and to consider a follow-up rulemaking effort to amend sections 163 and 164, in order to address concerns heard from the HEOK representative (see Section III(e) of this document). Proposed regulatory amendments to address these concerns were presented to the Commission's Marine Resources Committee meeting on November 5, 2019 by the Department and the HEOK representative. Establishing individual permit allocations of the total HEOK quota was among the changes initially considered. However, upon careful consideration and analysis of this potential change, the Department is not recommending that this change be adopted.

Instead, this change is presented here as an alternative to the proposed regulatory action, and is described below in Section IV of this document.

To understand the need for regulatory changes and evaluate the potential impacts of the proposed changes to sections 163 and 164, the Department's Marine Region staff have discussed the changes with the Law Enforcement Division, License and Revenue Branch, Commission staff, as well as with the HEOK representative. Using this information, the Department is proposing regulatory changes to include: 1) permittee on board requirements, 2) adding rinsing in the definition of processing, 3) gear marking requirements, 4) noise reduction measures, 5) marine mammal deterrent devices, and 6) weekend landings requirements. These proposed amendments to sections 163 and 164 reflect Department recommendations based on additional input from the HEOK representative. No changes are proposed to the Herring FMP itself, and of the Herring FMP implementing regulations adopted by the Commission in October 2019, only sections 163 and 164 are proposed for amendment as part of this follow-up rulemaking.

PROPOSED REGULATORY CHANGES FOR THE COMMERCIAL PACIFIC HERRING EGGS ON KELP FISHERY

- **Amend subsection 163(e)(3)(B), Proximity of Permittee or Authorized Agent to Harvesting, Processing, and Transporting of HEOK.**

Proposed Changes

The existing regulations, subsection 163(e)(3)(B), state that "The permittee or his/her authorized agent shall be aboard any vessel that is harvesting, processing or transporting herring eggs under the authority of the permit." This regulatory action would remove the requirement that the HEOK permittee or authorized agent be 'aboard any vessel' engaged in harvesting, processing, or transporting Herring eggs, and replace this with the requirement that the permittee or authorized agent be 'immediately present during' those activities.

The word "or" will also be removed and replaced with "and" within the list of activities that the permittee or authorized agent will be required to be immediately present during.

Necessity and Rationale

As stated by the HEOK representative (see Section III(e) of this document), much of the fishing activity in the HEOK fishery is not performed from a vessel, instead utilizing rafts and/or lines suspended from permanent structures like piers. Thus, this proposed change would make the regulation more appropriately capture and allow for how fishing is currently occurring in the HEOK fishery sector, and provide HEOK fishery participants with the ability to legally fish HEOK both on and off their registered vessel.

In order to ensure that the regulation is enforceable, the phrase "aboard any vessel" will be replaced with "immediately present". The terms "immediate" and "present" are used in other regulations within Title 14, CCR that affect commercial fishing, and thus the requirement for the HEOK permittee or authorized agent to be "immediately present" will be a familiar requirement to both HEOK fishery participants and the Department's law enforcement officers who will ensure compliance with this proposed regulation.

The replacing of “or” with “and” within the list of activities will clarify that the permittee or authorized agent is required to be immediately present during all listed activities (i.e. harvesting, processing, and transporting herring eggs).

- **Amend subsections 164(a) and (a)(1), Definition of “Fishing” for HEOK.**

Proposed Changes

The introduction to the definitions section (subsection 164(a)) is proposed for amendment to clarify that the definitions only apply to the HEOK fishery.

The definition of “Fishing” in subsection 164(a)(1) is proposed for amendment to include the period in which kelp is suspended in anticipation of harvesting, as well as itemize sub-items for clarity.

Necessity and Rationale

Existing regulations in subsection 164(a)(1) define “Fishing” as being limited to the acts of suspending kelp and harvesting. The proposed additional language will clarify that fishing is also occurring while kelp is suspended in anticipation of harvesting HEOK. The addition and itemization of subsections 164(a)(1)(A), (B), and (C) will ensure that the newly proposed definition of “fishing” is clear to the regulated public. This new definition of “fishing” is particularly important to the gear marking requirements set forth in subsections 164(d)(1)(E) and (F), which are also proposed for amendment as part of this rulemaking.

Due to concerns that the definition of “fishing” in Section 164 could be applied more broadly and impact other licensing requirements that regulate other fishing activities, it is necessary to clarify that the definitions in Section 164 only apply for the purposes of the HEOK fishery.

- **Amend subsection 164(a)(3) to Add “Rinsing” to Definition of Processing.**

Proposed Changes

The existing regulations state that “Processing” is the act of separating or removing kelp blades (with Herring eggs attached) from the stipe of harvested HEOK, trimming the product, brining, grading the product, and loading the processed blades into bins or totes. This proposed regulatory action would include ‘rinsing’ in the definition of Processing in subsection 164(a)(3).

Necessity and Rationale

As identified by the HEOK representative (see Section III(e) of this document), current regulations do not include “rinsing” in the definition of “Processing”. However, to ensure an acceptable high-quality and marketable product, HEOK must be rinsed prior to brining. Therefore, it is necessary to modify the definition of Processing to include rinsing to more accurately capture how processing should occur in the HEOK fishery.

- **Amend subsection 164(d)(1)(E), Light Marking Requirements.**

Proposed Changes

Amend language for light marking requirements in subsection 164(d)(1)(E) to apply only while lines are fishing HEOK, excluding the acts of suspending kelp and harvesting.

Necessity and Rationale

Regulations in subsection 164(a)(5) allow for a maximum of 1,200 ft of line per corkline, from which kelp may be suspended to fish HEOK. As current light marking requirements in subsection 164(d)(1)(E) could result in an unnecessary burden while assembling and disassembling the line during the acts of suspending kelp and harvesting HEOK product, it is necessary to clarify that the light marking requirement does not apply during suspension and harvesting. As a result of these proposed changes, light marking requirements will only be required in the period during which kelp is suspended in anticipation of harvesting (following the proposed amendment of the definition of “fishing” in the HEOK fishery in subsection 164(a)(1).

- **Amend subsection 164(d)(1)(F), Buoy Marking Requirements.**

Proposed Changes

Add language to subsection 164(d)(1)(f) to clarify the buoy marking requirement and that the Department registration number of the designated vessel is listed on the HEOK permit.

Necessity and Rationale

The current buoy marking requirement in subsection 164(d)(1)(f) is to indicate the “official number of the vessel from which such net is being fished” on suspended lines. This proposed change clarifies the “official number of the vessel” as the Department registration number for that vessel, and also clarifies that this is the vessel number designated by the permittee during renewal, and is listed on the HEOK permit. HEOK fishery participants will be familiar with this Department registration number, as it is the same number issued according to the existing process outlined in subsection 163(c)(6)(B). This change also eliminates the error of including the word “net” in a requirement specific to HEOK cork lines, and recognizes that fishing of these lines does not necessarily occur from just aboard a vessel.

The proposed language will also add the requirement that the identification of the Department registration number be legible on the buoy, in order to assist Department law enforcement officers in identification of fishing equipment ownership.

- **Amend subsection 164(f), Noise Rule.**

Proposed Changes

Remove “when fishing within 500 feet of any shoreline with residential dwellings, between the hours of 10:00 p.m. and 7:00 a.m. through implementation of noise reduction measures specified or developed by the herring fishing industry and approved by the Department. Noise reduction measures include but are not limited to: noise dampening devices for shakers and anchor chains, muffled engine exhaust systems, limited use of deck speakers, and/or reduced speed within 500 feet of shore” from subsection 164(f).

Necessity and Rationale

Historically, HEOK fishery participants held permits in the Herring sector (either as gill netters or seiners) and elected to transfer their permit to the HEOK fishery. A number of prior changes to those regulations that affect the HEOK and gill net fisheries were therefore designed to maintain parity between the gill net and HEOK sectors, but resulted in confusion in the regulations between these two fisheries. The Herring FMP implementing regulations adopted

by the Commission in October 2019 largely addressed this confusion, however the requirements concerning noise reduction measures listed in subsection 164(f) were identified by the HEOK representative as being applicable to the gill net fishery, and not the HEOK fishery. This proposed regulatory action would thus remove these non-applicable noise reduction measures currently listed in subsection 164(f), while continuing to require compliance with local ordinances.

- **Amend subsection 164(g), Use of Marine Mammal Deterrent Devices.**

Proposed Changes

In existing regulations, subsection 164(g) states “The use of explosives, seal bombs, or marine mammal deterrent devices in the HEOK sector is prohibited.” This proposed regulatory action would remove “marine mammal deterrent devices” from subsection 164(g), but keep the prohibition of “explosives” and “seal bombs”.

Necessity and Rationale

The proposed change will allow HEOK sector participants to take reasonable action to protect marketable product by discouraging seal and sea lion disturbance of HEOK gear and Herring spawning on that gear. The Department recognizes the concerns of HEOK fishery participants, and the request of the HEOK representative for the allowance of reasonable use of marine mammal deterrent devices such that suspended kelp is not destroyed and Herring are allowed to spawn without harassment by marine mammals. HEOK fishery participants would still be subject to any applicable local, state, and federal laws concerning marine mammal deterrence.

- **Amend subsection 164(h)(4), Reinstate Weekend Landings of HEOK Product.**

Proposed Changes

In existing regulations, subsection 164(h)(4) states “HEOK shall not be landed/off- loaded between the hours of 10:00 p.m. and 6:00 a.m. on weekdays, or from 10:00 p.m. Friday to 6:00 a.m. Monday”. This proposed regulatory action would remove language prohibiting weekend landings in subsection 164(h)(4).

Necessity and Rationale

Prior to the adoption of the Herring FMP and implementing regulations, the HEOK fishery was allowed to land product any day of the week. As part of the Herring FMP implementing regulations, the HEOK fishery was included in the weekend closure to improve the Department’s ability to track the catch relative to the quota and determine when the quota has been reached. However, this change was contested by the HEOK sector DHAC representative (see Section III(e) of this document), as the allowance to harvest and land HEOK on any day of the week, including weekends, is necessary to prevent deterioration and waste of otherwise marketable product. The proposed change to the regulatory language in subsection 164(h)(4) will retain the prohibition of landing/off-loading between the hours of 10:00 p.m. and 6:00 a.m., while allowing HEOK fishery participants to land/off-load HEOK any day of the week.

- **Other Amendments for Clarity.**

Proposed Changes and Rationale

Remove the date associated with Forms: DFW 1322-2 in subsections 163(c)(5)(B) and (C); DFW 1377 in subsections 163(c)(5)(B) and (d)(5)(C); and, DFW 1406 in subsections 163(c)(6)(A), (B), (C), (E), and (d)(5)(D). The current date of each form is indicated in Section 705, subsections (a) and (b). Future changes to these forms and dates will be incorporated by reference in Section 705, and this proposed regulatory change will remove the duplication of dates and avoid future public confusion over the correct version date of each form.

Within sections 163 and 164, the authority and reference citations to Fish and Game Code sections 8389 and 8550 will be removed. Per the Fishery Management Plan provisions of Fish and Game Code Section 7071, the adoption by the Commission in October 2019 of the Herring FMP implementing regulations made Fish and Game Code sections 8389 and 8550 inoperative, and thus they will be removed from sections 163 and 164.

(b) Goals and Benefits of the Regulation

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. The objectives of this policy include, but are not limited to, recognize the importance to the economy and the culture of California of sustainable sport and commercial fisheries and the development of commercial aquaculture consistent with marine living resource conservation policies, manage marine living resources on the basis of the best available scientific information and other relevant information that the Commission or Department possesses or receives, and to involve all interested parties, including, but not limited to, individuals from the sport and commercial fishing industries, aquaculture industries, coastal and ocean tourism and recreation industries, marine conservation organizations, local governments, marine scientists, and the public in marine living resource management decisions.

In consideration of the above policy, the implementation of these proposed changes to the existing HEOK regulations will support the viability of the fishery, help improve the quality of the product, and remove or update burdensome or unnecessary regulations that are not applicable to the HEOK fishing sector.

(c) Authority and Reference Sections from Fish and Game Code for Regulation

Section 163: Authority: Sections 7071 and 7078, Fish and Game Code.
Reference: Section 7071, Fish and Game Code.

Section 164: Authority: Sections 7071 and 7078, Fish and Game Code.
Reference: Section 7071, Fish and Game Code.

Per the Fishery Management Plan provisions of Fish and Game Code Section 7071, the adoption by the Commission in October 2019 of the Herring FMP implementing regulations made Fish and Game Code sections 8389 and 8550 inoperative.

(d) Specific Technology or Equipment Required by Regulatory Change

None.

(e) Identification of Reports or Documents Supporting Regulation Change

Appendix S: Public Comments Received, Responses, and Changes to the Draft California Pacific Herring Fishery Management Plan, November 2019

Appendix S of the Herring FMP includes comments made by the HEOK representative to the DHAC regarding these proposed changes along with the reasonable alternatives outlined in section IV of this initial statement of reasons. The specific comments from the HEOK representative are displayed on pages S-18 to S-20 of Appendix S.

(f) Public Discussions of Proposed Regulations Prior to Notice Publication

The proposed regulatory changes were discussed at the October 10, 2019 Commission meeting, and at the Commission's Marine Resources Committee meeting on November 5, 2019. The 45-day public comment period will provide additional time for public review of the proposed amendments.

IV. Description of Reasonable Alternatives to Regulatory Action

(a) Alternatives to Regulation Change

The discussion of alternatives in this document will focus on feasible HEOK management actions that could be modified to either improve HEOK fisheries management or the economics of the participants in the fishery.

- **Amend subsections 163(c)(4)(B), 163(c)(6)(B), 164(h)(6) and add new subsection 163(e)(3)(C), Reinstate individual HEOK permit quotas.**

The existing regulation of subsection 163(c)(4)(B) states that no more than one HEOK permit may be held per permittee, and there is no allocation of any HEOK quota established pursuant to Section 55.02 to individual permittees, effectively giving participants equal access to the quota for this sector of the commercial fishery. This proposed alternative would establish permit allocations by increasing the number of HEOK permits that may be held per permittee to two in subsection 163(c)(4)(B), allowing up to four permits to be fished at a time per vessel in subsection 163(c)(6)(B), allocating the total HEOK quota among permittees in new subsection 163(e)(3)(C), and adjusting 'product landed in excess' language in subsection 164(h)(6).

The Herring FMP and implementing regulations, which were adopted by the Commission in October 2019, eliminated individual permit quotas in the HEOK sector as part of a larger overhaul of the permitting system in the commercial Herring fishery, one of the stated goals of the Herring FMP. This overhauled permitting system streamlines permitting, gear requirements, and management of the fishery, as well as standardizes and clarifies regulatory language. It also ensures that commercial Herring regulations are consistent with those used in other fisheries in California, and that permit fees paid by HEOK-sector participants are consistent with those paid by gill net-sector participants. Additionally, subsection 55.02(d) of the Herring FMP implementing regulations gives the Director of the Department authority to set annual quotas for all fishery sectors, including HEOK. This section of the Herring FMP implementing regulations rendered Fish and Game Code sections 8389 and 8550, which had authorized the Commission to prescribe commercial Herring regulations, permits, and set quotas, inoperative.

The Department does not recommend that this alternative be adopted, as it would re-introduce regulations that were eliminated during the permit overhaul with the express purpose of implementing goals of the Herring FMP. Additionally, adoption of this alternative would require reassessment of permit fees in the HEOK sector, could restrict potential participants from

achieving equal access to any quotas established for this sector, and may be difficult to enforce without further changes to gear marking requirements.

(b) No Change Alternative

Under the “No Change” alternative, the Herring FMP implementing regulations in sections 163 and 164 related to the HEOK fishery would not be modified. As a result, HEOK fishery participants would still be required to comply with the burdensome and unnecessary regulations that have been identified in this document and proposed for change.

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, as the proposed regulatory changes are intended to simply provide clarification to accommodate HEOK permittee requests. The proposed regulations will support the viability of the fishery, help improve the quality of the product, and remove or update burdensome or unnecessary regulations that are not applicable to the HEOK fishing sector.

(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 impact on the creation or elimination of jobs, the creation of new businesses, the elimination of existing businesses or the expansion of businesses in California. The Commission also does not anticipate any benefits to the health and welfare of California residents or worker safety. The proposed regulatory changes are intended to simply provide clarification to accommodate HEOK permittee requests. The proposed regulations will support the viability of the fishery, help improve the quality of the product, and remove or update burdensome or unnecessary regulations that are not applicable to the HEOK fishing sector.

The Commission anticipates some benefit to the state’s environment through the sustainable management of herring egg harvest and of kelp forest habitats to foster and support a diverse balance of species.

(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 impacts on the creation or elimination of jobs within the state because the proposed regulatory changes are intended to provide clarification to accommodate HEOK permittee requests and are not anticipated to induce substantial, long-term changes in the demand for labor.

(b) Effects of the Regulation on the Creation of New Businesses or the Elimination of Existing Businesses Within the State

The Commission does not anticipate any new businesses, or elimination of existing businesses, because the proposed regulation is not likely to substantially increase or decrease herring egg harvest within California.

(c) Effects of the Regulation on the Expansion of Businesses Currently Doing Business Within the State

The Commission does not anticipate any effects substantial enough to induce the expansion of businesses currently doing business in the state.

(d) Benefits of the Regulation to the Health and Welfare of California Residents

The Commission does not anticipate benefits to the health and welfare of California residents as the proposed regulatory changes do not affect existing health and welfare conditions.

(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 Commission anticipates some benefit to the state's environment through the sustainable management of herring egg harvest and of kelp forest habitats to foster and support a diverse balance of species.

Informative Digest/Policy Statement Overview

At its October 10, 2019 meeting, the California Fish and Game Commission (Commission) adopted the California Pacific Herring Fishery Management Plan (Herring FMP) and implementing regulations, which included sections 163 and 164, Title 14, California Code of Regulations (CCR). Under those regulations, Pacific Herring (Herring) and Herring eggs on kelp (HEOK) may be taken for commercial purposes under a revocable permit, subject to such regulations as the Commission shall prescribe. Current regulations in sections 163 and 164, Title 14, CCR specify the number of permits that may be held by an individual, fishing areas, seasons, gear restrictions, and notification requirements for the HEOK fishery.

In response to permittee feedback on the HEOK regulations set forth in sections 163 and 164, Title 14, CCR, the Department of Fish and Wildlife (Department) is proposing several regulatory changes with the intent of providing for the efficient harvest and orderly conduct of the HEOK fishery. These proposed regulatory changes include 1) permittee on board requirements, 2) adding rinsing in the definition of processing, 3) gear marking requirements, 4) noise reduction measures, 5) marine mammal deterrent devices, and 6) weekend landings requirements. No changes are proposed to the Herring FMP itself, and of the Herring FMP implementing regulations adopted by the Commission in October 2019, only sections 163 and 164, Title 14, CCR are proposed for amendment.

The following is a summary of the changes proposed for sections 163 and 164, Title 14, CCR:

1. Amend subsection 163(e)(3)(B) to modify language regarding the requirement of a permittee or authorized agent to be aboard any vessel engaged in fishing HEOK by changing the requirement to 'immediately present during' while harvesting, processing or transporting HEOK.
2. Amend subsection 164(a) to modify language to clarify that the definitions in this section apply only to the HEOK fishery.
3. Amend subsection 164(a)(1) to add "the period during which kelp is suspended in anticipation of harvesting" to the definition of fishing, as well as itemize subsections of the definition for clarity.
4. Amend subsection 164(a)(3) to add "rinsing" to the definition of processing.
5. Amend subsection 164(d)(1)(E) to modify light marking requirements so they only apply while lines are fishing, exclusive of suspending and harvesting kelp.
6. Amend subsection 164(d)(1)(F) to add language to clarify the buoy marking requirement and that the Department registration number of the designated vessel is listed on the HEOK permit.
7. Amend subsection 164(f) to modify language regarding the noise reduction rule by eliminating language that applies to gill net gear.
8. Amend subsection 164(g) to remove "marine mammal deterrent devices", thus allowing for reasonable action by HEOK permittees to protect marketable product.
9. Amend subsection 164(h)(4) to reinstate weekend landings of HEOK product.

Editorial changes are also proposed to sections 163 and 164, Title 14, CCR, to remove the dates associated with forms DFW 1322-2, DFW 1377, and DFW 1406, as the current date of each form is already indicated in Section 705, Title 14 CCR.

Additionally, the authority and reference citations in sections 163 and 164, Title 14, CCR will be updated to remove Fish and Game Code sections 8389 and 8550, which became inoperative following the Commission's adoption in October 2019 of the Herring FMP (per Fish and Game Code Section 7071).

Benefits of the Proposed Regulations

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. The objectives of this policy include, but are not limited to, recognize the importance to the economy and the culture of California of sustainable sport and commercial fisheries and the development of commercial aquaculture consistent with marine living resource conservation policies, manage marine living resources on the basis of the best available scientific information and other relevant information that the Commission or Department possesses or receives, and to involve all interested parties, including, but not limited to, individuals from the sport and commercial fishing industries, aquaculture industries, coastal and ocean tourism and recreation industries, marine conservation organizations, local governments, marine scientists, and the public in marine living resource management decisions.

In consideration of the above policy, the proposed regulatory action will benefit fishermen, processors, and the State's economy in the form of a healthy sustainable fishery, future harvestable Herring populations, and the removal of burdensome or unnecessary regulations that are not applicable to the HEOK fishing sector.

Consistency and Compatibility with Existing Regulations

The proposed regulations are neither inconsistent nor incompatible with existing State regulations. Section 20, Article IV, of the State Constitution specifies that the Legislature may delegate to the Commission such powers relating to the protection and propagation of fish and game as the Legislature sees fit. The Legislature has delegated to the Commission the power to regulate the commercial take of Herring (Fish and Game Code Section 8550), and the power to adopt fishery management plan implementing regulations (Fish and Game Code sections 7071 and 7078). No other State agency has the authority to promulgate regulations concerning commercial take of Herring and fishery management plan implementation. 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 the commercial take of Herring and fishery management plan implementation.

Proposed Regulatory Language

Section 163, Title 14, CCR, is hereby amended as follows:

§ 163. Pacific Herring Permits.

. . . [No changes to subsections (a) and (b)]

(c) Permit Renewal.

(1) Each herring and HEOK permit is required to be renewed annually pursuant to Fish and Game Code § 7858 and shall only be valid for that season.

(2) An applicant is eligible to renew a herring permit of the same classification if they meet all of the following requirements:

(A) Hold a current California commercial fishing license.

(B) Have held a valid, unrevoked herring permit in the immediately preceding permit year (April 1-March 31).

(C) Have submitted a Release of Property form FG MR 674 (Rev. 5/13), which is incorporated by reference herein, and payment for all herring landed in excess of the established quota as specified in subsection 163.1(j) or subsection 164(h) of these regulations, and all fees from prior seasons.

(3) Applicants for renewal will be issued the same class of permit they held during the previous season, unless they hold two Temporary permits. Applicants who hold two Temporary permits will be issued a San Francisco Bay Herring permit.

(4) Number of permits issued.

(A) San Francisco Bay herring permits, Tomales Bay herring permits, Humboldt Bay herring permits, and Crescent City herring permits: No more than one permit will be issued to each applicant.

(B) HEOK permits: No more than one permit will be issued to each applicant.

(5) Herring permit renewals:

(A) Herring permits are renewed by submitting the completed form Commercial Herring Permit Worksheet DFW 1377 with the specified fee, as set forth in subsection 705(a) of these regulations.

(B) Permittees must designate a currently registered vessel on the form DFW 1377 ~~(NEW 10/30/19)~~. Up to two Temporary permits or one permit of any other classification of herring permit may be assigned to a single vessel. Two Temporary permits held by different permittees may be jointly fished on a single vessel upon submission of the completed form Season Request for Changes to Herring Permits DFW 1322-2 ~~(NEW 4/11/19)~~ specified in subsection 705(b) to the department. No permit shall be valid for more than one vessel at a time.

(C) A change in a permit's vessel designation may be authorized by the department upon application by the permittee using form DFW 1322-2 ~~(NEW 4/11/19)~~, and payment of the fee, as specified in subsection 705(b) of these regulations. The fee for any approved boat transfer pursuant to this paragraph must be submitted with the form DFW 1322-2 ~~(NEW 4/11/19)~~ to the department's License and Revenue Branch, Sacramento. Any permittee denied a boat transfer pursuant to this paragraph may submit an appeal in writing to the commission within 60 days of such denial to show cause why his or her request should not be denied. The written appeal shall specifically identify the legal and factual grounds for challenging the department's action. The commission shall forward to the department a copy of all materials received from the applicant. The Department shall respond in writing within 60 days of receipt of materials.

(6) HEOK permit renewals:

(A) HEOK permits are renewed by submitting the form Herring-Eggs-on-Kelp Permit Application DFW 1406 ~~(NEW 10/30/19)~~ with the specified fee, as set forth in subsection 705(a) of these regulations.

(B) The permittee shall receive written approval from the department before using a vessel for harvesting, processing or transporting HEOK. The permittee shall list the name and department

registration number issued pursuant to Section 7881 of the Fish and Game Code of any vessel that will be used for harvesting, processing or transporting HEOK under the authority of the permit on the form DFW 1406 (~~NEW 10/30/19~~).

(C) Each HEOK permittee may designate two authorized agents to operate under his or her permit on the application form DFW 1406 (~~NEW 10/30/19~~). A copy of the current California commercial fishing license for each authorized agent shall be submitted with form DFW 1406. Any person designated as an authorized agent shall act as an authorized agent only after the permittee has received written approval from the department.

(D) An authorized agent:

1. May serve in the place of the permittee for all fishery activities requiring the presence or action of the permittee, including the signing of electronic fish tickets and/or dock tickets;
2. May serve as an authorized agent on up to two permits.

(E) A permittee may replace an authorized agent by submitting a new application form DFW 1406 (~~NEW 10/30/19~~) as specified in subsection 705(a), to the department's License and Revenue Branch, Sacramento.

(7) For the 2020 license year, applications for renewal of herring permits must be received by the department or, if mailed, postmarked no later than May 31, 2020. Beginning in 2021, applications for renewal of herring permits must be received by the department or, if mailed, postmarked no later than April 30 of each year.

(8) Late fees and late fee deadlines are specified in Section 7852.2 of the Fish and Game Code.

(9) Any person denied a permit under this section may submit an appeal in writing to the commission to show cause why his/her permit request should not be denied. The written appeal shall specifically identify the legal and factual grounds for challenging the department's action. Such request must be received by the commission within 60 days of the department's denial. The commission shall forward to the department a copy of all materials received from the applicant. The Department shall respond in writing within 60 days of receipt of materials and shall further process all appeals pursuant to the procedure outlined in 14 CCR 671.1(c)(7)(C)-(I).

(d) Applications for New Permits.

(1) Herring Permits

(A) No new San Francisco Bay herring permits shall be issued until the number of San Francisco Bay herring permits held is less than 30.

(B) No new Tomales Bay herring permits shall be issued until the number of Tomales Bay herring permits held is less than 15.

(C) No new Humboldt Bay herring permits shall be issued until the number of Humboldt Bay herring permits held is less than four (4).

(D) No new Crescent City herring permits shall be issued until the number of Crescent City herring permits held is less than three (3).

(2) HEOK permits

(A) No new HEOK permits shall be issued until the number of HEOK permits held is less than ten (10).

(3) Applications for new herring and HEOK permits shall be made available each year on April 15 through the department's Automated License Data System at department license sales offices, the department's Internet Sales site and at retail License Agents authorized to sell commercial fishing licenses.

(4) Application Requirements

(A) Applicants shall apply by May 31 of each year.

(B) Applicants shall pay the appropriate nonrefundable Drawing Fee as specified in Section 705(a).

(C) Applicants shall possess a Commercial Fishing License valid at the time of application.

(D) Applicants for new HEOK permits shall not currently possess an HEOK permit.

(E) Applicants for new herring permits shall not currently possess a herring permit and must specify the area for the permit they are requesting.

(F) Applicants shall not submit more than one HEOK drawing application for the same license year.

(G) Applicants shall not submit more than one herring drawing application for the same license year.

(H) Each applicant who applies shall receive a "drawing receipt" printed from the terminal or downloaded from the Internet. The receipt shall contain the customer's name and permanent identification number, and proof of entry into drawing.

(5) Permit Random Selection Process.

(A) Random selection using computer generated random numbers will be used to determine which applicants will be awarded permits and which applicants will be alternates. Successful applicants and a list of alternates shall be determined within 20 business days following the application deadline date. If the drawing is delayed due to circumstances beyond the department's control, the department shall conduct the drawing at the earliest date possible.

(B) Successful applicants will be notified as soon as practical.

(C) Successful herring permit applicants shall submit the completed form Commercial Herring Permit Worksheet DFW 1377 (~~NEW 10/30/19~~) with the specified fee, as set forth in subsection 705(a) of these regulations by July 15.

(D) Successful HEOK Permit applicants shall submit the completed Herring-Eggs-On-Kelp Permit Application DFW 1406 (~~NEW 10/30/19~~) with the specified fee, as set forth in Section 705(a), per the instructions on the Application by July 15.

(E) Should permits still be available after that June 30, the alternate list shall be used to award any available permits.

(e) Conditions of the Permit.

(1) Herring may be taken for commercial purposes only in those areas and by those methods specified in Section 163.1 (for herring) or 164 (for HEOK) under a revocable permit issued by the department to an individual for use on a specified fishing vessel.

(2) Herring permits:

(A) A permittee may have any licensed commercial fisherman serve in his or her place on the designated vessel and engage in fishing, provided the permit is aboard the vessel named on the permit(s) at all times during herring fishing operations.

(3) HEOK permits:

(A) A department-issued copy of the permit shall be aboard each vessel engaged in fishing, harvesting, processing, or transporting HEOK under the authority of the permit.

(B) The permittee or his/her authorized agent shall be ~~aboard any vessel that is~~ immediately present during harvesting, processing, or and transporting herring eggs under the authority of the permit. The permit shall list the names of all authorized agents and all vessels used for harvesting, processing or transporting herring eggs under the authority of the permit (This includes the attachment of any changes approved by the department after the permit is issued).

. . . [No changes to (f) through (i)]

Note: Authority cited: Sections 7071 ~~and~~, 7078, ~~8389, and 8550~~, Fish and Game Code. Reference: Sections ~~7071, 8389, and 8550~~, Fish and Game Code.

Proposed Regulatory Language

Section 164, Title 14, CCR, is hereby amended as follows:

§ 164. Harvest of Herring Eggs on Kelp.

(a) Definitions. Herring Eggs on Kelp (HEOK) may only be taken by harvesting giant kelp (*Macrocystis* spp.), with spawn (i.e., eggs) attached, which has been artificially suspended using the following two (2) methods: rafts and/or lines, a technique commonly known as the “open pound” method. ~~Unless the context requires otherwise~~ For the purposes of the HEOK fishery only, the following definitions shall apply ~~to the HEOK fishery~~:

(1) “Fishing” ~~means~~ means:

(A) the act of suspending giant kelp (*Macrocystis* spp.) for the purposes of taking herring eggs, eggs;

(B) the period during which kelp is suspended in anticipation of harvesting; and/or

(C) harvesting.

(2) “Harvesting” means the act of removing HEOK from the water for the purposes of processing for sale and/or transport to market.

(3) “Processing” means the act of separating or removing kelp blades (with herring eggs attached) from the stipe of harvested HEOK, trimming the product, rinsing, brining, grading the product, and loading the processed blades into bins or totes.

(4) A raft is defined as a temporary, mobile structure with a metal, wood or plastic frame. The total surface area of each raft is not to exceed 2,500 square feet.

(5) A line is defined as a piece of line of no more than 1,200 feet in overall length that is suspended under a suitable permanent structure (e.g., pier or dock), or between two permanent structures (e.g., piers or docks).

. . . [No changes to subsections (b) and (c)]

(d) Gear Requirements.

(1) Not more than two (2) rafts and/or two (2) lines may be used per permit.

(A) Each raft shall have a light at each corner that may be seen for at least a distance of 100 yards.

(B) Each raft shall be further identified with the fishing vessel number the HEOK permit has been assigned to in Roman alphabet letters and Arabic numerals at least 14 inches high and 2 inches wide, painted on a white background and permanently affixed to the raft.

(C) Kelp lines shall have floats or cork over the entire length of line.

(D) If kelp lines are suspended under a permanent structure (e.g., pier or dock), or if a raft is tied up to a permanent structure (e.g., pier, dock or rock wall, natural stationary shoreline structures), the permittee shall obtain prior written approval from the appropriate owners or controlling agency (e.g., wharfinger, Coast Guard, Navy or private owner). Buoys are not permanent structures.

(E) Lines shall be marked at the beginning and the end while fishing, excluding suspending kelp and harvesting, with a light that may be seen for at least a distance of 100 yards.

(F) Each line shall be further identified at each end with a contrasting-colored buoy displaying above its waterline, in legible Roman alphabet letters and Arabic numerals at least 2 inches high, ~~the official number of the vessel from which such net is being fished~~ the department registration number of the designated fishing vessel listed on the HEOK permit.

. . . [No changes to subsection (e)]

(f) Noise. All permittees, authorized agents, vessel operators, crew, or employees shall recognize city ordinances governing transient noise sources, ~~when fishing within 500 feet of any shoreline with~~

~~residential dwellings, between the hours of 10:00 p.m. and 7:00 a.m. through implementation of noise reduction measures specified or developed by the herring fishing industry and approved by the department. Noise reduction measures include, but are not limited to: noise dampening devices for shakers and anchor chains, muffled engine exhaust systems, limited use of deck speakers, and/or reduced speed within 500 feet of shore.~~

(g) Marine Mammals. The use of ~~explosives, explosives and /or~~ seal bombs, ~~or marine mammal deterrent devices~~ in the HEOK sector is prohibited.

(h) Landing Requirements

(1) For the purposes of this section, all portions of the kelp blade, including all trimmed-off portions (trim), shall be considered part of the harvested product and included in the total weight of HEOK. The stipe and pneumatocyst shall not be considered a part of the harvested product; therefore, the weight of the stipe and pneumatocyst shall not be considered in determining the total weight of HEOK.

(2) All bins or totes shall be permanently marked with individualized serial numbers, beginning with the prefix CA, and predetermined tare weights (including lids). The serial number and predetermined tare weight shall be permanently marked in letters and numerals at least 3 inches high on each side of the bin or tote.

(3) Filled bins or totes shall be weighed when landed on-shore, or before they are moved from the premises if processing takes place on-shore.

(4) HEOK shall not be landed/off-loaded between the hours of 10:00 p.m. and 6:00 a.m. ~~on weekdays, or from 10:00 p.m. Friday to 6:00 a.m. Monday.~~

(5) Any HEOK taken for commercial purposes shall only be delivered to a person having a Herring Buyer's Permit pursuant to subsection 163.5(a) of these regulations.

(6) All HEOK landed in excess of any quota established in accordance with Section 55.02(d) of these regulations shall be forfeited to the department by the signing of a Release of Property form MR-FG-674 (REV. 5/13), as set forth in subsection 163(c). Such excess of HEOK shall be sold or disposed of, and the proceeds from all such sales shall be paid into the Fish and Game Preservation Fund.

. . . [No changes to subsection (i)]

Note: Authority cited: Sections 7071 and, 7078, ~~8389, and 8550~~, Fish and Game Code. Reference: Sections ~~7071, 8389, and 8550~~, Fish and Game Code.

Appendix S Public Comments Received, Responses, and Changes to the Draft California Pacific Herring Fishery Management Plan

The Draft California Pacific Herring Fishery Management Plan (Draft Herring FMP) was received by the California Fish and Game Commission (Commission) at their June 2019 meeting. This appendix presents summaries of public comments received by the Commission on the Draft Herring FMP during the public comment period, and California Department of Fish and Wildlife (Department) responses indicating how public comments were addressed (Table S-1). This appendix also summarizes all changes to the Draft Herring FMP (Table S-2), which includes corrections to minor errors, as well as changes made in response to public comments received.

The Final Draft Herring FMP was received by the Commission for adoption at its October 2019 meeting; additional changes as adopted by the Commission in response to public comments, and corrections to minor errors, are included in this appendix and summarized in Table S-3.

Table S-1. Summary of public comments received on the Draft Herring FMP and Implementing Regulations, and Department responses.

Commenter Number	Commenter Name, Organization If Applicable, Comment Format, and Date	Herring FMP Section or New Title 14, CCR (Implementing Regulations) Section Referenced	Comment Summary	Response
1	Edward Zeng Recreational Participant Email dated 6/18/2019	FMP Section 7.8.7; Title 14, CCR §28.62	1-a. The Herring FMP proposes a daily limit of 100 lb. For reasons stated in email (missing spawn windows, health of Herring consumption, low gear requirement for recreational Herring take, low overall recreational catches), Mr. Zeng requests that the daily bag limit be raised to a minimum of 300 lbs.	There are not adequate data available to assess the magnitude of recreational Herring catches, so it is unknown if overall recreational Herring catches are low. The daily limit of 10 gallons was chosen to allow for a satisfying recreational experience for individuals while ensuring that total Herring harvest remains sustainable.
2	Hua Bai Recreational Participant Email dated 6/18/2019	FMP Section 7.8.7; Title 14, CCR §28.62	2-a. Although a recreational limit is useful to prevent excess take, it is not practical to require recreational participants to have a scale that can weigh 100 lbs., as this requires purchase of extra equipment. An easier rule could be a big cooler full of Herring. Cooler can be sized so it is around 100lb to 200lb. This limit is easy to implement by all parties.	The daily bag limit of ten gallons is equivalent to two 5-gallon buckets, which are commonly owned pieces of equipment that allow participants and enforcement to assess compliance without having to weigh the Herring.
3	Charlie Zhao Recreational Participant Email dated 6/22/2019	FMP Section 7.8.7; Title 14, CCR §28.62	3-a. Because recreational take depends on targeting an ongoing spawning event, this type of fishing is typically a once-per-year opportunity. Mr. Zhao typically tries to take an entire year's worth of fish in a single trip (roughly equal to two 27-gal containers from Costco, for one-gallon zip lock bag consumption weekly for family all year). Even if people are commercializing recreational catch illegally, it does not affect ability of other recreational fishers to catch what they need. Mr. Zhao believes Herring are abundant, and that the commercial fishery takes much more, and has greater impact on population, than	The ten-gallon bag limit presented in implementing regulations is in line with the Department's goal of maintaining a satisfying recreational experience for participants. Recreational fishing limits are not intended to supply participants with a weekly food source throughout the year.

			recreational take. There should not be a limit on rec take, and if there must be one, it should be set in volume for ease of measurement in field. Proposes 50 gallons as a reasonable limit if we must have one.	
3	Charlie Zhao (Continued)	FMP Section 7.8.7; Title 14, CCR §28.62	3-b. Setting a recreational limit on Herring disproportionately affects minorities because of much higher consumption of Herring among certain minority groups. As health care becomes more and more expensive and drags on the economy, Herring consumption should be encouraged instead of limited.	The Department is responsible for protecting the long-term sustainability of the Herring resource, to the extent possible, and to ensure that all of California's recreational participants can benefit from this resource for many years to come.
4	Alastair Bland Recreational Participant Email dated 7/4/2019	FMP Section 7.8.7; Title 14, CCR §28.62	4-a. Concerned about proposal to limit recreational participants to two 5-gallon buckets or less per day. Four 5-gallon bucket (~150 lb) would be more reasonable than two buckets. A four-bucket limit would eliminate gross overtake, would remove incentive to illegally sell recreationally caught fish, would allow recreational participants to catch all that's needed for a year (share w/ family and friends) during a single spawn event. The Herring FMP's claim that recreational stakeholders expressed interest in 2-bucket limit misconstrues context of statement at 2018 Public Outreach meeting w/ stakeholders in Sausalito. Mr. Bland finds it personally offensive that commercial participants have called for tight limits on recreational catch, given that commercial fishery takes a far greater amount of Herring and sells for non-consumptive use, than recreational participants, who mostly eat their catch.	This limit allows recreational participants to take up to ten gallons (approximately 100 pounds or 520 fish) per person. Families that would like to retain a greater number of fish are able to have more people participate in fishing. All comments at the 2018 Sausalito meeting were recorded in order to accurately capture stakeholder feedback.
4	Alastair Bland Second email dated 7/5/2019	FMP Section 7.8.7; Title 14, CCR §28.62	4-b. Second comment letter further stressing that the Herring FMP's assertion that feedback from recreational sector informed proposed limit is essentially an overstatement.	Stakeholder feedback is an important part of the Herring FMP development process. All comments at the 2018 Sausalito meeting were recorded in order to accurately capture stakeholder feedback. Stakeholder support for the Department's proposed limit was expressed at this meeting and in follow up correspondence, in addition to some feedback that the limit should be higher.

5	John Vogel Recreational Participant Email dated 7/23/2019	FMP Section 7.8.7; Title 14, CCR §28.62	5-a. The proposed limit for recreational Herring harvest is too low. Recreational Herring is a unique fishery with opportunity to catch only once or twice a year. He understands the need to prevent over harvest, but is not aware of a significant number of recreational participants harvesting huge quantities for illicit commercialization or waste. Wants a five 5-gallon bucket as a limit.	The limit for recreational take allows participants to take up to ten gallons (approximately 100 pounds, or 520 fish) per person. Families that would like to maximize the amount of fish they take legally may choose to have more family members participate in fishing. While the Department understands that, due to the pulse nature of spawning events, there may be limited fishing opportunities in a season, this limit is designed to balance providing a satisfying recreational experience with the needs of the resource.
6	Bradley S. Cain Recreational Participant Email dated 7/24/2019	FMP Section 7.8.7; Title 14, CCR §28.62	6-a. Displeased with 1 bucket limit for recreational take of Herring. 4 or 5-bucket limit is more reasonable. Spawning is unpredictable in nature and it is difficult for rec fishers to get to an active spawning event. Sometimes miss spawns entirely. When a decent spawn event can be effectively targeted, currently take enough to stock freezer for entire year's use (consumption and bait). One bucket would not allow this as it wouldn't last a year. Additionally, 1 bucket limit is overly restrictive given volume of commercial catch annually. Rec fishers do not impact fishery, unlike commercial. Please reconsider and adopt a limit of no less than 4 buckets per day.	The limit for the recreational Herring fishery is not designed to supply participants with a year-long supply of either bait or daily food. The goal of this limit is to sustainably manage the resource, which can experience intense recreational fishing pressure during nearshore spawning events, while allowing fishers a satisfying recreational experience. The proposed limit takes into consideration the needs of the Pacific Herring resource as well as that of both the commercial and recreational sectors.
7	Kirk Lombard Recreational Participant, Blogger and Author, Fishmonger Email dated 7/24/2019	FMP Section 7.8.7; Title 14, CCR §28.62	7-a. The proposed recreational limit range goes too far. Supports limits in general. A zero-bucket limit is an overreaction. Makes six points about recreational take of Herring, including limited number of days they are accessible from shore, and that most people only take a few buckets during spawns (problem of over harvest stems from a few bad apples). Mr. Lombard contrasts recreational take with commercial gillnet take (recreationally-caught fish are eaten locally, gillnet catch is exported) emphasizing local benefit of recreational take and poor quality of gillnet-acquired fish for eating. He points out high utilization by Asian Americans and high level of complaint from non-Asian Americans	While the Department understands that Herring are only available during a few nearshore spawning events, those events can experience intensive recreational pressure, with hundreds of participants targeting Herring. The limit is designed to allow participants a satisfying recreational experience while limiting the impacts of harvest on the schools that spawn in these nearshore areas.

			and commercial fishermen. Mr. Lombard suggests that one bucket only seems like a large quantity to individuals who do not fish for Herring, since a single bucket only lasts 3 months, and emphasizes the healthy aspects of eating low-on-the-food chain species caught locally.	
7	Kirk Lombard (Continued)	FMP Section 7.8.7; Title 14, CCR §28.62	7-b. Prefers for the lower end of recreational Herring limit range be two 5-gallon buckets, if not 3-4.	At the FMP adoption meeting on October 10, 2019, the Fish and Game Commission selected a ten-gallon recreational bag limit from the 0-10 gallon range provided by the Department. Additionally, language in the FMP referring to a specific bag limit range has been removed.
8	Russell Johnston Marine Science Institute, UC Santa Barbara Email dated 7/25/2019	FMP General	8-a. General support for adoption pending specific listed changes.	The Department appreciates support for the Herring FMP and has responded to comments received as appropriate.
8	Russell Johnston (Continued)	FMP Appendices	8-b. Provide all appendices as part of FMP and organize so as to be readily navigated by the public.	Appropriate page numbering has been applied and all appendices are included in in the Final Herring FMP. Pending adoption, for ease of download, the FMP body and appendices will be made available separately.
8	Russell Johnston (Continued)	FMP Section 2.13.2.3, Appendix D	8-c. Include Humboldt Bay spawn areas in maps of spawn areas depicted in Chapter 2 and Appendix D.	Habitat maps for management areas where no commercial activity occurs at the time of Herring FMP development are presented in Appendix D. However, the Humboldt Bay map in the Draft Herring FMP Appendix D did not include spawn areas. Detailed maps of recent observed spawning locations are available for Humboldt Bay and have been be included in the Final Herring FMP. Section 2.13.2.3 has been edited to refer the reader to Appendix D for Humboldt Bay spawn areas.
8	Russell Johnston	FMP	8-d. Present all FMP goals equally, including compliance with forage species policy and incorporation of ecosystem indicators.	The primary management goals outlined in the Herring FMP are those described in the MLMA, which provides the legal framework for fisheries

	(Continued)	Executive Summary, General		management in California. For this reason, these goals are given primacy in the Herring FMP. However, the Commission's forage species policy also played an important role in the development of the FMP objectives, as described in the Herring FMP.
9	Nick Sohrakoff Commercial Participant, Director's Herring Advisory Committee President, FMP Steering Committee Member Email dated 7/29/2019	FMP Section 4.7.2	9-a. The SFBHRA (San Francisco Bay Herring Research Association) did not file a lawsuit. The lawsuit in referenced was filed by the SFHA (San Francisco Herring Association). Please correct the draft changing SFBHRA to SFHA to reflect the proper entity that filed the lawsuit.	This error has been corrected in the Final Herring FMP.
9	Nick Sohrakoff Oral Comment w/ Anna W. (Commenter 10) at FGC Meeting 8/8/2019	FMP General	9-b. General expression of support – DHAC supported FMP 12 years ago, SC was a successful collaborative effort, would like to fund a genetic study with Audubon for stocks in CA and southern Oregon.	The Herring FMP was the result of a great deal of work by many different stakeholders, and the Department hopes to continue future collaborations to benefit the resource.
10	Geoff Shester , Oceana and FMP Steering Committee; Anna Weinstein , Audubon California and FMP Steering	FMP Appendices	10-a. Appendix R is currently missing from the FMP due to an error. Based on an agreement by the Steering Committee, this Appendix was intended to describe an increased range of catch limit adjustments resulting from ecosystem considerations that the Department may use as scientific information improves, without an FMP amendment. We request that Appendix R be included in the FMP and that the public be afforded the opportunity to review and provide	Appendix R was drafted, but omitted from the Draft Herring FMP in error. Appendix R was included in an updated Draft FMP that was made available for public viewing and comment, and is included in the Final Herring FMP. Appendix R contains information on the development of the Harvest Control Rule framework, as well as guidance for amending the decision tree as the field of ecosystem-based fishery management develops. Any increase in the bounds on ecosystem-based

	<p>Committee; Irene Gutierrez, NRDC; Greg Helms, Ocean Conservancy; Andrea Treece, Earthjustice; Paul Shively, Pew Charitable Trusts</p> <p>Letter dated 7/25/2019 (NGO Letter)</p>		<p>comments on its contents prior to final adoption of the FMP.</p>	<p>quota adjustment beyond those indicated in Chapter 7 (Figure 7-3) and Appendix R (Figure R-3) will require an amendment.</p>
10	<p>NGO Letter (Continued)</p>	<p>FMP Section 7.5.3</p>	<p>10-b. We request the FMP include clear, objective criteria for determining whether a Tier 2 stock is overfished and clarify what the rebuilding provisions are for overfished Tier 2 stocks. The MLMA requires that FMPs must specify criteria for identifying when a stock is overfished, include measures to end or prevent overfishing, and provide a mechanism for rebuilding in the shortest time period possible (FGC §7086). While the draft FMP identifies criteria for determining whether the San Francisco Bay stock is overfished as well as rebuilding provisions (Section 7.8.1), it does not contain criteria for determining whether any of the stocks outside San Francisco Bay stocks would be considered overfished when they are in Tier 2. It also does not specify how the San Francisco Bay stock would be considered overfished if it is moved to Tier 2 status in the future. The FMP does not provide objective criteria for what constitutes "very poor spawning behavior" or "an SSB too small to support fishing." For example, this could be remedied by clarifying how "low" or "very poor spawning behavior" is determined in the Rapid Spawn</p>	<p>Section 7.5.3 has been amended in the Final Herring FMP to include specific criteria for determining when a given management area's spawning stock biomass is considered overfished or otherwise depressed under Tier 2. If the stocks drop below these respective limits, the quotas will be set to zero to promote stock rebuilding. This brings the management plan into compliance with the MLMA, which states that FMPs must specify overfishing limits and rebuilding plans.</p>

			Assessments for Tier 2 stocks and stating in the FMP that this is the criteria for overfished.	
10	NGO Letter (Continued)	FMP Appendices	10-c. The number and size of the Appendices substantially increase the size of the overall FMP document, which as presented, will complicate navigation of the FMP by the public. While each Appendix provides important information and is referenced in the body of the FMP, we suggest the Appendices be available as separate documents from the main body of the FMP, and that each Appendix contain consistent page numbering and formatting to improve navigation of the FMP.	Appropriate page numbering has been applied to all appendices in the Final Herring FMP. Pending adoption, for ease of download, the FMP body and appendices will be made available separately.
10	NGO Letter (Continued)	FMP General	10-d. Throughout the document, the term "quota" is used when referring to the annual catch limit. The term quota is problematic because in other contexts "quota" may refer to a minimum quantity or goal, rather than a maximum limit. To maintain consistency and clarity for the public, we request the FMP not use the term "quota" and instead use the term "catch limit."	The term "quota" is frequently used interchangeably with "catch limit" in fisheries management. In addition, the Marine Life Management Act uses the term "quota" rather than "catch limit" in specifying the types of conservation and management measures that should be described in an FMP (Section 7802(c)). Furthermore, the term quota has been used historically in documents related to management of California's Pacific Herring fishery. For consistency with these documents, the Final FMP retains use of the word "quota".
10	NGO Letter (Continued)	FMP Section 2.13.2.2, Appendix D	10-e. In Section 2.13.2.3 (p. 2-26), the Department's maps of Herring spawning area extent and most-used spawning areas for Humboldt Bay should be included, in the manner San Francisco Bay's maps appear in that section. Also, these updated maps should be put into the Habitat section (pg. 319).	Habitat maps for management areas where no commercial activity occurs at the time of FMP development are presented in Appendix D. However, the Humboldt Bay map in the Draft FMP Appendix D did not include spawn areas. Detailed maps of recent observed spawning locations are available for Humboldt Bay and have been included in the Final FMP. Section 2.13.2.3 has been edited to refer the reader to Appendix D for Humboldt Bay spawn areas.
10	NGO Letter (Continued)	FMP Section 7.7.2	10-f. The Executive Summary (p. ii) and Section 7.7.2 state that complying with the Commission's Forage Species policy is a secondary goal. This prioritization undercuts the	The primary management goals as outlined in the Herring FMP are those described in the MLMA, which is the overarching legal framework for fisheries management in

			Commission's forage policy and implies that other goals are more important. We request that the FMP present all goals equally, including compliance with the Forage Species policy and incorporating ecosystem considerations into Herring management.	California. For this reason, these goals are given primacy in the Herring FMP. However, the Commission's forage species policy played an important role in the development of FMP objectives, as described in the Herring FMP.
10	NGO Letter (Continued)	FMP Executive Summary, Section 7.6.3	10-g. The Executive Summary (p. iv) indicates that the multi-indicator predictive model is adopted by the FMP. However, Section 7.6.3 makes clear that the spawn deposition surveys are the default for estimating San Francisco Bay SSB until the predictive model has 3 or more years of successful predictive power. The Executive Summary should be clarified consistent with this description in Section 7.6.3.	The Herring FMP adopts the multi-indicator predictive model as an option for estimating Spawning Stock Biomass in the San Francisco Bay management area. The Final Herring FMP Section 7.6.3 has been edited to clarify the requirements for use of the multi-indicator predictive model. Spawn deposition surveys remain the default method for determining Spawning Stock Biomass, and the Executive Summary has been edited to clarify this.
10	NGO Letter (Continued)	FMP Section 7.7.1, Figure 7-2; Appendix F	10-h. The FMP should clarify that Figure 7-2 represents the default harvest control rule, which is subject to ecosystem adjustments as indicated by the decision tree. Currently, Appendix F and Figure 7-2 are misleading because they do not reference potential adjustments to catch limits based on ecosystem considerations, therefore implying that these represent the final catch limit.	Chapter 7 has been modified so that the caption for Figure 7-2 clarifies that the black line indicates the unadjusted quota for the season. Section 7.7 describes how the quota may be adjusted for ecosystem considerations.
10	NGO Letter (Continued)	FMP Executive Summary	10-i. Given California's leading role in addressing the climate crisis, the Executive Summary should emphasize and highlight the several areas where climate change is addressed in the FMP, specifically the use of climate indicators in the predictive model, the use of management strategy evaluation to ensure the harvest control rule is robust to future climate change scenarios, and the use of climate indicators as ecosystem considerations.	Adaptive management frameworks based on the best available science and including multiple indicators, such as the framework presented in the Herring FMP, are key tools for promoting climate change resilience in fisheries management, and this is emphasized throughout the document. The Executive Summary has been updated in the Final Herring FMP to better reflect this.
10	NGO Letter (Continued)	FMP Acknowledgements	10-j. Finally, we request that the Acknowledgments section recognize all cash funding sources for the FMP, specifically the	The Gordon and Betty Moore Foundation has been added to the Acknowledgements in the Final Herring FMP.

			Gordon and Betty Moore Foundation and the National Fish and Wildlife Foundation.	
10	NGO Letter (Continued)	FMP General	10-k. For the [several stated] reasons, we support the adoption of the FMP. We request the Commission incorporate the above recommendations on the Draft Herring FMP into the final version and urge the Commission to adopt the Final Herring FMP at its October meeting, as scheduled.	Support for the Herring FMP is appreciated. Comments received have been responded to here and in the Final FMP as appropriate.
11	Anna Weinstein Audubon California Herring FMP Steering Committee +3,258 Individual Signatories Letter dated 7/31/2019	FMP General	11-a. [Signatories and Audubon] support the adoption of the Fishery Management Plan (FMP) for Pacific Herring at your meeting in October 2019, pending specific changes listed.	Support for the Herring FMP is appreciated. Comments received have been responded to here and in the Final FMP as appropriate.
11	Anna Weinstein +3,258 Individual Signatories (Continued)	FMP Appendices	11-b. All the Appendices should be provided as part of the FMP and organized so they can be readily navigated by the public.	All appendices, including Appendix R (see response to Comment 9-a), are now available for the public to review, and include appropriate page numbering. Pending adoption, for ease of download, the FMP body and appendices will be made available separately.
11	Anna Weinstein +3,258 Individual Signatories (Continued)	FMP Section 2.13.2.3, Appendix D	11-c. The Department's maps of Herring spawning area extent and most-used spawning areas for Humboldt Bay should be included in the FMP.	Habitat maps for management areas where no commercial activity occurs at the time of Herring FMP development are presented in Appendix D. However, the Humboldt Bay map in the Draft Herring FMP Appendix D did not include spawn areas. Detailed maps of recent observed spawning locations are available for Humboldt Bay and have been included in the Final FMP. Section 2.13.2.3 has been edited

				to refer the reader to Appendix D for Humboldt Bay spawn areas.
11	Anna Weinstein +3,258 Individual Signatories (Continued)	FMP Executive Summary	11-d. In the Executive Summary and throughout the FMP, present all FMP goals equally, including compliance with the forage species policy and incorporating ecosystem considerations into Herring management.	The primary management goals as outlined in the FMP are those described in the MLMA, which is the overarching legal framework for fisheries management in California. For this reason, these goals are given primacy in the Herring FMP. However, the Commission's forage species policy played an important role in the development of the FMP objectives, as described in the FMP.
11	Anna Weinstein Oral comment w/ Nick S. (Commenter 8) at FGC meeting 8/8/2019	FMP General	11-e. General support. Commend and thank involved parties, including FGC. FMP is groundbreaking.	Support for the Herring FMP is appreciated.
11	Anna Weinstein Oral comment w/ Nick S. (Continued)	FMP General	11-f. Audubon has provided comment and non-substantive requests to ensure transparency and MLMA compliance (formatting fixes, better assembled appendices on website, tier 2 fishery criteria).	Comments received have been responded to here and in the Final FMP as appropriate.
11	Anna Weinstein Oral comment at FGC meeting 10/10/2019	FMP	11-g. Supports action to adopt Herring FMP and regs. Climate-ready framework that protects a very important food source for a variety of predators. Also supports properly sized commercial fleet and allows a generous yet sustainable catch. Really proud of this plan, learned a lot from this process. Grateful for our environmental colleagues. Barnes wisdom helped move us forward early on. Thanked a number of individuals. Also support pursuing a lessons learned that we think could help inform other FMPs.	Support for the Herring FMP is appreciated. The Herring FMP was the result of a great deal of work by many different stakeholders, and the Department hopes to continue future collaborations to benefit the resource.

12	Nils Warnock Audubon Canyon Ranch (ACR) Letter dated 7/31/2019	FMP Section 7.8.2.2	12-a. ACR agrees with the Commission's recommendation to reduce the maximum number of permits allowed for Tomales Bay (from 35 to 15 via attrition), but further recommends that no new permits be issued for Tomales Bay (instead of beginning to issue once number of Tomales permits drops below 15). Rather, Tomales Bay would be best left as a protected area for Herring. Cites linked importance of Herring to seabirds, lack of commercial interest in Tomales Bay Fishery, and proximity to SF bay fishery as reasons.	The FMP specifies a management approach for Pacific Herring in Tomales Bay that is compatible with both conservation and fishing goals. Should there be renewed commercial interest in Herring fishing in Tomales Bay, the quota will be set at a small fraction of historical quotas to ensure that the Tomales Bay Herring stock can serve as food for predators as well as support a small commercial fishery, as described in Chapter 7.
12	Nils Warnock (Continued)	FMP Section 7.8.7; Title 14, CCR §28.62	12-b. ACR endorses FMP's recommendation of a recreational bag limit range of 0-100 lbs, equivalent to up to ten gallons, or two 5-gallon buckets of Herring, each containing 260 fish.	Support for the recreational bag limit in the Herring regulations is appreciated.
12	Nils Warnock (Continued)	FMP Chapter 7 - Tomales Bay Spawning Biomass Surveys	12-c. As current monitoring data are critical for helping managers steward resources, especially during these times of rapid climate change, ACR encourages the Commission to recommend renewed Herring monitoring in Tomales Bay.	The Herring FMP identifies management areas with active commercial fisheries as the highest priority for monitoring. As described in Chapter 7, an appropriate level of monitoring will resume in Tomales Bay should commercial fishing activity resume there.
12	Nils Warnock (Continued)	FMP General	12-d. With some suggested modifications, Herring FMP will provide strong guidance for the long-term sustainable mgmt. of Pacific Herring in California, including Tomales Bay.	Support for the Herring FMP is appreciated. Comments received have been responded to here and in the Final FMP as appropriate.
13	Pam Young Golden Gate Audubon Society Letter dated 7/31/2019	FMP General	13-a. General support for the Herring FMP, including use of the best available science to support sustainable management.	Support for the Herring FMP is appreciated.
14	Morgan Patton, West Marin Environmental Action	FMP Section 7.8.7; Title 14, CCR §28.62	14-a. Consistent with past comments and Audubon Canyon Ranch's comments, EAC supports the Herring FMP's daily bag limit two 5-gallon buckets of Pacific Herring	Support for the recreational bag limit in the Herring regulations is appreciated.

	Committee (EAC); Ashley Eagle-Gibbs , EAC Letter dated 8/1/2019			
14	Morgan Patton, Ashley Eagle Gibbs (Continued)	FMP Chapter 7, General	14-b. While supportive of the overall management strategy in Chapter 7 of the Herring FMP, recommend full closure of commercial fishery in Tomales Bay, due to a number of factors. These include low Herring numbers, environmental considerations, lack of interest, high operating costs, and poor market conditions. No recent research (other than observations) has been conducted to indicate adequate biomass for the Tomales Bay fishery operation. Recommend CDFW (or other qualified and independent researchers) conduct renewed monitoring of Herring populations in Tomales Bay in order to compare against outdated information that is now 13 years old [limited monitoring conducted during 2006-07 season] to better understand the population dynamics	Support for the Herring FMP's management strategy is appreciated. The Herring FMP specifies a management approach for Pacific Herring in Tomales Bay that is compatible with both conservation and fishing goals. As described in Chapter 7, a precautionary quota is available, and an appropriate level of monitoring shall occur should commercial interest in the Tomales Bay stock resume.
14	Morgan Patton, Ashley Eagle Gibbs (Continued)	FMP Chapter 7, General	14-c. The Tomales Bay Herring fishery should only be open after a comprehensive and scientifically based assessment and analysis is made of the Herring stocks, current and future spawning estimates, biomass, etc. led by Department of Fish and Wildlife staff and/or other trained and independent researchers, with the involvement of multiple stakeholders. EAC requests that these opportunities are truly collaborative and include stakeholders representative of multiple interests including local West Marin fisherman, individuals from non-extractive industries, and environmental organizations.	Should there be renewed commercial interest in Herring fishing in Tomales Bay, the Herring FMP specifies that the quota will be set at precautionary harvest rate to ensure that the Tomales Bay Herring stock can fulfill its ecological role as forage for predators as well as support a small fishery. This harvest rate can only be increased with additional monitoring demonstrating the population can support additional harvest, including determination of the Spawning Stock Biomass. The Department welcomes the opportunity to collaborate with stakeholders to increase our collective

				understanding of California's Pacific Herring stocks.
14	Morgan Patton, Ashley Eagle Gibbs EAC Second letter Dated 9/26/2019	FMP Chapter 7,	14-d. Reiterates comments from 8/1/2019 letter, specifically 1) support for the recreational limit, 2) support of overall management goals, which the recommendation that Tomales Bay be closed to commercial take, and 3) commercial take in Tomales Bay should not be allowed until certain research and monitoring is conducted.	See responses above to comments 14-a , 14-b , and 14-c .
14	Morgan Patton, Ashley Eagle Gibbs (Second letter Continued)	Title 14 CCR §28.60	14-e. Recommends that the recreational take of Herring roe be prohibited in Tomales Bay due to sensitive nature of the ecosystem there. Specifically, waterbird populations in Tomales Bay are in decline, Tomales Bay serves as important marine mammal habitat, and eelgrass in Tomales Bay is important to herring. Furthermore, eelgrass is likely to be mistaken for kelp and taken along with the recreational take of roe, even though this is prohibited.	The daily limit of 25 lb wet weight, including roe and vegetation, is meant to allow for a satisfying recreational experience for individuals while ensuring that total Herring harvest remains sustainable. The Department recognizes the importance of eelgrass and other sensitive habitat types in Tomales Bay, and the prohibition on take of eelgrass is meant to prevent impacts to this important species during recreational fishing activity.
15	Julie Thayer, Ph.D. Farallon Institute Letter dated 7/31/2019 in attachment to Email dated 8/1/2019	FMP Chapters 3, 7; Appendices E, F	15-a. Work conducted by the Farallon institute as a contractor on FMP development was not accurately represented in the draft FMP. Includes specific description of issues with information presented in Ch 3, Ch 7, and Appendix E, and F. Inaccurate representation of this work led to erroneous conclusions by Peer Review of FMP science. Requests that actual contractor work be presented in the appendices.	The Farallon Institute was subcontracted to assist the Project Management Team with developing scientific advice for the management of Pacific Herring. This work produced a number of valuable contributions to the field of ecosystem-based fishery management, and the parts that were used in the development of the FMP's management framework were provided to the Peer Review, are reproduced in Appendices E and F. However, there were other components of the work produced that were evaluated by the Project Management Team, the Department, and the Steering Committee that were deemed to be not suitable for use in the management framework at this time. The Peer

				Review committee requested to see, and were provided, additional components from the Farallon Institute's work that were not used in the Herring FMP during the review process. As such, the review committee's final recommendation does take into account these additional components as well.
15	Julie Thayer, Ph.D. (Continued)	FMP Chapter 7, Section 7.6.3	15-b. Chapter 7 incorrectly states that the predictive model needs to be tested before use, though it has already been validated against 27 years of SF Bay biomass.	The Herring FMP adopts the multi-indicator predicted model as an option for estimating Spawning Stock Biomass in the San Francisco Bay management area. The Final Herring FMP Section 7.6.3 has been edited to clarify the requirements for use of the multi-indicator predictive model. Specifically, the model's use depends on availability of required data and its continued predictive skill.
15	Julie Thayer, Ph.D. (Continued)	FMP Appendix E	15-c. Appendix E summarizes a draft report of the SSB forecasting model submitted by Farallon Institute early in the FMP development process, instead of the final publication of this work which included key revisions to the original draft	The information summarized in appendices E and F includes the portions of the work produced by the Farallon Institute under subcontract by the Project Management Team that were included in the Herring FMP. The final publication referred to (Sydeman and others, 2018) does not include the multi-indicator predictive model adopted by the Herring FMP. However, this publication is referenced in the FMP, including in Appendix E, as appropriate.
15	Julie Thayer, Ph.D. (Continued)	FMP Chapter 9, Appendix R	15-d. Considerations for future research and management should include the importance of making ecosystem-based catch adjustments more meaningful. Re-instate appendix R, allow wider discretion on quota adjustment bounds in HCR framework.	Appendix R was drafted, but omitted from the May-dated Draft FMP in error (see response to Comment 9-a). It has been included in the Final FMP and contains information on the development of the Harvest Control Rule framework, as well as guidance for amending the Decision Tree as the field of ecosystem-based fishery management develops. Any increase in the bounds on ecosystem-based quota adjustment beyond those indicated in Chapter 7 (Figure 7-3) and Appendix R (Figure R-3) will require FMP amendment.

15	Julie Thayer, Ph.D. (Continued)	FMP Sections 2.4, 5.6, Chapter 8	15-e. Importance of temporal variability in spawning should be explicitly stated in the FMP (w/ specific recommendations for Sections 2.4, 5.6, and Chapter 8).	The observed temporal variability in Herring spawning is stated a number of times throughout the Herring FMP. In particular, Section 2.4 and Figure 2-4 describe the available information on this variability. Section 8.6 also flags changes in observed spawning habitat over time as a key uncertainty and avenue for future research.
15	Julie Thayer, Ph.D. (Continued)	FMP Appendices	15-f. The FMP is prohibitively large and difficult to navigate due to myriad of appendices, both current and historical information. Suggest final document only include immediately-relevant supplemental material such as formulas and decision trees, w/ clear page numbering. Historical info should be separated into distinct files that can be downloaded separately, and are also clearly referenced.	California's Herring fishery is complex, with a long history of management. The FMP serves as a central repository for all of the available information on Pacific Herring and its management in California. Pending adoption, for ease of download, the FMP body and appendices will be made available separately.
16	Jennifer Fearing Fearless Advocacy Oral comment at FGC meeting 8/8/2019	FMP General	16-a. Strong support for adoption in October. The FMP is a tremendous step forward for Ecosystem-Based Management. Appreciate CDFW incorporating Appendix R	Support for the Herring FMP is appreciated. Appendix R was drafted but was omitted in error (see response to Comment 9-a). It has been included in an updated draft of the FMP and is available for review.
16	Jennifer Fearing (Continued)	FMP Section 7.5.3	16-b. As per NGO Letter (see Commenter 9), recommendations to strengthen MLMA compliance w/out altering timeline for adoption, request Fish and Game Commission direct CDFW to address those recommendations prior to adoption.	Section 7.5.3 has been amended in the Final Herring FMP to include criteria for determining when a given management area's spawning stock biomass is considered overfished or otherwise depressed under Tier 2. If the stocks drops below these limits, the quotas will be set to zero to promote stock rebuilding. This brings the management plan into compliance with the MLMA, which states that FMPs must specify overfishing limits and rebuilding plans.

17	Geoff Shester Oceana FMP Steering Committee +3,091 California Residents Letter dated 9/24/2019	FMP and Regulations General	17-a. General support for Herring FMP and associated implementing regulations. Discussion of importance of Herring's ecosystem role, stresses importance of precautionary management for Herring. Commends Fish and Game Commission and Department of Fish and Wildlife for precautionary management, describes FMP in historic terms due to ecosystem adjustments. Points out that adoption of FMP and implementing regulations will advance implementation of Commission's forage species policy and ensure responsible fishery management moving forward. Requests that Commissioners please protect Herring and adopt the FMP.	The Department appreciates support for the FMP and the description of its various benefits to Herring and the California Current Ecosystem, as well as the future of responsible fishery management in California.
17	Geoff Shester Oral Comment at FGC Meeting 10/10/2019	FMP	17-b. Adoption is long-time coming, asking FGC to adopt as is without any further changes. Long road, including starting with forage species policy in 2012, then sat down with industry and Audubon to see what this could look like, raised money, and helped reviewed content along the entire way. Support CDFW, have brought all sides together for a very controversial issue where both sides were fighting adamantly for their views, compromised and think this does result in a number of positive aspects (including ecosystem based quota adjustments and tiered mgt.), been a valuable experience and ask Commission to adopt. Moving forward would be good to have a lessons learned, but think we have something we can all be proud of.	Support for the Herring FMP is appreciated. The FMP had valuable input from a variety of interested parties and the financial support from contributors was essential to its completion.
17	Geoff Shester (continued)	Implementing Regulations	17-d Ask FGC to adopt implementing regs package for FMP.	Support for adoption of the implementing regulations package is appreciated.
17	Geoff Shester (continued)	Implementing Regulations	17-e Support CDFW's proposal to do a follow up package for HEOK comments.	The Department has committed to working to resolve some of the concerns with the proposed HEOK regulations, including meeting the HEOK representative at a Marine Resources Committee meeting on November 5, 2019 and the possibility of a follow up rulemaking

				package in 2020 to address the remaining HEOK issues.
17	Geoff Shester (continued)	Implementing Regulations	17-f Hoped the regs would apply this season, but learned they will not go into effect until next season. Latest biomass estimate presented at the DHAC was ~ 8k tons which is well below the threshold and if the FMP was implemented it would be considered a depleted state.	The spawning stock biomass estimate of 8,030 is one of the lowest on record, however existing regulations establish a 750 ton gillnet quota during the 2019-20 season. This quota allows for a gillnet-sector target harvest rate (this year's quota as a percentage of last year's biomass) of 9.3%, which the Department considers to be precautionary.
17	Geoff Shester (continued)	Implementing Regulations	17-g Consider the current stock of the population for the rec bag limit considerations. Do support rec bag limit.	The Fish and Game Commission selected a ten-gallon recreational bag limit from the 0-10 gallon range provided by the Department.
18	Dan Yoakum Commercial Participant Letter dated 9/24/2019 Attached to Email dated 10/02/2019	FMP and Regulations General	18-a. The Department did not adequately incorporate recommendations from the HEOK sector into the FMP's rulemaking package. As a result, proposed regs create potential for violations when trying to conduct normal HEOK operations. Several specific issues are identified as (comments 18-b through 18-h), and Mr. Yoakum requests that the Department work with him to resolve these issues.	Department staff engaged with Mr. Yoakum, in his capacity as the HEOK-sector representative, by way of multiple, formal, in-person meetings, as well as numerous phone calls, regarding the proposed regulations. The Department has committed to working with Mr. Yoakum to resolve some of the concerns with the proposed HEOK regulations mentioned in his letter, including meeting at a Marine Resources Committee meeting on November 5, 2019 and the possibility of a follow-up rulemaking in 2020 to address the remaining HEOK issues. Regarding specific issues identified by Mr. Yoakum with this regulatory package, see responses to comments 18-b through 18-h below.
18	Dan Yoakum (continued)	FMP Section 7.8.1.1, Title 14 CCR §55.02(d)	18-b. Doing away with permit quotas will result in increased competition, reduced cooperation, inferior quality product, and will be inconsistent with HEOK regulations in Canada, Alaska, and Washington.	Proposed regulations in §55.02(d) state that the Director of the Department shall set quotas for all sectors according to Chapter 7 of the FMP. Under the FMP, HEOK permits are separate from Herring gillnet permits. Section 7.8.1.1 of the FMP's Chapter 7 describes HEOK quota as being set to a product weight equivalent to approximately 1% of the total quantity of eggs produced by the most recent SSB. The permit quotas under regulation prior to the FMP were

				<p>derived from a system that subtracts HEOK quota from the total gillnet quota, despite the HEOK sector not taking any adult fish. The rationale for setting HEOK quotas at 1% of the most recent SSB's egg deposition is addressed in Appendix N of the Herring FMP.</p> <p>Department staff will work with Mr. Yoakum to incorporate allocation of the HEOK quota to individual permittees in a follow-up rulemaking in 2020 (see response to comment 18-a).</p>
18	Dan Yoakum (continued)	Title 14 CCR § 164(h)(4)	18-c. Prohibiting weekend landings will negatively affect the quality of product, and effectively reduce fishable time by 1/3, since HEOK must be harvested and landed immediately after spawn on the kelp, and participants cannot control when fish spawn.	<p>As described in the Necessity and Rationale for this regulatory change, the intent of this requirement was to improve the Department's ability to track the catch relative to the quota and determine when the quota has been reached. Quota managed fisheries, like the HEOK fishery, require staff to be able to track landings in near-real time, and it is difficult for Department staff to track landings at night and/or during the weekend. However, in light of points made by Mr. Yoakum's comment, the Department will work to address this issue in a follow-up rulemaking in 2020 (see response to comment 18-a).</p>
18	Dan Yoakum (continued)	Title 14 CCR § 164(a)(3)	18-d. The definition of "processing" omits washing/rinsing, which needs to be included.	<p>The Department will address this issue in a follow-up rulemaking in 2020 (see response to comment 18-a).</p>
18	Dan Yoakum (continued)	Title 14 CCR § 164(g)	18-e. Proposed regulations prohibit marine mammal deterrent devices during HEOK fishing in San Francisco Bay.	<p>The HEOK sector is a high-visibility fishery in San Francisco Bay. Department program staff worked closely with Law Enforcement Division staff on this requirement, and it was made clear to Mr. Yoakum that he would not be allowed to harass seals and/or sea lions in San Francisco Bay. An experimental fishery permit is an available option to HEOK participants who would like to develop seal-exclusion gear that does not harass marine mammals.</p>

18	Dan Yoakum (continued)	Title 14 CCR § 164(d)(1)(E) and (F)	18-f. Gear requirements for the allowable length of corklines and their marking requirements ignore that lines must be broken down into smaller segments in order to be operated.	Department program staff worked with Law Enforcement Division to develop this requirement, the intent of which is that any line engaged in fishing be 1,200 feet in length or less and adequately marked at each end.
18	Dan Yoakum (continued)	Title 14 CCR § 164(f)	18-g. The noise rule in 164(f) is unnecessary, as the HEOK sector is quiet by nature. Including this rule leaves HEOK participants open to harassment.	This requirement has always applied to all Herring permittees in § 163 (including HEOK) prior to FMP-implementing regulations. Under FMP-implementing regulations, harvest of HEOK is addressed in § 164, including noise reduction requirements.
18	Dan Yoakum (continued)	Title 14 CCR § 163(e)(3)(B)	18-h. The requirement that the HEOK permittee be aboard any vessel engaged in harvesting, processing, or transporting herring eggs is not workable, as kelp is not hung aboard the vessel. Dan recommends that the requirement be changed to 'in the vicinity' of the vessel, so that permittees may be allowed to work from, for example, their raft(s).	Department program staff worked with Law Enforcement Division to develop this requirement, the intent of which is that the permittee be present during harvest, processing, or transporting of HEOK product. Language such as "in the vicinity" is vague, and could potentially be interpreted in such a way that no permittee need be present during these operations, which is not sufficient from an enforcement standpoint. However, the Department will clarify this requirement in a follow-up rulemaking in 2020 (see response to comment 18-a).
18	Dan Yoakum Oral comment at FGC meeting 10/10/2019	FMP and Regulations General	18-i. There are many problems with the regs and the HEOK fishery that came about because CDFW took recommendations but did not reach out to review them, just kept pushing it off and never talked about the changes they made.	See responses above to comment 18-a . The Department has committed to working with Mr. Yoakum to resolve some of the concerns with the proposed HEOK regulations mentioned in this letter, including meeting at a Marine Resources Committee meeting on November 5, 2019 and the possibility of a follow up rulemaking in 2020 to address the remaining HEOK issues.
18	Dan Yoakum (continued)	FMP and Regulations (Reiterated)	18-j. Reiterated comments from 9/24/2019 letter, specifically 1) maintain individual quotas. 2) Continue to allow weekend landings. And 3) to fish HEOK, you have to be able to get off the vessel while fishing HEOK.	See responses above to comment 18-b , 18-c , and 18-h .

19	<p>Neha Ram</p> <p>Student</p> <p>Scripps Institute of Oceanography</p> <p>Oral comment at FGC meeting</p> <p>10/10/2019</p>	Herring FMP	<p>19-a. Support for Herring FMP along with some concerns. 1) pushing not only for more research on climate change effects, but also concrete mitigation measures using scientific information produced, 2) whale entanglement – collaboration, 3) mitigation measures to protect marine mammals, birds and large fish.</p>	<p>Support for the Herring FMP is appreciated, and the Department welcomes the opportunity to collaborate with stakeholders and researchers to increase our collective understanding of California's Pacific Herring stocks. Due to the small mesh size of the gillnets used and the nearshore fishing locations, whale entanglement is not likely in this fishery. Close tending of nets reduces the chance of entangling other marine mammals, birds and large fish.</p>
----	---	-------------	--	--

Table S-2. Summary of minor corrections and changes to the Draft Herring FMP.

Document Section	Page Number	Correction
Title page	NA	<p>Draft California Pacific Herring Fishery Management Plan</p> <p>Draft</p> <p>August 08, 2019 <u>October 25, 2019</u></p>
Executive Summary	ii	<p>The overarching goal of this FMP is to ensure the long-term sustainable management of the Herring resource consistent with the requirements of the Marine Life Management Act (MLMA) and the Commission's forage species policy. In particular, it seeks to:</p> <p>(...)</p> <ul style="list-style-type: none"> • <u>describe the effects of climate change on California's Herring stocks, and identify environmental and ecosystem indicators that can inform effective management,</u>
Executive Summary	iv	<p>The currently used method is available as a backup should data be unavailable or should environmental changes compromise the predictive power of the model. The FMP adopts this multi-indicator predictive model as an option for estimating the coming year's SSB in the San Francisco Bay management area, contingent upon availability of necessary input data and continued predictive power by the model. Spawn deposition surveys remain the default method for determining SSB.</p>
Acknowledgements	xxii	<p>Finally, the <u>Gordon and Betty Moore Foundation and the National Fish and Wildlife Foundation</u> provided the necessary funding to support the Project Management Team, composed of Dr. Sarah Valencia, Huff McGonigal, and David Crabbe.</p>
2.8, Figure 2-5 caption	2-10	<p>Figure 2-5. Observed age distribution of the research catch in San Francisco Bay, Percent at age, by number, of ripe fish for the San Francisco Bay spawning stock biomass. Based on age composition of the research catch (excluding age-1 fish), 1982-83 through 2017-18 seasons. Note that no sampling was conducted in final age composition was not determined for the 1990-91 and 2002-03 seasons.</p>

2.8	2-10	...the North Pacific Marine Heatwave (Chapter <u>Section 3.2</u>).
2.13.2.3	2-26	Herring spawning occurs in both North and South Bays, although North Bay typically receives the majority of spawning activity. Spawning has occurred every year in North Bay since the fishery began during the 1973-74 season. <u>Maximum spawning extents observed during the 2014-15 through 2017-18 seasons are presented in Appendix D.</u>
4.2, Figure 4-2 caption	4-3	California Herring landings by area in short tons between 1973 and 2017 in San Francisco Bay (blue), Tomales Bay (yellow), Humboldt Bay (gray), and Crescent City Harbor (black). <u>The commercial fishery was closed for the 2009-10 season. Note that this figure does not include landings from the ocean waters fishery (Monterey Bay).</u>
4.7.2	4-16	In 2014, the SFBHRA <u>San Francisco Herring Association</u> , a group of commercial Herring fishermen, filed a lawsuit against Pacific Gas and Electric (PG&E) for contamination of the San Francisco Bay waterfront.
4.7.3, Table 4-2 caption	4-18	2017 <u>Commercial landings and ex-vessel value for the five most valuable fisheries each in the San Francisco, Tomales, Eureka, and Crescent City ports in 2017.</u>
5.6.1, Table 5-2 caption	5-12	Table 5-2. California Herring fishery season dates <u>prior to the implementation of this FMP.</u>
5.6.2.2	5-13	Currently, Herring offloading only takes place at Pier 45 on the San Francisco waterfront. Remove sentence as unnecessary and potentially inaccurate in the future. Section is titled "Nighttime Restrictions on Unloading", and content functions just fine without this sentence.
6.2.1	6-12	Spawn surveys in Tomales and Humboldt Bays were discontinued after 2006-07 due to staffing and resource constraints. Due to low Herring roe prices and lack of processing facilities, <u>at the time of FMP development</u> , no commercial fishing has occurred...
7.4	7-6	The Tier 1 quota for Crescent City Harbor is set at 42 11 <u>tons (4110 metric tons)</u> , which is 50% of the average historical <u>landings</u> and a 60% <u>63%</u> decrease from the quota prior to the adoption of this FMP.
7.5.3	7-8	Conversely, under a Tier 2 monitoring protocol, the quota shall be reduced to zero <u>as a rebuilding provision</u> in years where either the employed Rapid Spawn Assessment indicates poor spawning behavior, or spawn deposition survey-derived SSB estimates indicate an SSB too small to support fishing <u>that is overfished or otherwise depressed</u> . <u>For San Francisco Bay, the stock is considered overfished or otherwise depressed at SSB estimates below the 15,000-ton cutoff established by the HCR (see Section 7.7.1).</u>

		For Tomales Bay and Humboldt Bay, the stock is considered overfished or otherwise depressed at stock sizes that are less than 20% of the long-term average biomass (including historical and contemporary SSB estimates) for each respective management area. For Crescent City Harbor, the stock is considered overfished or otherwise depressed at SSB estimates less than 66 tons, which is approximately three times the average historical catch in that management area.
7.6.2.1	7-10	All necessary data are may be available by the end of September each year, and prior to the beginning of the fishing season, which begins in December.
7.6.3	7-12	While the predictive model provides a promising avenue for incorporating additional indicators into Herring management, as well as for improving predictive accuracy, the model needs to be tested before it is used to set quotas. To do this, the model must have three consecutive years where a) all of the data required are available, and b) demonstrate that over those three years it has greater predictive skill than the spawn deposition survey alone. At that point the model's use depends on availability of required data and the model's continued predictive skill (see Section 7.6.2.1, Appendix E). When these two requirements are met, the Department may decide to use the predictive model in yearly quota setting.
7.7.1, Figure 7-2 caption	7-13	HCR Harvest Control Rule describing the relationship between estimated SSB and <u>unadjusted</u> quota for subsequent season of the San Francisco Bay Herring commercial fishery.
7.7.2.3	7-21	Should one or more of the criteria in the decision tree recommend that the Department consider reducing the quota, a 300-ton (272 metric ton) reduction in the harvest should be applied the target harvest rate may be reduced by up to 1% (Figure 7-3).
7.7.2.3	7-22	Conversely, if an increase is warranted, a 300-ton increase to the quota should be applied the target harvest rate may be increased by up to 1% (Figure 7-3).
9.2	9-4	Additionally, as the science evolves, the Department may adjust the magnitude of changes to the quota recommended by the decision tree up to the limits defined in Appendix R Section 7.7.2.3, provided the supporting science is clearly documented (see Appendix R).
All appendices	multiple	<i>Insert incomplete and/or missing page numbers into all pages of all appendices</i>

Appendix D, Figure D3 and caption	D-3	<i>Include recent ('14-'15 thru '17-'18 seasons) spawn areas in Humboldt Bay map; Figure D3. Eelgrass and other habitat types in Humboldt Bay (from Schlosser and Eicher, 2012) and <u>Herring spawn coverage</u>.</i>
Appendix D, Figure D6	D-6	<i>Include Noyo Harbor eelgrass map; update figure numbers in appendix.</i>
Appendix E	E-7	<i>Based on these criteria, the model that provided the best prediction for the current year SSB included three factors: SSB_{yr-1}, YOY_{yr-3} and $SST_{(Jul-Sep)_{yr-1}}$ (Table E-3 and Figure E-3). Notably, current Department fishing quotas are based on SSB_{yr-1}. The three-factor models, including the current model used by the Department out-performed simpler one- and two-factor models by a large margin (improved $r^2 = 0.64-0.67$ compared to 0.31 to 0.58; improved model fit AIC = 188 to 190 compared to 193 to 204, and reduced predictive error of 63% to 64.6% compared to 77% to 119%) (Sydeman and others, 2018; Table E-3). The three-factor model that provided the best prediction for the current year SSB included: SSB_{yr-1}, YOY_{yr-3} and $SST_{(Jul-Sep)_{yr-1}}$. Notably, current Department fishing quotas are based on SSB_{yr-1}.</i>
Appendix R	<i>multiple</i>	<i>Included Appendix R in response to public comment (see Table S-1).</i>
Appendix S	<i>multiple</i>	<i>Add Appendix S, including summary of public comments received and responses (Table S-1), and summary of changes to the FMP (Tables S-2 and S-3).</i>
Chapter 11. Works Cited	11-10	<i><u>Merkel & Associates. 2016. Noyo River and Harbor Maintenance Dredging Pre-dredge Eelgrass Survey Results Transmittal. Prepared for U.S. Army Corps of Engineers San Francisco District, September 2016.</u></i>
All	<i>multiple</i>	<i>Various corrections to capitalization, spacing, spelling, punctuation, font, nomenclature, and formatting.</i>

Table S-3. Summary of minor corrections and changes to the Final Draft Herring FMP as adopted.

Document Section	Page Number	Correction
Executive Summary	vi	<i>Recreational Regulations</i> – Prior to this FMP, there was no limit for the recreational take of Herring. To address this, the FMP recommends a range between 0 and 100 pounds, which is equivalent to up to 10 gallons (or two 5-gallon buckets), as establishing a daily bag limit <u>through regulation. This</u> The established bag limit is <u>should be</u> easily enforceable and provides for a satisfying <u>and sustainable</u> recreational experience while deterring illegal commercialization of the fishery.
7.8.7	7-28	This FMP establishes that a daily bag limit for recreational fishing <u>be adopted through regulation. This</u> The FMP recommends a range between 0 and 100 lb (45 kg) daily bag limit <u>be established at</u> which is equivalent to up to ten gallons, or two 5-gallon buckets of Herring, each containing approximately 260 Herring. Based on input from stakeholders this is considered to be an appropriate amount to provide a reasonable and sustainable amount of recreational harvest for participants. <u>This</u> The possession limit is also <u>should also be</u> designed to be clear and easily enforceable. <u>For reference, two 5-gallon buckets of Herring are equivalent to 100 lb of herring, or, approximately 260 Herring per bucket.</u> Currently, there are no estimates of the recreational catch available, but this a possession limit will provide Department staff with a means of estimating recreational take via counting the number of recreational anglers observed during each spawning event.
10.5.1	10-11	Deleted Section 10.5.1.
10.5.2	10-11	Renumbered Section 10.5.2 as Section 10.5.1.

10. PACIFIC HERRING EGGS ON KELP REGULATIONS**Today's Item**Information ☐Action ☒

Consider authorizing publication of notice of intent to amend commercial Pacific herring eggs on kelp (HEOK) regulations that implement the California Pacific Herring Fishery Management Plan (Herring FMP).

Summary of Previous/Future Actions

- | | |
|--|--|
| • FGC adoption of Herring FMP and implementing regulations | Oct 9-10, 2019; Valley Center |
| • MRC discussion of amendments to Herring FMP implementing regulations | Nov 5, 2019; MRC, Sacramento |
| • Today's notice hearing | Apr 15-16, 2020; Teleconference |
| • Discussion/adoption hearing | Jun 24-25, 2020; Santa Ana |

Background

At its Oct 10, 2019 meeting, FGC adopted the Herring FMP and implementing regulations, including changes to Title 14, sections 163 and 164. Under those regulations, Pacific herring and HEOK may be taken for commercial purposes under a revocable permit, subject to FGC regulation. Current regulations specify the number of permits that may be held by an individual, fishing areas, seasons, gear restrictions, and notification requirements for the HEOK fishery.

At the adoption hearing for the Herring FMP and implementing regulations in Oct 2019, comments from the HEOK representative of the DFW Director's Herring Advisory Committee highlighted potential concerns associated with new regulations proposed for the HEOK fishery. While the regulations package was adopted at the meeting, FGC and DFW committed to reviewing the Herring FMP implementing regulations based on the expressed concerns (see exhibits 2 and 3 for more detail). Proposed regulatory amendments to address the concerns were presented and discussed at the Nov 5, 2019 MRC meeting with participation by the HEOK representative. Establishing individual permit allocations from the total HEOK quota was among the changes initially considered at that meeting; however, upon careful consideration and analysis of this potential change subsequent to the MRC meeting, DFW does not recommend that this change be adopted. Instead, this change is presented as an alternative to the proposed regulatory action, and is evaluated as such in the draft initial statement of reasons (ISOR; Exhibit 2).

DFW is proposing to amend permittee on-board requirements; clarify the definition of processing related to "rinsing"; and amend gear marking requirements, noise reduction measures, marine mammal deterrent device allowances, and weekend landings requirements. No changes are proposed to the Herring FMP itself, and no other changes are proposed to the Herring FMP implementing regulations adopted by FGC in Oct 2019.

Proposed Regulations

As detailed in Exhibit 2, proposed regulatory changes are:

- Modify requirement for a permittee or authorized agent to be ‘*aboard any vessel*’ engaged in fishing HEOK to require they be ‘*immediately present during*’ harvesting, processing or transporting HEOK.
- Update the definition of HEOK fishing to include “the period during which kelp is suspended in anticipation of harvesting.”
- Add “rinsing” to the definition of processing.
- Modify light marking requirements to only apply while lines are fishing, exclusive of suspending and harvesting kelp.
- Clarify buoy marking requirement to include vessel registration number listed on the HEOK permit.
- Remove requirements for noise reduction measures that only apply to gill net gear.
- Revise marine mammal deterrent provisions to remove “marine mammal deterrent devices” from the remaining provisions that allow for reasonable action by HEOK permittees to protect marketable product.
- Reinstate weekend landings of HEOK product.
- Make additional editorial changes and update authority and reference citations.

Significant Public Comments

At the Oct 2019 adaption hearing for implementing regulations, the HEOK representative expressed concerns and proposed solutions related to HEOK regulations. The comments were included in Appendix S of the Herring FMP and are considered in this proposed rulemaking; specific comments can be located on pages S-18 to S-20 of Appendix S (Exhibit 3).

Recommendation

FGC staff: Authorize publication of a notice as recommended by DFW.

Committee: Authorize publication of a notice as recommended by DFW.

DFW: Authorize publication of a notice as proposed in the draft ISOR (Exhibit 2) and, following adoption of any changes, request that the Office of Administrative Law make the regulation effective on or before Oct 1, 2020 (Exhibit 1).

Exhibits

1. DFW memo transmitting ISOR, received Apr 6, 2020
2. Draft ISOR
3. *Appendix S: Public Comments Received, Responses, and Changes to the Draft California Pacific Herring Fishery Management Plan*, Nov 2019
4. Draft economic and fiscal impact statement (Std. 399)
5. DFW presentation

Motion/Direction

Moved by _____ and seconded by _____ that the Commission authorizes publication of a notice of its intent to amend sections 163 and 164, relating to California Pacific Herring Fishery Management Plan implementing regulations that affect the commercial herring eggs on kelp fishery.

Memorandum

Date: May 26, 2020

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

From: Charlton H. Bonham
Director

Subject: **Public Comment Response and Pre-Adopt Memorandum for Proposed Amendments to Section 163 and 164, Title 14, California Code of Regulations, Re: Pacific Herring Eggs on Kelp (Agenda Item for the June 24-25, 2020, Fish and Game Commission Meeting)**

The Department of Fish and Wildlife (Department) has prepared this memorandum in response to comments received from one member of the public at the April 16, 2020, Fish and Game Commission meeting regarding proposed amendments to Sections 163 and 164, Title 14, California Code of Regulations for the Pacific Herring Fishery Management Plan implementing regulations concerning the commercial Pacific Herring Eggs on Kelp fishery. The Department has summarized and prepared responses to these comments in Attachment 1 and does not recommend changes to the proposed rulemaking.

If you have any questions regarding this item, please contact Environmental Scientist Thomas Greiner, the Department's point of contact. Mr. Greiner can be reached at (707) 239-9955 or Tom.Greiner@wildlife.ca.gov.

cc: 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

Mike Stefanak, Assistant Chief
Law Enforcement Division
Mike.Stefanak@Wildlife.ca.gov

Robert Puccinelli, Captain
Law Enforcement Division
Robert.Puccinelli@wildlife.ca.gov

Melissa Miller-Henson, Executive Director
Fish and Game Commission
May 26, 2020
Page 2

Mary Loum, Staff Counsel
Office of General Counsel
Mary.Lou@wildlife.ca.gov

Susan Ashcraft, Marine Advisor
Fish and Game Commission
Susan.Ashcraft@fgc.ca.gov

Kirsten Ramey, Env. Program Manager
Marine Region
Kirsten.Ramey@wildlife.ca.gov

Adam Frimodig, Sr. Env. Scientist
Marine Region
Adam.Frimodig@wildlife.ca.gov

Tom Greiner, Environmental Scientist
Marine Region
Tom.Greiner@wildlife.ca.gov

Stephen Hibel, Assistant Branch Chief
License and Revenue Branch
Stephen.Hibel@wildlife.ca.gov

Michelle Selmon, Program Manager
Regulations Unit
Michelle.Selmon@wildlife.ca.gov

Mike Randall, Analyst
Regulations Unit
Mike.Randall@wildlife.ca.gov

Attachment 1

163 and 164 – Responses to Public Comments: Herring Eggs on Kelp

Responses to comments received at the April 16, 2020 Fish and Game Commission meeting.

Commenter Name, Format, Date	Comment	Department Response
1. Daniel Yoakum Commercial fisherman, Herring Eggs on Kelp (HEOK) representative to the Director's Herring Advisory Committee	1-a. Supports proposed regulatory changes as presented at the April 16, 2020 Fish and Game Commission meeting.	1-a. Support for the adoption of these regulations is appreciated.
1. Daniel Yoakum Cont.	1-b. Allow individual quotas and two permits per permittee for the HEOK fishery.	1-b. Regulations in Title 14, California Code of Regulations (CCR), Section 55.02(d) state that the Director of the Department shall set quotas for all sectors of the Pacific herring fishery, according to Chapter 7 of the California Pacific Herring Fishery Management Plan (Herring FMP). The individual HEOK permit quotas were eliminated by the Herring FMP and implementing regulations to streamline permitting and management of the fishery, as well as standardize and clarify regulatory language, and ensure the regulations are consistent with those used in other fisheries in California. Allowing two permits to be owned by a single permittee could reduce access to this limited entry fishery from ten to as few as five individuals, and the amount of gear allowed per permit would need to be reconsidered.
1. Daniel Yoakum Cont.	1-c. Specify penalties less severe than suspension or revocation of permits	1-c. A decision was made during the preparation of the Herring FMP to do away with the point system for determining penalties. According to Department Law Enforcement Division staff, options for penalties less severe than permit suspension or revocation already exist and do not need to be spelled out in the regulations.

Attachment 1

163 and 164 – Responses to Public Comments: Herring Eggs on Kelp

Commenter Name, Format, Date	Comment	Department Response
1. Daniel Yoakum Cont.	1-d. Allow anchoring corklines.	1-d. The expansion of anchoring in San Francisco Bay is likely to be controversial and would require going through public notice. Title 14, CCR, Section 164(a)(5), defines lines as being tied to a permanent structure. Allowing anchoring of lines could introduce navigation hazards in high-use boating areas in San Francisco Bay due to their length, and could also result in damage to sensitive benthic habitat. Allowing anchoring of lines would require changes to multiple subsections of Title 14, CCR, Section 164 that are outside the scope of this rulemaking.

ECONOMIC IMPACT STATEMENT

DEPARTMENT NAME Fish and Game Commission	CONTACT PERSON Margaret Duncan margaret.duncan	EMAIL ADDRESS @wildlife.ca.gov	TELEPHONE NUMBER 916 653-4674
DESCRIPTIVE TITLE FROM NOTICE REGISTER OR FORM 400 Amend Sections 163 and 164 Title 14, CCR, Re: Herring Eggs on Kelp Amendment			NOTICE FILE NUMBER Z

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

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

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

[No new costs or impact on harvest; amend for clarification of regulation text.](#)

If any box in Items 1 a through g is checked, complete this Economic Impact Statement.
If box in Item 1.h. is checked, complete the Fiscal Impact Statement as appropriate.

2. The _____ estimates that the economic impact of this regulation (which includes the fiscal impact) is:

(Agency/Department)

☐ Below \$10 million

☐ Between \$10 and \$25 million

☐ Between \$25 and \$50 million

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

3. Enter the total number of businesses impacted: _____

Describe the types of businesses (Include nonprofits): _____

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

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

Explain: _____

5. Indicate the geographic extent of impacts: ☐ Statewide

☐ Local or regional (List areas): _____

6. Enter the number of jobs created: _____ and eliminated: _____

Describe the types of jobs or occupations impacted: _____

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

If YES, explain briefly: _____

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

STD. 399 (REV. 12/2013)

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

1. What are the total statewide dollar costs that businesses and individuals may incur to comply with this regulation over its lifetime? \$ _____
 - a. Initial costs for a small business: \$ _____ Annual ongoing costs: \$ _____ Years: _____
 - b. Initial costs for a typical business: \$ _____ Annual ongoing costs: \$ _____ Years: _____
 - c. Initial costs for an individual: \$ _____ Annual ongoing costs: \$ _____ Years: _____
 - d. Describe other economic costs that may occur: _____
2. If multiple industries are impacted, enter the share of total costs for each industry: _____
3. If the regulation imposes reporting requirements, enter the annual costs a typical business may incur to comply with these requirements. *Include the dollar costs to do programming, record keeping, reporting, and other paperwork, whether or not the paperwork must be submitted.* \$ _____
4. Will this regulation directly impact housing costs? ☐ YES ☐ NO
 If YES, enter the annual dollar cost per housing unit: \$ _____
 Number of units: _____
5. Are there comparable Federal regulations? ☐ YES ☐ NO
 Explain the need for State regulation given the existence or absence of Federal regulations: _____
 Enter any additional costs to businesses and/or individuals that may be due to State - Federal differences: \$ _____

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

1. Briefly summarize the benefits of the regulation, which may include among others, the health and welfare of California residents, worker safety and the State's environment: _____
2. Are the benefits the result of: ☐ specific statutory requirements, or ☐ goals developed by the agency based on broad statutory authority?
 Explain: _____
3. What are the total statewide benefits from this regulation over its lifetime? \$ _____
4. Briefly describe any expansion of businesses currently doing business within the State of California that would result from this regulation: _____

D. ALTERNATIVES TO THE REGULATION *Include calculations and assumptions in the rulemaking record. Estimation of the dollar value of benefits is not specifically required by rulemaking law, but encouraged.*

1. List alternatives considered and describe them below. If no alternatives were considered, explain why not: _____

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

STD. 399 (REV. 12/2013)

ECONOMIC IMPACT STATEMENT (CONTINUED)

2. Summarize the total statewide costs and benefits from this regulation and each alternative considered:

Regulation: Benefit: \$ _____ Cost: \$ _____

Alternative 1: Benefit: \$ _____ Cost: \$ _____

Alternative 2: Benefit: \$ _____ Cost: \$ _____

3. Briefly discuss any quantification issues that are relevant to a comparison of estimated costs and benefits for this regulation or alternatives: _____

4. Rulemaking law requires agencies to consider performance standards as an alternative, if a regulation mandates the use of specific technologies or equipment, or prescribes specific actions or procedures. Were performance standards considered to lower compliance costs? ☐ YES ☐ NOExplain: _____
_____**E. MAJOR REGULATIONS** *Include calculations and assumptions in the rulemaking record.****California Environmental Protection Agency (Cal/EPA) boards, offices and departments are required to submit the following (per Health and Safety Code section 57005). Otherwise, skip to E4.***1. Will the estimated costs of this regulation to California business enterprises **exceed \$10 million**? ☐ YES ☐ NO***If YES, complete E2. and E3******If NO, skip to E4***

2. Briefly describe each alternative, or combination of alternatives, for which a cost-effectiveness analysis was performed:

Alternative 1: _____

Alternative 2: _____

(Attach additional pages for other alternatives)

3. For the regulation, and each alternative just described, enter the estimated total cost and overall cost-effectiveness ratio:

Regulation: Total Cost \$ _____ Cost-effectiveness ratio: \$ _____

Alternative 1: Total Cost \$ _____ Cost-effectiveness ratio: \$ _____

Alternative 2: Total Cost \$ _____ Cost-effectiveness ratio: \$ _____

4. Will the regulation subject to OAL review have an estimated economic impact to business enterprises and individuals located in or doing business in California exceeding \$50 million in any 12-month period between the date the major regulation is estimated to be filed with the Secretary of State through 12 months after the major regulation is estimated to be fully implemented?

☐ YES ☒ NO*If YES, agencies are required to submit a [Standardized Regulatory Impact Assessment \(SRIA\)](#) as specified in Government Code Section 11346.3(c) and to include the SRIA in the Initial Statement of Reasons.*

5. Briefly describe the following:

The increase or decrease of investment in the State: _____

The incentive for innovation in products, materials or processes: _____

The benefits of the regulations, including, but not limited to, benefits to the health, safety, and welfare of California residents, worker safety, and the state's environment and quality of life, among any other benefits identified by the agency: _____

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

STD. 399 (REV. 12/2013)

FISCAL IMPACT STATEMENT**A. FISCAL EFFECT ON LOCAL GOVERNMENT** *Indicate appropriate boxes 1 through 6 and attach calculations and assumptions of fiscal impact for the current year and two subsequent Fiscal Years.*

- ☐ 1. Additional expenditures in the current State Fiscal Year which are reimbursable by the State. (Approximate)
(Pursuant to Section 6 of Article XIII B of the California Constitution and Sections 17500 et seq. of the Government Code).

\$ _____

- ☐ a. Funding provided in _____
Budget Act of _____ or Chapter _____, Statutes of _____

- ☐ b. Funding will be requested in the Governor's Budget Act of _____
Fiscal Year: _____

- ☐ 2. Additional expenditures in the current State Fiscal Year which are NOT reimbursable by the State. (Approximate)
(Pursuant to Section 6 of Article XIII B of the California Constitution and Sections 17500 et seq. of the Government Code).

\$ _____

Check reason(s) this regulation is not reimbursable and provide the appropriate information:

- ☐ a. Implements the Federal mandate contained in _____
- ☐ b. Implements the court mandate set forth by the _____ Court.

Case of: _____ vs. _____

- ☐ c. Implements a mandate of the people of this State expressed in their approval of Proposition No. _____

Date of Election: _____

- ☐ d. Issued only in response to a specific request from affected local entity(s).

Local entity(s) affected: _____

- ☐ e. Will be fully financed from the fees, revenue, etc. from: _____

Authorized by Section: _____ of the _____ Code;

- ☐ f. Provides for savings to each affected unit of local government which will, at a minimum, offset any additional costs to each;

- ☐ g. Creates, eliminates, or changes the penalty for a new crime or infraction contained in _____

- ☐ 3. Annual Savings. (approximate)

\$ _____

- ☐ 4. No additional costs or savings. This regulation makes only technical, non-substantive or clarifying changes to current law regulations.

- ☒ 5. No fiscal impact exists. This regulation does not affect any local entity or program.

- ☐ 6. Other. Explain _____

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

STD. 399 (REV. 12/2013)

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

**Original signature on file 3/5/20***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

**Original signature on file 4/22/20***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



Notice of Exemption

Appendix E

To: Office of Planning and Research
P.O. Box 3044, Room 113
Sacramento, CA 95812-3044

County Clerk

County of: _____

From: (Public Agency): _____

(Address)

Project Title: _____

Project Applicant: _____

Project Location - Specific:

Project Location - City: _____ Project Location - County: _____

Description of Nature, Purpose and Beneficiaries of Project:

Name of Public Agency Approving Project: _____

Name of Person or Agency Carrying Out Project: _____

Exempt Status: **(check one):**

- ☐ Ministerial (Sec. 21080(b)(1); 15268);
- ☐ Declared Emergency (Sec. 21080(b)(3); 15269(a));
- ☐ Emergency Project (Sec. 21080(b)(4); 15269(b)(c));
- ☐ Categorical Exemption. State type and section number: _____
- ☐ Statutory Exemptions. State code number: _____

Reasons why project is exempt:

Lead Agency _____

Contact Person: _____ Area Code/Telephone/Extension: _____

If filed by applicant:

1. Attach certified document of exemption finding.
2. Has a Notice of Exemption been filed by the public agency approving the project? ☐ Yes ☐ No

Signature: _____ Date: _____ Title: _____

☐ Signed by Lead Agency ☐ Signed by Applicant

Authority cited: Sections 21083 and 21110, Public Resources Code.
Reference: Sections 21108, 21152, and 21152.1, Public Resources Code.

Date Received for filing at OPR: _____

ATTACHMENT TO NOTICE OF EXEMPTION

Adoption of Amendments to Sections 163 and 164, Title 14, California Code of Regulations (CCR), Re: Commercial Pacific Herring Eggs on Kelp

Project Title

Amend sections 163 and 164, Title 14, CCR, relating to the California Pacific Herring Fishery Management Plan (Herring FMP) implementing regulations that affect the Herring Eggs on Kelp (HEOK) fishery.

Project Location

The project is located within state waters in coastal northern and central California, specifically San Francisco Bay, and encompasses eight counties: Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma.

Project Description

The proposed project is the amendment of regulations adopted by the Fish and Game Commission (Commission) on October 10, 2019, to implement the fishery management plan for Pacific Herring under the State's jurisdiction. The proposed regulatory amendments specifically concern sections 163 and 164, Title 14, CCR that affect the HEOK fishery, and are intended to support the viability of the HEOK fishery, help improve the quality of the HEOK product, and remove or update burdensome or unnecessary regulations that are not applicable to the HEOK fishery.

Exemption from California Environmental Quality Act (CEQA) Review

On October 10, 2019, the Commission adopted the Herring FMP and implementing regulations, including sections 163 and 164, Title 14, CCR. The regulations that constitute this project (amendments to sections 163 and 164, Title 14, CCR) are regulations that implement the Herring FMP and thus explicitly fit within the referenced statute of Fish and Game Code subdivision 7078(e) that provides an exemption from an additional review process under CEQA.



Herring Eggs on Kelp (HEOK) Regulations

June 2020

Presented to:

Fish and Game Commission

Presented by:

Thomas Greiner

**Environmental Scientist
Marine Region**



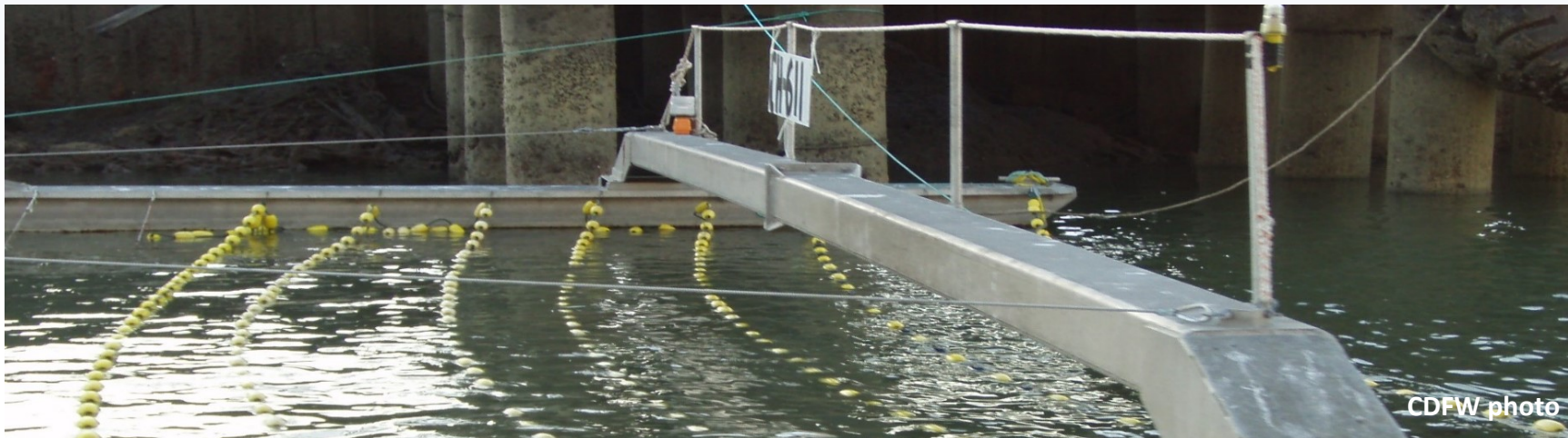
Proposed Amendments

- Replace requirement of permittee ‘on board vessel’ with ‘immediately present during’ suspension of kelp and breakdown of lines – §163(e)(3)(B)
- Include period of kelp suspension in definition of fishing – §164(a)
- Include ‘rinsing’ in definition of processing – §164(a)(3)
- Clarify corkline and buoy marking requirements – §164(d)(1)
- Modify noise rule language – §164(f)
- Remove prohibition on certain marine mammal deterrent devices – §164(g)
- Allow weekend landings – §164(h)(4)



Additional Requests – Not Included

- Allocate total HEOK quota among permittees ('permit quotas')
 - Including allowing permittees to own up to two permits
- Specify less severe penalties
- Amend definition of lines to allow anchoring on water bottom



Thank You

Thomas Greiner
Tom.Greiner@wildlife.ca.gov
(707) 576-2876

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

COMMITTEE STAFF SUMMARY FOR MARCH 17, 2020 MRC
For Background Purposes Only

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

COMMITTEE STAFF SUMMARY FOR MARCH 17, 2020 MRC
For Background Purposes Only

- 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: _____

Memorandum

Date: June 8, 2020

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

From: Charlton H. Bonham
Director

Subject: **Recreational Crab Rulemaking Guidance for Proposed Amendments to Section 29.8, 29.85, 701 - Title 14, CCR**

At the upcoming June Fish and Game Commission (Commission) meeting the Department is requesting additional guidance on four elements of the proposed recreational crab fishing rulemaking.

1. Validation stamp sunset period – The Department does not recommend a sunset period on the validation stamp. The additional license cost to anglers is expected to be minimal and the validation stamp is expected to support long term data collection needs. When the validation has outlived its purpose, it can be eliminated in a future rulemaking.
2. Service interval – Criteria used to provide a “severe weather extension.” The Department recommends using Fish and Game Code 9004 as a guide, “weather conditions at sea permitting.” Any criteria used to determine a weather exemption is very difficult if not impossible to define and apply due to the many factors involved. This section provides discretion to Enforcement officers based on recent sea conditions and accounts for vessel safety and operation at sea.
3. Director authority – The Department recommends using the proposed regulations to establish the Risk Assessment and Mitigation Program (RAMP) to guide the Director’s decision to take a management action, either pre-season or in-season. A management trigger for the recreational fishery would only be applied based on elevated risk due to marine life concentrations under the RAMP. Elevated risk could either cause a delay in the opening of the season or an early season closure.
4. Recreational gear retrieval program – The Department has considered the proposal to include a recreational gear retrieval program and does not recommend development of such a program at this time for the following reasons:
 - Considerations of authority need to be further explored to ensure a retrieval program can be appropriately implemented.
 - The commercial 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.

- The Department has not conducted outreach on this proposal, 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 gear marking program for the recreational sector needs to be implemented first so that gear can clearly be identified once a retrieval program is established. The marking requirement is not expected to be implemented until November 2021.
- Given current workload commitments and COVID-19 impacts, adding any complexity or new elements to the rulemaking would result in additional delays to the adoption of the regulations

To better inform a future recreational gear retrieval effort, the Department recommends requesting existing commercial retrieval program permittees to voluntarily document the scope of the problem by identifying and reporting lost/abandoned recreational trap gear. If lost recreational pots are observed during commercial retrieval operations, Law Enforcement should be contacted for options to remove the gear.

If you have any questions or need additional information, please contact Ryan Bartling, Senior Environmental Scientist, at Ryan.Bartling@Wildlife.ca.gov.

cc: 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, Program Manager
State Managed Invertebrate Fisheries
Sonke.Mastrup@wildlife.ca.gov

Mary Loum, Staff Counsel
Office of General Counsel
Mary.Loum@wildlife.ca.gov

Mike Stefanak, Assistant Chief
Law Enforcement Division
Mike.Stefanak@wildlife.ca.gov

Ryan Bartling, Senior Environmental Scientist
Marine Region
Ryan.Bartling@wildlife.ca.gov



Recreational Crab Rulemaking

24 June 2020

Presented to:

Fish and Game Commission

Title

Presented by:

Ryan Bartling

**Senior Environmental Scientist
Marine Region**



Recreational Crab Proposals

- **Enhanced Gear Marking**
 - Unique buoy
- **Trap Limit**
 - 5-10 pots per individual
- **Service Interval**
 - 9 days
 - “severe weather extension” - use FGC 9004



Recreational Crab Proposals (Cont.)

- **Validation stamp**
 - Nominal cost add-on to license purchase
 - “Sunset” not recommend
- **Director’s authority**
 - Based on Risk Assessment and Mitigation Program
 - Season delay or early season closure based on elevated risk, including “fair and orderly provision”
- **Gear retrieval program**
 - Not recommend at this time

Thank You

Ryan Bartling

Ryan.Bartling@wildlife.ca.gov

Whale Safe Fisheries

www.wildlife.ca.gov/Conservation/Marine/Whale-Safe-Fisheries



From: George Osborn <george@osbornstrategies.com>
Sent: Thursday, May 7, 2020 5:24 PM
To: FGC <FGC@fgc.ca.gov>
Cc: Bonham, Chuck@Wildlife <Chuck.Bonham@wildlife.ca.gov>; Shuman, Craig@Wildlife <Craig.Shuman@wildlife.ca.gov>; Mastrup, Sonke@Wildlife <Sonke.Mastrup@wildlife.ca.gov>
Subject: Coastsides proposal to mitigate entanglements

Dear Commissioners,

Please find attached a Coastsides Fishing Club proposal to mitigate the risk of whale and turtle entanglements with recreational Dungeness Crab gear.

We appreciate that the Commission and Department has asked Coastsides to work with you in finding an equitable approach.

Thank you.

--

George L. Osborn

[Redacted]
[Redacted]
[Redacted]

--



May 7, 2020

VIA EMAIL: fgc@fgc.ca.gov

Ms. Samantha Murray, Vice-President
Mr. Pete Silva
California Fish and Game Commission
1416 Ninth Street, Suite 1320
Sacramento, CA 95814

Re: Appropriate Metrics for Risk Assessment in the Recreational Dungeness Crab Fishery

Dear Vice-President Murray and Commissioner Silva:

The Coastside Fishing Club appreciates the progress made with the Commission and Department on certain aspects of proposed regulatory changes to recreational Dungeness crab regulations. There remains one significant area, perhaps the most significant, where our efforts to engage with the Department have proved fruitless. While captioned as "director authority," what's really at stake is whether the recreational and commercial Dungeness crab fisheries present identical risks of whale entanglement and ought to be treated the same.

We earlier cited NMFS data to the Commission and Department establishing that recreational crab gear is responsible for a very small fraction of identified entanglements. Identified entanglement data show the commercial Dungeness crab sector has 16 times as many whale entanglements as the recreational sector. While it is true that the fishery responsible for entanglements is identified only about half of the time, there is no reason to doubt that the identified entanglements are at least broadly representative of the total. Accordingly, there shouldn't be a genuine dispute that the recreational Dungeness crab fishery presents a much lower risk of whale entanglements than the commercial fishery.

The Department has prepared for the commercial fishery a Risk Assessment and Mitigation Plan (RAMP). Provisions of the RAMP are tied closely to the terms of a settlement agreement that concluded litigation relating solely to the commercial Dungeness crab fishery. The Commission was not a party to the litigation, of course, because the claims did not concern the recreational crab fishery.

We do not object to the adoption of risk assessment measures for the recreational crab fishery, but the metrics adopted must reflect the well documented lower risk of whale entanglements for this sector. To do otherwise would be patently arbitrary.

We have the following modest proposal based on language found in the commercial RAMP. We do not see the need for any additional surveys or the expenditure of additional funds to administer a recreational RAMP. The Director can rely on the data already collected to manage the commercial fishery.

- With reference to animal concentration numbers, Coastside suggests that the concentrations be increased by a factor of 10 to reflect the lower impact of recreational crabbing on entanglements when compared to the number of commercial entanglements. Coastside believes a factor of 10 to be conservative as actual known recreational entanglements are 1/16th that of the commercial sector. Given that the commercial RAMP specified animal concentration metrics produce an acceptable risk of entanglement in the commercial fishery, then appropriately scaled metrics for the recreational fishery would also present an acceptable risk.
- The commercial RAMP incorporates a scoring system that can be used in a recreational RAMP with one change. Unidentified entanglements should not be scored against the recreational sector. That provision appears in the commercial RAMP as a requirement of the commercial settlement agreement. Based on the best scientific information available, recreational gear is responsible for about 5% of whale entanglements. It would not be fair to charge the recreational sector with 0.5 of an entanglement for unidentified gear, roughly ten times the historical average while the commercial sector is charged much less than its own historical average.
- The recreational Dungeness crab opener should only be delayed (or closed in season) when a survey determines that animal concentrations exceed the threshold for the recreational sector (or as provided under the scoring of confirmed entanglements). The season should not automatically be delayed simply because the Department had not timely completed a survey.

Commissioners should understand that the recreational Dungeness crab fishery, particularly in District 10 (south of the Mendocino-Sonoma County line), becomes severely restricted upon the opening of the commercial season. The commercial fishery is a “derby” with nearly all commercial gear thrown into the fray immediately with the goal of harvesting all available crab as soon as possible. Consequently, the “productive” period of the recreational crab fishery terminates in much of the State on the commercial opening. Under current regulations, the productive period ranges from seven to fourteen days¹ in District 10.

¹ The recreational season opens on the first Saturday in November, i.e. in the range of November 1-7 depending on the calendar. Absent extenuating circumstances, commercial gear is deployed on November 14 in District 10.

Ms. Samantha Murray

Mr. Pete Silva

May 7, 2020

Page 3 of 3

If the recreational and commercial sectors are governed by the same RAMP metrics, then they open at the same time and the recreational sector is largely shut out of that year's fishery. The Department has suggested a five-day "fair start," but that further shortens an already abbreviated season. On the other hand, if different animal concentrations are used for the two sectors, the recreational sector will be less restricted and will naturally open earlier than the commercial sector, as it does today.

We look forward to discussing this proposal with the Commission and Department.

Respectfully submitted,

Coastside Fishing Club

cc: Fish and Game Commission, Chuck Bonham, Craig Shuman, Sonke Mastrup

STAFF SUMMARY FOR AUGUST 22-23, 2018
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

STAFF SUMMARY FOR AUGUST 22-23, 2018
For Background Purposes Only

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.



Amend §29.15: Rec. Abalone Closure



California Fish and Game Commission
June 24, 2020

Ian Taniguchi, Senior Environmental Scientist
CDFW Invertebrate Management Project

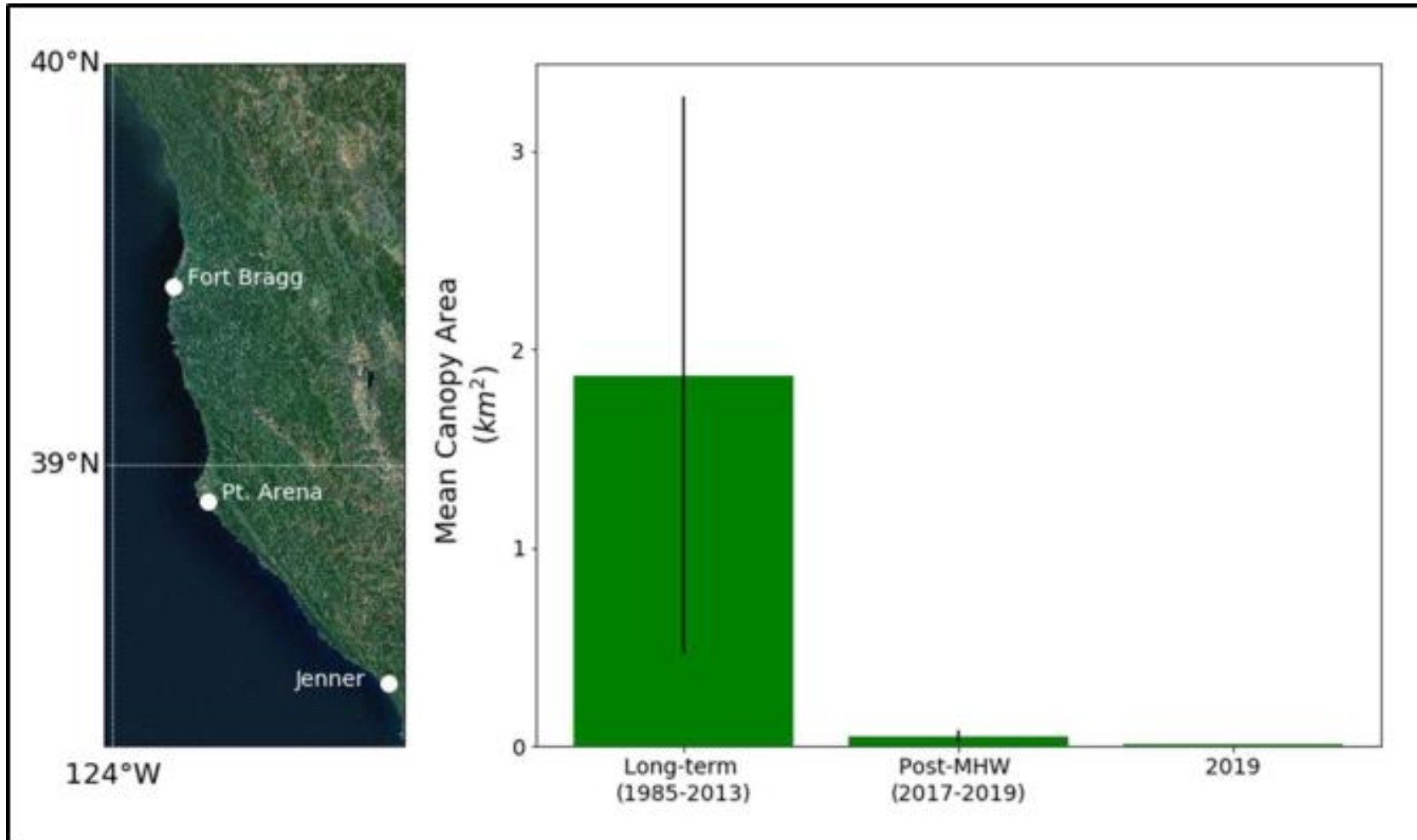


Summary

- Fishery closed since April 1, 2018 due to poor environmental and stock conditions
- Stock and environmental conditions have continued to decline
- Proposed amendment removes current sunset date on closure (April 1, 2021)
- Recently completed collaborative process is informing development of FMP, which will specify thresholds for reopening



Landsat Kelp Cover Decline



Mean Bull Kelp Coverage in Northern California in km² before Marine Heat Wave (MHW), after MHW, and in 2019 (Source: McPherson, Finger, Housekeeper, Bell, Carr, Rogers-Bennett, & Kudela 2020)



CDFW Dive Survey Density Data

Location	2012-2016 Average Density (ab/m ²)	2017-2018 Average Density (ab/m ²)	% Decline in Density
Sonoma County (5 Sites)	0.39	0.15	61%
Mendocino County (5 Sites)	0.49	0.13	73%
Combined Average	0.44	0.12*	72%

* The ARMP fishery closure is 0.30 abalone/m². The overall average, when including past densities as a proxy for sites not sampled since 2016, is 0.28.

- Limited dive surveys in 2019 suggest continued decline in density
 - Density at Van Damme in 2019 was 0.09 ab/m², compared to 0.15 (2018) and 0.33 (2016)



Opportunities for Engagement

- Recreational Abalone Advisory Committee
 - Via webinar date TBA July 2020
- FGC Hearing Schedule:
 - Notice: August 19-20, 2020 (Fortuna)
 - Discussion: October 14-15, 2020 (Oakland)
 - Adoption: December 9-10, 2020 (San Diego)
- Contact: Ian.Taniguchi@wildlife.ca.gov



Current Density Data (Supplemental)

Index Site (Sonoma-SC or Mendocino-MC)	Past Density (ab/m ²) (year sampled)	2017-2019 Density (ab/m ²)	% Decline In Density
Fort Ross (SC)	0.44 (2015)	0.08 (2018) &	81%
Timber Cove (SC)	0.38 (2015)	0.10 (2018)	74%
Ocean Cove (SC)	0.44 (2016)	0.11 (2018) &	75%
Salt Point (SC)	0.38 (2016)	0.06 (2017)	84%
Sea Ranch (SC)	0.37(2012)	0.27 (2017)	27%
SONOMA AVERAGE	0.39	0.15	61%
Point Arena (MC)	0.66 (2014-15)	0.25 (2017) &	62%
Van Damme (MC)	0.33 (2016)	0.15 (2018) 0.09 (2019)	55% 73%
Russian Gulch (MC)	0.60 (2014)	0.05 (2018)	92%
Caspar Cove (MC)	0.35 (2013)	0.01 (2018)	97%
Todd's Point (MC)	0.47 (2013)	0.13 (2018)	72%
MENDOCINO AVERAGE	0.49	0.13	73%
Overall Average	0.44	0.12*	72% 74%

* The ARMP fishery closure is 0.30 abalone/m². The overall average, when including past densities as a proxy for sites not sampled in 2017, is 0.28.

Source: CDFW dive surveys. Red ampersands (&) indicate sites where surveys occurred in 2019 but data were insufficient to calculate densities.

CALIFORNIA FISH AND GAME COMMISSION - NONREGULATORY REQUESTS - ACTIVE

Revised 06/12/2020

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
3/25/2020	Concern over perceived DFW/FGC inactivity on application for state water bottom lease	States that after two years, DFW and FGC staff have hindered progress on considering his lease application and have made requests that are unreasonable. Provides documentation of efforts to coordinate on the application process and environmental review. Gives six key comments (p. 27) and asks: What can be done to remedy this and encourage consideration of this aquaculture operation?	David Willett Santa Barbara Sea Ranch	Marine	Staff has been working with Mr. Willett, legislative representatives, and DFW to clarify a process to move the application forward and has made progress in starting environmental review. No further FGC action is recommended at this time.

California Fish and Game Commission
Meeting Locations for 2016-2021

Month	2021 (Proposed)	2020	2019	2018	2017	2016
January (WRC)	Redding	Long Beach/Los Alamitos	Ontario	Santa Rosa	Redding	Sacramento (cancelled)
February (FGC)	<i>LA/OC Area</i>	Sacramento	Sacramento	Sacramento	Rohnert Park	Sacramento
March (MRC)	<i>Monterey area</i>	Santa Rosa and Teleconference	Sacramento	Santa Rosa	San Clemente	Los Alamitos
April (FGC & TC)	<i>Sacramento</i>	Webinar and Teleconference	Santa Monica	Ventura	Van Nuys	Santa Rosa
May (FGC & WRC)	<i>Santa Rosa</i>	Webinar and Teleconference	Sacramento	Los Alamitos	Sacramento	West Sacramento
June (FGC)	<i>Merced or San Jose</i>	Webinar and Teleconference	Redding	Sacramento	Smith River	Bakersfield
July (MRC)	<i>San Clemente</i>	Webinar and Teleconference	Ventura	San Clemente	Santa Rosa	Petaluma
August (FGC & TC)	<i>Fortuna</i>	Fortuna	Sacramento	Fortuna	Sacramento	Folsom
September (WRC)	<i>So Cal</i>	Sacramento	Santa Rosa	Sacramento	Riverside	Woodland
October (FGC)	<i>Sacramento</i>	Oakland	San Diego	Fresno	Atascadero	Eureka
November (MRC)	<i>Santa Rosa</i>	Monterey Area	Pacific Grove	Sacramento	Marina	Sacramento
December (FGC & TC)	<i>San Diego</i>	San Diego	Sacramento	Oceanside	San Diego	San Diego

State of California
Department of Fish and Wildlife

M e m o r a n d u m

Original on file,
received May 22, 2020

Date: May 20, 2020

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

From: Charlton H. Bonham
Director

Subject: **Agenda Item for the June 24-25, 2020 Fish and Game Commission Meeting Private Lands Wildlife Habitat Enhancement and Management (PLM) Area Licenses**

The Department of Fish and Wildlife has reviewed the Annual and 5-year renewals for 49 properties in 13 counties consisting of approximately 275,192 acres. Corrections to the Tejon Ranch season dates are also included in this request.

The Annual renewal PLM areas were previously licensed under Commission regulations Section 601, Title 14, California Code of Regulations. Full payment was made for all tags used in 2019, and all habitat work was completed.

The 5-year renewal management plans are in compliance with Commission policy for private lands management. The applicants have identified the location where records will be kept and made available for inspection.

Tejon Ranch was approved at the April 16, 2020 Commission meeting with incorrect season dates. The Department of Fish and Wildlife is requesting the following changes be made:

- Change the either-sex deer early season end date from November 3, 2020 to November 8, 2020
- Change the either-sex deer late season start date from November 3, 2020 to November 9, 2020
- Change the spring turkey season from March 28, 2020 through May 3, 2020 to March 14, 2021 through May 17, 2021

Habitat improvements accomplished under these plans will enhance and maintain wildlife resources on and around the PLM areas. The goals and objectives stated in the management plans are compatible with Department management plans for appropriate species in these areas. In addition, access to public lands will not be diminished under implementation of these management plans.

Melissa Miller-Henson, Executive Director
Fish and Game Commission
May 20, 2020
Page 2

The Department recommends that the Commission approve the specified wildlife management plans, applications, and each 2020/21 harvest program under conditions specified in the attached tables.

If you have any questions, please contact Ms. Victoria Barr at (916) 371-3466 or by email at Victoria.barr@wildlife.ca.gov.

Attachment

cc: Stafford Lehr, Deputy Director
Wildlife and Fisheries Division
Stafford.Lehr@wildlife.ca.gov

Kevin Shaffer, Acting Branch Chief
Wildlife Branch
Kevin.shaffer@wildlife.ca.gov

Brad Burkholder
Environmental Program Manager
Wildlife Branch
Brad.burkholder@wildlife.ca.gov

Victoria Barr, Environmental Scientist
Wildlife Branch
Victoria.barr@wildlife.ca.gov

PLM AREA LICENSE
ANNUAL RENEWALS, 2020/2021
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS

PLM Area	Proposed Season and Harvest	Habitat Improvement Program
NORTHERN REGION		
ASH VALLEY RANCH DEER ZONE X3A LASSEN 8,736 ACRES	<p>Authorized Harvest: 4 buck deer forked horn or better and 1 pronghorn antelope</p> <ul style="list-style-type: none"> • Issue 6 buck deer tags to take 4 forked horn or better buck deer for the period August 15, 2020 through November 30, 2020. • No person shall take more than one buck deer annually in the X zones. • In no case shall the number of tags issued be used to exceed the authorized harvest. • The number of tag holders actively hunting shall not exceed the number of deer available to harvest. • Issue 1 buck pronghorn antelope tag for the period of August 1, 2020 through September 30, 2020. 	<ul style="list-style-type: none"> ➤ Remove noxious weeds from at least 20 acres by grubbing and/or chemical application. ➤ Through the use of rotational grazing prescriptions, maintain previously completed habitat restoration work.
BASIN VIEW RANCH DEER ZONE X2 MODOC 8,500 ACRES	<p>Authorized Harvest: 7 buck deer forked horn or better and 1 buck pronghorn antelope</p> <ul style="list-style-type: none"> • Issue 7 buck deer tags for the period of October 17, 2020 through November 30, 2020. • No person shall take more than 1 buck deer annually in the X zones. • Issue 1 buck pronghorn antelope tag for the period of September 1, 2020 through September 30, 2020. 	<ul style="list-style-type: none"> ➤ Remove all western junipers from 50 acres in order to encourage shrub and forb recruitment. ➤ Inspect and, as necessary, repair 10 miles of interior fencing that controls livestock movement and grazing. ➤ Exclude livestock grazing from 1 of the rotation management units (775 acres) year-round. ➤ Till and seed perennials grasses on 90 acres in Unit 9. ➤ Maintain and repair any damage to 5 ponds and springs.
BLACK RANCH SHASTA DEER ZONE C3 1,000 ACRES	<p>Authorized Harvest: 2 buck deer forked horn or better, 2 antlerless deer, 1 bull elk, and 1 antlerless elk</p> <ul style="list-style-type: none"> • Issue 2 buck deer tags and 2 antlerless deer tags for the period of September 15, 2020 through November 30, 2020. 	<ul style="list-style-type: none"> ➤ Maintain the 145-acre wetlands project that was constructed last year to re-establish the native hydrology of the floodplain to Burney Creek. ➤ Maintain 4 owl boxes, 7 bat boxes, and 6 goose nesting platforms by checking use and replacing nesting material as necessary.

PLM AREA LICENSE
ANNUAL RENEWALS, 2020/2021
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS

PLM Area	Proposed Season and Harvest	Habitat Improvement Program
BLACK RANCH CONT.	<ul style="list-style-type: none"> • Issue 1 bull elk tag and 1 antlerless elk tag for the period of August 15, 2020 through November 30, 2020. • No antlerless deer or elk may be harvested before September 15, 2020. 	<ul style="list-style-type: none"> ➤ Maintain wood duck box program. ➤ Limit livestock grazing to a 5-acre pen and barn area (exclusion area is 990 acres).
CLARKS VALLEY RANCH DEER ZONE X3B LASSEN 2,793 ACRES	<p>Authorized Harvest: 3 buck deer forked horn or better</p> <ul style="list-style-type: none"> • Issue 3 buck deer tags for the period of August 16, 2020 through November 30, 2020. • No person shall take more than 1 buck deer annually in the X zones. 	<ul style="list-style-type: none"> ➤ Maintain at least 10 acres of previously treated juniper treatments through removal of young junipers. ➤ Maintain 3 aspen and willow enclosures by inspecting fencing and making any necessary repairs. ➤ Continue rotational grazing by resting a different pasture each spring to protect critical wildlife habitat areas and aspen. ➤ Through this 5-yr. period a plan and implementation to improve 55 acres of riparian habitat in Clarks Valley, this year there will be field work, planning, and implementation on 18 acres.
CLOVER CREEK RANCH PLM DEER ZONE C3 SHASTA 880 ACRES	<p>Authorized Harvest: 3 buck deer forked horn or better</p> <ul style="list-style-type: none"> • Issue 3 buck deer tags for the period of August 1, 2020 through November 30, 2020. 	<ul style="list-style-type: none"> ➤ Replace the bottom strand of barbed wire with smooth wire 18 in. from the ground on at least 1 mile of fencing. ➤ Maintain 25 wood duck boxes on Clover Creek. ➤ Maintain 6 ponds in an area of the ranch that does not currently have water to encourage less cattle use of riparian areas. ➤ Plant one 1-acre or larger, fenced dry land food plot with grain or legumes using 70 lbs. of seed per acre, or alfalfa using 15-25 lbs. of seed per acre. ➤ Increase the amount of water piping and quantity of storage tank capacity for food plot areas and wildlife water. ➤ Continue reducing erosion and control sediment by creating water bars on graded dirt roads. ➤ Manage grazing intensity to retain 400 lbs. of residual dry matter (RDM) per acre. Begin spring grazing after grass height reaches at least 8 in. and end by May 1 to provide forage for wildlife.

PLM AREA LICENSE
ANNUAL RENEWALS, 2020/2021
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS

PLM Area	Proposed Season and Harvest	Habitat Improvement Program
DIXIE VALLEY RANCH DEER ZONE X3A LASSEN 12,500 ACRES	<p>Authorized Harvest: 4 buck deer forked horn or better, 2 buck pronghorn antelope, and 1 bull elk</p> <ul style="list-style-type: none"> • Issue 4 buck deer tags for the period of August 1, 2020 through November 30, 2020. • No more than 3 buck deer may be harvested after October 18, 2020. • No person shall take more than 1 buck deer annually in the X zones. • Issue 2 buck pronghorn antelope tag for the period of August 1, 2020 through September 30, 2020 • Issue 1 bull elk tag for the period of August 1, 2020 through November 30, 2020 	<ul style="list-style-type: none"> ➤ Remove all western juniper from 100 acres (goal is 1000 junipers/yr.) to increase shrub recruitment for wildlife forage. ➤ Manage 30 days of timed cattle grazing on 250 acres of natural pasture containing a large pond, a creek, and several springs to provide forage and water for wildlife. ➤ Establish a 10-acre legume plot for elk within the 800-acre irrigated pasture from which cattle are excluded. ➤ Plant and irrigate at least 50 acres of grain or other suitable deer food, retaining 5 of the 50 acres unharvested to provide forage for wildlife. ➤ Maintain and improve existing water sources by removing obstacles, checking dams for erosion or cattle damage, repairing spillways, and where appropriate, enlarging ponds. ➤ Maintain 20 Canada goose nesting platforms at Saw Mill pond, Jacks Hole and in the large marsh area.
DUNCAN CREEK RANCH DEER ZONE B5 SHASTA 1,366 ACRES	<p>Authorized Harvest: 6 buck deer forked horn or better</p> <ul style="list-style-type: none"> • Issue 8 buck deer tags for the period August 16, 2020 through November 30, 2020. • In no case shall the number of tags issued be used to exceed the authorized harvest. • The number of tag holders actively hunting shall not exceed the number of deer available to harvest. 	<ul style="list-style-type: none"> ➤ Burn at least 20 acres decadent brush to improve wildlife forage.
EL RANCHO RIO FRIO DEER ZONE B5 TEHAMA 12,682 ACRES	<p>Authorized Harvest: 24 buck deer forked horn or better</p> <ul style="list-style-type: none"> • Issue 24 buck deer tags for the period of August 15, 2020 through November 30, 2020. • No more than 12 deer may be harvested after October 25, 2020 	<ul style="list-style-type: none"> ➤ Burn 300-500 acres of decadent shrubs (mostly chamise) to enhance deer habitat. If burning is not permitted, use ball and chain to treat shrubs. ➤ Continue to maintain a 3-acre irrigated forage plot by first ripping to dislodge brush and then spraying brush sprouts with herbicide. Seed any mechanically disturbed areas with a mix of perennial grasses and annual clovers.

PLM AREA LICENSE
ANNUAL RENEWALS, 2020/2021
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS

PLM Area	Proposed Season and Harvest	Habitat Improvement Program
<p>FIVE DOT RANCH-AVILA</p> <p>DEER ZONE X3A</p> <p>LASSEN</p> <p>11,000 ACRES</p>	<p>Authorized Harvest: 6 buck deer forked horn or better</p> <ul style="list-style-type: none"> • Issue 10 buck deer tags to take 6 for the period of September 19, 2020 through November 30, 2020. • No person shall take more than 1 buck deer annually in the X zones. • In no case shall the number of tags issued be used to exceed the authorized harvest. • The number of tag holders actively hunting shall not exceed the number of deer available to harvest. 	<ul style="list-style-type: none"> ➤ Continue reduced livestock use at 300-400 head (previously 450 head). ➤ Cut 300 Junipers from Coral reservoir. ➤ Continue to exclude livestock from 7 aspen and wetland habitat enclosures by inspecting fencing and making any necessary repairs. These areas provide important deer fawning habitat. ➤ Maintain 6 nesting platforms for Canada geese at 4 reservoirs by checking use and replacing nesting material as necessary. ➤ Cut and disperse 100 mountain mahogany branches with ripe seeds in order to recruit young plants. ➤ Maintain 6 existing springs by checking for broken pipes and repairing as necessary. ➤ Maintain 4 existing reservoirs by inspecting spillways and dams for damage and making any necessary repairs.
<p>FOUR PINES RANCH</p> <p>DEER ZONE B1</p> <p>MENDOCINO</p> <p>2,001 ACRES</p>	<p>Authorized Harvest: 12 buck deer forked horn or better and 4 antlerless deer</p> <ul style="list-style-type: none"> • Issue 12 buck deer tags and 4 antlerless deer tags for the period of July 18, 2020 through November 30, 2020. • No more than 6 buck deer may be harvested after October 25, 2020. • No antlerless deer shall be harvested before September 15, 2020. 	<ul style="list-style-type: none"> ➤ Maintain 7 previously improved springs and 2 existing ponds. ➤ Develop 1 spring in section 1, 7, 11, 12, or 13. ➤ Plant and maintain 0.50-acre forage plot with legumes for wildlife use in section 1, 7, 11, 12, or 13. ➤ Treat 0.25-acre of invasive weeds in section 1, 7, 11, 12, or 13, by hand manipulation or herbicides, to encourage native vegetation growth. ➤ Remove 50 ft. of interior fence to enhance wildlife passage in section 1, 7, 11, 12, or 13. ➤ Create a 0.25-acre opening through dense brush in section 1, 7, 11, 12, or 13 to enhance wildlife access to forage. ➤ Remove encroaching conifer seedlings and saplings in 0.25 acre of oak woodlands in section 1, 7, 11, 12, or 13. ➤ Restrict livestock grazing to no more than 50 head of cattle during the winter and spring. ➤ Plant 50 willow shoots at existing water sources; improve existing willow patches by trimming to encourage growth. ➤ Create at least 2 new brush piles annually for wildlife cover.

PLM AREA LICENSE
ANNUAL RENEWALS, 2020/2021
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS

PLM Area	Proposed Season and Harvest	Habitat Improvement Program
FOUR PINES RANCH CONT.		<ul style="list-style-type: none"> ➤ Maintain and/or improve existing water sources at dams/ponds.
HATHAWAY OAK RUN RANCH DEER ZONE C3 SHASTA 6,640 ACRES	<p>Authorized Harvest: 12 buck deer forked horn or better</p> <ul style="list-style-type: none"> • Issue 12 buck deer tags for the period of September 19, 2020 through November 30, 2020. • No more than 9 buck deer may be harvested after October 25, 2020. 	<ul style="list-style-type: none"> ➤ Maintain the 6-acre riparian livestock exclusion on Swede Creek by inspecting fencing and making any necessary repairs. ➤ Maintain or improve 7 springs that provide year-round water for wildlife by checking for broken pipes and repairing as necessary and clearing sediment and vegetation from the sources. ➤ Develop 1 new spring either in the SE corner of Section 3 or in the Swede Basin area of Section 4. At each location, a French drain will be installed with water piped to a 225-gallon stock tank. ➤ Maintain existing deer forage areas by diverting spring water over the maximum area possible and along the contour through a shallow ditch system. ➤ Promote vernal pool flora and fauna by using cattle grazing to protect and maintain 2 vernal pools in Section 9 and 18. ➤ Install 1 new owl box and maintain 2 owl boxes along Oak Run Creek by checking use and replacing material as necessary. ➤ Plant 3 container stock cottonwood trees and install fencing to exclude livestock along the springs in the Swede Creek plains area.
JERUSALEM CREEK RANCH DEER ZONE B5 SHASTA 726 ACRES	<p>Authorized Harvest: 4 forked horn or better buck deer</p> <ul style="list-style-type: none"> • Issue 4 buck tag for the period of August 8, 2020 through November 30, 2020. 	<ul style="list-style-type: none"> ➤ Maintain 2 water sources that provide water for wildlife by checking for broken pipes and repairing as necessary. ➤ Thin at least 5 acres of dense thickets of stunted interior live oak trees by, on average, cutting 1-2 weaker, branching trunks from multi-trunk trees. The new shoots provide high-quality forage for wildlife. ➤ Mechanically treat a minimum of 15 acres decadent <i>Ceanothus</i> or white leaf manzanita. ➤ Burn brush piles from mechanically treated acreages.

PLM AREA LICENSE
ANNUAL RENEWALS, 2020/2021
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS

PLM Area	Proposed Season and Harvest	Habitat Improvement Program
KRAMER RANCH PLM DEER ZONE X1 LASSEN 4,070 ACRES	<p>Authorized Harvest: 5 buck deer forked horn or better</p> <ul style="list-style-type: none"> Issue 5 buck deer tags for the period of August 20, 2020 through November 30, 2020. No person shall take more than 1 buck deer annually in the X zones. 	<ul style="list-style-type: none"> ➤ Remove all western junipers from at least 45 acres except for any large, old-growth juniper that are being used by wildlife. ➤ Replace 2959.9 ft. of 5 strand barbed wire fencing with wildlife-friendly fencing. ➤ Maintain rotational grazing practices in the juniper removal area to allow for establishment of native grasses, forbs, and shrubs for wildlife. Rotate cattle to next pasture before grasses reach a 6in. stubble height. Available forage for wildlife on the ranch will be monitored using 1-m² grazing enclosure cages. ➤ Noxious weed monitoring and treatment of at least 2 acres by grubbing and/ or chemical treatments. ➤ Remove conifers from 6-acre aspen grove.
LITTLE DRY CREEK RANCH DEER ZONE C4 TEHAMA 2,000 ACRES	<p>Authorized Harvest: 2 buck deer forked horn or better</p> <ul style="list-style-type: none"> Issue 2 buck deer tags for the period of October 20, 2020 through November 30, 2020. 	<ul style="list-style-type: none"> ➤ Continue to exclude livestock grazing from the entire ranch to benefit wildlife. ➤ Maintain 3 springs by checking for broken pipes and repairing as necessary. Install wildlife escapement ramps within existing troughs at spring 3. ➤ Treat at least 2 acres of yellow star thistle with herbicides. ➤ Keep trespass livestock off the ranch by annually inspecting the perimeter fence and repairing any damage.
LONG PRAIRIE FARMS DEER ZONE X1 SISKIYOU 1,814 ACRES	<p>Authorized Harvest: 2 either-sex deer and 1 bull elk</p> <ul style="list-style-type: none"> Issue 2 either-sex deer tags for the period of September 1, 2020 through November 30, 2020. No person shall take more than 1 buck deer annually in the X zones. No antlerless harvest may occur before September 15, 2020. Only 1 buck deer shall be harvested after November 1, 2020. 	<ul style="list-style-type: none"> ➤ Remove western juniper from at least 5 acres to improve shrub recruitment. ➤ Increase forage quality for wildlife by pruning bitterbrush and mechanically disturbing the soil within a 5-acre area. ➤ Maintain 9 miles of exclusion fencing on the ranch to prohibit grazing from trespass cattle. ➤ Use ground water pumps to create and maintain a 1-acre wetland to provide year-round water for wildlife. ➤ Retain at least 150 acres of alfalfa and timothy grass in the crop pivot corners to provide fall forage for wildlife. ➤ Identify and retain at least 3 pine and/or juniper trees currently providing nesting opportunities for raptors on the ranch.

PLM AREA LICENSE
ANNUAL RENEWALS, 2020/2021
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS

PLM Area	Proposed Season and Harvest	Habitat Improvement Program
LONG PRAIRIE FARMS CONT.	<ul style="list-style-type: none"> Issue 1 bull elk tag for the period of September 1, 2020 through December 15, 2020. 	
LOOKOUT RANCH DEER ZONE X1 MODOC 6,880 ACRES	<p>Authorized Harvest: 6 buck deer forked horn or better and 1 pronghorn antelope tag</p> <ul style="list-style-type: none"> Issue 6 buck deer tags for the period of August 15, 2020 through November 30, 2020. No person shall take more than 1 buck deer annually in the X zones. Issue 1 pronghorn antelope tag for the period of August 1, 2020 through September 15, 2020. 	<ul style="list-style-type: none"> ➤ Renovate and re-level at least 80 acres of wild rice to improve water storage for waterfowl. ➤ Remove western junipers from 3 acres at Moon Pasture. ➤ Plant 250 willows in the Buck Pasture draw below the third pond and 250 willows in the southwest corner of the marsh. ➤ Plant 30 acres of millet, chufa, and dwarf corn on the eastside marsh to be left unharvested and ungrazed, 12 acres of wild rice to be left unharvested in Buck Pasture, 10 acres of barley to be left unharvested in Bass Pond, and 15 acres in the pivot corners to provide forage for wildlife. ➤ Rotate 200 head of cattle through all deeded ground. During summer, graze 75% of cattle on private lease ground, then bring cattle back to the ranch in fall to manage crop residue that restricts plant growth and development. Gather cattle and ship to winter pasture. ➤ Build at least 5 brush piles (average size of 12 x 8 ft.) in the Moon Pasture to provide escape cover for wildlife.
MENDIBOURE COLD SPRINGS RANCH DEER ZONE X5B LASSEN 1,880 ACRES	<p>Authorized Harvest: 1 buck deer forked horn or better</p> <ul style="list-style-type: none"> Issue 1 buck deer tag for the period of October 3, 2020 through October 18, 2020. No person shall take more than 1 buck deer annually in the X zones. 	<ul style="list-style-type: none"> ➤ Maintain 2-acre young aspen exclosure above Hall Cabin. ➤ Cut at least 50 mountain mahogany branches with ripe seeds and disperse on the ground in order to recruit young plants. ➤ Mechanically remove western juniper from 5 acres in the southeast corner of Section 36 to improve shrub and forb recruitment. ➤ Maintain East Meadow spring by checking and repairing any damaged parts. ➤ Continue rotational cattle grazing between 2 pastures so that the residual dry matter does not fall below 40% using the Double-Weight sampling technique.

PLM AREA LICENSE
ANNUAL RENEWALS, 2020/2021
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS

PLM Area	Proposed Season and Harvest	Habitat Improvement Program
OBSERVATION PEAK RANCH DEER ZONE X5B LASSEN 640 ACRES	<p>Authorized Harvest: 1 forked horn or better buck deer</p> <ul style="list-style-type: none"> • Issue 1 buck tag for the period of September 25, 2020 through November 30, 2020. • No person shall take more than 1 buck deer annually in the X zones. 	<ul style="list-style-type: none"> ➤ Seed 1 acre of mountain mahogany at a rate of 0.20 lbs./acre. ➤ Water 100 bitterbrush seedlings during the summer. ➤ Install 1 750-gallon wildlife guzzler with exclusion fencing.
PONDOSA DEER ZONE X1 SISKIYOU 27,734 ACRES	<p>Authorized Harvest: 3 either-sex deer, 2 bull elk, and 2 antlerless elk</p> <ul style="list-style-type: none"> • Issue 3 either-sex deer tags of which no more than 2 bucks may be harvested for the period of August 15, 2020 through November 15, 2020. • No antlerless deer shall be harvested before September 15, 2020. • Issue 2 bull elk tags and 2 antlerless elk tags for the period of September 1, 2020 through November 25, 2020. 	<ul style="list-style-type: none"> ➤ Maintain 30 acres of aspen and meadow restoration areas by removing encroaching conifer seedlings and saplings in Bear lake/Horseshoe Meadow. ➤ Create 4 brush piles for wildlife cover. ➤ Continue ongoing study that utilizes trail cameras to estimate cow:calf ratios on the property. ➤ Recruit 30 acres of late seral habitat by retaining up to 10% of the standing inventory within even-aged timber units.
RED ROCK RANCH DEER ZONE X3B LASSEN 6,887 ACRES	<p>Authorized Harvest: 7 buck deer forked horn or better, 2 buck pronghorn antelope and 1 bull elk</p> <ul style="list-style-type: none"> • Issue 7 buck deer tags for the period of August 16, 2020 through November 30, 2020. • No person shall take more than 1 buck deer annually in the X zones. • Issue 2 buck pronghorn antelope tags for the period of August 16, 2020 through November 30, 2020. • Issue 1 bull elk tag for the period of August 16, 2020 through November 30, 2020. 	<ul style="list-style-type: none"> ➤ Aspen meadow restoration in Red Rock Creek, Quaking Creek, and Bare Creek totaling 100 acres. This year includes field work, planning and implementation of 33 acres. ➤ Maintain the livestock fencing at 2 springs near Windy Flat to exclude livestock. ➤ Inspect and make any necessary repairs to the livestock exclusion fencing around 2 aspen and willow stands that provide deer fawning habitat. ➤ Remove all western juniper from 41 acres to enhance shrub recruitment. ➤ Maintain aspen enclosure in Boot Lake Canyon, west of Boot Lake, to exclude livestock grazing and encourage the development of additional fawning habitat. ➤ Continue rotational grazing to rest at least 1 meadow for wildlife cover and forage.

PLM AREA LICENSE
ANNUAL RENEWALS, 2020/2021
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS

PLM Area	Proposed Season and Harvest	Habitat Improvement Program
RED ROCK RANCH CONT.		<ul style="list-style-type: none"> ➤ Maintain Little Boot Lake and Little Boot Springs through inspection, evaluation, and repair. ➤ Masticate 2 acres of decadent sage and mountain mahogany.
RED ROCK VALLEY FARMS DEER ZONE X1 SISKIYOU 5,562 ACRES	<p>Authorized Harvest: 3 either-sex deer and 1 bull elk</p> <ul style="list-style-type: none"> • Issue 3 either-sex deer tags for the period of September 15, 2020 through November 30, 2020. • No antlerless deer shall be harvested before September 15, 2020. • No person shall take more than 1 buck deer annually in the X zones. • Only 1 buck deer shall be harvested after November 1, 2020. • Issue 1 bull elk tag for the period of September 1, 2020 through December 15, 2020. 	<ul style="list-style-type: none"> ➤ Selectively remove western juniper from at least 5 acres improve shrub recruitment. ➤ Increase forage quality for wildlife by pruning bitterbrush and mechanically disturbing the soil within a 5-acre area. ➤ Maintain 12 miles of exclusion fencing on the ranch to prohibit grazing from trespass cattle. ➤ Retain 500 acres of alfalfa and timothy grass in the crop pivot corners to provide fall forage for wildlife. ➤ Maintain a restored 2-acre wetland by pumping water into it to providing year-round water for wildlife. ➤ Protect known pine and juniper trees that provide nesting and perching opportunities for raptors. ➤ Maintain Tecnor Spring by removing western juniper trees and silt as necessary.
RICKERT RANCH DEER ZONE C3 SHASTA 4,441 ACRES	<p>Authorized Harvest: 5 buck deer forked horn or better and 1 bull elk</p> <ul style="list-style-type: none"> • Issue 8 buck deer tags for the period of August 1, 2020 through November 30, 2020. • Only 3 buck deer shall be harvested after October 25, 2020. • In no case shall the number of tags issued be used to exceed the authorized harvest. • The number of tag holders actively hunting shall not exceed the number of deer available to harvest. • Issue 1 bull elk tag for the period of August 1, 2020 through November 30, 2020. 	<ul style="list-style-type: none"> ➤ Enhance water storage capacity of the 3 Ponds area ponds by enlarging, deepening and repairing the dams for longer water storage through the summer. ➤ Crush 2 acres of decadent manzanita and buckbrush in the BCHI-4B and 4C area to enhance seeding and regeneration of brush to improve forage for wildlife. ➤ Create at least 5 brush piles in the tree clean up areas. Piles will be 12 ft. wide by 6 ft. tall for quail habitat. ➤ Develop at least 0.50-acre semi-irrigated food plot in area FPD- 4A. Irrigation will be dependent upon water availability from source spring and pond area.

PLM AREA LICENSE
ANNUAL RENEWALS, 2020/2021
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS

PLM Area	Proposed Season and Harvest	Habitat Improvement Program
R-R RANCH MENDOCINO 1,470 ACRES	<p>Authorized Harvest: 2 bull and 6 antlerless elk</p> <ul style="list-style-type: none"> • Issue 2 bull elk tags for the period of August 1, 2020 through November 30, 2020. • Issue 4 antlerless elk tags for the period of September 15, 2020 through November 30, 2020. • On or before October 15, 2020, the licensee may request (in writing) up to 2 additional antlerless elk tags to accomplish the authorized harvest. 	<ul style="list-style-type: none"> ➤ Irrigate a 7-acre alfalfa pasture. If the alfalfa production falls below a total cover of 50% in the fall, rip, replant and roll the pasture at a rate of 20 lbs./acre the following March or April with a clover and alfalfa seed mix to provide high quality forage for wildlife. ➤ Maintain the existing 100-acre dryland plot with a rye grass/clover mix by harvesting and thatching every summer. ➤ Maintain 2 ponds and 2 water troughs for wildlife use. ➤ Clean (through a rotor-roter process) and maintain 3 natural springs and associated bathtub holding structures found on the Ranch to facilitate water flow from the springs to the tubs. ➤ Exclude livestock from the ranch to improve forage and cover for wildlife. ➤ Make wood piles for non-game wildlife. The location, size, and number are determined by the amount of large oak trees and branches that have fallen during the winter. However, in an effort to help pre-suppress wildfire on the Ranch, approximately 50% of the piles will be burned each year.
SALT CREEK RANCH DEER ZONE B5 TEHAMA 640 ACRES	<p>Authorized Harvest: 3 buck deer forked horn or better</p> <ul style="list-style-type: none"> • Issue 3 buck deer tags for the period of September 1, 2020 through November 30, 2020. 	<ul style="list-style-type: none"> ➤ Mechanically crush at least 3 acres of decadent brush to promote new growth. ➤ Maintain existing open areas (approx. 18 acres have been brush-cleared) by replanting with annual grains and clover. ➤ Continue to improve water retention ponds by repairing and plugging any leaks in the dams.
SCHNEIDER RANCH DEER ZONE B1 MENDOCINO 5,222 ACRES	<p>Authorized Harvest: 9 buck deer forked horn or better</p> <ul style="list-style-type: none"> • Issue 9 buck deer tags for the period of August 1, 2020 through November 30, 2020. • No more than 5 buck deer may be harvested after October 25, 2020. 	<ul style="list-style-type: none"> ➤ Cultivate with tractor equipment and irrigate the 1-acre Cabin food plot, which provides a year-round deer feeding area. ➤ Create 6 brush piles for wildlife cover. The piles will each be approximately 10 ft. in diameter and 6 ft. tall and will provide good habitat for both deer and quail.

PLM AREA LICENSE
ANNUAL RENEWALS, 2020/2021
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS

PLM Area	Proposed Season and Harvest	Habitat Improvement Program
SCHNEIDER RANCH CONT.		<ul style="list-style-type: none"> ➤ Burn 6 brush piles. The remnant charcoal and ashes are nutrient rich and deer roll in them, perhaps for control of external parasites. ➤ Cut/hinge at least 10 smaller sub-canopy oaks so they droop to a point where branches are within reach of deer. ➤ Inspect previously improved springs and repair any damaged parts, clear any brush that is intruding on the collection galleries, cleaning out accumulated debris and mud, and ensure the box is structurally sound. ➤ Exclude all livestock from the ranch, including regular fence maintenance in order to prohibit trespass cattle from USFS and BLM grazing allotments.
SL RANCH DEER ZONE X3A MODOC 7,500 ACRES	<p>Authorized Harvest: 4 buck deer forked horn or better and 1 buck pronghorn antelope</p> <ul style="list-style-type: none"> • Issue 4 buck deer tags for the period of August 15, 2020 through November 30, 2020. • No person shall take more than 1 buck deer annually in the X zones. • Issue 1 buck pronghorn antelope tag for the period of August 1, 2020 through September 30, 2020. 	<ul style="list-style-type: none"> ➤ Use a combination of chainsaws and herbicides to remove western juniper from at least 5 acres. ➤ Treat at least 5 acres of young juniper trees with herbicide. ➤ Flood 400 acres of harvested wild rice fields for waterfowl use. ➤ Maintain the livestock exclusion fence around the spring below Likely Mill to exclude cattle. ➤ Maintain 2 springs on Rocky Prairie and 1 pond by ensuring that fencing excludes cattle. Any damaged fences and structures will be repaired as necessary. ➤ Maintain the livestock exclusion fencing along the West Side Canal where willows are present. Fences and structures will be repaired as necessary. ➤ Plant 200 willow shoots along the north and south banks of the West Canal. ➤ Maintain and replace goose nesting platforms as needed.

PLM AREA LICENSE
ANNUAL RENEWALS, 2020/2021
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS

PLM Area	Proposed Season and Harvest	Habitat Improvement Program
<p>WALTON HOMESTEAD FAMILY, LLC</p> <p>DEER ZONE X3A</p> <p>LASSEN</p> <p>5,980 ACRES</p>	<p>Authorized Harvest: 5 either-sex deer and 1 buck pronghorn antelope</p> <ul style="list-style-type: none"> • Issue 5 either-sex deer tags for the period of August 15, 2020 through November 30, 2020. • No antlerless deer shall be harvested before September 15, 2020. • No person shall take more than 1 buck deer annually in the X zones. • Issue 1 buck pronghorn antelope tag for the period of August 1, 2020 through September 30, 2020. 	<ul style="list-style-type: none"> ➤ Removal and or thinning of at least 200 acres of junipers. ➤ Complete and maintain at least 200 yards of wildlife friendly fencing on the exterior fencing on the North property line. ➤ Plant at least 200 pounds of grasses and forbs as wildlife food sources. ➤ Plant at least 1 acre of bitterbrush and mahogany for wildlife forage and habitat. ➤ Plant at least 1 acre of berries, roses, and aspens for wildlife forage and habitat. ➤ Complete the 2 spring development projects. Including fencing, guzzler and remote cattle watering trough. ➤ Identify and begin work on a well drilling and conveyance system for livestock watering to relieve the demand on springs to allow better access for wildlife use. ➤ Maintain the containment basin, piping and water trough downhill from the spring for Hanna's and Horse Meadow Springs. ➤ Maintain wildlife-friendly livestock enclosure fencing around springs and basins and use solar pumping or gravity flow to give cattle and wildlife water access outside the fence. ➤ Install 2 owl nesting boxes and maintain previously installed boxes. ➤ Maintain aspen enclosure fencing and continue to remove junipers and pine trees within the enclosures.

PLM AREA LICENSE
ANNUAL RENEWALS, 2020/2021
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS

PLM Area	Proposed Season and Harvest	Habitat Improvement Program
NORTH CENTRAL REGION		
<p>ANDERSON RANCH</p> <p>DEER ZONE C4</p> <p>GLENN</p> <p>400 ACRES</p>	<p>Authorized Harvest: 3 buck deer forked horn or better and 3 antlerless deer</p> <ul style="list-style-type: none"> • Issue 3 buck deer tags for the period of November 1, 2020 to December 31, 2020. • Issue 3 antlerless deer for the period of November 1, 2020 to December 31, 2020. These 3 antlerless tags will be donated to the DFW SHARE Program. 	<ul style="list-style-type: none"> ➤ Maintain current conditions. ➤ Plant 5 coyote brush plants, 5 wild grapes, 5 valley oaks. ➤ Wire baskets will be placed around all the valley oak trees. ➤ Re-plant any trees/plants that do not survive. ➤ Conduct 2 deer surveys.
<p>BIRD HAVEN RANCH</p> <p>DEER ZONE D3</p> <p>GLENN</p> <p>2,500 ACRES</p>	<p>Authorized Harvest: 6 buck deer forked horn or better</p> <ul style="list-style-type: none"> • Issue 6 buck deer tags with 1 of the 6 tags being reserved for a junior hunter. 1-2 of these tags will be donated to a non-profit or sold to generate revenue for any such non-profit. The harvest period will be from August 15, 2020 to November 30, 2020. 	<ul style="list-style-type: none"> ➤ Maintain current conditions. ➤ Maintain and monitor 150 wood duck boxes. ➤ Retreat and clean-up 1-2 acres of Himalayan blackberry. ➤ Spot spray 150 acres for noxious weeds. ➤ Conduct 2 deer surveys or set up 6 or more trail cameras and catalog deer use as well as other wildlife species. ➤ Plant 10 separate 2+ acre foraging/nesting habitat food plots (corn, safflower, oats, or milo). ➤ Restore and enhance 25 acres of wetland habitat (clean swales, remove downed trees, mowing, spraying noxious weeds, burning and discing).
<p>DESERET FARM – WILSON UNIT</p> <p>DEER ZONE C4</p> <p>BUTTE</p> <p>7,989 ACRES</p>	<p>Authorized Harvest: 6 buck deer forked horn or better and 15 antlerless deer</p> <ul style="list-style-type: none"> • Issue 6 buck deer tags for the period of November 1, 2020 through December 31, 2020. • Issue 15 either-sex tags to take antlerless deer for the period of November 1, 2020 through December 31, 2020. 1 of the antlerless tags must be a junior tag. 	<ul style="list-style-type: none"> ➤ Plant, monitor, and replace any plantings that have died from all previous years including caging and the installation of irrigation. Outcome will total ~100 plantings. ➤ Build and install 10 bat boxes. ➤ Maintain all wildlife boxes and record usage. ➤ Conduct 2 deer surveys. ➤ Continue blackberry control across ~5 acres removing ~0.50 acres.

PLM AREA LICENSE
ANNUAL RENEWALS, 2020/2021
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS

PLM Area	Proposed Season and Harvest	Habitat Improvement Program
<p>DESERET FARMS – BALLARD UNIT</p> <p>DEER ZONE C4</p> <p>BUTTE</p> <p>2,948 ACRES</p>	<p>Authorized Harvest: 2 buck deer forked horn or better and 10 antlerless deer</p> <ul style="list-style-type: none"> • Issue 2 buck deer tags for the period of November 1, 2020 through December 31, 2020. • Issue 10 antlerless deer tags to take antlerless deer for the period of November 1, 2020 through December 31, 2020. 1 of the antlerless tags must be a junior tag. 	<ul style="list-style-type: none"> ➤ Plant, monitor, and replace any plantings that have died from all previous years including caging and the installation of irrigation. Outcome will total ~100 plantings. ➤ Build and install 8 wood duck boxes. ➤ Maintain all wildlife boxes and record usage. ➤ Conduct 2 deer surveys. ➤ Continue star thistle control on ~25 acres.
<p>ORDWAY RANCH</p> <p>DEER ZONE D5</p> <p>CALAVERAS</p> <p>850 ACRES</p>	<p>Authorized Harvest: 6 buck deer forked horn or better</p> <ul style="list-style-type: none"> • Issue 6 buck deer for the period of September 26, 2020 through November 30, 2020. 	<ul style="list-style-type: none"> ➤ No cattle grazing in Pasture C. ➤ Maintain 4 water sources for wildlife (including 3 solar-powered wells). ➤ Maintain 50 acres of fencing around two natural springs and creek to exclude cattle. ➤ Continue control of invasive weeds. ➤ Develop new wildlife brush piles and enhance existing brush piles.
<p>SOPER-WHEELER</p> <p>DEER ZONE D3</p> <p>BUTTE</p> <p>5,250 ACRES</p>	<p>Authorized Harvest: 18 buck deer forked horn or better, 26 turkey, 200 quail, and 8 bear</p> <ul style="list-style-type: none"> • Issue 18 buck tags for the period of August 15, 2020 through November 30, 2020. 2 tags to be donated to California Deer Association for auction with the season extended to December 10, 2020 for any donated tags. • Issue 26 turkey tags for the periods of October 17, 2020 through November 30, 2020 (fall season, either-sex harvest) and March 13, 2021 through May 16, 2021 (spring season, bearded turkey only harvest). 2 tags to be donated to the Hunter Education Instructor Tag Incentive Program (HEI). 2 tags to be donated to the SHARE Program. • Issue 200 quail tags for the periods of October 1 2020 through February 28 2021. • 10 bear tags to take up to 6 bears. The season will run August 15, 2020 through December 31, 2020 or until 1,700 bears have been taken statewide. 	<ul style="list-style-type: none"> ➤ Develop 10 brush piles. ➤ Maintain and provide maintenance on all 11 wells, 5 water sources, and 7 guzzlers. ➤ Maintain restrictions on grazing. ➤ Plant 10 acres of turkey mullein or other seed-bearing plants for game birds. ➤ Conduct small burns to clean up after logging operations. ➤ Build and install 10 bluebird boxes. ➤ Perform 2 deer surveys, one in November and one in December.

PLM AREA LICENSE
ANNUAL RENEWALS, 2020/2021
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS

PLM Area	Proposed Season and Harvest	Habitat Improvement Program
SUGARLOAF-BANGOR RANCH DEER ZONE D3 YUBA 2,626 ACRES	<p>Authorized Harvest: 12 buck deer forked horn or better, 50 turkey, and 200 quail</p> <ul style="list-style-type: none"> • Issue 12 buck deer tags for the period of September 26, 2020 through November 30, 2020. • Issue 50 turkey tags for the periods of October 1, 2020 through January 15, 2021 (fall season, either-sex harvest) and March 1, 2021 through May 15, 2021 (spring season, gobbler-only harvest). • Issue 200 upland game seals for the period of September 1, 2020 through February 28, 2021. Additional orders are approved in 100 seal increments up to the authorized harvest. 	<ul style="list-style-type: none"> ➤ Moderate livestock grazing program. ➤ Maintain hot line around Round Lake to keep livestock from riparian plantings (willows and cottonwoods). ➤ Maintain solar-operated well that is water source for Round Lake. ➤ Continue repair and replacement of fencing (wildlife-friendly design). ➤ Clear roads of downed trees from 2017 Cascade Fire. ➤ Inventory and set plan to restore the water supply to Wood Duck Lake.
INLAND DESERTS REGION		
BIG MORONGO SPRINGS RANCH DEER ZONE D14 SAN BERNARDINO 6,632 ACRES	<p>Authorized Harvest: 10 buck deer forked horn or better, 2 antlerless deer, and 2 black bear</p> <ul style="list-style-type: none"> • Issue 10 buck deer tags and 2 antlerless deer for the period of September 12, 2020 through December 6, 2020. • Issue 2 tags to take black bear for the period of September 12, 2020 through December 6, 2020 or when the statewide quota of 1,700 is met. 	<ul style="list-style-type: none"> ➤ Continue non-use by livestock. ➤ Repair or replace all pipelines and tanks damaged by Sawtooth wildfire. ➤ Repair fire-damaged roads within PLM. ➤ Continue monitoring of water sources with trail cameras.

PLM AREA LICENSE
NEW 5-YEAR MANAGEMENT PLANS, 2020-2024
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS

PLM Area	Proposed Season and Harvest	Habitat Improvement Program
NORTHERN REGION		
ACKERMAN-SOUTH DAUGHERTY WMA DEER ZONE A MENDOCINO 10,831 ACRES	<p>Authorized Harvest: 18 buck deer forked horn or better</p> <ul style="list-style-type: none"> • Issue 18 buck deer tags for the period of July 15, 2020 through November 30, 2020. • No more than 9 buck deer may be harvested after September 20, 2020. • On or before October 15, 2020, the licensee may request, in writing, up to 10 additional buck tags to accomplish the authorized harvest. • In no case shall the number of tags issued be used to exceed the authorized harvest. • The number of tag holders actively hunting shall not exceed the number of deer available. 	<ul style="list-style-type: none"> ➤ Remove encroaching Douglas-fir up to 12-in. Diameter at Breast Height (DBH) by chainsaw or hand tools from 10 acres of grassy openings in Daugherty Creek watershed. In these areas oak, manzanita and <i>Ceanothus</i> will be mowed down to create a mosaic of opening and promote browse growth and improve summer range for deer. ➤ Construct 4 brush piles for wildlife in South Daugherty Creek. ➤ Enhance access to 1 water source near Johnson Creek in the Daugherty Creek watershed by mechanically removing vegetation to increase depth/water retention and developing a gradual ramp for safe wildlife access. ➤ Remove an additional 0.25 miles of hog wire fencing to facilitate fawn movement near Ackerman Creek. ➤ Treat at least 20 acres of grassland with herbicide to control star thistle.
BIG BLUFF RANCH DEER ZONE B5 TEHAMA 3,736 ACRES	<p>Authorized Harvest: 8 deer of which no more than 5 may be forked horn or better buck deer and no more than 3 may be antlerless deer</p> <ul style="list-style-type: none"> • Issue 8 either-sex deer tags for the period of August 8, 2020 through November 30, 2020. • No antlerless deer shall be harvested before September 15, 2020. 	<ul style="list-style-type: none"> ➤ Maintain and improve the Red Bank Restoration Project improvements (native vegetation restoration of 30 acres along 3 miles of creek) by repairing any damage to the livestock control fencing and irrigating until plants are fully established. ➤ Maintain the water development at Miller Place as needed to provide water for wildlife by repairing any damage to the system. ➤ Maintain the wildlife-friendly fence below Sunflower Dam to exclude livestock and allow wildlife access to wetlands. ➤ Participate in the Sunflower Coordinated Resource Management Program which is working, in part, to improve wildlife habitat on the surrounding 40,000 acres. ➤ Continue to participate in the CAL FIRE Vegetation Management Program to manage mixed chaparral fuels, enhance wildlife habitat, and reduce exotic weeds.

PLM AREA LICENSE
NEW 5-YEAR MANAGEMENT PLANS, 2020-2024
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS

PLM Area	Proposed Season and Harvest	Habitat Improvement Program
<p>FIVE DOT RANCH - HORSE LAKE</p> <p>DEER ZONE X5A</p> <p>LASSEN</p> <p>8,025 ACRES</p>	<p>Authorized Harvest: 1 buck deer forked horn or better and 1 buck pronghorn antelope</p> <ul style="list-style-type: none"> • Issue 1 buck deer tag for the period of August 15, 2020 through November 30, 2020. • No person shall take more than 1 buck deer annually in the X zones. • Issue 1 buck pronghorn antelope tag for the period of August 8, 2019 through September 12, 2020. 	<ul style="list-style-type: none"> ➤ Maintenance of rehabilitation project to Coon Camp Springs the spring and associated riparian vegetation on 20 acres by excluding cattle (allow grazing for 4-5 days only), a water storage tank, solar panel, and troughs. Continued clearance of juniper trees in an 80-acre area to enhance the riparian and wildlife habitat. ➤ Defer livestock grazing of the 300-acre Packard Field until after July 1 to improve duck and goose brood survival. Grazing will occur between July 1 and October 1. ➤ Maintain 5 goose nesting platforms at Packard Reservoir and Coon Camp Reservoir as needed. ➤ Knock seed off bitterbrush plants so cattle can stomp them into the ground for regeneration. Bitterbrush regeneration will be monitored annually through photo monitoring will be conducted to track growth and success of the practice.
<p>FIVE DOT RANCH – SCHOOL SECTION</p> <p>DEER ZONE X5A</p> <p>LASSEN</p> <p>640 ACRES</p>	<p>Authorized Harvest: 1 buck deer forked horn or better</p> <ul style="list-style-type: none"> • Issue 1 buck deer tag for the period of September 19, 2020 through November 30, 2020. • No person shall take more than 1 buck deer annually in the X zones. 	<ul style="list-style-type: none"> ➤ No cattle grazing for the 2020 season. ➤ Maintain livestock exclusion fence around a 3-acre aspen patch by inspecting it regularly and making any necessary repairs. ➤ Cut and disperse 50 mountain mahogany branches with ripe seeds in order to recruit young plants. Photo monitoring will be conducted to track growth and success of the practice.

PLM AREA LICENSE
NEW 5-YEAR MANAGEMENT PLANS, 2020-2024
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS

PLM Area	Proposed Season and Harvest	Habitat Improvement Program
<p>FIVE DOT RANCH-TUNNEL SPRINGS</p> <p>DEER ZONE X5A</p> <p>LASSEN</p> <p>2,600 ACRES</p>	<p>Authorized Harvest: 1 buck deer forked horn or better and 2 buck pronghorn antelope</p> <ul style="list-style-type: none"> • Issue 1 buck deer tag for the period of September 19, 2020 through November 30, 2020. • No person shall take more than 1 buck deer annually in the X zones. • Issue 2 buck pronghorn antelope tags for the period of August 8, 2020 through September 19, 2020. 	<ul style="list-style-type: none"> ➤ Repair damaged livestock exclusion fencing with wildlife-friendly fencing at Tunnel Springs. ➤ Retain water in 2 reservoirs at 50% of the current year's water capacity for wildlife. ➤ Remove 100 junipers from around Tunnel Springs and the reservoirs. ➤ Knock seeds off bitterbrush plants in the fall so cattle can stomp them into the ground for regeneration. Bitterbrush regeneration will be monitored annually photo monitoring will be conducted to track growth and success of the practice. ➤ Maintain the solar panel water pump system that keeps 12 water troughs full to provide water for wildlife. ➤ Coordinate with BLM to facilitate the gathering of wild horses on the property as soon as possible.
<p>FIVE DOT RANCH - WILLOW CREEK</p> <p>DEER ZONE X4</p> <p>LASSEN</p> <p>7,200 ACRES</p>	<p>Authorized Harvest: 7 buck deer forked horn or better and 2 buck pronghorn antelope</p> <ul style="list-style-type: none"> • Issue 8 buck deer tags to take 7 buck deer for the period of September 12, 2020 through November 30, 2020. • No person shall take more than 1 buck deer annually in the X zones. • In no case shall the number of tags issued be used to exceed the authorized harvest. • The number of tag holders actively hunting shall not exceed the number of deer available to harvest. • Issue 2 buck pronghorn antelope tags for the period of August 5, 2020 through September 13, 2020. 	<ul style="list-style-type: none"> ➤ Repair any damaged livestock exclusion fencing around 4 aspen and willow stands totaling 30 acres that provide deer fawning habitat. ➤ Crush at least 35 acres of snowbrush to provide new palatable forage at different sites in Sections 21, 22, 27, or 28. Photo monitoring will be conducted to track growth and success of the practice ➤ Exclude livestock grazing on at least one acre on the North pond on the east side of SR 139, to benefit waterfowl and watering wildlife. ➤ Retain water in reservoirs and ponds at 50% of the current year's water capacity for wildlife by filling them as needed. ➤ Leave the third cutting of alfalfa on 100 acres west of Hwy 139 for deer and pronghorn antelope use. ➤ Maintain a 50-acre field of alfalfa and grass, providing forage for deer. ➤ Maintain 4 goose nesting platforms at Round Valley Reservoir. ➤ Continue to maintain the 150 foot radius Bald eagle protection area in section 30. ➤ Leave 100 acres of bitterbrush in the Windmill Field for wildlife. ➤ Leave 50 acres of native vegetation in the triangle field between SR 139 and Horse Lake Road for wildlife use.

PLM AREA LICENSE
NEW 5-YEAR MANAGEMENT PLANS, 2020-2024
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS

PLM Area	Proposed Season and Harvest	Habitat Improvement Program
JS RANCH DEER ZONE C3 SHASTA 6,500 ACRES	<p>Authorized Harvest: 12 buck deer forked horn or better and 1 bull elk</p> <ul style="list-style-type: none"> • Issue 12 buck deer tags for the period of August 1, 2020 through November 30, 2020. • No more than 6 buck deer may be harvested after October 25, 2020. • Issue 1 bull elk tag for the period of August 1, 2020 through November 30, 2020. 	<ul style="list-style-type: none"> ➤ Retain vegetation for wildlife cover along irrigation canal banks to the extent it does not interfere with ditch maintenance. ➤ Grazing will be managed to prevent erosion and retain browse and grass for wildlife use. ➤ Maintain water in irrigation canals year-round to provide water for wildlife and cattle. ➤ Continue to maintain at least 750 acres of irrigated pastures for both cattle and wildlife use. ➤ Maintain at least a 50-acre irrigated pasture for elk foraging in the north east corner of the ranch and the Rock Garden Flats. ➤ Mechanically control the spread of extensive blackberry thickets within a 650-acre area. Bramble margins and some interior areas will be cut or crushed to reduce blackberry water consumption and increase forage. ➤ Install water bars on dirt roads adjacent to Cow Creek to prevent sediment erosion. ➤ Maintain the exclusion of livestock from 0.50 miles of riparian area by inspecting exclusion fencing and repairing any damage. ➤ Maintain cattle exclusion fencing and replant 50 acres within 4 wildlife food plots. ➤ Maintain the 1,000-acre livestock exclusion area to provide forage for wildlife during late summer and early fall. Livestock are excluded from June 1 through October 31. ➤ Enhance and maintain ponds by enlarging and repairing spillways and dams and making any other necessary repairs. ➤ Maintain a 200-acre fenced area with no human disturbance or cattle grazing for wildlife use year-round. ➤ No commercial wood or rock harvesting on the entirety of the ranch.

PLM AREA LICENSE
NEW 5-YEAR MANAGEMENT PLANS, 2020-2024
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS

PLM Area	Proposed Season and Harvest	Habitat Improvement Program
MENDIBOURE RANCH DEER ZONE X5B LASSEN 8,840 ACRES	<p>Authorized Harvest: 3 buck deer forked horn or better and 1 buck pronghorn antelope</p> <ul style="list-style-type: none"> Issue 6 buck deer tags to take 3 buck deer for the period of October 3, 2020 through November 1, 2020. No person may take more than 1 buck deer annually in the X zones. In no case shall the number of tags issued be used to exceed the authorized harvest. The number of tag holders actively hunting shall not exceed the number of deer available to harvest. Issue 1 buck pronghorn antelope tag for the period of August 22, 2020 through September 13, 2020. 	<ul style="list-style-type: none"> ➤ Maintain aspen and willow livestock exclusion fencing at Etchecopar Spring, Van Loan Creek, and Big Springs by checking and repairing fencing if needed. ➤ Removal of at least 25 junipers from the Big Springs area. Create brush piles from these removed trees. ➤ Maintain at least 14 acres of dryland alfalfa and reseed as necessary for wildlife. Construct a wildlife-friendly fence to exclude cattle from the plot. ➤ Maintain springs and water sources. ➤ Cut at least 100 mountain mahogany branches with ripe seeds and disperse on the ground in order to recruit young plants. ➤ Maintain perimeter fences. ➤ Continue rotational cattle grazing so that the residual dry matter does not fall below 40% using the Double-Weight sampling technique.
STEWART RANCH DEER ZONE B1 TRINITY 11,006 ACRES	<p>Authorized Harvest: 35 buck deer forked horn or better, 5 antlerless deer and 10 bears</p> <ul style="list-style-type: none"> Issue 35 buck deer tags for the period of August 1, 2020 through November 30, 2020. 10 of those tags shall be provided to apprentice or first-time hunters, and 1 shall be donated to a Hunter Education Instructor. Issue 5 antlerless deer tags for the period of September 15, 2020 through November 30, 2020. No more than 18 buck deer may be harvested after October 26, 2020. On or before October 15, 2020, the licensee may request (in writing) up to 15 additional either-sex deer tags to accomplish the authorized harvest. In no case shall the number of tags issued be used to exceed the authorized harvest. The number of tag holders actively hunting shall not exceed the number of deer available to harvest. 	<ul style="list-style-type: none"> ➤ Maintain at least 20 acres of previously treated oak woodlands from encroaching conifers. ➤ Replant 4 irrigated food plots (10 acres total) with clover, chicory, and brassica to provide forage for wildlife at least every 4 years. ➤ Replant at least 11 acres of dryland food plots with barley, wheat, oats, plantain, and grains. ➤ Maintain electric livestock exclusion fencing around all fenced food plots. ➤ Maintain and replace nesting material in 15 wood duck nest boxes. ➤ Maintain 8 water sources (ponds and springs) with cattle exclusion fencing by inspecting and repairing any damaged parts. Plant at least 20 willows and alders in these areas. ➤ Maintain 0.50 mile of livestock exclusion fencing along Kekawaka Creek to improve riparian vegetation by inspecting and repairing any damaged parts.

PLM AREA LICENSE
NEW 5-YEAR MANAGEMENT PLANS, 2020-2024
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS

PLM Area	Proposed Season and Harvest	Habitat Improvement Program
STEWART RANCH CONT.	<ul style="list-style-type: none"> • Issue 5 bear tags for the period of August 1, 2020 through December 29, 2020, or earlier, if CDFW determines 1,700 bears have been harvested. • On or before October 15, 2020, the licensee may request (in writing) up to 5 additional bear tags to accomplish the authorized harvest. • Cubs and females accompanied by cubs may not be taken. • Hunters may only harvest one bear per hunting license year. 	<ul style="list-style-type: none"> ➤ Install 1 wood duck nest box on Kekawaka Creek annually. Maintain 15 of the previously installed wood duck nesting boxes by repairing and replacing any damaged boxes and monitoring annually for nesting activity. ➤ Maintain the 200-yard no entrance buffer around the Golden Eagle nesting site protection area below “TinaMarie’s Rock” during the spring and early summer.
NORTH CENTRAL REGION		
ROCK CREEK DEER ZONE C4 BUTTE/TEHAMA 9,945 ACRES	<p>Authorized Harvest: 30 buck deer forked horn or better</p> <ul style="list-style-type: none"> • Issue 33 deer tags to take 30 buck deer for the period of August 15, 2020 through November 30, 2020. 	<ul style="list-style-type: none"> ➤ Remove 1 mile of old exterior fencing on the Rose Ranch. ➤ Create a continual ~140 ft. brush pile from the forest canopy to “little spring” ➤ Clear 2 to 4 half acre areas of decadent buck brush on the Watson Ranch to promote new buck brush growth. ➤ Continue to graze at a sustainable level. Cattle levels and duration will be adjusted for drought or other environmental factors. ➤ Maintain all previously developed springs and well sites, maintain fencing, and replenish previously created brush piles.
LLANO SECO RANCHO DEER ZONE C4 BUTTE 14,500 ACRES	<p>Authorized Harvest: 25 buck deer forked horn or better</p> <ul style="list-style-type: none"> • Issue 25 buck deer tags for the period of September 1, 2020 through November 30, 2020. 	<ul style="list-style-type: none"> ➤ Mow 250 acres on west side to control thistle. ➤ Grow 1,000 acres of dry land grains. ➤ Maintain or replace existing 50 barn owl and wood duck nest boxes. ➤ Maintain or replace 4 pond turtle basking structures. ➤ Plant 70 acres of native grass just north of Dodge Opening. ➤ Over-seed native grasses on Dodge Opening.

PLM AREA LICENSE
NEW 5-YEAR MANAGEMENT PLANS, 2020-2024
PROPOSED SEASONS, HARVESTS, AND HABITAT IMPROVEMENTS

PLM Area	Proposed Season and Harvest	Habitat Improvement Program
<p>SPURLOCK RANCH</p> <p>DEER ZONE B3</p> <p>GLENN</p> <p>2,630 ACRES</p>	<p>Authorized Harvest: 10 buck deer forked horn or better</p> <ul style="list-style-type: none"> Issue 10 buck deer tags for the period of September 19, 2020 through November 30, 2020. 	<ul style="list-style-type: none"> Cattle numbers at or below 200 cow/calf pairs. Cattle grazing season October 25, 2020 to May 15, 2021; post- season grazing standard of 1,200 lbs/acre of Residual Dry Matter (RDM). Treat approximately 10-15 acres of yellow star thistle and/or bull thistle with herbicide. Maintain cattle hot wire fence around riparian area below Fig Tree Pond. Maintain cattle exclusion fences on both sides of creek in Vanderford Valley, and around reservoir and riparian area in Johanson Valley.
CENTRAL REGION		
<p>BARDIN RANCH</p> <p>MONTEREY</p> <p>8,000 ACRES</p>	<p>Authorized Harvest: 2 bull and 4 antlerless tule elk</p> <ul style="list-style-type: none"> Issue 2 bull elk tags for the period October 1, 2020 through December 31, 2020. Issue 4 antlerless elk tags for the period October 1, 2020 through December 31, 2020. 	<ul style="list-style-type: none"> Maintain existing springs, pipelines and troughs to provide water for wildlife. Plant 30 acres of forage grass in the Elk Field and Hayfield for use by wildlife. Maintain rotational grazing system and allow cattle access to the upper hills only from November through June. Develop new water storage in the Camp River Crossing area to provide more water for wildlife. Develop springs at the Sticker Flat and upper Middle Road Canyon areas to provide water for wildlife. Mechanically remove & pile brush to provide escape cover for upland birds and small animals.

PLM AREA LICENSE CORRECTION TO 2020/21 PROPOSED SEASONS		
PLM Area	Proposed Season and Harvest	Habitat Improvement Program
CENTRAL REGION		
Approved at the April 16, 2020 Commission Meeting		
TEJON RANCH DEER ZONE D-10 KERN & LOS ANGELES 270,000 ACRES	<p>Authorized Harvest: 30 either-sex deer, 5 antlerless deer, 12 bull elk, 3 cow elk, 10 bearded turkeys, 0 pronghorn tags</p> <ul style="list-style-type: none"> • Issue 15 either-sex tags for the period of September 19, 2020 through November 3, 2020 (early season). • Issue 15 either-sex tags for the period of November 3, 2020 through December 31, 2020 (late season). • Issue 5 antlerless deer tags for the period of September 19, 2020 through December 31, 2020. • Issue 12 bull elk tags and 3 antlerless elk tags for the period of September 1, 2020 through December 31, 2020. • No persons shall take more than 1 buck deer, 1 bull elk, or 1 antlerless elk. • Issue 10 bearded turkey tags for the period of March 28, 2020 through May 3, 2020. <p>No pronghorn tags shall be issued for the authorized harvest of either sex.</p>	<ul style="list-style-type: none"> ➤ Treatment of roadside invasive weeds/ Comanche, Alamo, Haul Road, Antelope Valley. ➤ Treatment of invasive weeds at pond sites. ➤ Maintenance of livestock water systems / wildlife escape ramps. ➤ Guzzler system repairs and maintenance. ➤ Addition of water trough, Juan Yaqui System. ➤ RDM surveys. ➤ Maintenance of netting covering open water tanks and large spring containments. ➤ Maintenance of fencing to exclude cattle; maintenance of smooth wire pasture fences modified for pronghorn movement. ➤ Monitor riparian zones using Best Management Practices for Wildlife management and cattle grazing.

PLM AREA LICENSE
CORRECTION TO 2020/21 PROPOSED SEASONS

PLM Area	Proposed Season and Harvest	Habitat Improvement Program
<i>Corrected Proposed Seasons</i>		
<p>Tejon Ranch</p> <p>Deer Zone D-10</p> <p>Kern & Los Angeles</p> <p>270,000 Acres</p>	<p>Authorized Harvest: 30 either-sex deer, 5 antlerless deer, 12 bull elk, 3 cow elk, 10 bearded turkeys, 0 pronghorn tags</p> <ul style="list-style-type: none"> • Issue 15 either-sex deer tags for the period of September 19, 2020 through November 8, 2020 (early season). • Issue 15 either-sex deer tags for the period of November 9, 2020 through December 31, 2020 (late season). • Issue 5 antlerless deer tags for the period of September 19, 2020 through December 31, 2020. • Issue 12 bull elk tags and 3 antlerless elk tags for the period of September 1, 2020 through December 31, 2020. • No persons shall take more than 1 buck deer, 1 bull elk, and 1 antlerless elk. • Issue 10 bearded turkey tags for the period of March 14, 2021 through May 17, 2021. <p>No pronghorn tags shall be issued for the authorized harvest of either sex.</p>	<ul style="list-style-type: none"> ➤ Treatment of roadside invasive weeds/ Comanche, Alamo, Haul Road, Antelope Valley. ➤ Treatment of invasive weeds at pond sites. ➤ Maintenance of livestock water systems / wildlife escape ramps. ➤ Guzzler system repairs and maintenance. ➤ Addition of water trough, Juan Yaqui System. ➤ RDM surveys. ➤ Maintenance of netting covering open water tanks and large spring containments. ➤ Maintenance of fencing to exclude cattle; maintenance of smooth wire pasture fences modified for pronghorn movement. ➤ Monitor riparian zones using Best Management Practices for Wildlife management and cattle grazing.

State of California
Department of Fish and Wildlife

Memorandum

Original on file,
received May 8, 2020

Date: May 8, 2020

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

From: Charlton H. Bonham
Director

Subject: **Request for Six-Month Extension, San Bernardino Kangaroo Rat Status Review**

Per Section 2074.6 of the Fish and Game Code, the California Department of Fish and Wildlife (Department) requests an extension of time, by six months, to further analyze and evaluate available science, to undergo the peer review process, and to complete the San Bernardino Kangaroo Rat status review. Such an extension would change the due date of the Department's report to February 23, 2021, which is 18 months from the date the candidacy findings were published (August 23, 2019).

If you have any questions or need additional information, please contact Kevin Shaffer, acting Chief of Wildlife Branch at (Kevin.Shaffer@wildlife.ca.gov).

ec: Stafford Lehr, Deputy Director
Wildlife and Fisheries Division
Stafford.Lehr@wildlife.ca.gov

Kevin Shaffer, Acting Chief
Wildlife Branch
Kevin.shaffer@wildlife.ca.gov

From: Tom [REDACTED]
Sent: Wednesday, June 10, 2020 3:13 PM
To: FGC <FGC@fgc.ca.gov>
Cc: Tom [REDACTED] sue n. [REDACTED]
Subject: Fwd: Written Comments Fish and Game Commission Meeting-June 24-25, 2020

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

Please find my written comments (4 pages) I am submitting to be available to the Commissioners prior to the June 24-25, 2020 Fish and Game Commission Public meeting. I plan to make verbal comments to the Commission on Agenda Item 21 - San Bernardino Kangaroo Rat Listing and the Commissioners prior review of the submitted written comments would greatly enhance my effort to communicate. Please confirm your receipt of the written material and their presentation to the Commissioners prior to the upcoming meeting.

Thank you for your courtesy.

Tom Paulek / Susan Nash

September 27, 2019

Via: Email: wildlifemgt@wildlife.ca.gov / U.S. Postal Service

California Department of Fish and Wildlife
Attn. Scott Osborn
1812 9th Street
Sacramento, California 95811

SUBJECT: California Department of Fish and Wildlife Notification of Status Review for San Bernardino Kangaroo Rat ("SBKR") - Public Comments

The petition to list the San Bernardino Kangaroo Rat (SBKR) as a candidate for the State endangered species list under the California Endangered Species Act (CESA) asserts that the Trump administration's politicization of federal environmental agencies threatened the rat's survival. "State listing is a necessary backstop to the disregard of law and science by federal government agencies under the current administration" said the petitioner Endangered Habitat League (Los Angeles Times, August 31, 2019 - *State steps in for rat species as U.S. weakens protections*). While this criticism of our current federal government misdeeds is certainly valid, we must not ignore state government misfeasance/malfeasance in the management of our endangered wildlife.


Attachment "A" presents the State Auditor report "*California Department of Fish and Wildlife - It Is Not Fulfilling Its Responsibilities Under the California Environmental Quality Act [CEQA] - June 2019.*" The Auditor Report, which includes the CDFW response to the audit, is presented in its entirety herein for inclusion in the California Fish and Game Commission Administrative Record for the SBKR determination. The Auditor Report should be reviewed with the realization CDFW is one of four designated "trustee" agencies under CEQA and most importantly recognize the fish and wildlife resources of California are held in trust for the people of the state by and through the department [CDFW] (Fish and Game Code § 711.7).

The Audit Report recognizes CDFW is the highest state authority overseeing California's fish and wildlife resources and that CDFW input on CEQA documents, such as environmental impact reports (EIR's) is **critical** for endangered wildlife such as the subject SBKR. The audit notes in recent years CDFW has reviewed less than half of the CEQA documents it received. CDFW frequently does not respond to consultation requests and rarely provides comments on draft CEQA documents. In **2018** CDFW provided formal comments on just **8 percent** of draft documents it received. Because CDFW lacks policies for prioritizing and reviewing CEQA documents, CDFW cannot ensure that its staff are consistently reviewing projects with potentially significant impacts on the environment such as the reduction in number and range of the candidate species SBKR.


Another troubling revelation in the Auditor Report is that CDFW has not ensured that it spends the filing fee paid by project applicants and public agencies subject to CEQA exclusively on its CEQA work activities. Although state law (Fish and Game Code § 711.4) restricts the use of the filing fee revenue [currently \$ 3,271.00 for the CDFW review of a Draft EIR] to fund only activities related to its CEQA responsibilities, the CDFW keeps the revenue in a shared account with revenues for other functions, and it does not track the CEQA revenue and expenditures separately from the other functions. The Audit determined that from fiscal years 2012-13 through 2016-17 CDFW spent \$5.7 million in CEQA filing fee revenue to subsidize non-CEQA programs. The propriety and adequacy of the above CEQA management practices by CDFW are clearly a relevant consideration in the subject SBKR listing action.

It must also be recognized SBKR is one of 146 plants and animals covered under the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP). SBKR is therefore now subject to an "incidental take" permit pursuant to the State Natural Communities Planning Act issued by CDFW. The defacto exemption of the CEQA review of projects by CDFW along the San Jacinto River floodplain continues to allow agencies such as Eastern Municipal Water District (EMWD) to destroy the little SBKR habitat remaining.

We appreciate the opportunity to comment on yet another species destined for a CESA listing. We believe absent substantial reform of the above faulty CDFW implementation of CEQA this listing will largely be another empty CESA promise emblematic of a failed SBKR conservation effort.



Tom Paulek, Conservation Chair.
Friends of the Northern San Jacinto Valley.



Susan Nash,
FNSJV, president

Attachment "A" : California State Auditor Report, June 2019, California Department of Fish and Wildlife, REPORT 2018-119

ATTACHMENT "A"



DAY 2 – June 25, 2020 - Agenda Item 21
San Bernardino Kangaroo Rat

California Department of Fish and Wildlife

It Is Not Fulfilling Its Responsibilities Under
the California Environmental Quality Act

June 2019

REPORT 2018-01





June 27, 2019
2018-119

DAY 2 – June 25, 2020 - Agenda Item 21
San Bernardino Kangaroo Rat

The Governor of California
President pro Tempore of the Senate
Speaker of the Assembly
State Capitol
Sacramento, California 95814

Dear Governor and Legislative Leaders:

As directed by the Joint Legislative Audit Committee, the California State Auditor performed an audit of the California Department of Fish and Wildlife's (department) duties and activities related to the California Environmental Quality Act (CEQA). The following report concludes that the department has failed to meet its responsibilities under CEQA.

As the highest state authority overseeing California's fish and wildlife resources, the department's input on CEQA documents, such as environmental impact reports, is critical. However, in recent years, the department has reviewed less than half of the CEQA documents it received. The department frequently does not respond to consultation requests and rarely provides comments on draft CEQA documents. In 2018 the department provided formal comments on just 8 percent of draft CEQA documents it received. Because it lacks policies for prioritizing and reviewing CEQA documents, the department cannot ensure that its staff are consistently reviewing projects with potentially significant impacts on the environment.

Further, the department has not ensured that it spends the filing fee paid by project applicants and public agencies subject to CEQA exclusively on its CEQA activities. Although state law restricts the use of the filing fee revenue to fund only activities related to its CEQA responsibilities, the department keeps this revenue in a shared account with revenues for other functions, and it does not track the CEQA revenue and expenditures separately from the other functions. In fact, we determined that from fiscal years 2012–13 through 2016–17, the department spent \$5.7 million in CEQA filing fee revenue to subsidize non-CEQA programs.

Similarly, the department's current timekeeping practices do not differentiate between staff time spent on CEQA activities and staff time spent on other departmental work. Even though the department has frequently cited insufficient staff resources as the cause for its inability to meet its CEQA responsibilities, without accurately capturing the amount of time staff spend working on CEQA activities, it cannot correctly determine either its necessary staff resources or the amount it should charge for filing fees.

Respectfully submitted,

A handwritten signature in black ink that reads "Elaine M. Howle".

ELAINE M. HOWLE, CPA
California State Auditor

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

cc: California Department of Fish and Wildlife

Valerie Termini,
Chief Deputy Director
Valerie.Termini@wildlife.ca.gov

Melissa Miller-Henson, Executive Director
Fish and Game Commission
June 4, 2020
Page 2

Stafford Lehr, Deputy Director
Wildlife and Fisheries Division
Stafford.Lehr@wildlife.ca.gov

Chad Dibble, Deputy Director
Ecosystem Conservation Division
Chad.Dibble@wildlife.ca.gov

Kevin Shaffer, Branch Chief
Fisheries Branch
Kevin.Shaffer@wildlife.ca.gov

Scott Gardner, Branch Chief
Wildlife Branch
Scott.Gardner@wildlife.ca.gov

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).

California Department of Fish and Wildlife
Inland Deserts Region
FISH SLOUGH ECOLOGICAL RESERVE
Mono and Inyo Counties

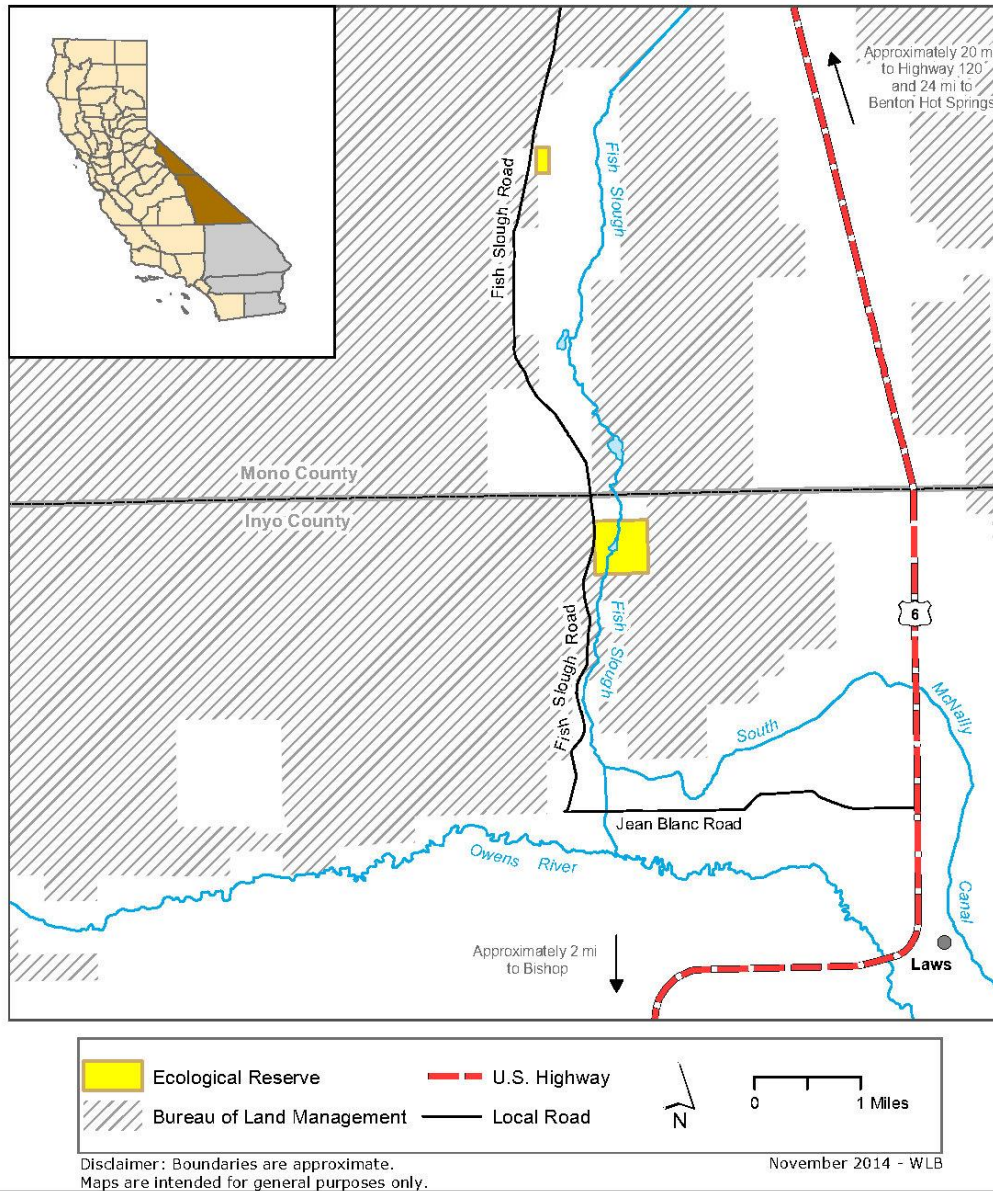


Figure 1. Map of Fish Slough Ecological Reserve, located approximately 2 miles northwest of Bishop, California. Map inset highlights the location of the Owens Basin in Mono and Inyo counties, California.

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).

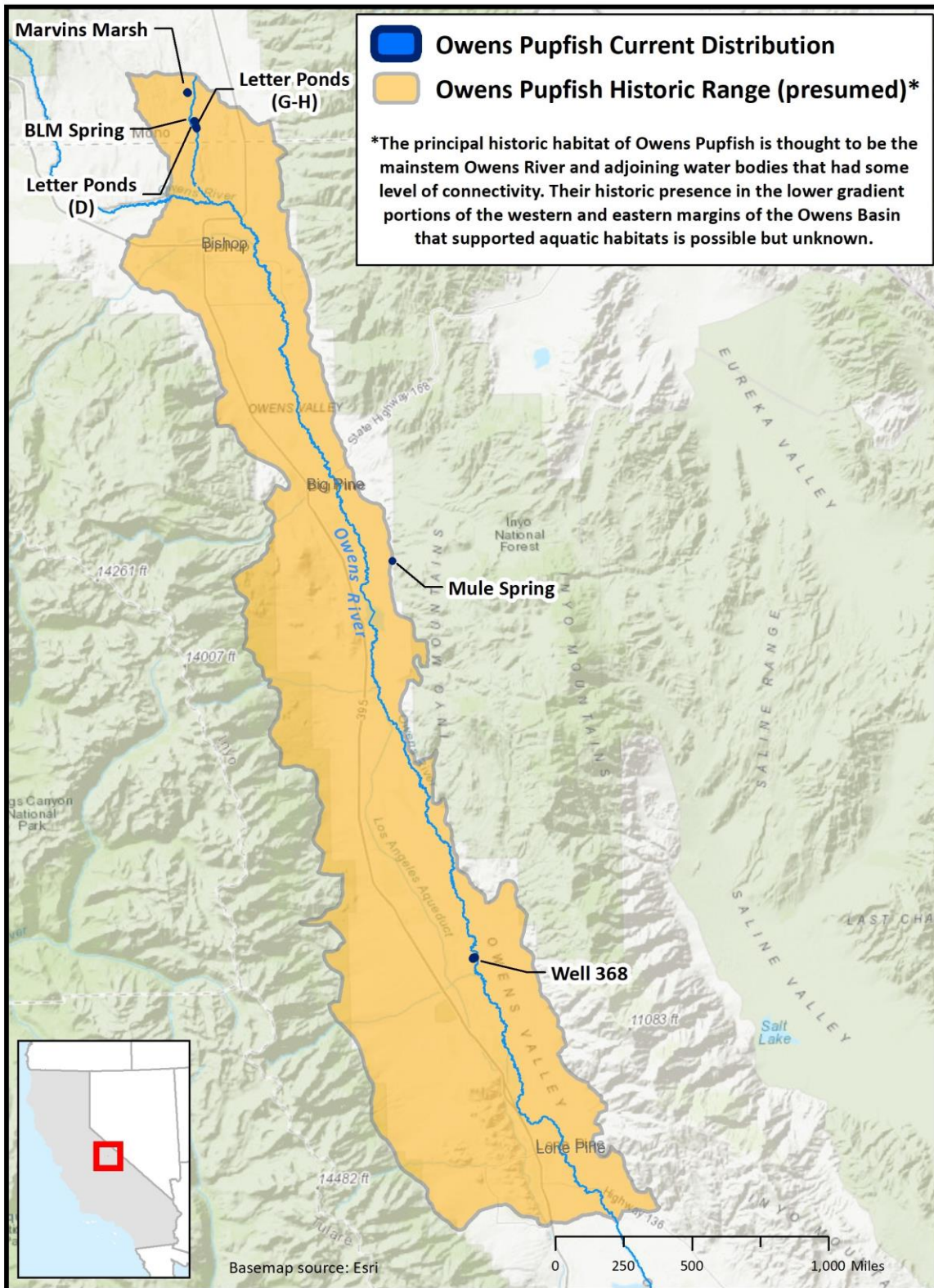


Figure 3. Map of historic range and current distribution of Owens Pupfish in Mono and Inyo counties, California.

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).

Overexploitation

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).

Predation and Competition

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).

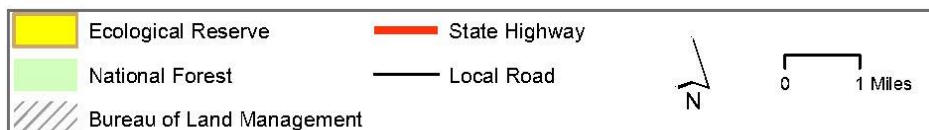
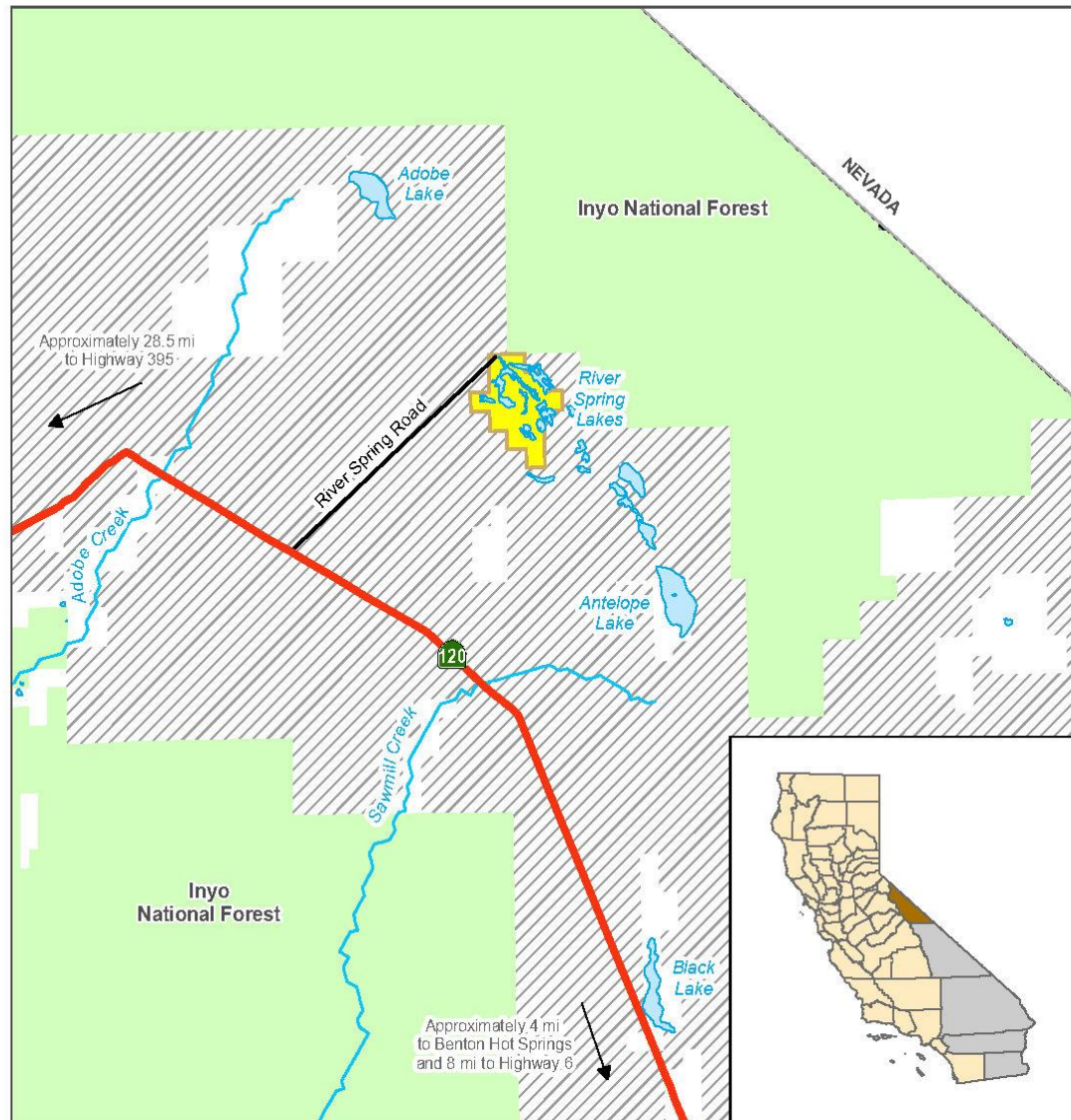
Table 2. Overview of ongoing Owens Pupfish population monitoring.

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.

California Department of Fish and Wildlife
Inland Deserts Region
RIVER SPRING LAKES ECOLOGICAL RESERVE
Mono County



Disclaimer: Boundaries are approximate.
Maps are intended for general purposes only.

November 2014 - WLB

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.
- STEWART, 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

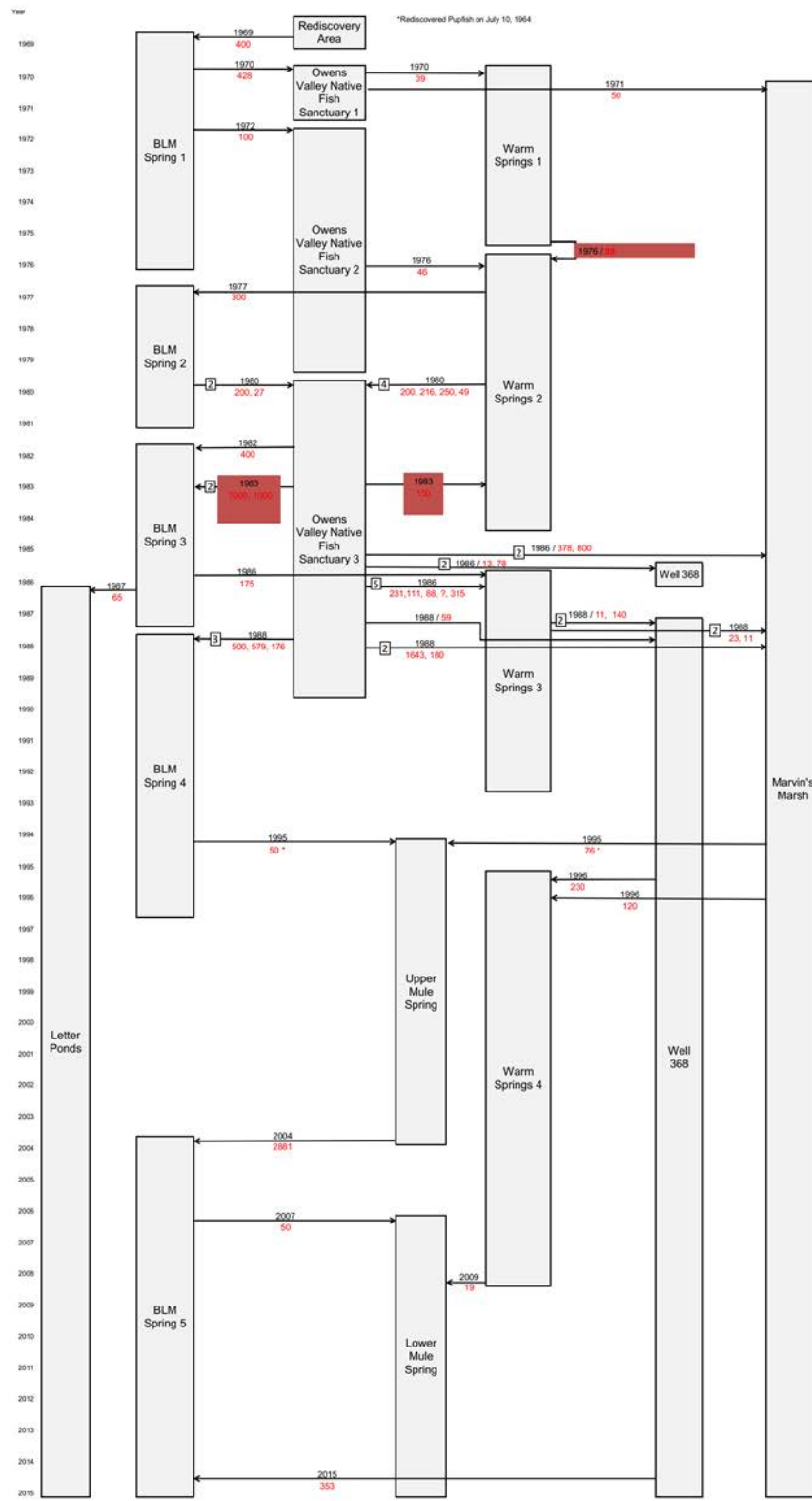
X. LIST OF TABLES

Table 1. Descriptions of refuge sites and populations of Owens Pupfish	9
Table 2. Overview of ongoing Owens Pupfish population monitoring	14

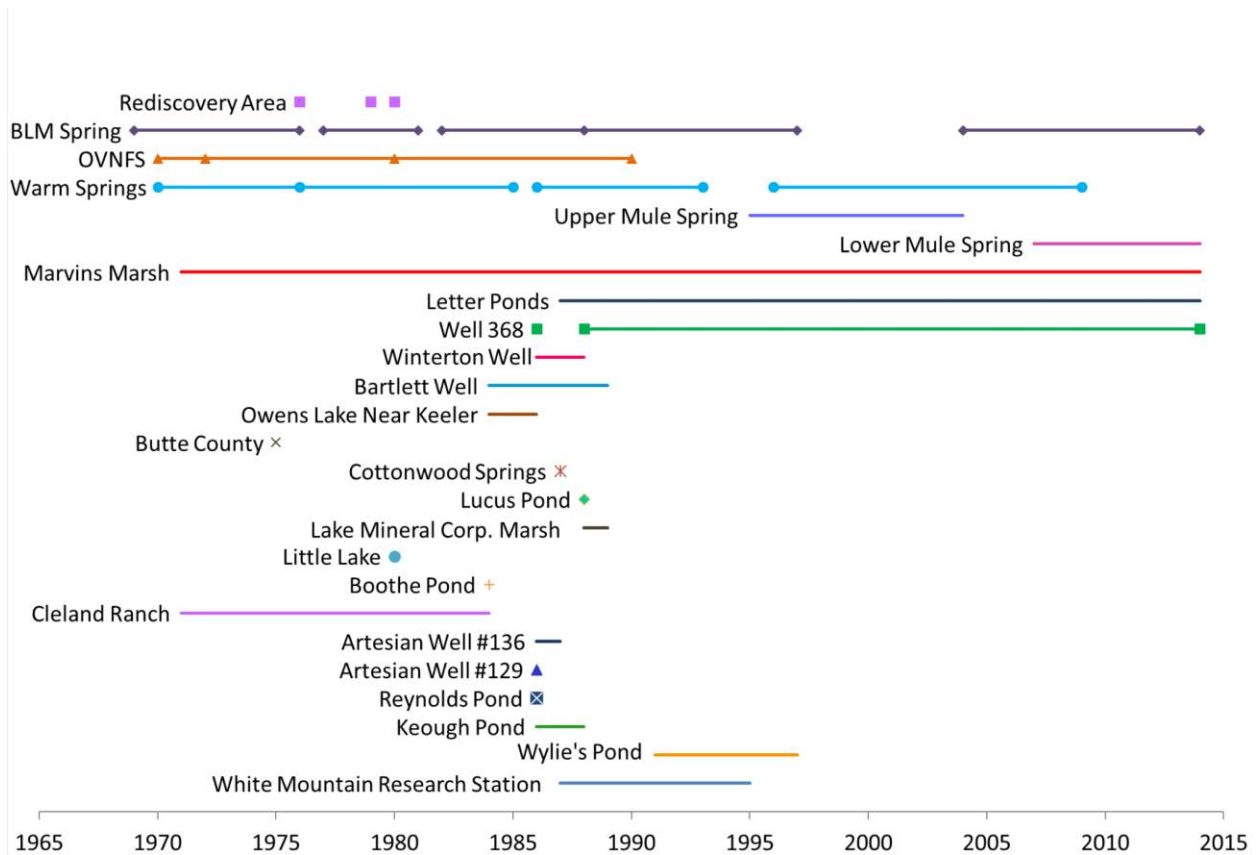
XI. LIST OF APPENDICES

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

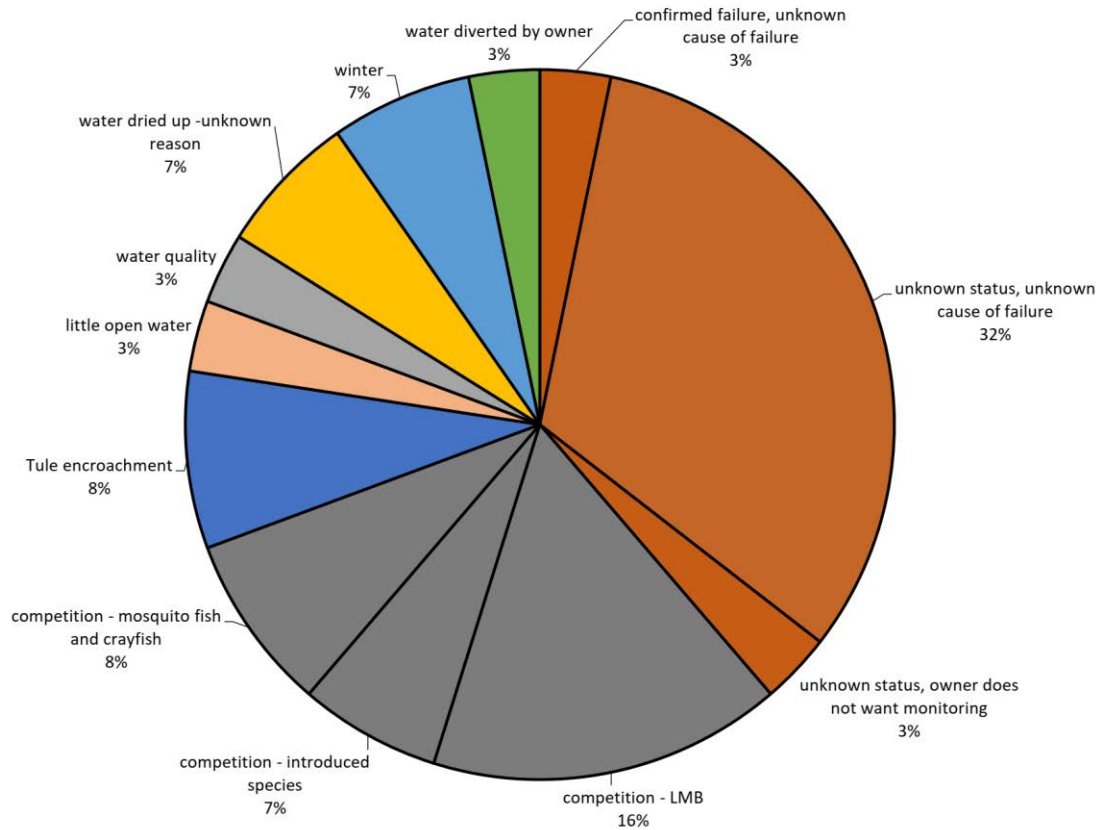
Appendix A. Owens Pupfish translocations from 1969-2015. (Source: S. Parmenter, CDFW 2019).



Appendix B. Presence of Owens Pupfish in various transplant locations 1969-2018 (Source: S. Parmenter, CDFW 2019).



Reasons for translocation failure



[illegible]

State of California
Department of Fish and Wildlife

M e m o r a n d u m

Updated memo received June 11, 2020
Signature on file

Date: May 28, 2020

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

From: Charlton H. Bonham
Director

Subject: **Agenda Item for the June 25, 2020, Fish and Game Commission Meeting Duck Stamp Proposals for Fiscal Year 2020-21**

Pursuant to Fish and Game Code § 3702-3705, the Department of Fish and Wildlife (Department) submits the attached summary of proposed projects to the Fish and Game Commission (Commission) for consideration and approval for funding with the Duck Stamp Dedicated Account funds for the Fiscal Year (FY) 2020-21. These projects were reviewed by the Department and the Duck Stamp Advisory Committee.

The Account's estimated beginning balance will be \$4,736,633 on July 1, 2020, which includes the estimated revenue of \$1,338,795 from the sale of duck stamps during FY 2019-20. The Department proposes to spend revenues to accomplish the goals established for the Duck Stamp Dedicated Account as authorized.

For FY 2020-21, spending authority for expenditures from this fund are \$2,500,000. This is an increase of \$1,000,000 for this FY only to spend down the reserve while still maintaining the required amount for economic uncertainty. After deducting the required administrative overhead costs (limited to 6% per §3701 or \$82,728), the mandated amount portioned to Canada (\$2.25 per stamp/validation per §3704 or \$139,037) a total of \$2,278,235 is available for new and ongoing projects.

The Department is proposing three new projects for funding totaling \$2,040,000. The attached list includes all projects recommended, including ongoing projects (approved in past years) for continued authorization. The new and ongoing projects in California total \$2,278,235. This figure includes contingency funding to allow for emergencies or project costs that differ slightly from the original estimates.

As always, the Department appreciates the Commission's consideration of our proposal and requests its approval for funding of the noted projects totaling \$2.5 million dollars.

Melissa Miller-Henson, Executive Director
Fish and Game Commission
May 28, 2019
Page 2

If you have any questions regarding this item, please contact Kevin Shaffer, Acting Chief, Wildlife Branch, at (916) 768-3758.

Attachment

ec: Department of Fish and Wildlife

Stafford Lehr, Deputy Director
Wildlife and Fisheries Division
Stafford.Lehr@wildlife.ca.gov

Kevin Shaffer, Acting Chief
Wildlife Branch
Kevin.Shaffer@wildlife.ca.gov

Brad Burkholder
Game Program Manager
Wildlife Branch
Brad.Burkholder@wildlife.ca.gov

Melanie Weaver
Waterfowl Program Lead
Wildlife Branch
Melanie.Weaver@wildlife.ca.gov

Tyrone Williams, Chief
Budget Branch
Tyrone.Williams@wildlife.ca.gov

FILE: D, DD-WFD

**Summary of Department Recommendations
For FY 2020-21 California Duck Stamp
(project costs rounded to nearest dollar)**

Canada Habitat Project

Wetland and Upland Conservation – Alberta/Saskatchewan, Canada.....\$139,037

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

Ongoing Projects - California

Duck Banding (pintail and mallards) – California Waterfowl Association..... \$64,000

This is a cooperative project to maintain sufficient banded samples of pintail and mallards to assess harvest and survival rates, as well as inputs for the Western Mallard Model.

CA VCF Portion of Breeding Population Survey..... \$45,000

This project will continue the survey to estimate visibility correction factors for the California waterfowl breeding population survey.

Tule Greater White-fronted Goose Population Study..... \$7,000

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

Department of Fish and Wildlife – Internal Expenditures \$90,000

This funding provides the match for the Pittman Robertson Act funding for the Waterfowl Program in the Wildlife Branch.

Department of Fish and Wildlife – Duck Stamp Administration \$2,500

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

Department of Fish and Wildlife – Contingency Fund..... \$29,735

This funding provides the ability to cover for emergencies (drought related or otherwise) and or cost overruns on new and existing projects. The Fish and Game Commission approved the expenditure of \$50,000 to contribute to an easement in conjunction with the Intermountain West Joint Venture, located in northeastern California that protects staging habitat for waterfowl from FY 2018-19. However; funds had to be diverted to cover costs of printing and distributing regulation booklets. The Department intends to contribute to the easement this fiscal year.

New Projects – California

Pintail Harvest Strategy Analysis and Review \$150,000

Contract with experienced waterfowl statistician to review and analyze revised pintail harvest strategy (in development) to ensure regulations allow for hunting opportunity commensurate with population status.

Butte Valley Wildlife Area – Solar Array Project \$890,000

Maintain 2,190 wetland acres by installing a solar array as a means for pumping water to flood the area. The array is estimated to generate \$35-40,000 in useable power credits annually. The electricity credit frees up existing budgets to expand managed wetlands including brood ponds.

Yolo Basin Wildlife Area – Green’s Lake Water Conveyance Improvement....\$1,000,000

Establish a reliable water delivery infrastructure by installing water control structures, HDPE pipe and gates, and vegetation removal.

After Coordination with Local Government, CDFW Lifts Fishing Delay in Mono County

May 22, 2020

As requested by county officials, California Department of Fish and Wildlife (CDFW) Director Charlton H. Bonham is [lifting the delay of the trout opener in Mono County](#). Beginning May 23, trout season will be open in the county.

The trout season was originally scheduled to open in Mono County on April 25, 2020. In April, CDFW had discussions with county leadership regarding trout fishing, which typically draws a high tourism influx to the area. Local officials were concerned about the transmission of COVID-19 and its potential to put a strain on their healthcare systems. Further, all non-essential businesses including lodging, dining and camping options were closed in compliance with state and local public health officers' orders. Thus, CDFW, in consultation with Fish and Game Commission President Eric Sklar, delayed the opener through May 31, 2020.

However, in a letter yesterday, Mono County officials requested that CDFW end the delay before May 31, indicating that the county received approval from the California Department of Public Health to move into the Governor's Phase Two, Stage Two Resilience Roadmap and would begin discussions of reopening. Though county officials requested the opening on May 22, CDFW required one additional day for consultation and processing this request, thus the delay in Mono County will expire at midnight on May 22 and fishing can resume on May 23, 2020.

This decision does not affect the trout season in any other county.

CDFW reminds anglers to abide by all state and local health guidelines regarding non-essential travel and physical distancing. Staying home in order to stay healthy is still the best way to keep yourself and others safe. Anglers are also advised to check with local authorities on the status of access points as many site closures and access restrictions exist and may change daily.

Pursuant to the emergency regulation approved by the Commission, CDFW will provide accurate information for the angling public at this [website](#) or by phone at (916) 445-7600.

###

Media Contact:

[Jordan Traverso](#), CDFW Communications, (916) 654-9937

After Coordination with Local Government, California Department of Fish and Wildlife Lifts Delay in Inyo County

May 27, 2020

As requested by county officials, California Department of Fish and Wildlife (CDFW) Director Charlton H. Bonham is lifting the delay of the trout opener in Inyo County. Beginning May 28, trout season will be open in the county.

The trout season was originally scheduled to open in Inyo County on April 25, 2020. In April, CDFW had discussions with county leadership regarding trout fishing, which typically draws a high tourism influx to the area. Local officials were concerned about the transmission of COVID-19 and its potential to put a strain on their healthcare systems. Further, all non-essential businesses including lodging, dining and camping options were closed in compliance with state and local public health officers' orders. Thus, CDFW, in consultation with Fish and Game Commission President Eric Sklar, delayed the opener through May 31, 2020.

However, in a letter yesterday, Inyo County officials requested that CDFW end the delay before May 31, indicating that the county received approval from the California Department of Public Health to move into the Governor's Phase Two, Stage Two Resilience Roadmap and would begin discussions of reopening. Though county officials requested the opening on May 27, CDFW required one additional day for consultation and processing this request, thus the delay in Inyo County will expire at midnight on May 27 and fishing can resume on May 28, 2020.

This decision does not affect the trout season in any other county.

CDFW reminds anglers to abide by all state and local health guidelines regarding non-essential travel and physical distancing. Staying home in order to stay healthy is still the best way to keep yourself and others safe. Anglers are also advised to check with local authorities on the status of access points as many site closures and access restrictions exist and may change daily.

Pursuant to the emergency regulation approved by the Commission, CDFW will provide accurate information for the angling public at this website or by phone at (916) 445-7600.

###

Media Contacts:

[Jordan Traverso](#), CDFW Communications, (916) 654-9937

From: [REDACTED]
Sent: Wednesday, April 15, 2020 8:04 AM
To: Wildlife DIRECTOR <DIRECTOR@wildlife.ca.gov>
Subject: Delays/suspensions.

Message sent from www.wildlife.ca.gov/Explore/Director/Email:

Name: Alan Earles

County: Alameda

Message: Dear Director, I'm writing to you today in hopes that you see this and hear my concerns. With the current crisis developing I understand the measures being taken to slow the spread of Covid-19. However, while all this is understandably a priority not only for our great state of California but also our fellow Americans nationwide, I'm becoming more and more concerned with how local officials and counties are handling the situation. As you saw California fisherman are EXTREMELY worried that we are going to lose our fishing season. You promptly addressed those concerns, assuring us that fishing will not end in California but only a few delays of certain species in certain areas. I think it eased a lot of people's minds, although I can't say the same for myself. Public health officials in various counties statewide have recommended the closures of boat ramps/state parks/beaches/parking lots etc severely limiting our access to the water. For example almost all launch ramps have closed on the coast denying boat/kayak fisherman access to the ocean as well as piers/beaches denying access to those who fish from shore. My worry here is that even though you assured the millions of Californian anglers that fishing is still allowed so long as we adhere to the state and local orders. With many access points to the waterways closing one by one, county by county across the state I'm starting to think fishing isn't allowed. As a fisherman I can't stress enough how critical it is to be able to access the water in order to fish. During this time of year it is prime time for fisherman to get out and fill their freezers with fresh non-farmed fish for their families. Millions of people are being laid off/furloughed without pay causing extremely tough times as I know you are fully aware of. Many of our state's citizens are going out of business, behind on bills and for those of us who live paycheck to paycheck the savings just are not there in order to sustain through this crisis. Fishing like hunting or any type of foraging allows citizens to go out and harvest their own food the way our ancestors did, without having to spend hundreds of dollars at a market. In California we spend on average about \$1,282 per month on food. While Un-employment is recovering some of our lost wages it is just not enough to survive. Mr. Director fishing is a cost effective way to provide for our families during this time of financial burden. Allow fisherman to access the waterways in order to provide for our families. I hope you hear these concerns. Thank you for your time and consideration Sincerely, A concerned citizen

From: Bob White [REDACTED]
Sent: Thursday, May 7, 2020 8:35 AM
To: Bloom, Roger@Wildlife <Roger.Bloom@wildlife.ca.gov>
Cc: Richard White [REDACTED]
Subject: Yuba River Fishing Season Closure

Mr Bloom,

The decision to keep the fishing season closed on the Yuba River above Goodyears Creek until after May 31 is not based on any legitimate supportive data. Your department's action on this issue illustrates that those individuals in the department making these decisions are far more interested in their personal occupational interests than the interests of the public they serve. This decision is strictly political and should be immediately reversed.

Please forward my comment to Charlton H. Bonham and Eric Sklar.

--

Bob White

[REDACTED]
[REDACTED]
[REDACTED]

STRATEGIC SURVEILLANCE PLAN FOR TREPONEME- ASSOCIATED HOOF DISEASE IN CALIFORNIA

June 2020



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

Prepared By:

Brandon A. Munk, MS, DVM

Emma L. Lantz, MPH, DVM

Kristin Denryter, Ph.D.

Table of Contents

Executive Summary.....	2
Acknowledgments	2
Plan Overview	3
Plan Purpose and Goals	3
Departmental Jurisdiction and Authority	3
Background and Current Understanding of Treponeme-Associated Hoof Disease	3
History and Known Geographic Distribution	3
Clinical Findings and Etiology.....	5
Ecology and Epidemiology.....	6
Surveillance.....	6
Determining Geographic Distribution of TAHD	6
Surveillance in Elk Herds Following Initial Detection.....	8
Confirmation of Treponeme-Associated Hoof Disease	8
Research.....	9
Disease Management	9
Data Management	10
Communication Strategy	11
Literature Cited	12
APPENDIX A: Depiction of elk hoof lesions and associated lesion grades from Han et al. 2019. Adapted by permission from Hoenes et al. 2018.....	13
APPENDIX B: Sample Datasheet.	14

Suggested citation: Munk, B.A., Lantz, E.L., and Denryter, K. 2020. Strategic surveillance plan for treponeme-associated hoof disease in California. California Department of Fish and Wildlife, Sacramento, CA.

Executive Summary

Treponeme-associated hoof disease (TAHD), also known as elk hoof disease, was confirmed in California for the first time in April 2020 in a Roosevelt elk harvested from Del Norte County in December 2019. Subsequently, TAHD was been confirmed in two additional elk from the same area. This plan outlines the Department's strategy to determine geographic distribution, estimate prevalence when feasible, and inform research and management actions to better understand and mitigate risks this disease may pose to California's elk populations. Having and maintaining robust demographic data will be vital to the understanding of this disease in California's elk populations and continuing to prioritize Population Monitoring objectives, outlined in the 2018 Elk Conservation and Management Plan and detailed in specific Elk Management Unit (EMU) plans, will be critical.

As the name implies, TAHD is associated with one or more species of spiral-shaped bacteria, or spirochetes, in the genus *Treponema*. The disease was first described in 2009 following increasing reports of limping or lame Roosevelt elk in southwestern Washington the year prior. Since then, it has been detected in Roosevelt and Rocky Mountain elk in other parts of Washington, Oregon, Idaho, and now California. While much has been learned about this disease, much more remains unknown, including what factors lead to disease in individuals and what the potential impacts may be to affected elk populations. These unknowns make planning response and management actions and predicting outcomes to California's elk populations challenging. As such, the Department's immediate priorities for this disease are to determine its distribution in California and to better understand the ecology, epidemiology, and pathophysiology of this disease to better advise the Department's management actions.

Acknowledgments

We are grateful for the support, advice, and input of many individuals in the preparation of this strategic surveillance plan for treponeme-associated hoof disease in California. Several individuals from the Washington Department of Fish and Wildlife (WDFW), Oregon Department of Fish and Wildlife (ODFW), and Washington State University (WSU) generously shared their time and invaluable insights with us before and during the drafting of this plan. We are especially grateful to Kyle Garrison and Dr. Kristin Mansfield from WDFW, Dr. Julia Burco (ODFW), and Dr. Margaret Wild (WSU) for their review of this plan and their input. We also are grateful to Dr. Rachel Cook of the National Council for Air and Stream Improvement for providing materials to help standardize collection of nutritional condition indices from deceased elk.

Plan Overview

Plan Purpose and Goals

The Department developed this plan in response to the initial detection of treponeme-associated hoof disease (TAHD) in California. The purpose of this plan is to direct statewide surveillance for TAHD which will, in turn, support or direct research and management efforts related to elk hoof disease.

Surveillance Goal 1: Determine geographic distribution and, where feasible, estimate prevalence of TAHD in California.

Surveillance Goal 2: Inform research and management actions to better understand and mitigate the risk of this disease to California's elk populations.

Surveillance provides the foundation for understanding this disease in California and will both support and direct any proposed research or management objectives and actions by providing the necessary information to inform and adapt management priorities. Robust population monitoring as outlined in Elk Management Unit plans will be required to adequately interpret surveillance data over time and direct management priorities. Specific surveillance and population monitoring objectives will be incorporated into Elk Management Unit plans as disease and management priorities evolve. Surveillance goals may change as our understanding of this disease increases, new tools are developed, management priorities shift, and resources change.

Departmental Jurisdiction and Authority

California Fish and Game Code (FGC) declares various objectives for preservation, conservation, and maintenance of wildlife resources under the jurisdiction and influence of the state, including alleviation of public health or safety problems caused by wildlife (§1801) and establishes the California Department of Fish and Wildlife (hereafter CDFW or Department) as the trustee agency for the conservation, protection, and management of fish and wildlife (§1802). Additionally, California FGC §1001 grants CDFW the authority to take wildlife for prevention or relief of suffering.

Background and Current Understanding of Treponeme-Associated Hoof Disease

History and Known Geographic Distribution

Treponeme-associated hoof disease (TAHD), sometimes referred to simply as elk hoof disease, was first characterized in Roosevelt elk from southwest Washington in 2009, following sporadic reports of limping elk back to the 1990s and a dramatic increase in 2008 (Han and Mansfield 2014, Han et al. 2019). It has since been detected in Roosevelt and Rocky Mountain elk in Oregon (2014), Idaho (2018), and California (April 2020) (Fig. 1). As of May 2020, TAHD is not known to occur in tule elk. The first cases of TAHD in California were

FIGURE 1: KNOWN DISTRIBUTION OF TAHD AS OF MAY 2020. ORANGE SHADING INDICATES COUNTIES WHERE TAHD HAS BEEN CONFIRMED IN FREE-RANGING ELK. NOTE, DEL NORTE COUNTY IS THE ONLY KNOWN AFFECTED COUNTY IN CALIFORNIA BUT SURVEILLANCE FOR TAHD WILL BE PERFORMED WHEREVER ELK ARE PRESENT IN CALIFORNIA.



Clinical Findings and Etiology

To date, few studies have been published on TAHD and research efforts have focused largely on describing the disease in individual elk and identifying pathogens associated with the disease (Han and Mansfield 2014; Clegg et al. 2016; Han et al. 2019). Early infections are characterized by superficial changes (e.g. erosions, ulcers, hyperkeratosis) at the coronary band and interdigital space of affected feet and hooves. As the disease progresses, ulcers undermine the coronary band, hoof capsule, and/or heel-sole junction. Further ulceration associated with inflammation and necrosis of deep and superficial tissues leads to increasingly overgrown, broken, or otherwise damaged hoof capsules. In severely affected hooves, the hoof capsule can ultimately break or slough off (Table 1; Appendix A). Hoof capsule overgrowth or deformity may be found at any stage of TAHD (Han et al. 2019). Hoof lesions are painful and can lead to limping or lameness. Secondary bacterial infections, both localized and systemic, may occur and could contribute to disease in affected animals.

TABLE 1. DESCRIPTION AND GRADES OF TREPONEME-ASSOCIATED HOOF LESIONS FROM HAN ET AL. (2019); SEVERITY OF LESIONS INCREASES WITH INCREASING GRADE NUMBER.

Grade of foot lesion	Description
I	Cutaneous only with coronary, interdigital skin, or heel erosions or ulcers with or without hoof capsule overgrowth and deformity
II	Ulceration with undermining of the hoof capsule or heel-sole junction, with or without hoof capsule overgrowth and deformity
III	Sole ulceration with inflammation or necrosis of the epidermal and dermal lamina, with or without hoof capsule overgrowth and deformity
IV	Grade II or III lesions with breakage or sloughage of the hoof capsule, with or without hoof capsule overgrowth and deformity

Spirochete (spiral-shaped) bacteria in the genus *Treponema* are consistently detected in affected hooves (Clegg et al. 2016, Han et al. 2019), though in combination with diverse species of aerobic and anaerobic bacteria, hence the descriptive name treponeme-associated hoof disease (Han et al. 2019). Genetically related treponemes are associated with similar hoof diseases, digital dermatitis (DD), found in domestic livestock including cattle, pigs, sheep, and goats (Clegg et al. 2016). However, the role these treponemes play in the development of TAHD or DD is not fully understood and other species of bacteria routinely identified in association with these diseases may play a role in developing disease (Han et al. 2019). To date, TAHD has not been detected in other wild ungulate species.

Ecology and Epidemiology

Relatively little is known about the ecology and epidemiology of TAHD and much work is needed to describe and understand the various host, pathogen, and environmental factors associated with the disease. Susceptibility of individual elk to TAHD is believed to be multifactorial (Han et al. 2019). Understanding these factors is necessary to effectively manage this (and any) disease in wildlife populations (Wobeser 2007).

Development of TAHD is likely influenced by multiple factors including environmental conditions (e.g., moist soils, bacterial community makeup), population densities, nutritional condition of individual animals, and mineral deficiencies (e.g., selenium, copper) (Han and Mansfield 2014; Han et al. 2019). Preliminary results from a Washington Department of Fish and Wildlife (WDFW) study of the Mount Saint Helen's elk population suggest that affected elk were in poorer nutritional condition in December (usually the time of year of peak body fat levels in temperate environments), had lower pregnancy and lactation rates, and had lower annual survival than unaffected elk. Additionally, WDFW found that more elk affected by TAHD died from general debilitation and predation than unaffected elk (Hoenes et al. 2018). These findings, taken together, suggest that TAHD has the potential to negatively influence susceptible elk populations. However, many risk factors remain unknown and much work remains to understand what effects TAHD may have on elk populations and what effective management strategies may be.

Surveillance

In their Terrestrial Animal Health Code, the OIE (World Organisation for Animal Health) defines surveillance as **the “systematic on-going collection, collation, and analysis of information related to animal health and the timely dissemination of information so that action can be taken.”** In accordance with this definition, CDFW's **surveillance efforts** are described below and will be incorporated into existing population assessment efforts across every elk management unit. The Department is responsible for collecting population data which will continue to be critical to help inform potential management actions. Population monitoring will be continuous and disease surveillance intensities will adapt and vary over time as detections are confirmed and our understanding of the disease improves. We anticipate broad interest in the potential implications of the disease so efforts will coordinate with other state and federal wildlife and agricultural agencies, universities, federally recognized Tribes, and the public to monitor and document the distribution of TAHD in California. Surveillance activities are underway where TAHD has been detected and will be expanded to other Elk Management Units (EMU) as we implement this plan.

Determining Geographic Distribution of TAHD

To determine the geographic distribution of TAHD and monitor for changes in that distribution, surveillance will be conducted throughout the range of elk in California. Surveillance intensities will vary between EMUs based on presence/absence of TAHD, presence of risk factors associated with TAHD, and management priorities in each EMU. The Department will work with partners including other state and federal resource agencies and

land managers; federally recognized tribes; hunters; scientific collecting permit holders; law enforcement; CalTrans; private landowners enrolled in Private Lands Management (PLM) or Shared Habitat Alliance for Recreational Enhancement (SHARE) programs; non-governmental organizations; and the general public to facilitate disease surveillance. These efforts will focus on the following surveillance activities:

1. Reporting limping elk or elk with deformed hooves through [WIL's online disease/mortality reporting tool](https://wildlife.ca.gov/Conservation/Laboratories/Wildlife-Investigations/Monitoring/Mortality-Report):
 - a. Used to prioritize populations to sample.
 - b. May come from the public, CDFW staff during routine population management activities (surveys, captures, depredation, etc.), or CDFW partners and volunteers.
 - c. <https://wildlife.ca.gov/Conservation/Laboratories/Wildlife-Investigations/Monitoring/Mortality-Report>.
2. Hooves from hunter-harvested elk (removed approximately four inches above the "ankle" joint):
 - a. Initial focus on PLM and SHARE program and managed hunts.
 - b. Brought to CDFW Regional Offices or hunter check stations, as organized by Regional staff in coordination with the Wildlife Branch (WLB) Elk Species Lead and Wildlife Investigations Lab (WIL).
 - c. Visual inspection of hooves by trained CDFW staff, partner, or volunteer to identify lesions consistent with TAHD. Training will be provided by the WIL.
 - d. Submit a subset of hooves either directly to the California Animal Health and Food Safety (CAHFS) Laboratory or the WIL for confirmation of TAHD and collection of samples for archive (biopsy interdigital space, coronary band; cryovial; freeze -80°C).
 - e. Hooves not sampled for diagnostics may be stored frozen for ongoing TAHD research collaborations.
3. Sick or debilitated elk may be euthanized by CDFW staff for Animal Welfare or Management purposes.
 - a. Collect and submit all four hooves (described above) and a 2" x 2" piece of liver to the WIL or directly to CAHFS in coordination with WIL.
 - b. Store on ice or refrigerate for up to 48 hours, otherwise freeze at -20°C until samples can be submitted.
 - c. There may be cases where a full necropsy and postmortem investigation is required. For these cases, a standardized necropsy protocol will be developed in coordination with the WIL.
4. Elk mortalities from other sources may be opportunistically inspected or sampled for TAHD.
 - a. Regional staff should coordinate with scientific collection permit holders, CalTrans, and Tribes to facilitate visual inspection and/or sampling.
 - b. Hooves and liver samples will be collected and submitted as described in 3(a), if visual inspection suggests TAHD or if samples are from an EMU with negative or unknown disease status.

Surveillance in Elk Herds Following Initial Detection

Following initial detection and confirmation of TAHD in a herd or EMU, the Department may increase surveillance and sample collection intensity in an EMU to accomplish specific objectives that may be developed in response to TAHD or management priorities, otherwise disease monitoring will continue as described in the previous section. The decision to increase surveillance intensity will depend on multiple factors including evolving management, disease, and research priorities, defined as we work with partners and gain a broader understanding of this disease in California, and resource availability. Situations that may require increased surveillance intensity include, for example, confirming disease status of herds with negative or unknown disease status that are adjacent to known positive herds, determining prevalence within an affected population, measuring success of disease management actions, or to support specific research goals.

As we learn more about TAHD in California, specific population, management, and disease objectives will be developed and more intensive surveillance strategies may be required to support those objectives. As such, they will be developed as specific Research and Management priorities are developed. Where required, a specific and detailed disease sampling and surveillance plan will be developed collaboratively by WLB, WIL, and Regional staff within Research and/or EMU Plans. These plans will, at a minimum, identify:

1. Specific Research or Management Goal(s) and Objective(s) to be addressed.
2. The specific Surveillance Goal(s) and Objective(s) to accomplish.
3. Population(s) to be sampled.
4. Sampling unit(s) defined.
5. Minimum sample size(s) and, where appropriate, predictive values.
6. Samples to be collected and tests performed.

Confirmation of Treponeme-Associated Hoof Disease

Confirmation of TAHD in an individual animal will be based on identifying one or more gross and microscopic lesions consistent with TAHD and in association with argyrophilic (silver-loving) spirochete bacteria (Han et al. 2019). As understanding of this disease expands additional diagnostic assays like immunohistochemistry (IHC), polymerase chain reaction (PCR), metagenomics, or others may become available and modify or replace this standard for case confirmation.

Sampling, testing, and surveillance strategies may change based on the availability of diagnostic assays or resources, disease detections, and management or research priorities. For example, once TAHD is detected in a herd, identification of additional diseased animals may be based on evidence of lame elk or by visual inspection of affected hooves, and confirmatory testing may be waived.

For continuity, a minimum dataset will be collected from each animal sampled or inspected to include:

- Reporting party or inspector's name and contact information
- Location of affected elk, EMU and GPS (UTM) coordinates.

- Date of observation and/or collection.
- Number of elk affected.
- Age and sex of affected elk.
- Identify and label which hooves have lesion(s) and which were collected.
- Note any antler abnormalities.

Research

Much remains unknown about TAHD and research into the disease, particularly the causes and effects, will be crucial for developing effective management strategies (Wobeser 2007, Han et al. 2019). As such, research into TAHD performed or supported by CDFW will focus on understanding the ecology and epidemiology, causative factors, population level effects, and effective management strategies of TAHD in California's elk populations. This will be accomplished by initially defining the geographic extent of TAHD in California and monitoring trends over time through disease surveillance (described above), continued demographic monitoring (described in CDFW's 2018 Elk Conservation and Management Plan), and working with local and regional partners to develop and implement specific research priorities. We will continue to support already established research collaborations to further understand the pathophysiology, confirm causative relationships between pathogens, and develop additional diagnostic tests for TAHD.

Specific research Objectives and Actions will be developed collaboratively within and among CDFW and CDFW's partners. Research goals, objectives, and actions will be modified or expanded as additional needs arise. As our understanding of the etiology, epidemiology, and ecology of TAHD increase, we will transition to research efforts that prioritize identifying strategies for managing TAHD.

Disease Management

Selecting appropriate methods for managing a disease requires a clear understanding of the cause, ecology, and epidemiology of the disease. Generally, objectives for managing wildlife diseases focus on prevention and reducing the prevalence and spread of disease, rather than eradication which is often not feasible once a disease becomes established in a wild population. In controlled or captive settings, animal disease management can include contact tracing, quarantine, treatment, vaccination, husbandry or habitat manipulation, and culling. However, these tools are often unavailable or ineffective for managing diseases in wildlife.

Contact tracing is generally not feasible in wildlife populations since not all animals are marked to be individually identifiable, individual movements and interactions among individuals cannot be tracked with adequate detail, and it is often impractical, dangerous, or impossible to capture and mark or quarantine all affected animals. Similarly, treatments available for similar hoof diseases in domestic livestock (e.g., topical antibiotics, prophylactic footbaths) are not feasible in free-ranging wildlife as they require repeated treatments and resource prohibitive to implement. There is no vaccine available for TAHD or

similar diseases in livestock. That leaves habitat manipulation and culling as the remaining options to consider, with our current understanding of TAHD.

Lethal removal has been used in Washington and Oregon for management of TAHD and is currently the only tool considered feasible for managing TAHD in California. To the extent feasible, management will focus on disease containment and mitigation, with lethal removals being a tool to help achieve that goal. Where lethal removal is employed, it will be performed to maximize animal welfare and conducted whenever possible in accordance with the American Veterinary Medical Associations guidelines. It is likely that habitat features (moist environments, overlap with livestock) are important risk factors as such habitat manipulation that alters habitat usage patterns by elk may be an option to consider as we learn more about the risk factors and ecology of TAHD. However, much work remains before habitat manipulation is likely to be a viable management action. Surveillance and research will inform TAHD-related management objective and actions. Management objectives and actions will be developed within specific EMU plans.

Potential Management Actions, unknown efficacies:

- Identify and cull affected animals (Wildlife Services and/or CDFW staff).
 - Removes sources of transmission and environmental contamination.
 - Decrease or slow disease transmission and spread.
- Lowering population objectives in affected areas.
 - Increase tag limits in affected areas.
 - Decrease density dependent disease transmission.
- Improve habitat conditions and forage quality.
 - Increase nutritional status of elk.
 - Decrease (yet undefined) environmental risk factors.
- Ban translocations of elk into or out of affected populations.
- Increase disease surveillance prior to any translocation from an unaffected herd.
- Habitat management/manipulation to affect habitat use by elk.
 - Fire or mechanical manipulation of habitats.
 - Fencing to exclude elk from certain habitats.
 - Decrease interactions with livestock.

Data Management

Samples will be submitted directly to the WIL or to CAHFS in coordination with WIL. Copies of data sheets (Appendix B) will accompany all samples and be copied to the WLB. The WIL will store, archive, and submit samples for testing; report test results; enter data and maintain an TAHD database. Regional staff will be responsible for providing (and updating quarterly) all available data on elk to the WLB for maintenance in a relational database. The WLB and WIL will develop an TAHD website where we will report and map TAHD surveillance results.

Data will be analyzed, summarized, and reported on annually by July 1. Reports will be prepared collaboratively by WLB, WIL, and appropriate regional staff, and will include

information on surveillance efforts (including number of samples analyzed, maps of geographic distribution of samples, diagnostic results, changes in distribution or prevalence, and other pertinent information).

Communication Strategy

Communication and dissemination of results in a timely manner are integral to successful disease surveillance and management efforts.

Communication Goal 1: Increase public awareness of TAHD in California.

Objective 1.1: Facilitate transparency and timely sharing of information related to TAHD in California.

Action 1.1.1: Communicate important updates using press releases through CDFW's Office of Communication, Education, and Outreach.

Action 1.1.2: Produce and maintain an up-to-date webpage on TAHD and associated surveillance and research activities in California.

Action 1.1.3: Provide information to elk hunters on hoof disease in hunter information documents, including information on reporting hoof abnormalities.

Action 1.1.4: Produce a technical report, with accompanying non-technical summary, of TAHD surveillance and research efforts annually.

Action 1.1.5: Department staff provide updates at public meetings.

Literature Cited

- CDFW. 2018. Elk Conservation and Management Plan. Sacramento, California.
- Clegg, S. R., S. D. Carter, R. J. Birtles, J. M. Brown, C. Anthony Hart, and N. J. Evans. 2016. Multilocus sequence typing of pathogenic treponemes isolated from cloven-hoofed animals and comparison to treponemes isolated from humans. *Applied and Environmental Microbiology* 82:4523–4536. American Society for Microbiology.
- 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. <<http://www.jwildlifedis.org/doi/10.7589/2013-07-163>>.
- Han, S., K. G. Mansfield, D. S. Bradway, T. E. Besser, D. H. Read, G. J. Haldorson, D. P. Alt, and J. H. Wilson-welder. 2019. Treponeme-Associated Hoof Disease of Free-Ranging Elk (*Cervus elaphus*) in Southwestern Washington State , USA. *Veterinary Pathology* 56:118–132.
- Hoenes, B., K. G. Mansfield, I. Keren, K. Garrison, B. George, E. Holman, N. Stephens, and R. C. Cook. 2018. Assessing the potential effects of Treponeme associated hoof disease (TAHD) on elk population dynamics in southwest Washington: Project update.
- Wobeser, G. A. 2007. *Disease in Wild Animals: Investigation and Management*. 2nd edition. Springer-Verlag Berlin Heidelberg.

APPENDIX A: Depiction of elk hoof lesions and associated lesion grades from Han et al. 2019. Adapted by permission from Hoenes et al. 2018.

Elk Hoof Disease

Coronary band: where the hair meets the hoof

Claw: one of two digits/toes on each hoof

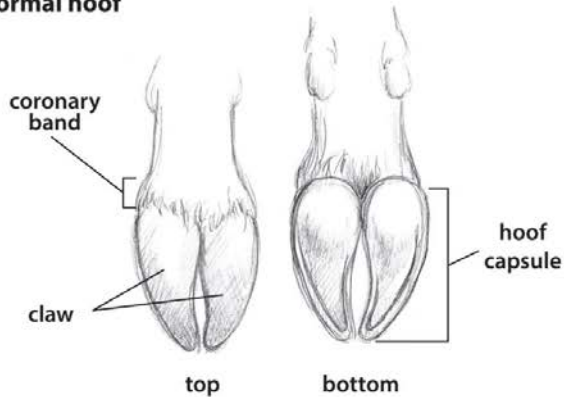
Hoof capsule: the entire structure, made of horn, that covers the digit/toe/claw

More Info:

wdfw.wa.gov/conservation/health/hoof_disease/

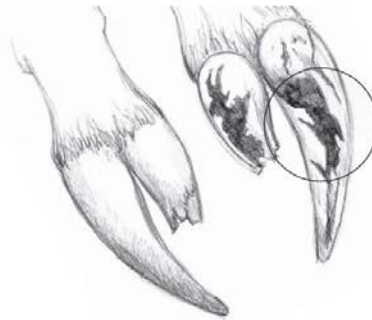


Normal hoof



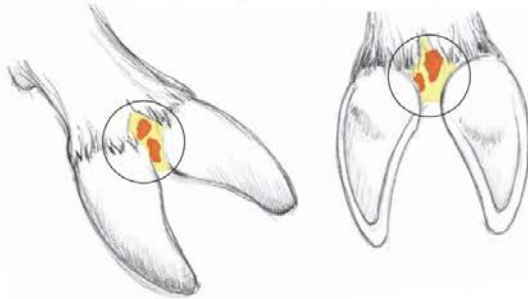
Grade 3

A large cavity or hole in one or both hoof capsules, usually on the bottom of the hoof. May include Grade 2 lesion. Hoof capsule(s) may or may not be overgrown.



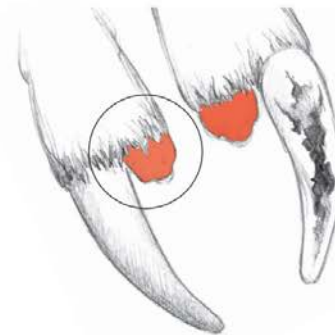
Grade 1

Broken or infected-appearing skin along the coronary band or between the toes/claws/digits. Lesions are limited to the skin with no hoof capsule involvement. Hoof capsule(s) may or may not be overgrown, but are not infected or broken.



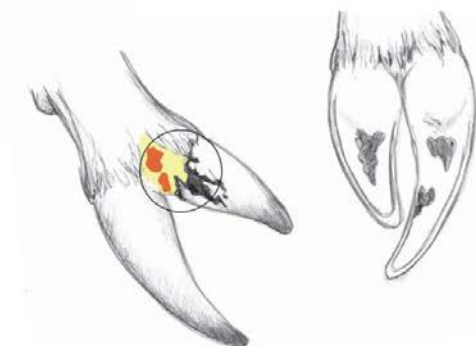
Grade 4

Missing one or both hoof capsules. Remaining claw may include Grade 2 or Grade 3 lesions; and remaining hoof capsule is usually overgrown.



Grade 2

Skin wound is beginning to work its way underneath the hoof capsule. Hoof capsule(s) may or may not be overgrown.





ELK HEALTH SURVEILLANCE

ID Number

Date: _____
Name: _____
Source: _____
Subspecies: ☐ Roosevelt ☐ Calf ☐ Yearling ☐ Adult ☐ Unknown (years)
Age Class: ☐ Female ☐ Male
Sex: _____

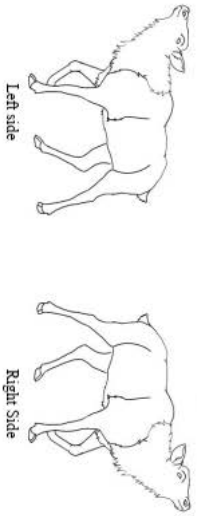
Post-mortem condition: ☐ Good ☐ Fair ☐ Autolyzed ☐ Poor
Nutritional Status: ☐ Good ☐ Fair ☐ Euthanasia ☐ Vehicular ☐ Predation ☐ Other ☐ Unknown
Death via: _____

Date of death: _____ Hunter name: _____ Tag # (or Gold): _____
Notes: _____

GPS coordinates: Latitude: _____ Longitude: _____
Easting: _____ Northing: _____
Datum: ☐ WGS 84 ☐ NAD83 Zone: _____

General location (physical land description, address, hunt zone, etc.): _____

Carcass injuries (Mark general location of injuries on picture and describe below)



Description of injuries

Marked individual: Ear Tag ID _____ Collar ID _____ Collar Frequency _____

Samples Collected

Hooves: ☐ Right Front ☐ Left Front ☐ Right Hind ☐ Left Hind ☐ Notes (description of any abnormalities):

Feces: ☐ WhirlPak 1 ☐ WhirlPak 2 ☐

Liver: ☐ WhirlPak 1 ☐ WhirlPak 2 ☐

CWD Samples: ☐ WhirlPak RPLN ☐ Formalin RPLN & obex ☐

GI: ☐ Ileocecocolic LN ☐ Colon ☐ Mesenteric LN ☐

Muscle: ☐ WhirlPak 1 ☐

Elk Hoof Disease Detected in Del Norte County Herd

May 7, 2020

The California Department of Fish and Wildlife (CDFW) has detected the state's first cases of a potentially crippling hoof disease in two Roosevelt elk from a resident herd in Del Norte County.

Treponeme-associated hoof disease (TAHD) – commonly referred to as “elk hoof disease” – can cause deformed, overgrown and otherwise damaged hooves. The lesions and resulting deformities are painful and lead to limping, lameness and even death as observed in other states. When the disease is severe, elk may become too weak to graze, fight off other infections or escape predators.

TAHD was first identified in elk from Washington state in the 1990s, but much remains unknown about the disease. Currently, there is no known cure or vaccination.

TAHD has been documented in elk in Washington, Oregon and Idaho. [Recent detections in Oregon's Douglas County](#) were previously the closest to California. TAHD gets its name from a bacterium, *Treponema* sp., that is associated with this disease, but other pathogens also may play a role. Scientists at Washington State University who are experienced with TAHD confirmed the disease in the two Roosevelt elk from Del Norte County.

It is unknown what impact TAHD may have on elk populations in California or other states. California is home to three subspecies of elk – Rocky Mountain elk, Roosevelt elk and tule elk – that together inhabit approximately 25 percent of the state. In other states, both Rocky Mountain and Roosevelt elk have contracted TAHD. To date, there are no known cases of TAHD among tule elk.

While the disease appears to be highly infectious among elk, there is no evidence that it affects humans. Still, hunters who harvest an elk exhibiting signs of deformed or damaged hooves should exercise caution and practice safe hygiene when processing, cooking and consuming the meat. Hunters also are encouraged to submit hoof samples to CDFW from suspect elk.

CDFW will be working with natural resource agencies in other western states and academic partners to increase surveillance for TAHD in California, plan management actions and facilitate research.

The general public can assist CDFW's efforts by reporting any elk that appears to be limping, lame or have abnormal hooves via CDFW's Wildlife Investigations Lab disease and mortality reporting website: <https://wildlife.ca.gov/conservation/laboratories/wildlife-investigations/monitoring/mortality-report>.

Additional information on elk hoof disease is available at the following links:

- Washington State University's webpage on TAHD: vmp.vetmed.wsu.edu/research/elk-hoof-disease
- Washington Department of Fish and Wildlife's web page on TAHD: wdfw.wa.gov/species-habitats/diseases/elk-hoof
- Oregon Department of Fish and Wildlife's fact sheet on TAHD: www.dfw.state.or.us/wildlife/health_program/docs/elkhoofdiseasefactsheetfinal.pdf

###

Media Contacts:

Dr. Brandon Munk, CDFW Wildlife Investigations Lab, (916) 358-1194

Peter Tira, CDFW Communications, (916) 215-3858

Deadly Disease Detected in California Wild Rabbits for the First Time

May 13, 2020

The California Department of Fish and Wildlife (CDFW), in conjunction with the California Animal Health and Food Safety Lab, San Bernardino has diagnosed Rabbit Hemorrhagic Disease (RHD) in a black-tailed jackrabbit carcass submitted from private property near Palm Springs in early May. Samples submitted to the National Veterinary Services Laboratory in Plum Island, New York, confirmed the presence of the RHD virus type 2 (RHDV2) in California for the first time. This disease is highly contagious and often lethal to both wild and domestic rabbits. The carcass that was tested was one of about 10 dead jackrabbits observed on the Palm Springs property.

RHDV2 is not related to coronavirus; it is a calicivirus that does not affect humans or domestic animals other than rabbits. At this time, no other California rabbit populations are known to be infected, but the disease has spread quickly in other states, prompting CDFW biologists to prepare for more reports in the coming months. A [“quick facts” reference guide](#) can be found on CDFW’s website.

Since March 2020, RHDV2 has caused mortalities of both wild and domestic rabbits in New Mexico, Colorado, Arizona, Texas and Mexico. Deaths of both wild rabbits and jackrabbits have occurred. Infected rabbits and jackrabbits may exhibit no symptoms leading up to their sudden death, or may suffer from fever, swelling, internal bleeding and liver necrosis. The range of susceptible species in North America is currently unknown, but all rabbit, jackrabbit, hare and pika species are likely susceptible.

CDFW Senior Wildlife Veterinarian Deana Clifford noted the introduction of RHDV2 to California could significantly impact wild rabbit populations, particularly those already at risk, such as the endangered riparian brush rabbit (*Sylvilagus bachmani riparius*) and those with limited distribution in the state, such as the pygmy rabbit (*Brachylagus idahoensis*).

“Unfortunately, we may also see impacts to species that depend on rabbits for food, as rabbits are a common prey species for many predators,” noted Dr. Clifford.

CDFW will carefully monitor the progression of RHDV2 in California, including investigating and testing rabbits found dead, monitoring populations of endangered rabbits and working with partners, including the U.S. Fish and Wildlife Service, the California Department of Food and Agriculture (CDFA) and the U.S. Department of Agriculture.

Public reports are an extremely helpful tool as wildlife veterinarians monitor the situation. CDFW is asking anyone who lives, works or recreates in wild rabbit habitat to report any sightings of sick or dead rabbits to CDFW’s Wildlife Investigations Laboratory. To report

sightings of sick or dead wild rabbits, hares or pikas contact the CDFW Wildlife Investigations Lab at (916) 358-2790 or file an [online mortality report](#) through CDFW's website.

Outdoor recreationists should take precaution when hiking, camping or backpacking and not handle or disturb carcasses to minimize the potential spread of RHDV2. Additionally, hunters should take precautions to prevent spreading the virus, such as wearing gloves when field dressing rabbits, washing hands and burying remains onsite so that scavengers cannot spread the virus. The virus is hardy and can remain viable on meat, fur, clothing and equipment for a very long time, making it easily transmissible to other areas.

In California, hunting season for brush rabbits and cottontails opens July 1 and runs through the last Sunday in January. The season is open statewide, except for a closed area in the Central Valley near the riparian brush rabbit range. Hunting season for jackrabbits is year-round and statewide.

A vaccine for RHDV2 is not currently available in the U.S., thus domestic rabbit owners should practice good biosecurity measures to protect their animals from this disease, such as washing hands before and after working with rabbits, not sharing equipment with other owners and keeping their rabbits isolated from wild or feral rabbits.

Domestic rabbit owners who have a sick rabbit should contact their veterinarian. If domestic rabbits are found dead, please contact the [local CDFA Animal Health Branch](#) or call (916) 900-5002.

###

Media Contacts:

[Dr. Deana Clifford](#), CDFW Wildlife Investigations Laboratory, (916) 358-2378

[Kirsten Macintyre](#), CDFW Communications, (916) 804-1714

From: Tom Wheeler <tom@wildcalifornia.org>
Sent: Monday, May 11, 2020 10:35 AM
To: FGC <FGC@fgc.ca.gov>
Subject: Comment for May 15 meeting

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

Dear Fish and Game Commission,

On behalf of the Environmental Protection Information Center (EPIC), I write to bring to your attention significant new information concerning elk health on the North Coast that directly relates to the elk hunting quotas that the Commission previously approved at your April 16th meeting and future elk management decisions.

As you are likely aware, the California Department of Fish and Wildlife has recently announced the presence of treponeme-associated hoof disease (TAHD) in North Coast elk. TAHD has previously been detected in elk in both Washington and Oregon. From their experience, TAHD is extremely concerning for the following reasons:

- The disease causes lameness in elk populations, which in turn reduces the fitness of elk and increases mortality. Elk populations in Washington have experienced significant population declines as a result of the disease.
- Spread of the disease is rapid and can infect nearly all of a herd, with herds in Washington and Oregon reporting between 20-90% of elk experiencing symptoms.
- There is no treatment for the disease.
- Further regulations concerning elk hunting can minimize the spread of the disease and moderate the effects.

EPIC believes that this information constitutes significant new information and the cumulative impacts of the disease, together with approved hunting, is unknown. EPIC will provide more information about the disease and management recommendations in a future letter.

Thank you for your attention to this issue.

Sincerely,

Thomas Wheeler
Executive Director

--

Tom Wheeler
Executive Director and Staff Attorney
Environmental Protection Information Center
145 G Street Suite A
Arcata, CA 95521
Office: (707) 822-7711 | Cell: (206) 356-8689
tom@wildcalifornia.org
www.wildcalifornia.org

Pronouns: he/him/his

"If EPIC had not undertaken its lonely efforts on behalf of the Marbled Murrelet, it is doubtful that the species would have maintained its existence throughout its historical range in California." - Judge L. Bechtle, Marbled Murrelet v. Pacific Lumber Co.

From: Phoebe Lenhart [REDACTED]
Sent: Tuesday, June 9, 2020 8:05 PM
To: FGC <FGC@fgc.ca.gov>
Subject: FGC meeting on June 24 and 25, 2020

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

Dear FGC Commissioners,

It is not clear to me the appropriate category for my E-mail to you, regarding the treponeme-associated hoof disease (TAHD) found in 2 Roosevelt elk in Del Norte County (DNC), belongs in. On June 24, #2 on the agenda is for "general public comments"; as well as, June 25, #18 on the agenda is also for "general public comments". In addition, agenda item #25 pertains to the Wildlife Resources Committee (WRC) and to recommendations for topics to be added for future meetings. I am requesting that the TAHD infection in Roosevelt elk in DNC be included on the agenda for future FGC and WRC meetings.

I have tried, for over 1 month, to receive information from the CA DFW regarding the TAHD infection found in our Roosevelt, even before the May 14, 2020 FGC and WRC meetings. To date, I have not received any information. Many residents are very concerned about the appearance of the TADH in our elk. I have requested information on the location of these Roosevelt elk in relation to the "Big Game Drawing" (held by the DFW on June 2), as well as, the SHARE hunts (on June 24). Since the beginning of the SHARE hunting program in 2015, the number of elk being hunted has tripled! Has the Roosevelt elk population tripled? Absolutely not!

According to the DFW's own surveys, there are 50 fewer elk in 2019 than in 2018. Even worse, among the 9 small herds, there are 2 herds with no bulls, one herd with 5 bulls, and another with only 8 bulls. Within the approximately 400 remaining elk, 110 elk are calves and 48 are "spikes". If you were to subtract these 158 immature elk from the 400 remaining elk, that leaves a population of only 242 mature elk. Within this small population, the DFW unrealistically made their proposal for the 2020-2021 hunting season with the FGC's approval. Due to the fact that the DFW submitted their report 2 days before the May 14, 2020, FGC meeting, the public has not had an opportunity to review the DFW's proposal which did NOT consider the existence of TAHD at the time. I think that the DFW is very irresponsible and incompetent.

Please consider an emergency meeting before the hunting season begins (in about 2 months) to formulate the best stewardship of our small herds of Roosevelt elk in DNC. Many of us want to know if the DFW is testing the soil? Is the DFW examining cattle and livestock in the region where the TAHD was found in the Roosevelt elk? There are very many issues with the TAHD that need to be seriously considered before the DFW and FGC go on their merry way, (during summer vacations) abandoning the good stewardship of Roosevelt elk in DNC.

Sincerely,
Phoebe Lenhart
Supporters for Del Norte Roosevelt Elk
[REDACTED]

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
Jamu

STATE OF CALIFORNIA
Gavin Newsom, Governor

Fish and Game Commission



*Celebrating 150 Years of
Wildlife Heritage and Conservation!*

Melissa Miller-Henson
Executive Director
P.O. Box 944209
Sacramento, CA 94244-2090
(916) 653-4899
fgc@fgc.ca.gov
www.fgc.ca.gov

WILDLIFE RESOURCES COMMITTEE

Committee Co-Chairs: Commissioner Burns and President Sklar

May 14, 2020 Meeting Summary

Following is a summary of the California Fish and Game Commission (Commission) Wildlife Resources Committee (WRC) 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 9:30 a.m. by Co-Chair Sklar, who gave welcoming remarks.

Wildlife Advisor Ari Cornman outlined meeting procedures and guidelines for participating in Committee discussions, noting that the Committee is a non-decision-making body that provides recommendations to the Commission on wildlife and inland fisheries items. He introduced Commission staff and California Department of Fish and Wildlife (Department) staff. The following Committee members, and Commission and Department staff, attended:

Committee Co-Chairs

Eric Sklar	Present
Russell Burns	Present

Commission Staff

Melissa Miller-Henson	Executive Director
Rachel Ballanti	Deputy Executive Director
Ari Cornman	Wildlife Advisor
Cynthia McKeith	Staff Services Analyst

Department Staff

Stafford Lehr	Deputy Director, Wildlife and Fisheries Branch
David Bess	Chief, Law Enforcement Division
Jennifer Ikemoto	Assistant Chief, Law Enforcement Division
Kevin Shaffer	Acting Branch Chief, Wildlife Branch
Roger Bloom	Acting Branch Chief, Fisheries Branch
Chris Stoots	Captain, Law Enforcement Division
Randy Lovell	Statewide Aquaculture Coordinator

1. Approve agenda and order of items

The Committee approved the agenda and order of items.

2. Public comment for items not on the agenda

A representative from Friends of Del Norte thanked the Commission for the transparency and inclusiveness of its mission, while also expressing concerns about the processing and distribution of comments that were submitted previously. Another commenter raised concerns about comment letters submitted to the Commission and asked that the Department provide information to the Commission and public prior to Commission comment deadlines.

3. Department updates

(A) Wildlife Branch

Kevin Shaffer spoke about the safety of Department personnel and the public during the COVID-19 pandemic and expressed concerns about getting all the data necessary to inform regulations. He mentioned that the Department's attention is focused on human-wildlife conflict, status reviews, and wildfires. He affirmed that the Department is working diligently on elk wildlife disease issues.

Stafford Lehr stated that the Department is striving to provide information timely to the public, ideally well-ahead of a Commission meeting. He committed to discussing relevant information in the local working group for the elk north coast management unit and encouraged stakeholders to participate in that group, including its efforts to develop a local elk management plan. Concurrently, the Department is working diligently on Treponeme-associated hoof disease (TAHD) issues and will bring information to light as it is formulated. Stafford highlighted the attention on other wildlife diseases, including chronic wasting disease, wild sheep diseases, and a new disease called rabbit hemorrhagic disease.

(B) Fisheries Branch

Roger Bloom highlighted the ongoing sport fish simplification initiative, the recent emergency closures due to COVID-19, work with stakeholders regarding Department-permitted events, and ongoing work regarding species petitioned for listing under the California Endangered Species Act. He touched on the challenges that COVID-19 and remote working have created for Fisheries Branch operations. He raised concerns about lower snowpack levels and potential wildfire issues.

(C) Law Enforcement Division

Chief Bess spoke about large crowds recreating and the public education that wildlife officers have been engaged in regarding physical distancing and other safety measures. Officers have participated in security details with the U.S. Coast Guard, provided security for COVID-19 task centers, and worked with other agencies on state park closures.

Discussion

A representative of the Friends of Del Norte stated that it and the Environmental Protection Information Center would like to be invited to the local elk working group. She advocated for contact tracing of elk with TAHD and focusing resources on the disease. Another

commenter spoke about the sportfish simplification regulations and stated they looked forward to continuing the dialogue with the Department.

Stafford committed to providing information to the Commission and public about TAHD. He also stated that the Department looks to local boards of supervisors for help setting up and facilitating local public meetings, and that the Department would reach out to both groups.

4. Initial vetting of regulations

(A) Mammal Hunting

Kevin Shaffer stated that the Department may be looking at potential reductions to northern California deer hunts, adjustments to sheep hunts, and a reduction to pronghorn antelope allowances in Zone 3.

Discussion

A representative of the Public Interest Coalition spoke against the use of dogs to hunt deer. A stakeholder expressed the hope that some information on TAHD would be presented at the next meeting.

A representative of the California Rifle and Pistol Association and the California Bowmen Hunters/ State Archery Association urged consideration of a one-power scope on archery equipment and an increase of SHARE archery tags.

A representative for the Friends of Del Norte asked for clarification on whether projected hunting decreases included elk, requested more information on herds in general, and advocated for a new environmental document that takes TAHD into account and has a plan for preventing spread of the disease. Kevin clarified that the data analysis in question is for deer only and not elk. Another commenter echoed concerns for the effects of TAHD on elk herds and the lack of information from the Department, encouraged the use of elk-proof fencing where appropriate, and requested that the Department void the 2020 hunting regulations and reconsider them in light of the disease.

Co-Chair Burns asked about previous discussions surrounding scopes on archery equipment and muzzleloaders; Stafford clarified that low-power optics are allowed on muzzleloaders now and that the Department would need to consider the suggestion internally. Co-Chair Burns suggested that crossbows could be included in the conversations.

(B) Waterfowl Hunting

Kevin stated that the Department is working with the federal government on a framework for waterfowl, given the lack of data this year. The Department may propose slight changes to goose season.

Discussion

The California Waterfowl Association stated that it would like clarification on whether goose adjustments would require approval from the Pacific Flyway Council and raised concerns regarding light goose overabundance. Stafford answered that the goose date adjustments were within State authority. He mentioned that the white goose depredation order is a federal issue and requires National Environmental Policy Act review, but staff at the U.S.

Fish and Wildlife Service is stretched thin; therefore, the Department is concentrating on pintail duck issues.

(C) Klamath River Basin, Central Valley, and Miscellaneous Sport Fishing

Roger Bloom mentioned the upcoming effort for anadromous sport fishing regulation simplification. He also mentioned that the Department would be evaluating the inland fishing boat limit concept. The Department will be monitoring the fishing season on the Klamath River, including the new jack size, for next-year's recommendation.

Discussion

A representative of the Northern California Guides and Sportsmen's Association (NGASA) indicated a strong desire for the Department to consider boat limits and to have a dialogue as soon as possible.

A representative of California Bowmen Hunters/State Archery Association recommended exempting carp from the wanton waste rules and allowing bowfishing of gizzard shad.

Roger reiterated that the Department is committed to evaluating the boat limits issue. Ari Cornman provided some history and context to the boat limits issue. The NGASA representative asked whether a new petition was required, and Ari responded that it was unnecessary – the Department and Commission staff are committed to evaluating the issue as they are able, and discussions could occur to potentially chart a way forward.

5. Bullfrogs and non-native turtles

Ari Cornman stated that the agency team made significant progress on its situation analysis. Commission staff was contacted by an importer, who has agreed to be part of the industry group, which will allow that team to start meeting. Once all three stakeholder groups have met, it will allow staff to implement its legislative strategy as well. Commission staff will vet a draft timeline with the full Commission at its June meeting.

Discussion

A stakeholder asked what can be done if it is known that a person is breeding bullfrogs. Stafford suggested that the stakeholder get in touch with him or contact CalTIP by phone, text or online (details at <https://wildlife.ca.gov/enforcement/caltip>); commercial breeding of bullfrogs requires an aquaculture permit. Stafford spoke about the heightened sense of awareness surrounding wildlife diseases.

Another stakeholder complimented Commission staff on the meeting preparations under the extraordinary circumstances.

6. Future agenda items

The next WRC meeting is scheduled for September 17, 2020 in Sacramento; topics for discussion will include potential recommendations for mammal hunting, waterfowl hunting, Central Valley sport fishing, Klamath River Basin sport fishing and general sport fishing, as well as initial vetting for upland game bird hunting and an update on the bullfrog and non-native turtle project.

Discussion

A stakeholder praised the technology used for the meeting and encouraged the use of video in the future. The Co-Chairs thanked Commission staff and stakeholders.

Adjourn

The Committee adjourned at 10:56 a.m.

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 June 15, 2020

		May 2020 Teleconference	Sep 2020 Sacramento	Jan 2021 TBD
Annual Regulations				
Upland (Resident) Game Birds	Annual		X	X/R
Sport Fishing	Annual			
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			
Simplification of Statewide Inland Fishing Regulations	Regulatory			
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

* Note: The March meeting is an additional meeting that was added by FGC

California Fish and Game Commission
Draft Revised Stakeholder Engagement on American Bullfrogs and
Non-native Turtles Timeline

Revised June 12, 2020

Purpose

California Fish and Game Commission (Commission) staff recommendation on a revised timeline for stakeholder engagement to identify potential regulatory and statutory changes, funding mechanisms, and strategies for existing wild populations of American bullfrogs and non-native turtles to reduce the impacts on California's native wildlife.

Proposed Revised Timeline for Completion

- ***Jun-Nov 2020***
 - Complete situation analyses with Agency, Industry and Environmental/Animal Welfare groups
 - Provide updates on the process at regular Commission and Wildlife Resources Committee (WRC) meetings
 - Outreach meetings with legislative caucuses/committees
- ***Dec 2020***
 - Staff synthesis of three plans
 - Formulate range of options for the Commission
- ***Jan 2021***
 - Presentation to WRC and discussion of options
- ***Feb-Apr 2021***
 - Public workshop
 - Commission and California Department of Fish and Wildlife staff finalize proposal
- ***May 2021***
 - WRC recommendation to Commission
- ***June 2021***
 - Staff presentation and possible action on proposal by Commission

DRAFT

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.

DRAFT

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 Policy¹, 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.** All year = Most liberal and focused on maximizing angling opportunities.
- B.** Last Saturday in April through November 15 = 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.** November 16 through the Friday preceding the last Saturday in April = 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.** Last Saturday in April through July 31 = 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

DRAFT

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

DRAFT

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.

Deletion ##	Necessity for removal in Section 7.50(b)
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).

Deletion ##	Necessity for removal in Section 7.50(b)
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

DRAFT

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. 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

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

DRAFT

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

DRAFT

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

- DRAFT
- 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.

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.): 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.

DRAFT

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.

DRAFT

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 Regulations:

(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).

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-, <u>except those streams listed by name in Section 7.50(b), Special Fishing Regulations.</u>	All year.	12-inch minimum.	5
The remaining streams of Inyo County, except those waters listed in sections <u>Section 7.50(b)(82) and 7.50(b)(134), Special Fishing Regulations.</u>	Last Saturday in April through Nov-November 15. <u>Closed to bass fishing from November 16 through the Friday preceding the last Saturday in April.</u>	12-inch minimum.	5
All Lakes, Big Pine Canal, Fish Spring Canal, and Millpond <u>in Inyo County.</u>	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
(53) Mono County: all watersstreams except for Fish Slough (see subsection (b)(1610)) 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
(64) 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			
SPECIAL REGULATIONS			
(85) 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
(106) Casitas Lake (Ventura County).	All year.	12-inch minimum. No more than one over 22 inches.	5
(117) Castaic Lake (Los Angeles County).	All year.	15-inch minimum.	5
(128) 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

(149) Eastman Lake (Madera and Mariposa 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 <u>10</u>) 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. <u>See Section 7.50(b)(49), Special Fishing Regulations.</u>	All year.	No size limit.	5
(17 <u>11</u>) Hensley Lake (Madera County).	All year.	15-inch minimum.	2
(18 <u>12</u>) Hodges Lake (San Diego County).	All year.	15-inch minimum.	5
(19 <u>13</u>) Isabella Lake (Kern County).	All year.	15-inch minimum.	2
(20 <u>14</u>) Kaweah Reservoir (Tulare County).	All year.	15-inch minimum.	2
(21 <u>15</u>) Lett's Lake (Colusa County).	All year.	No size limit.	5
(22) Perris Lake (Riverside County).	All year.	12-inch minimum.	5
(23 <u>16</u>) Plaskett Meadows lakes, upper and lower (Glenn County).	All year.	No size limit.	5
(24 <u>17</u>) 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 <u>18</u>) 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

(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.	4
(3019) 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.

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.

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.

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.

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, except in Lake Oroville and Oroville-Thermalito Complex (Diversion Pool, Forebay, and Afterbay) and the Feather River from the Diversion Pool Dam to the Fish Barrier Dam. Incidentally hooked Coho (silver) salmon, except those in Lake Oroville and Oroville-Thermalito Complex (Diversion Pool, Forebay, and Afterbay) and the Feather River from the Diversion Pool Dam to the Fish Barrier Dam, 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).

<i>District/Water</i>	<i><u>Open Season and Special Restrictions</u></i>	<i><u>Daily Bag and Possession Limit</u></i>
(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.
(21) Anadromous waters of the Klamath and Trinity River S <u>systems</u> , and those entering the ocean south of Humboldt Bay, which are not listed in the Special Regulations.	Closed to all fishing all year.	
(32) 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 POSSESSED IN ADDITION TO THE OTHER DAILY BAG AND POSSESSION LIMITS SPECIFIED FOR THE NORTH COAST DISTRICT~~

(b) Sierra District		
(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 7.507.40). (See subsections (b)(156) and (b)(156.580) of Section 7.507.40 regarding the Sacramento River.)	Last Saturday in Apr. through Nov. 15. Only artificial lures <u>and with</u> 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 River in Shasta County, except those listed by 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		
(1) All lakes and reservoirs except those listed by name in the Special Regulations.	All year.	5 trout
(21) All streams except those listed by name in the Section 7.40, Special Regulations.	Closed to all fishing all year.	
(32) 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		
(1) All lakes and reservoirs except those listed by name in the Special Regulations.	All year.	5 trout
(21) 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		
(1) All lakes and reservoirs except those listed by name in the Special Regulations.	All year	5 trout

(21) That portion of any stream west of any Highway 1 bridge except those listed by name in the Section 7.40, special <u>Special Regulations</u> .	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.
(32) 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 <u>Closed to the take of salmon.</u>	5 trout Closed to the take of salmon.
(43) All other streams and portions of streams except those listed in subsection (e)(21) above or by name in the Section 7.40, Special Regulations .	Closed to all fishing all year.	
(f) Southern District		
(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
(41) All anadromous waters except those listed by name in the <u>Section 7.40, Special Regulations</u> (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 Matilija Dam on Matilija Creek and above Wheeler Gorge Campground on NF Matilija Creek; and above Rindge Dam on Malibu Creek.	All year	5 trout
(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.

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)

<i>Body of Water</i>	<i>Open Season and Special Restrictions</i>	<i>Daily Bag and Possession Limit</i>
<u>(1) Alameda Creek and tributaries (Alameda and Santa Clara cos.).</u>		
<u>(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.</u>	<u>Closed to all fishing all year.</u>	
<u>1. Arroyo Del Valle between Bernal Ave. and the Thiessen St. intersection with Vineyard Ave.</u>	<u>All year. Only artificial lures with barbless hooks may be used.</u>	<u>0 trout</u>
<u>(2) Albion River (Mendocino Co.). Also see Section 8.00(b). Main stem below the confluence of South Fork Albion.</u>	<u>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</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>

Body of Water	Open Season and Special Restrictions	Daily Bag and Possession Limit
	<u>be used from Nov. 1 through Mar. 31.</u>	
<u>(3) Alder Creek (Mendocino Co.). Also see Section 8.00(b). Main stem below Tramway Gulch.</u>	<u>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.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(4) American River (Sacramento Co.).</u>		
<u>(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.</u>	<u>Closed to all fishing all year.</u>	
<u>(B) From the U.S. Geological Survey gauging station cable crossing about 300 yards downstream from the Nimbus Hatchery fish rack site to the SMUD power line crossing at the southwest boundary of Ancil Hoffman Park.</u>	<u>Jan. 1 through July 15. Only barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
	<u>July 16 through Oct. 31. Only barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession. 2 Chinook Salmon. 4 Chinook Salmon in possession.</u>
<u>(C) From the SMUD power line crossing at the southwest boundary of Ancil Hoffman Park downstream to the Jibboom Street bridge.</u>	<u>Jan. 1 through July 15.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
	<u>July 16 through Dec. 31.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession. 2 Chinook Salmon. 4 Chinook Salmon in possession.</u>
<u>(D) From the Jibboom Street bridge to the mouth.</u>	<u>Jan. 1 through July 15.</u>	<u>2 hatchery trout or hatchery steelhead**. 4</u>

Body of Water	Open Season and Special Restrictions	Daily Bag and Possession Limit
		<u>hatchery trout or hatchery steelhead** in possession.</u>
	<u>July 16 through Dec. 16.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession. 2 Chinook Salmon. 4 Chinook Salmon in possession.</u>
	<u>Dec. 17 through Dec. 31.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(5) Antelope Creek (Tehama Co.).</u>		
<u>(A) From confluence with North Fork downstream to U.S. Geological Survey gauging station cable crossing at mouth of Antelope Creek Canyon.</u>	<u>Last Saturday in April through Nov. 15. Only artificial lures with barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(B) From U.S. Geological Survey gauging station cable crossing at mouth of Antelope Creek Canyon downstream to mouth of Antelope Creek.</u>	<u>June 16 through September 30.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(6) Aptos Creek (Santa Cruz Co.) from mouth to bridge on Aptos Creek Road. Also see Low-Flow Restrictions, Section 8.00(c)(4).</u>	<u>Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(7) Arroyo Grande Creek (San Luis Obispo Co.). From mouth to Lopez Canyon Dam.</u>	<u>Closed to all fishing all year.</u>	
<u>(8) Arroyo Leon (San Mateo Co.).</u>	<u>Closed to all fishing all year.</u>	
<u>(9) Arroyo Seco River (Monterey Co.). Also see Section 8.00(c). The main stem Arroyo Seco and tributaries below the waterfall located approximately 3.5 miles</u>	<u>Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>

Body of Water	Open Season and Special Restrictions	Daily Bag and Possession Limit
<u>upstream from the U.S. Forest Service Ranger Station.</u>		
<u>(10) Auburn Ravine Creek and tributaries (Placer Co.) east of Nelson Lane.</u>	<u>Fourth Saturday in May through Oct. 15.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(11) Battle Creek (Shasta and Tehama Cos.).</u>		
<u>(A) From mouth to Coleman Fish Hatchery weir.</u>	<u>Closed to all fishing all year.</u>	
<u>(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.</u>	<u>Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(12) Bear River (Humboldt Co.) downstream from County Road Bridge at Capetown, excluding tributaries.</u>	<u>Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(13) Bear River and tributaries (Placer Co.) From Highway 65 to the South Sutter Irrigation District Diversion Dam.</u>	<u>Fourth Saturday in May through Oct. 15.</u>	<u>2 hatchery trout or hatchery steelhead**, 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(14) Big Chico Creek (Butte Co.).</u>		
<u>(A) From mouth to Bear Hole, located approximately one mile downstream from the upper end of Bidwell Park.</u>	<u>June 16 through Feb. 15. Only artificial lures with barbless hooks may be used from Oct. 16 through Feb. 15.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(B) From Bear Hole to the upper boundary of the Big Chico Creek Ecological Reserve.</u>	<u>Nov. 1 through April 30. Only artificial lures with barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(C) From the upper boundary of the Big Chico Creek Ecological Reserve to Higgins Hole Falls,</u>	<u>Closed to all fishing all year.</u>	

<i>Body of Water</i>	<i>Open Season and Special Restrictions</i>	<i>Daily Bag and Possession Limit</i>
<u>located about one-half mile upstream from Ponderosa Way.</u>		
<u>(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.</u>	<u>All year. Only barbless hooks may be used. Cutthroat trout minimum size limit: 10 inches.</u>	<u>2 cutthroat trout. 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(16) Big River (Mendocino Co.). Also see Section 8.00(b). Main stem below the confluence of Two Log Creek.</u>	<u>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.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(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.</u>	<u>Closed to all fishing all year.</u>	
<u>(18) Black Butte River and tributaries (Glenn Co.) except Cold Creek.</u>	<u>Closed to all fishing all year.</u>	
<u>(19) Bodfish Creek and tributaries (Santa Clara Co.)</u>	<u>Closed to all fishing all year.</u>	
<u>(20) Bogus Creek (Siskiyou Co.).</u>	<u>See Klamath River 7.40(b)(50).</u>	
<u>(21) Brush Creek (Mendocino Co.). Main stem below the Lawson bridge. Also see Section 8.00(c).</u>	<u>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.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(22) Butano Creek (San Mateo Co.).</u>		

<i>Body of Water</i>	<i>Open Season and Special Restrictions</i>	<i>Daily Bag and Possession Limit</i>
<u>From mouth to county bridge on Pescadero-Bean Hollow Road. Also see Low- Flow Restrictions, Section 8.00(c)(2).</u>	<u>Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(23) Butte Creek (Butte and Sutter Cos.).</u>		
<u>(A) From the Oro-Chico Road bridge crossing south of Chico to the Centerville Head Dam, located 300 yards downstream from the DeSabra Powerhouse below DeSabra Reservoir.</u>	<u>November 15 through February 15. Only artificial lures with barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(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.</u>	<u>All year.</u>	<u>Open to fishing for non-salmonids only. Closed to the take of trout, and steelhead.</u>
<u>(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.).</u>	<u>Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(25) Carmel River and tributaries above Los Padres Dam (Monterey Co.).</u>	<u>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.</u>	<u>5 trout, no more than 2 of which may be rainbow trout.</u>
<u>(26) Carmel River below Los Padres Dam. (Monterey Co.)</u>		
<u>(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).</u>	<u>Closed to all fishing all year.</u>	

Body of Water	Open Season and Special Restrictions	Daily Bag and Possession Limit
<u>(B) Carmel River main stem below the bridge at Robles Del Rio/Esquiline roads (Rosie's Bridge). Also see Section 8.00(c).</u>	<u>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.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(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.</u>	<u>Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(28) Codornices Creek (Alameda Co.).</u>	<u>Closed to all fishing all year.</u>	
<u>(29) Coon Creek and tributaries (Placer Co.) east of Highway 65.</u>	<u>Fourth Saturday in May through Oct. 15.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(30) Coon Creek (San Luis Obispo Co.)</u>	<u>Closed to all fishing all year.</u>	
<u>(31) Corralitos Creek (Santa Cruz Co.) from mouth to Browns Valley Road. Also see Low-Flow Restrictions, Section 8.00(c)(5).</u>	<u>Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(32) Cosumnes River (Sacramento Co.) from Highway 99 bridge upstream to the Latrobe vehicle bridge.</u>	<u>Jan. 1 through Oct. 15. Only barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(33) Cottoneva Creek (Mendocino Co.). Main stem below the confluence of South Fork Cottoneva Creek. Also see Section 8.00(b).</u>	<u>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.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(34) Coyote Creek (Santa Clara Co.) Also see Low-Flow Restrictions, Section 8.00(c)(1).</u>	<u>Last Saturday in April through November 15. Only artificial lures and barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>

Body of Water	Open Season and Special Restrictions	Daily Bag and Possession Limit
<u>(35) Deer Creek (Tehama Co.).</u>		
<u>(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).</u>	<u>Last Saturday in April through Nov. 15. Only artificial lures with barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(B) From U.S. Geological Survey gauging station cable crossing at mouth of Deer Creek Canyon downstream to mouth of Deer Creek.</u>	<u>June 16 through Sept. 30.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(36) Deer Creek (Yuba and Nevada Cos.) from mouth to Smartville- Englebright Dam road crossing.</u>	<u>Fourth Saturday in May through Oct. 15. Only artificial lures with barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(37) Dry Creek and tributaries (Placer Co.) east of the Atkinson Street Bridge in Roseville.</u>	<u>Fourth Saturday in May through Oct. 15.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(38) Dry Creek (Yuba and Nevada Co.) from mouth to Sid Smith Dam about one mile above junction of Scott Forbes and Peoria roads.</u>	<u>Fourth Saturday in May through Oct. 15.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(39) Earl Lake/Talawa (Del Norte Co.).</u>	<u>All year. Only barbless hooks may be used. Cutthroat trout minimum size limit: 10 inches.</u>	<u>2 cutthroat trout. 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(40) Eel River (Humboldt, Lake, Mendocino and Trinity cos.).</u>	<u>Low-Flow Restrictions, Section 8.00, also apply, see below for more detail.</u>	
<u>ALL WATERS OF THE EEL RIVER DRAINAGE EXCEPT THOSE LISTED BELOW ARE CLOSED TO ALL FISHING.</u>		

Body of Water	Open Season and Special Restrictions	Daily Bag and Possession Limit
<u>(A) Main stem.</u>		
<u>1. From mouth to Fulmor Road, at its paved junction with the south bank of the Eel River.</u>	<u>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.</u>	<u>Catch and Release of Chinook Salmon 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>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).</u>	<u>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.</u>	<u>Catch and Release of Chinook Salmon 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>3. From South Fork Eel River to Cape Horn Dam.</u>	<u>Jan. 1 through Mar. 31 and Fourth Saturday in May through Sept. 30. Only artificial lures with barbless hooks may be used.</u>	<u>Catch and Release of Chinook Salmon 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
	<u>Apr. 1 through the Fourth Friday in May and Oct. 1 through Dec. 31.</u>	<u>Closed to all fishing.</u>
<u>(B) Van Duzen River.</u>		
<u>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).</u>	<u>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.</u>	<u>Catch and Release of Chinook salmon 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(C) South Fork Eel River from mouth to Rattlesnake Creek. Also see Low-Flow Restrictions, Section 8.00(a)(2).</u>	<u>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</u>	<u>Closed to all fishing Catch and Release of Chinook salmon 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in</u>

<i>Body of Water</i>	<i>Open Season and Special Restrictions</i>	<i>Daily Bag and Possession Limit</i>
	<u>through Mar. 31. Apr. 1 to Fourth Friday in May.</u>	<u>possession. Closed to all fishing</u>
<u>(D) Middle Fork Eel River.</u>		
<u>1. Middle Fork main stem from mouth to Bar Creek. Also see Low-Flow Restrictions, Section 8.00(a)(2).</u>	<u>Jan. 1 through May 31 and July 16 through Sept. 30. At all times, only artificial lures with barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
	<u>Jun. 1 through July 15 and Oct. through Dec. 31.</u>	<u>Closed to all fishing</u>
<u>(41) Elk Creek (Mendocino Co.). Also see Section 8.00(b). Main stem below the confluence of South Fork Elk Creek.</u>	<u>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</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(42) Elk River (Humboldt Co.) downstream from Highway 101 bridge, excluding tributaries.</u>	<u>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.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or 4 hatchery steelhead** in possession.</u>
<u>(43) Feather River below Fish Barrier Dam (Butte, Sutter and Yuba cos.).</u>		
<u>(A) From Fish Barrier Dam to Table Mountain bicycle bridge in Oroville.</u>	<u>Closed to all fishing all year.</u>	
<u>(B) From Table Mountain bicycle bridge to Highway 70 bridge.</u>	<u>Jan. 1 through July 15. Only barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(C) From Highway 70 bridge to the unimproved boat ramp above the Thermalito Afterbay Outfall.</u>	<u>All year.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout</u>

Body of Water	Open Season and Special Restrictions	Daily Bag and Possession Limit
		<u>or hatchery steelhead** in possession.</u>
<u>(D) From the unimproved boat ramp above the Thermalito Afterbay Outfall to 200 yards above the Live Oak boat ramp.</u>	<u>Jan. 1 through July 15.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
	<u>July 16 through Oct. 31.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession. 3 Chinook Salmon. 6 Chinook Salmon in possession.</u>
	<u>Nov. 1 through Dec. 31.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(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.</u>	<u>Jan. 1 through July 15.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
	<u>July 16 through Dec. 16.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession. 3 Chinook Salmon. 6 Chinook Salmon in possession.</u>
	<u>Dec. 17 to Dec. 31.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(44) Freshwater Creek (Humboldt Co.) downstream from bridge at "3 Corners" on the Old Arcata Road, excluding tributaries.</u>	<u>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</u>	<u>2 hatchery trout hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>

Body of Water	Open Season and Special Restrictions	Daily Bag and Possession Limit
	<u>be used from Nov. 1 through Mar. 31.</u>	
<u>(45) Garcia River (Mendocino Co.). Also see Section 8.00(b). Main stem below the Eureka Hill Road bridge.</u>	<u>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.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(46) Greenwood Creek (Mendocino Co.). Also see Section 8.00(b).</u>		
<u>Main stem below the log bridge about 1 1/2 miles east of Highway 1.</u>	<u>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.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(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.</u>	<u>Last Saturday in April through November 15. Only artificial lures and barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(48) Gualala River (Mendocino and Sonoma cos.). Also see Section 8.00(b). Main stem below the confluence of Wheatfield and South Forks.</u>	<u>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.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(49) Islay Creek (San Luis Obispo Co.).</u>	<u>Closed to all fishing all year.</u>	

Body of Water	Open Season and Special Restrictions	Daily Bag and Possession Limit
<u>(50) Klamath River Regulations (See Section 1.74 for salmon punch card requirements).</u>		
<p><u>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 Dwinell 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)).</u></p> <p>(A) <u>Restrictions and Requirements.</u></p> <ol style="list-style-type: none"> <u>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.)</u> <u>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.</u> <u>3. See Section 1.74 for sport fish report card requirements.</u> <p>(B) <u>General Area Closures.</u></p> <ol style="list-style-type: none"> <u>1. No fishing is allowed within 750 feet of any Department of Fish and Wildlife fish-counting weir.</u> <u>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.</u> <u>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.</u> <u>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.</u> <p>(C) <u>Klamath River Basin Possession Limits.</u></p> <ol style="list-style-type: none"> <u>1. Trout Possession Limits.</u> <ol style="list-style-type: none"> <u>a. The Brown Trout possession limit is 20.</u> <u>b. The hatchery trout or hatchery steelhead possession limits are as follows:</u> <ol style="list-style-type: none"> <u>(i) Klamath River - 4 hatchery trout or hatchery steelhead.</u> <u>(ii) Trinity River - 4 hatchery trout or hatchery steelhead.</u> <u>2. Chinook Salmon Possession Limits.</u> <ol style="list-style-type: none"> <u>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.</u> <u>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</u> 		

Body of Water

Open Season and Special Restrictions

Daily Bag and Possession Limit

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.

<u>1. Bogus Creek and tributaries.</u>	<u>Fourth Saturday in May through August 31. Only artificial lures with barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead.**</u>
<u>2. Klamath River main stem from 3,500 feet downstream of Iron Gate Dam to the mouth.</u>		
<u>a. Klamath River from 3,500 feet downstream of the Iron Gate</u>	<u>January 1 to August 14.</u>	<u>0 Chinook Salmon</u>

Body of Water	Open Season and Special Restrictions	Daily Bag and Possession Limit
<u>Dam to the Highway 96 bridge at Weitchpec.</u>		<u>2 hatchery trout or hatchery steelhead**</u>
	<u>Fall Run Quota 220 Chinook Salmon August 15 to December 31, 2020.</u>	<u>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.</u> <u>2 hatchery trout or hatchery steelhead**</u>
	<u>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.</u>	
<u>b. Klamath River downstream of the Highway 96 bridge at Weitchpec.</u>	<u>January 1 to August 14.</u>	<u>2 Chinook Salmon</u> <u>2 hatchery trout or hatchery steelhead**</u>
	<u>Fall Run Quota 648 Chinook Salmon August 15 to December 31, 2020.</u>	<u>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.</u> <u>2 hatchery trout or hatchery steelhead**</u>
	<u>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.</u> <u>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.</u>	
<u>3. Salmon River main stem, main stem of North Fork downstream of Sawyer's Bar bridge, and main stem of South Fork downstream</u>	<u>November 1 through February 28.</u>	<u>2 hatchery trout or hatchery steelhead**</u>

<i>Body of Water</i>	<i>Open Season and Special Restrictions</i>	<i>Daily Bag and Possession Limit</i>
<u>of the confluence of the East Fork of the South Fork.</u>		
<u>4. Scott River main stem downstream of the Fort Jones-Greenvew bridge to the confluence with the Klamath River.</u>	<u>Fourth Saturday in May through February 28.</u>	<u>2 hatchery trout or hatchery steelhead**</u>
<u>5. Shasta River main stem downstream of the Interstate 5 bridge north of Yreka to the confluence with the Klamath River.</u>	<u>Fourth Saturday in May through August 31 and November 16 through February 28.</u>	<u>2 hatchery trout or hatchery steelhead**</u>
<u>6. Trinity River and tributaries.</u>		
<u>a. Trinity River main stem from 250 feet downstream of Lewiston Dam to the Old Lewiston Bridge.</u>	<u>April 1 through September 15. Only artificial flies with barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**</u>
<u>b. Trinity River main stem downstream of the Old Lewiston Bridge to the Highway 299 West bridge at Cedar Flat.</u>	<u>January 1 to August 31.</u>	<u>2 Chinook Salmon 10 Brown Trout 2 hatchery trout or hatchery steelhead**</u>
	<u>Fall Run Quota 214 Chinook Salmon September 1 to December 31, 2020.</u>	<u>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**</u>
	<u>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.</u>	
<u>c. Trinity River main stem downstream of the Highway 299 West bridge at Cedar Flat to the Denny Road bridge at Hawkins Bar.</u>	<u>January 1 through August 31.</u>	<u>2 Chinook Salmon 10 Brown Trout 2 hatchery trout or hatchery steelhead**</u>

Body of Water	Open Season and Special Restrictions	Daily Bag and Possession Limit
	<u>September 1 through December 31.</u>	<u>Closed to all fishing.</u>
<u>d. New River main stem downstream of the confluence of the East Fork to the confluence with the Trinity River.</u>	<u>September 15 through November 15. Only artificial lures with barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**</u>
<u>e. Trinity River main stem downstream of the Denny Road bridge at Hawkins Bar to the mouth of the South Fork Trinity River.</u>	<u>January 1 to August 31.</u>	<u>2 Chinook Salmon 10 Brown Trout 2 hatchery trout or hatchery steelhead**</u>
	<u>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.</u>	<u>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**</u>
<u>f. Trinity River main stem downstream of the mouth of the South Fork Trinity River to the confluence with the Klamath River.</u>	<u>January 1 to August 31.</u>	<u>0 Chinook Salmon 10 Brown Trout 2 hatchery trout or hatchery steelhead**</u>
	<u>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.</u>	<u>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**</u>
<u>g. Hayfork Creek main stem downstream of the Highway 3 bridge in Hayfork to the confluence with the South Fork Trinity River.</u>	<u>November 1 through March 31. Only artificial lures with barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**</u>

Body of Water	Open Season and Special Restrictions	Daily Bag and Possession Limit
<u>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.</u>	<u>November 1 through March 31. Only artificial lures with barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**</u>
<u>i. South Fork Trinity River downstream of the South Fork Trinity River bridge at Hyampom to the confluence with the Trinity River.</u>	<u>November 1 through March 31.</u>	<u>0 Chinook Salmon. 2 hatchery trout or hatchery steelhead**</u>
<u>(51) Special Order Regarding Take of Chinook Salmon in Anadromous Waters of the Klamath River Basin Downstream of Iron Gate and Lewiston dams.</u>		
<u>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.</u>		
<u>(A) Klamath River segment identified in subsection 7.40(b)(50)(E)2.b.</u>	<u>July 1 through August 14</u>	<u>1 Chinook Salmon 2 Chinook Salmon in possession</u>
<u>(B) Trinity River segment identified in subsection 7.40(b)(50)(E)6.b.</u>	<u>July 1 through August 31</u>	<u>1 Chinook Salmon 2 Chinook Salmon in possession</u>
<u>(C) Trinity River segment identified in subsection 7.40(b)(50)(E)6.c.</u>	<u>July 1 through August 31</u>	<u>1 Chinook Salmon 2 Chinook Salmon in possession</u>
<u>(D) Trinity River segment identified in subsection 7.40(b)(50)(E)6.e.</u>	<u>July 1 through August 31</u>	<u>1 Chinook Salmon 2 Chinook Salmon in possession</u>

Body of Water	Open Season and Special Restrictions	Daily Bag and Possession Limit
<u>(52) Laguna de Santa Rosa (Sonoma Co. tributary to Russian River) upstream from Guerneville Road bridge.</u>	<u>Last Saturday in Apr. through Nov. 15.</u>	<u>Open to fishing for non-salmonids only. Closed to the take of trout, and steelhead.</u>
<u>(53) Lagunitas Creek and tributaries (Marin Co.).</u>	<u>Closed to all fishing all year.</u>	
<u>(54) Limekiln Creek and tributaries above Highway 1 (Monterey Co.). Also see Low-Flow Restrictions, Section 8.00(c)(9).</u>	<u>Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(55) Little River (Humboldt Co.) downstream from the County Road bridge at Crannell, excluding tributaries.</u>	<u>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.</u>	<u>2 cutthroat trout 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(56) Little Sur River and tributaries above Coast Road (Monterey Co.).</u>	<u>Fourth Saturday in May through Oct. 31. Only artificial lures with barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
	<u>Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used.</u>	<u>0 trout</u>
<u>(57) Llagas Creek (Santa Clara Co.). Also see Low-Flow Restrictions, Section 8.00(c)(5).</u>		
<u>(A) From mouth to Monterey Highway Bridge.</u>	<u>Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(B) From Monterey Highway Bridge to Chesbro Dam.</u>	<u>Closed to all fishing all year.</u>	
<u>(58) Los Osos Creek (San Luis Obispo Co.).</u>	<u>Closed to all fishing all year.</u>	

<i>Body of Water</i>	<i>Open Season and Special Restrictions</i>	<i>Daily Bag and Possession Limit</i>
<u>(59) Los Padres Reservoir (Monterey Co.).</u>	<u>Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used.</u>	<u>5 brown trout, 0 rainbow trout.</u>
<u>(60) Mad River and tributaries (Humboldt Co.).</u>		
<u>(A) Mad River from the mouth to 200 yards upstream.</u>	<u>Jan. 1 through Mar. 31. Only artificial lures with barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(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).</u>	<u>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.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(C) Mad River main stem, from the confluence with Cowan Creek to the confluence with Deer Creek, excluding tributaries.</u>	<u>Closed to all fishing all year.</u>	
<u>(D) Mad River main stem from the confluence with Deer Creek to Ruth Dam.</u>	<u>Fourth Saturday in May through Oct. 31. Only artificial lures with barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(61) Mattole River (Humboldt Co.). Also see Section 8.00(a).</u>		
<u>(A) Mattole River main stem from the mouth to 200 yards upstream.</u>	<u>Closed to all fishing all year.</u>	
<u>(B) Mattole River main stem from 200 yards upstream of mouth to confluence with Stansberry Creek.</u>	<u>Jan. 1 through Mar. 31. Only artificial lures with barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(C) Mattole River main stem from confluence with Stansberry Creek to confluence with Honeydew Creek.</u>	<u>Jan. 1 through Mar. 31 and Fourth Saturday in May through Aug. 31. Only artificial</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or</u>

Body of Water	Open Season and Special Restrictions	Daily Bag and Possession Limit
	<u>lures with barbless hooks may be used.</u>	<u>hatchery steelhead** in possession.</u>
<u>(62) McDonald Creek (Humboldt Co.).</u>	<u>Closed to fishing all year.</u>	
<u>(63) Merced River (Merced Co.).</u>		
<u>(A) From Crocker-Huffman Dam downstream to the Schaffer bridge on Oakdale Road.</u>	<u>Jan. 1 through Oct. 31. Only artificial lures with barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(B) From the Schaffer bridge on Oakdale Road downstream to the mouth.</u>	<u>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.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(64) Mill Creek (Tehama Co.).</u>		
<u>(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.</u>	<u>Last Saturday in April through Nov. 15. Only artificial lures with barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(B) From U.S. Geological Survey gauging station cable crossing at mouth of Mill Creek Canyon downstream to the mouth of Mill Creek.</u>	<u>June 16 through Sept. 30.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(65) Mitchell Creek and tributaries (Contra Costa Co.).</u>	<u>Closed to all fishing all year.</u>	
<u>(66) Mokelumne River (San Joaquin Co.).</u>		
<u>(A) From Camanche Dam to Elliot Road.</u>	<u>Jan. 1 through Mar. 31.</u>	<u>1 hatchery trout or hatchery steelhead**</u>
	<u>Fourth Saturday in in May through July 15.</u>	<u>1 hatchery trout or hatchery steelhead**</u>

<i>Body of Water</i>	<i>Open Season and Special Restrictions</i>	<i>Daily Bag and Possession Limit</i>
	<u>July 16 through Oct. 15.</u>	<u>1 hatchery trout or hatchery steelhead**.</u> <u>2 Chinook Salmon.</u> <u>4 Chinook Salmon in possession.</u>
<u>(B) From Elliot Road to the Woodbridge Irrigation District Dam including Lodi Lake.</u>	<u>Jan. 1 through July 15.</u>	<u>1 hatchery trout or 1 hatchery steelhead**</u>
	<u>July 16 through Dec. 31.</u>	<u>1 hatchery trout or hatchery steelhead**.</u> <u>2 Chinook Salmon.</u> <u>4 Chinook Salmon in possession.</u>
<u>(C) Between the Woodbridge Irrigation District Dam and the Lower Sacramento Road bridge.</u>	<u>Closed to all fishing all year.</u>	
<u>(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.</u>	<u>Jan. 1 through July 15.</u>	<u>1 hatchery trout or hatchery steelhead**</u>
	<u>July 16 through Dec. 16.</u>	<u>1 hatchery trout or hatchery steelhead**.</u> <u>2 Chinook Salmon.</u> <u>4 Chinook Salmon in possession.</u>
	<u>Dec. 17 through Dec. 31.</u>	<u>1 hatchery trout or hatchery steelhead**</u>
<u>(67) Nacimiento River (Monterey and San Luis Obispo cos.)</u>		
<u>Main stem below Nacimiento Dam, downstream to its confluence with the Salinas River.</u>	<u>Saturday preceding Memorial Day through October 31. Only artificial lures with barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**.</u> <u>4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(68) Napa River and tributaries (Napa Co.). Also see Section 8.00(b).</u>		
<u>(A) Main stem above the Oakville Cross Road Bridge near Yountville and all Napa River tributaries.</u>	<u>Closed to all fishing all year.</u>	
<u>(B) From the Oakville Cross Road Bridge near Yountville to the Trancas Bridge. Note: The</u>	<u>Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may</u>	<u>2 hatchery trout or hatchery steelhead**.</u> <u>4 hatchery trout or</u>

Body of Water	Open Season and Special Restrictions	Daily Bag and Possession Limit
<u>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).</u>	<u>be used from the fourth Saturday in May through Oct. 31. Only barbless hooks may be used from Nov. 1 through Mar. 31.</u>	<u>hatchery steelhead** in possession.</u>
<u>(69) Navarro River (Mendocino Co.). Also see Low-Flow Restrictions, Section 8.00(b)(1). Main stem below the Greenwood Road bridge.</u>	<u>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.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(70) Noyo River (Mendocino Co.). Also see Low-Flow Restrictions, Section 8.00(b)(1).</u>		
<u>(A) Noyo River main stem from the mouth to the Georgia-Pacific logging road bridge one mile east of Highway 1.</u>	<u>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.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(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.</u>	<u>Fourth Saturday in May through Oct. 1. Only artificial lures with barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession</u>
<u>(C) Noyo River main stem from the confluence with the South Fork Noyo River to the Sonoma/Mendocino Boy Scout Council Camp.</u>	<u>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.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(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).</u>	<u>Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>

<i>Body of Water</i>	<i>Open Season and Special Restrictions</i>	<i>Daily Bag and Possession Limit</i>
<u>(72) Upper Penitencia Creek (Santa Clara Co.) a tributary to Coyote Ck. Also see Section 8.00(c).</u>	<u>Closed to all fishing all year.</u>	
<u>(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).</u>	<u>Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(74) Pescadero Creek tributaries and main stem above the Stage Road bridge at Pescadero (Santa Clara and San Mateo Cos.).</u>	<u>Closed to all fishing all year.</u>	
<u>(75) Pinole Creek (Contra Costa Co.) and tributaries.</u>	<u>Closed to all fishing all year.</u>	
<u>(76) Redwood Creek and tidewaters (Marin Co.)</u>	<u>Closed to all fishing all year.</u>	
<u>(77) Redwood Creek (Humboldt Co.). Also see Section 8.00(a).</u>		
<u>(A) Redwood Creek main stem, within a radius of 200 yards of its mouth.</u>	<u>Jan. 1 through Mar. 31. Only artificial lures with barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(B) Redwood Creek main stem, from 200 yards above the mouth to the mouth of Prairie Creek.</u>	<u>Fourth Saturday in May through Mar. 31. Only barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(C) Redwood Creek main stem, from the mouth of Prairie Creek to the mouth of Bond Creek.</u>	<u>Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(D) Redwood Creek and tributaries, above the mouth of Bond Creek.</u>	<u>Closed to all fishing all year.</u>	
<u>(78) Russian Gulch and tributaries (Sonoma Co.). Main stem below the confluence of the East Branch. Also see Section 8.00(b).</u>	<u>Fourth Saturday in May through Mar. 31. Only artificial lures with barbless hooks may be used from the fourth Saturday in May through Oct.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>

Body of Water	Open Season and Special Restrictions	Daily Bag and Possession Limit
	<u>31. Only barbless hooks may be used from Nov. 1 through Mar. 31.</u>	
<u>(79) Russian River and tributaries (Sonoma and Mendocino Cos.). Also see Section 8.00(b).</u>		
<u>(A) Russian River main stem below the confluence of the East Branch Russian River.</u>	<u>All Year. Only artificial lures with barbless hooks may be used from Apr. 1 through Oct. 31</u> <u>Only barbless hooks may be used from Nov. 1 through Mar. 31.</u>	<u>2 hatchery trout or hatchery steelhead**.</u> <u>4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(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.)</u>	<u>Closed to all fishing all year.</u>	
<u>(C) Russian River within 250 feet of the Healdsburg Memorial Dam.</u>	<u>Closed to all fishing all year.</u>	
<u>(80) Sacramento River and tributaries below Keswick Dam (Butte, Colusa, Contra Costa, Glenn, Sacramento, Shasta, Solano, Sutter, Tehama and Yolo Cos.).</u>		
<u>(A) Sacramento River from Keswick Dam to 650 feet below Keswick Dam.</u>	<u>Closed to all fishing all year.</u>	
<u>(B) Sacramento River from 650 feet below Keswick Dam to the Deschutes Road bridge.</u>		
<u>1. Sacramento River from 650 feet below Keswick Dam to the Highway 44 bridge.</u>	<u>Closed to all fishing from Apr. 1 through July 31.</u>	
	<u>Jan. 1 to Mar. 31. Only barbless hooks may be used.</u> <u>Aug. 1 to Dec. 31. Only barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**.</u> <u>4 hatchery trout or hatchery steelhead** in</u>

Body of Water	Open Season and Special Restrictions	Daily Bag and Possession Limit
		<u>possession. 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>2. Sacramento River from the Highway 44 bridge to the Deschutes Road bridge.</u>	<u>All year. Only barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(C) Sacramento River from the Deschutes Road bridge to the Red Bluff Diversion Dam.</u>	<u>Jan. 1 through July 31.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
	<u>Aug. 1 through Dec. 31.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession. 2 Chinook Salmon. 4 Chinook Salmon in possession.</u>
<u>(D) Sacramento River from the Red Bluff Diversion Dam to the Hwy 113 bridge near Knights Landing.</u>	<u>Jan. 1 through July 15.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
	<u>July 16 through Dec. 16.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession. 2 Chinook Salmon. 4 Chinook Salmon in possession.</u>
	<u>Dec. 17 through Dec. 31.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(E) Sacramento River from the Hwy 113 bridge near Knights Landing to the Carquinez Bridge</u>	<u>Jan. 1 through July 15.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or</u>

<i>Body of Water</i>	<i>Open Season and Special Restrictions</i>	<i>Daily Bag and Possession Limit</i>
<u>(includes Suisun Bay, Grizzly Bay and all tributary sloughs west of Highway 160).</u>		<u>hatchery steelhead** in possession.</u>
	<u>July 16 through Dec. 16.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession. 2 Chinook Salmon. 4 Chinook Salmon in possession.</u>
	<u>Dec. 17 through Dec. 31.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(81) Salinas River and tributaries (Monterey and San Luis Obispo Cos.). Also see Section 8.00(c).</u>		
<u>(A) The main stem Salinas River.</u>	<u>Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(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).</u>	<u>Last Saturday in Apr. through Nov. 15. Only barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(82) Salmon Creek and tributaries (Sonoma Co.). Also see Section 8.00(b).</u>		
<u>(A) Salmon Creek main stem below Highway 1.</u>	<u>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.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>

<i>Body of Water</i>	<i>Open Season and Special Restrictions</i>	<i>Daily Bag and Possession Limit</i>
<u>(B) Salmon Creek main stem above Highway 1 and all Salmon Creek tributaries.</u>	<u>Closed to all fishing all year.</u>	
<u>(83) Salmon River (Siskiyou Co.).</u>	<u>See Klamath River 7.50(b)(50).</u>	
<u>(84) San Benito River and tributaries (San Benito Co.).</u>	<u>Last Saturday in Apr. through Nov. 15.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(85) San Clemente Creek and tributaries (Monterey Co.) except for Trout Lake.</u>	<u>Last Saturday in Apr. through Nov. 15 Only artificial lures with barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(86) San Diego Creek (Orange Co.). Downstream of the MacArthur Blvd. bridge only.</u>	<u>Saturday preceding Memorial Day through Nov. 30. Only artificial lures with barbless hooks may be used.</u>	<u>Open to fishing for non-salmonids only. Closed to the take of trout, and steelhead.</u>
<u>(87) San Francisquito Creek and tributaries (Santa Clara and San Mateo Cos.)</u>	<u>Closed to all fishing all year.</u>	
<u>(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.</u>	<u>Saturday preceding Memorial Day through Nov. 30. Only artificial lures with barbless hooks may be used.</u>	<u>Open to fishing for non-salmonids only. Closed to the take of trout, and steelhead.</u>
<u>(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).</u>	<u>Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(90) San Joaquin River (Fresno, Madera, Merced, San Joaquin, and Stanislaus Cos.).</u>		
<u>(A) From Friant Dam downstream to the Highway 140 bridge.</u>	<u>All year.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>

<i>Body of Water</i>	<i>Open Season and Special Restrictions</i>	<i>Daily Bag and Possession Limit</i>
<u>(B) From the Highway 140 bridge downstream to the Interstate 5 bridge at Mossdale.</u>	<u>All year.</u>	<u>2 hatchery trout or hatchery steelhead**.</u> <u>4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(91) San Juan Creek main stem (Orange Co.).</u>	<u>Closed to all fishing all year.</u>	
<u>(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).</u>	<u>Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**.</u> <u>4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(93) San Luis Obispo Creek (San Luis Obispo Co.) from mouth to the first and most southwestern highway 1/101 bridge.</u>	<u>Dec. 1 through Mar. 7, but only Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**.</u> <u>4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(94) San Luis Rey River (San Diego Co.).</u>	<u>Closed to all fishing all year.</u>	
<u>(95) San Mateo Creek and tributaries downstream from the falls between the Tenaja Road crossing and Fisherman's Camp (San Diego and Riverside cos.).</u>	<u>Closed to all fishing all year.</u>	
<u>(96) San Simeon Creek (San Luis Obispo Co.) from mouth to the pedestrian bridge in San Simeon Beach State Park.</u>	<u>Dec. 1 through Mar. 7, but only Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**.</u> <u>4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(97) Santa Margarita River and tributaries downstream from the Interstate 15 bridge (San Diego and Riverside cos.).</u>	<u>Closed to all fishing all year.</u>	
<u>(98) Santa Rosa Creek (Sonoma Co. tributary to Russian River) from Laguna de Santa Rosa to Highway 12 bridge.</u>	<u>Last Saturday in Apr. through Nov. 15.</u>	<u>Open to fishing for non-salmonids only. Closed to the take of trout, and steelhead.</u>
<u>(99) Santa Ynez River and tributaries downstream from Bradbury Dam (Santa Barbara Co.).</u>	<u>Closed to all fishing all year.</u>	

Body of Water	Open Season and Special Restrictions	Daily Bag and Possession Limit
<u>(100) Scott Creek (Santa Cruz Co.) from mouth to confluence with Big Creek. Also see Low-Flow Restrictions, Section 8.00(c)(3).</u>	<u>Dec. 1 through Mar. 7, but only Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.</u>	<u>0 trout</u>
<u>(101) Scott River (Siskiyou Co.).</u>	<u>See Klamath River 7.40(b)(50).</u>	
<u>(102) See Canyon Creek (San Luis Obispo Co.).</u>	<u>Closed to all fishing all year.</u>	
<u>(103) Shasta River (Siskyou Co.).</u>	<u>See Klamath River 7.40(b)(50).</u>	
<u>(104) Sisquoc River and tributaries (Santa Barbara Co.).</u>	<u>Closed to all fishing all year.</u>	
<u>(105) Smith River (Del Norte Co.) Yearly limits apply for entire river.</u>	<u>Low-Flow Restrictions, Section 8.00, also apply, see below for more detail.</u>	
<u>(A) Main stem from the mouth to confluence of Middle and South forks. Also see Low-Flow Restrictions, Section 8.00(a)(7).</u>	<u>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.</u>	<u>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.</u>
<u>(B) Middle Fork Smith River</u>		
<u>1. from mouth to Patrick Creek Also see Low-Flow Restrictions, Section 8.00(a)(7).</u>	<u>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.</u>	<u>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.</u>

<i>Body of Water</i>	<i>Open Season and Special Restrictions</i>	<i>Daily Bag and Possession Limit</i>
<u>2. above the mouth of Patrick Creek. Also see Low-Flow Restrictions, Section 8.00(a)(7).</u>	<u>Fourth Saturday in May through Oct. 31. Only artificial lures with barbless hooks may be used.</u>	<u>2 cutthroat trout minimum size limit: 10 inches total length. 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(C) South Fork Smith River</u>		
<u>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).</u>	<u>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.</u>	<u>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.</u>
<u>2. from the George Tryon bridge upstream to the mouth of Craigs Creek. Also see Low-Flow Restrictons, Section 8.00(a)(7).</u>	<u>Closed to fishing all year.</u>	
<u>3. above the mouth of Jones Creek. Also see Low-Flow Restrictions, Section 8.00(a)(7).</u>	<u>Fourth Saturday in May through Oct. 31. Only artificial lures with barbless hooks may be used.</u>	<u>2 cutthroat trout minimum size limit: 10 inches total length. 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(D) North Fork Smith River.</u>		
<u>1. from the mouth to Stony Creek. Also see Low-Flow Restrictions, Section 8.00(a)(7).</u>	<u>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.</u>	<u>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</u>

Body of Water	Open Season and Special Restrictions	Daily Bag and Possession Limit
		<u>Chinook salmon* over 22 inches per year.</u>
<u>2. above the mouth of Stony Creek.</u>	<u>Fourth Saturday in May through Oct. 31. Only artificial lures with barbless hooks may be used.</u>	<u>2 cutthroat trout minimum size limit: 10 inches total length. 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(106) Sonoma Creek and tributaries (Sonoma Co.).</u>		
<u>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).</u>	<u>Closed to all fishing year.</u>	
<u>(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).</u>	<u>Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks maybe used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(108) Stanislaus River</u>		
<u>(A) From Goodwin Dam downstream to the Highway 120 bridge in Oakdale.</u>	<u>Jan. 1 through Oct. 31. Only artificial lures with barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(B) From the Highway 120 bridge in Oakdale to the mouth.</u>	<u>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</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>

Body of Water	Open Season and Special Restrictions	Daily Bag and Possession Limit
	<u>having a gap between 1/2 and 1 inch, or with multiple hooks</u> <u>having a gap between 1/4 and 1/2 inch.</u>	
<u>(109) Stevens Creek (Santa Clara Co.) downstream of Stevens Reservoir.</u>	<u>Last Saturday in April through Nov. 15. Only artificial lures with barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(110) Stone Lagoon (Humboldt Co.).</u>	<u>All year. Only artificial lures with barbless hooks may be used. Cutthroat trout minimum size limit: 14 inches.</u>	<u>2 cutthroat trout 2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(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 River North Fork below the confluence with Bald Hill Creek.</u>	<u>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.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(112) Topanga Canyon Creek and tributaries (Los Angeles Co.).</u>	<u>Closed to all fishing all year.</u>	
<u>(113) Trabuco Creek (a.k.a. Arroyo Trabuco Creek) (Orange Co.). Downstream of the I-5 bridge to the confluence with San Juan Creek</u>	<u>Closed to all fishing all year.</u>	
<u>(114) Trinity River and tributaries downstream of Lewiston Dam.</u>	<u>See Klamath River 7.40(b)(50).</u>	
<u>(115) Tuolumne River (Stanislaus and Tuolumne Cos.).</u>		
<u>(A) From La Grange Dam downstream to Hickman bridge.</u>	<u>Jan. 1 through Oct. 31. Only artificial lures with barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(B) From Hickman bridge to the mouth.</u>	<u>Jan. 1 through Oct. 31. Bait may be used from Jan. 1 through Oct. 31. However,</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or</u>

Body of Water	Open Season and Special Restrictions	Daily Bag and Possession Limit
	<u>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.</u>	<u>hatchery steelhead** in possession.</u>
<u>(116) Usal Creek and tributaries (Mendocino Co.). Also see Section 8.00(b). Usal Creek main stem below the Usal-Shelter Cove Road</u>	<u>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.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(117) Uvas or Carnadero Creek (Santa Clara Co.) Also see Low-Flow Restrictions, Section 8.00(c)(5).</u>		
<u>(A) From Highway 152 Bridge to Uvas Dam.</u>	<u>Closed to all fishing all year.</u>	
<u>(B) From mouth to Highway 152 Bridge.</u>	<u>Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(118) Van Duzen River (Humboldt Co.).</u>	<u>See Eel River 7.40(b)(40) and Section 8.00(a).</u>	
<u>(119) Waddell Creek (Santa Cruz Co.) from mouth to Highway 1 bridge. Also see Low-Flow Restrictions, Section 8.00(c)(3).</u>	<u>Dec. 1 through Mar. 7, but only Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(120) Walker Creek and tributaries (Marin Co.) Also see Section 8.00(b).</u>		
<u>(A) Walker Creek main stem below Highway 1.</u>	<u>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</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>

Body of Water	Open Season and Special Restrictions	Daily Bag and Possession Limit
	<u>be used from Nov. 1 through Mar. 31.</u>	
<u>(B) Walker Creek main stem above Highway 1 and all Walker Creek tributaries.</u>	<u>Closed to fishing all year.</u>	
<u>(121) Walnut Creek (Contra Costa Co.).</u>		
<u>(A) Upstream of the confluence with Grayson Creek.</u>	<u>Fourth Saturday in May through Mar. 31. Only artificial lure with barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(B) Downstream of the confluence with Grayson Creek.</u>	<u>All year.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(122) Wildcat Creek and tributaries (Contra Costa Co.).</u>	<u>Closed all year to fishing.</u>	
<u>(123) Yuba River (Yuba and Nevada Cos.) from mouth to Englebright Dam.</u>		
<u>(A) From mouth to the Highway 20 bridge.</u>	<u>All year. Only artificial lures with barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>
<u>(B) From Highway 20 bridge to Englebright Dam.</u>	<u>Dec. 1 through Aug. 31. Only artificial lures with barbless hooks may be used.</u>	<u>2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.</u>

* 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.

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.~~

~~(21) 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.

~~(32)~~ 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.

~~(43)~~ Daily bag and possession limits, unless otherwise noted, mean the total number of trout.

~~(54)~~ Unless otherwise provided, it is unlawful to possess more than one daily bag limit.

~~(65)~~ 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)

<i>Body of Water</i>	<i>Open Season and Special Regulations <u>Restrictions</u></i>	<i>Daily Bag and Possession Limit</i>	<i><u>Menu option</u></i>
(1) Alambique Creek (San Mateo Co.).	Last Saturday in Apr. through Nov. 15 <u>Saturday preceding Memorial Day through September 30. Only artificial lures with barbless hooks may be used.</u>	5 trout <u>0 trout</u>	F6
(1.52) Alameda Creek and tributaries (Alameda and Santa Clara Cos. <u>cos.</u>).			
(A) Alameda Creek <u>mainstem</u> and <u>all</u> tributaries downstream of San Antonio, Calaveras, and Del Valle Reservoirs <u>reservoirs</u> 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	<u>Open Season and Special Regulations</u> Restrictions	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
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. <u>Saturday preceding Memorial Day through September 30. Only artificial lures with barbless hooks may be used.</u>	0 trout	F6
<u>(C) San Antonio and Calaveras reservoirs.</u>	<u>All year. Only artificial lures with barbless hooks may be used.</u>	<u>0 trout</u>	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
(43) Almanor Lake tributaries (Lassen, Plumas, and Shasta Cos. cos.) upstream to the first lake.	Saturday preceding Memorial Day through Nov. 15 <u>September 30.</u>	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. <u>Saturday preceding Memorial Day through September 30.</u>	5 trout per day 10 trout in possession.	F1

Body of Water	<u>Open Season and Special Regulations-Restrictions</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
	<u>October 1 through the Friday preceding Memorial Day. Only artificial lures with barbless hook may be used.</u>	<u>0 trout</u>	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 downstream 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. 4 Chinook Salmon. 2 Chinook Salmon in possession.	HSS
(C) From the SMUD power line crossing at the southwest boundary of Ancil Hoffman Park downstream 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 <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
		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	<u>Open Season and Special Regulations-Restrictions</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
(6-5) Antelope Lake tributaries (Plumas Co.).	Saturday preceding Memorial Day through Nov. 15. <u>Saturday preceding Memorial Day through September 30.</u>	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. <u>Saturday preceding Memorial Day through September 30.</u>	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 <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
(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
(157) 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 <u>Saturday preceding Memorial Day through September 30. Only artificial lures may be used.</u>	<u>2 trout per day. 10 trout in possession.</u>	F3
(178) Bear Creek (San Bernardino Co.) from Big Bear Dam to confluence of Santa Ana River.	All year. Only artificial lures <u>with barbless hooks may be used.</u>	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	<u>Open Season and Special Regulations-Restrictions</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
(48.59) 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. <u>Saturday preceding Memorial Day through the last day in February.</u>	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
(4910) Berryessa Lake tributaries (Lake and Napa Cos.cos.).	Last Saturday in Apr. through Nov. 15. <u>Last Saturday in April through September 30.</u>	5 trout <u>2 trout.</u> 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 <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
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
<u>(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.</u>	<u>Fourth Saturday in May through Oct. 31. Saturday preceding Memorial Day through September 30. Only artificial lures with barbless hooks may be used.</u>	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
(23.512) 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	<u>Open Season and Special Regulations-Restrictions</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
(2413) 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
(25.514) Boggy Creek (Fresno Co.) and tributaries (tributary to Thomas Edison Lake).	June 1 through October 15. <u>Saturday preceding Memorial Day through September 30.</u>	5 trout per day. 10 trout in possession.	F1
(26) Bogus Creek (Siskiyou Co.).	See Klamath River 7.50(b)(91.1).		HSS
<u>(15) Boulder Creek (San Diego Co.) upstream of El Capitan Reservoir, and all of its tributaries.</u>	<u>All year. Only artificial lures may be used.</u>	<u>2 trout</u>	A3
(26.516) Bridgeport Reservoir <u>and</u> tributaries (Mono Co.). <u>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.</u>	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. <u>Last Saturday in April through November 15.</u>	4 trout. <u>5 trout</u>	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	Daily Bag and Possession Limit	<u>Menu option</u>
		salmon per day. 20 landlocked salmon in possession.	
(2817) Bucks Lake tributaries (Plumas Co.).	Saturday preceding Memorial Day through Sept. September 30.	5 trout per day. 10 trout in possession. <u>5 trout</u>	F1
(28.518) 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. <u>0 trout</u>	A6
(219) Butano Creek (San Mateo Co.).			
(A) Above Butano Falls.	Last Saturday in Apr. through Nov. 15. <u>Saturday preceding Memorial Day through September 30. Only artificial lures with barbless hooks may be used.</u>	5 trout <u>0 trout</u>	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
(3020) Butt Creek and Butt Valley Reservoir Powerhouse Outfall (Plumas Co.).			
(A) Butt Creek.	Saturday preceding Memorial Day through Nov. 15. <u>September 30.</u>	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. <u>the last day in February.</u>	2 trout. <u>4 trout in possession.</u>	G2
(321) Butt Valley Reservoir (Plumas Co.).	All year.	2 trout. <u>4 trout in possession.</u>	A2

Body of Water	Open Season and Special Regulations <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
(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 DeSabra Powerhouse below DeSabra 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
(3322) By-Day Creek and tributaries (Mono Co.).	Closed to all fishing all year.		J
(3423) Cache Creek and tributaries (Lake Co.).	Last Saturday in Apr. through Nov. 15 <u>Saturday preceding Memorial Day through September 30.</u>	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 <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
located about four miles north of the wilderness area boundary. (Trinity Co.)			
<u>(24) Caples Creek from the confluence with the Silver Fork American River upstream to Caples Lake Dam (El Dorado and Alpine cos.)</u>	<u>All year. Only artificial lures with barbless hooks may be used.</u>	<u>0 trout</u>	<u>A6</u>
(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
(3825) 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	<u>Open Season and Special Regulations-Restrictions</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
(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. <u>Only artificial lures may be used. Minimum size limit: 14 inches total length.</u>	0 trout <u>2 trout</u>	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
(39.526) Ceder Cedar Creek and tributaries upstream from Moon Lake access road (Lassen Co.).	Closed to all fishing all year <u>Saturday preceding Memorial Day through the last day in February. Only artificial lures may be used.</u>	<u>2 trout</u>	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**. <u>4 hatchery trout or hatchery steelhead** in possession.</u>	HSS
(4227) Clear Lake tributaries (Lake Co.).	Last Saturday in Apr. through Nov. 15 <u>All year. Only artificial lures with barbless hooks may be used.</u>	5 trout <u>0 trout</u>	A6
(42.3) Codornices Creek (Alameda Co.).	Closed to all fishing all year		HSS
(42.528) Cold Creek (Fresno Co.) and tributaries (tributary to Thomas Edison Lake).	June 1 through October 15. <u>Saturday preceding Memorial Day through September 30.</u>	5 trout per day. 10 trout in possession.	F1
(4329) 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 <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
(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 <u>5 trout</u>	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
<u>(30) Convict Lake (Mono Co.).</u>	<u>Last Saturday in April through November 15.</u>	<u>5 trout</u>	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
(4431) 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 <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
		steelhead** in possession.	
(47) Cottonova Creek (Mendocino Co.). Main stem below the confluence of South Fork Cottonova 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
(4832) 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
(4933) 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. <u>September</u>	0 trout <u>2 trout</u>	H4

Body of Water	<u>Open Season and Special Regulations</u> <u>Restrictions</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
	<u>1 through November 30. Only artificial lures may be used. Minimum size limit: 14 inches total length.</u>		
(B) All remaining Cottonwood Creek drainage lakes.	July 1 through Nov. 15. Only artificial lures with barbless hooks may be used. <u>All year. Only artificial lures may be used.</u>	5 trout <u>2 trout</u>	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
(5034) Cottonwood Creek, North Fork and tributaries (White Mountains, Mono Co.).	Closed to all fishing all year.		J
(50.535) 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
(5136) Coyote Valley Creek and tributaries (Alpine Co.).	Closed to all fishing all year.		J
(5237) 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 <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
(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. <u>All year. Only artificial flies with barbless hooks may be used.</u>	0 trout	A7
(5338) 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. <u>August 1 through November 15. Only artificial lures may be used. Minimum size limit: 18 inches total length.</u>	2 trout	E5
(53-539) Davis Creek (<u>Goose Lake tributary</u>) and tributaries (Modoc Co.).	Saturday preceding Memorial Day through November 15. <u>the last day in February.</u> Only artificial lures with barbless hooks may be used.	0 trout <u>5 trout</u>	G1

Body of Water	<u>Open Season and Special Regulations-Restrictions</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
(5440) Davis Lake tributaries (Plumas Co.).	Saturday preceding Memorial Day through Nov. 15. <u>the last day in February.</u>	5 trout per day. 10 trout in possession.	G1
(54.541) 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. <u>All year. Only artificial lures with barbless hooks may be used.</u>	2 trout <u>0 trout</u>	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
(5542) 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 <u>used.</u>	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	<u>Open Season and Special Regulations-Restrictions</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
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.).	<u>Saturday preceding Memorial Day through the last day in February. Only artificial lures with barbless hooks may be used.</u>	<u>0 trout</u>	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
(6144) Eagle Lake and tributaries (Lassen Co.).			

Body of Water	<u>Open Season and Special Regulations</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
(A) Eagle Lake.	Saturday preceding Memorial Day through Dec. 31. <u>the last day in February.</u>	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
<u>(C) Eagle Lake tributaries, including Pine Creek above State Hwy. 44.</u>	Saturday preceding Memorial Day through Nov. 15. <u>Saturday preceding Memorial Day through the last day in February.</u>	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
(6345) 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	<u>Open Season and Special Regulations-Restrictions</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
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.	
<u>(A) Eel River above Lake Pillsbury and tributaries to Lake Pillsbury (Lake Co.).</u>	<u>Saturday preceding Memorial Day through the last day in February. Only artificial lures may be used.</u>	<u>2 trout</u>	G3
(B) Van Duzen River.			
4. Main stem and tributaries above <u>upstream of Eaton Falls</u> , located about ½ mile upstream of the mouth of the South Fork (Little Van Duzen) and 2 ½ miles west <u>downstream of Dinsmore (Humboldt and Trinity cos).</u>	Last Saturday in Apr. through Nov. 15. <u>Saturday preceding Memorial Day through September 30. Only artificial lures may be used.</u>	5 trout <u>2 trout</u>	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	Daily Bag and Possession Limit	<u>Menu option</u>
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. <u>Saturday preceding Memorial Day through the last day in February. Only artificial lures may be used.</u>	5 trout <u>2 trout</u>	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. <u>Saturday preceding Memorial Day through the last day in</u>	2 trout	G3

Body of Water	<u>Open Season and Special Regulations-Restrictions</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
	<u>February. Only artificial lures may be used.</u>		
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
(6446) 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
(647) Fall River Complex (Shasta Co.).			

Body of Water	<u>Open Season and Special Regulations-Restrictions</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
(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. <u>PG&E Pit #1 Diversion Dam, including all lakes, tributaries, and springs, excluding Bear Creek.</u>	<u>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.</u>	2 trout	F3
	<u>October 1 through the Friday preceding Memorial Day. Only artificial lures with barbless hooks may be used.</u>	<u>0 trout</u>	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 or hatchery 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	<u>Open Season and Special Regulations-Restrictions</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
	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 <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
Railroad Bridge (1/4 mile upstream of County A-23 bridge) to the Mohawk Bridge.			
(68.248) Feather River North Fork from Belden Bridge downstream to Cresta Powerhouse (excluding reservoirs) (Butte and Plumas Cos. <u>cos.</u>).	Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used. <u>Saturday preceding Memorial Day through the last day in February. Only artificial lures with barbless hooks may be used.</u>	0 trout	G6
(68.349) 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. <u>All year</u>	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
<u>(50) George Lake (Lake George, Mono Co.)</u>	<u>Last Saturday in April through November 15.</u>	<u>5 trout</u>	B1
(7151) 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. <u>All year. Only artificial lures may be used.</u>	5-trout <u>2 trout</u>	A3
<u>(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)).</u>	<u>Saturday preceding Memorial Day through the last day in February. Only artificial lures with barbless hooks may be used.</u>	<u>0 trout</u>	G6
<u>(53) Grant Lake (Mono Co.)</u>	<u>Last Saturday in April through November 15.</u>	<u>5 trout</u>	B1
<u>(54) Gull Lake (Mono Co.)</u>	<u>Last Saturday in April through November 15.</u>	<u>5 trout</u>	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 Alamos 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	<u>Open Season and Special Regulations-Restrictions</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
(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
(7455) 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. <u>All year. Only artificial lures with barbless hooks may be used.</u>	2 trout <u>0 trout</u>	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
(756) 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. <u>September 1 through November 30. Only artificial lures with barbless hooks may be used.</u>	0 trout	H6

Body of Water	Open Season and Special Regulations <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
(B) Heenan Lake tributaries.	Closed to all fishing all year.		
(757) Hennessey Lake tributaries (Napa Co.).	Last Saturday in Apr. through Nov. 15 <u>Saturday preceding Memorial Day through September 30.</u>	5 trout. <u>2 trout. 4 trout in possession.</u>	F2
(77.358) 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 <u>5 trout</u>	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
(77.559) 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. <u>2 trout</u>	F3
(60) <u>Horseshoe Lake (Mono Co.).</u>	<u>Last Saturday in April through November 15.</u>	<u>5 trout</u>	B1
(7861) 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
(7962) Illinois River and tributaries (Del Norte Co.).	Closed to all fishing all year.		J
(8063) Independence Lake and tributaries	NOTE: ALL LAHONTAN CUTTHROAT TROUT TAKEN		

Body of Water	Open Season and Special Regulations Restrictions	Daily Bag and Possession Limit	<u>Menu option</u>
(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 <u>Saturday preceding Memorial Day through September 30.</u> Only artificial lures with barbless hooks may be used.	5 trout per day. 10 trout in possession <u>0 trout</u>	F6
(8164) Indian Tom Lake (Siskiyou Co.).	All year.	2 trout. <u>4 trout in possession.</u>	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
(<u>65</u>) Isabella Lake (Lake Isabella, Kern Co.)	<u>All year.</u>	<u>5 trout</u>	A1
(8466) Junction Lake and tributaries (Mono Co.) including the lake's outlet stream to Highway 108.	Closed to all fishing all year.		J
(<u>67</u>) June Lake (Mono Co.).	<u>Last Saturday in April through November 15.</u>	<u>5 trout</u>	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 <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
(8568) Kent Lake tributaries (Marin Co.).	Last Saturday in Apr. through Nov. 15 <u>Saturday preceding Memorial Day through September 30.</u>	5 trout <u>2 trout. 4 trout in possession.</u>	F2
(8669) Kern River (Kern and Tulare Cos.)			
(A) From Lake Isabella <u>upstream</u> 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 join the Rincon Trail. <u>Sequoia National Park boundary near the Kern Canyon Ranger Station.</u>	Last Saturday in Apr. through Nov. 15. Minimum size limit: 14 inches total length. <u>All year.</u> 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	
<u>(C) Downstream of Lake Isabella.</u>	<u>All year.</u>	<u>5 trout</u>	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
(8770) 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.	<u>2 trout. 4 trout in possession.</u>	A2

Body of Water	<u>Open Season and Special Regulations</u> <u>Restrictions</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
(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. <u>4 trout in possession.</u>	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. <u>Closed to all fishing all year.</u>	5 trout	J
<u>(E) 1. Kings River from the U.S. Army Corps of Engineers Bridge on Pine Flat Road downstream to Cobbles (Alta) Weir.</u>	<u>All year.</u>	<u>5 trout</u>	A1
(E) 2. <u>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.</u>	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

<i>Body of Water</i>	<i>Open Season and Special Regulations <u>Restrictions</u></i>	<i>Daily Bag and Possession Limit</i>	<i><u>Menu option</u></i>
<u>(G) Kings River from the Highway 180 crossing downstream.</u>	<u>All year.</u>	<u>5 trout</u>	A1
(88) Reserved.			
<u>(8971) Kirman (Carmen) Lake and all its tributaries (Mono Co.).</u>	<u>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</u>	2 trout	B5
(90) Kirman (Carmen) Lake tributaries (Mono Co.).	<u>Closed to all fishing all year.</u>		Del10
<u>(72) Kitchen Creek (San Diego Co.) upstream of Lake Morena, and all its tributaries.</u>	<u>All year. Only artificial lures may be used.</u>	<u>2 trout</u>	A3
(9173) Klamath River Regulations (See Section 1.74 for salmon punch card requirements.			
<u>(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.</u>	<u>Last Saturday in Apr. through Nov. 15 Saturday preceding Memorial Day through September 30.</u>	5 trout per day. 10 trout in possession.	F1
	<u>October 1 through the Friday preceding Memorial Day. Only artificial lures with barbless hooks maybe used.</u>	<u>0 trout</u>	I6
(B) Shovel Creek and tributaries above mouth of Panther Creek.	<u>Last Saturday in Apr. through Nov. 15.</u>	5 trout	Del11

Body of Water	<u>Open Season and Special Regulations-Restrictions</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
(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)).~~

~~(F) 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.~~

~~(G) 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.~~

~~(H) 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.~~

Body of Water	Open Season and Special Regulations <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
	<p>(I) 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 <i>Open Season and Special Regulations</i> column.</p> <p>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.)</p> <p>2. Subquota Percentages.</p> <p>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.</p> <p>(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.</p> <p>(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.</p> <p>(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.</p> <p>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.</p> <p>(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.</p> <p>(J) 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.</p>		
<p>(91.2) Special Order Regarding Take of Chinook Salmon in Anadromous Waters of the Klamath River Basin Downstream of Iron Gate and Lewiston dams.</p>	<p>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</p>		<p>HSS</p>

Body of Water	Open Season and Special Regulations <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
	the following table. All other restrictions apply.		
(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
(9274) 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
(9675) Lagunitas Lake (Marin Co.).	All year. Maximum size limit: 14 inches total length. Only artificial lures with barbless hooks may be used. <u>Only artificial lures may be used.</u>	2 trout	A3
(96.576) Lane Lake (Mono Co.).	Last Saturday in Apr. through Nov. 15. <u>All year. Only artificial lures may be used.</u>	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
(98.577) Laurel Lakes and tributaries (Mono Co.).	Last Saturday in Apr. through Nov. 15. Minimum size limit: 14 inches total length. Only	2 trout	A4

Body of Water	<u>Open Season and Special Regulations-Restrictions</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
	artificial lures with barbless hooks may be used <u>All year. Only artificial lures may be used. Minimum size limit: 14 inches total length.</u>		
(98.678) Lee Vining Creek from the Lee Vining conduit downstream to Mono Lake (Mono Co.).	Last Saturday in Apr. through Nov. 15. <u>Saturday preceding Memorial Day through September 30.</u>	2 trout. <u>4 trout in possession.</u>	F2
	<u>October 1 through the Friday preceding Memorial Day. Only artificial lures with barbless hooks may be used.</u>	<u>0 trout</u>	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**. <u>4 hatchery trout or hatchery steelhead** in possession.</u>	HSS
(10079) Little Butano Creek above the diversion dam at Butano State Park (San Mateo Co.).	Last Saturday in Apr. through Nov. 15 <u>Saturday preceding Memorial Day through September 30. Only artificial lures with barbless hooks may be used.</u>	5 trout <u>0 trout</u>	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 Grannell, 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**. <u>4 hatchery trout or hatchery steelhead** in possession.</u>	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**. <u>4 hatchery trout or hatchery</u>	HSS

Body of Water	Open Season and Special Regulations <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
		steelhead** in possession.	
(403.580) 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.	<u>All year. Only artificial lures with barbless hooks may be used.</u>	<u>0 trout</u>	A6
(104.5) Los Osos Creek (San Luis Obispo Co.).	Closed to all fishing all year.		HSS

<i>Body of Water</i>	<i>Open Season and Special Regulations <u>Restrictions</u></i>	<i>Daily Bag and Possession Limit</i>	<i><u>Menu option</u></i>
(105) Los Padres Reservoir (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
(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
(40684) 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	Closed to all fishing all year.		HSS

Body of Water	Open Season and Special Regulations <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
Creek, excluding tributaries.			
(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
<u>(85) Mamie Lake (Lake Mamie, Mono Co.).</u>	<u>Last Saturday in April through November 15.</u>	<u>5 trout</u>	B1
(10986) Mammoth Pool (Fresno and Madera Cos.<u>cos.</u>).	June 16 through Apr. 30. <u>All year.</u>	<u>5 trout per day.</u> 10 trout in possession.	A1
(110) Mammoth Pool tributaries (Fresno and Madera Cos.<u>cos.</u>) from their mouths to a point 300 feet upstream.	June 16 through Nov. 15	5 trout per day. 10 trout in possession.	SR
(11187) 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. <u>All year.</u> Only artificial lures with barbless hooks may be used.	2 trout <u>0 trout</u>	A6
(11288) Martis Lake and tributaries (Nevada and Placer Cos.<u>cos.</u>).	<u>All year. Only artificial lures with barbless hooks may be used.</u>	<u>0 trout</u>	
(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. <u>All year. Only artificial lures with barbless hooks may be used.</u>	<u>0 trout</u>	A6

Body of Water	Open Season and Special Regulations <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
<u>(89) Mary Lake (Lake Mary, Mono Co.).</u>	<u>Last Saturday in April through November 15.</u>	<u>5 trout</u>	B1
(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
(44590) McCloud River and tributaries (Shasta and Siskiyou 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
(CB) Edson Creek and all tributaries, excluding Dry Creek.	Closed to all fishing all year.		J
(DC) 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.	<u>0 trout</u>	G6

Body of Water	Open Season and Special Regulations <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
<u>(D) Sheephaven Creek.</u>	<u>Closed to all fishing all year.</u>		J
<u>(E) Bull Creek and tributaries.</u>	<u>Closed to all fishing all year.</u>		J
<u>(F) Dry Creek south of upper McCloud River.</u>	<u>Closed to all fishing all year.</u>		J
(EG) 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. <u>Saturday preceding Memorial Day through September 30. Only artificial lures may be used.</u>	2 trout	F3
	<u>October 1 through the Friday preceding Memorial Day. Only artificial lures with barbless hooks may be used.</u>	<u>0 trout</u>	I6
(FH) 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). <u>Shasta Lake.</u>	Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used. <u>All year. Only artificial lures with barbless hooks may be used.</u>	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).	<u>Closed to all fishing all year.</u>		Del15
(115.2) McDonald Creek (Humboldt Co.).	<u>Closed to fishing all year.</u>		HSS
(115.391) 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.	2 trout <u>5 trout</u>	F1

Body of Water	<u>Open Season and Special Regulations-Restrictions</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
	Minimum size limit: 18 inches total length. Only artificial lures with barbless hooks may be used. <u>Saturday preceding Memorial Day through September 30.</u>		
	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
(115.692) McLeod Lake (Mono Co.).	Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used. <u>All year. Only artificial lures with barbless hooks may be used.</u>	0 trout	A6
(115.893) Meiss Lake (Alpine Co.).	Closed to all fishing all year <u>Saturday preceding Memorial Day through September 30. Only artificial lures with barbless hooks may be used.</u>	<u>0 trout</u>	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

Body of Water	Open Season and Special Regulations <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
(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
(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
(148.294) Milk Ranch Creek and tributaries (Alpine Co.) above the confluence with the North Fork Mokelumne River.	Closed to all fishing all year.		J
(148.595) Mill Creek (Mono Co. tributary to West Walker River) and tributaries upstream from confluence with Lost Cannon Creek.	Closed to all fishing all year. <u>All year. Only artificial flies with barbless hooks may be used.</u>	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

Body of Water	Open Season and Special Regulations <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
(B) From U.S. Geological Survey gauging station cable crossing at mouth of Mill Creek Canyon downstream to the mouth of Mill Creek.	June 16 through Sept. 30.	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.	HSS
<u>(96) Miller Canyon Creek from Silverwood Lake upstream (San Bernardino Co.)</u>	<u>All year.</u>	<u>5 trout</u>	A1
(42097) 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. <u>All year. Only artificial lures with barbless hooks may be used.</u>	2 trout <u>0 trout</u>	A6
(42298) 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	

Body of Water	Open Season and Special Regulations <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
		steelhead**. 2 Chinook salmon.	
(C) Between the Woodbridge Irrigation District Dam and the Lower Sacramento Road bridge.	Closed to all fishing all year		HSS
(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**	
(12599) Mono Creek (Fresno Co.) and tributaries from Edison Lake upstream to the confluence with the North Fork Mono Creek.	June 1 through October 15. <u>Saturday preceding Memorial Day through September 30.</u>	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
(126100) 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	Last Saturday in Apr. through Nov. 15	5 trout	SR

<i>Body of Water</i>	<i>Open Season and Special Regulations <u>Restrictions</u></i>	<i>Daily Bag and Possession Limit</i>	<i><u>Menu option</u></i>
Hunter-Liggett Military Reservation.			
(B) Nacimiento Lake, and the main stem Nacimiento River upstream to the southern boundary of Fort Hunter-Liggett.	All-year.	5 trout	SL
(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

Body of Water	<u>Open Season and Special Regulations</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
(430.5101) Nelson Corral Reservoir and tributary (Lassen Co.).			
(A) Nelson Corral Reservoir.	All year.	2 trout. <u>4 trout in possession.</u>	A2
(B) Nelson Corral Reservoir tributary (the unnamed tributary entering the reservoir at the north end).	Closed to all fishing all year.		J
(130.6) New Bullards Bar Reservoir.	All year.	5 trout. 10 landlocked salmon per day. 20 landlocked salmon in possession.	SL
(431.102) Newlands Lake tributaries (Lassen Co.).	Closed to all fishing all year.		J
(432.103) Nicasio Lake tributaries (Marin Co.).	Last Saturday in Apr. through Nov. 15 <u>Saturday preceding Memorial Day through September 30.</u>	5 trout <u>2 trout. 4 trout in possession.</u>	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	Fourth Saturday in May through Mar. 31. Only artificial lures	2 hatchery trout or hatchery	HSS

Body of Water	Open Season and Special Regulations <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
the South Fork Noyo River to the Sonoma/Mendocino Boy Scout Council Camp.	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.	steelhead**. 4 hatchery trout or hatchery steelhead** in possession.	
(134104) 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. <u>All year.</u>	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. <u>All year.</u> Only artificial lures with barbless hooks may be used.	2 trout <u>0 trout</u>	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. <u>to Crowley Lake.</u>	Saturday preceding Memorial Day through Sep. 30. <u>Last Saturday in April through July 31.</u>	5 trout per day. 10 trout in possession.	D1
	<u>August 1 through November 15. Only artificial lures may be used. Minimum size limit: 18 inches total length.</u>	<u>2 trout</u>	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

Body of Water	Open Season and Special Regulations Restrictions	Daily Bag and Possession Limit	Menu option
(DC) 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. <u>4 trout in possession.</u>	B2
	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
(ED) 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. <u>to 5 Bridges Road.</u>	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**. <u>4 hatchery trout or hatchery steelhead** in possession.</u>	HSS
(135.4) Lake Pardee.	All year.	5 trout. 10 landlocked salmon per day. <u>20 landlocked salmon in possession.</u>	SL
(135.5 <u>105</u>) Parker Creek (Mono Co.) from the Lee Vining Conduit to Rush Creek. <u>from Parker Lake to the confluence with Rush Creek.</u>	Last Saturday in Apr. though Nov. 15. Only artificial lures with barbless hooks may be used. <u>All year. Only artificial lures with barbless hooks may be used.</u>	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

Body of Water	Open Season and Special Regulations <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
(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
(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.	
(139.5106) 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. <u>Saturday preceding Memorial Day through the last day in February.</u>	0 trout <u>5 trout</u>	G1
<u>(107) Pine Valley Creek (San Diego Co.) upstream of Barrett Lake and all its tributaries.</u>	<u>All year. Only artificial lures may be used.</u>	<u>2 trout</u>	A3
(139.7) Pinole Creek (Contra Costa Co.) and tributaries.	Closed to all fishing all year		HSS
(140108) Piru Creek (Los Angeles and Ventura Cos. cos.).			

Body of Water	<u>Open Season and Special Regulations</u> <u>Restrictions</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
(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
(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
(441109) 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
<u>(A) Pit River, South Fork (Modoc Co.) and tributaries upstream of the Highway 395 bridge in Likely.</u>	<u>Saturday preceding Memorial Day through the last day in February.</u>	<u>5 trout</u>	G1
<u>(B) Pit River, North Fork (Modoc Co.) and tributaries from the confluence with the South Fork in Alturas upstream to (including) Franklin Creek.</u>	<u>Saturday preceding Memorial Day through the last day in February. Only artificial lures may be used.</u>	<u>2 trout</u>	G3
(BC) 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. <u>All year.</u> Only artificial lures with barbless hooks may be used.	2 trout <u>0 trout</u>	A6

Body of Water	<u>Open Season and Special Regulations-Restrictions</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
	Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used.	0 trout	
(GD) Pit River, from Pit No. 3 Powerhouse downstream to Pit No. 7 dam <u>Shasta Lake</u> .	Last Saturday in Apr. through Nov. 15. <u>All year.</u>	5 trout <u>2 trout. 4 trout in possession.</u>	A2
	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
(443110) Pole Creek and tributaries (Placer Co.)	Closed to all fishing all year.		J
(444111) 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. <u>Saturday preceding Memorial Day through the last day in February. Only artificial lures with barbless hooks may be used.</u>	0 trout	G6
(445112) 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. <u>All year. Only artificial lures with barbless hooks may be used.</u>	2 trout. <u>0 trout</u>	A6
(446113) Purisima Creek (San Mateo Co.).	Last Saturday in Apr. through Nov. 15 <u>Saturday preceding Memorial Day through September 30. Only artificial lures with barbless hooks may be used.</u>	5 trout <u>0 trout</u>	F6
(447114) Putah Creek (Solano and Yolo	All year. Only artificial lures and <u>with</u> barbless hooks may be used.	0 trout	A6

Body of Water	Open Season and Special Regulations <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
Cos.cos.) from Solano Lake to Monticello Dam.			
(148115) 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
(150116) Redwood Creek (Humboldt Co.). Also see Section 8.00(a) and tributaries above the mouth of Bond Creek.	<u>Closed to all fishing all year.</u>		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
(150.5117) Robinson Creek (Mono Co.).			

Body of Water	<u>Open Season and Special Regulations-Restrictions</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
(A) From the U.S. Forest Service boundary downstream to Upper Twin Lake.	Last Saturday in April through Sept. 14 <u>Saturday preceding Memorial Day through September 30.</u>	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 <u>Saturday preceding Memorial Day through September 30.</u>	5 trout	F1
(451118) 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
<u>(119) Rock Creek Lake (Mono Co.).</u>	<u>Last Saturday in April through November 15.</u>	<u>5 trout</u>	B1
(451.5120) 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
(452121) 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
(452.5122) Roosevelt Lake (Mono Co.).	Last Saturday in Apr. through Nov. 15. <u>All year. Only artificial lures may be used.</u>	2 trout	A3
(453123) Rush Creek (Mono Co.)			

Body of Water	<u>Open Season and Special Regulations-Restrictions</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
(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 <u>All year. Only artificial lures with barbless hooks may be used.</u>	0 trout	A6
<u>(B) Rush Creek (Mono Co.) between Silver Lake and Grant Lake</u>	<u>Saturday preceding Memorial Day through September 30.</u>	<u>5 trout</u>	F1
(154) 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.	HSS
(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
<u>(124) Sabrina Lake (Lake Sabrina, Inyo Co.).</u>	<u>Last Saturday in April through November 15.</u>	<u>5 trout</u>	B1

Body of Water	<u>Open Season and Special Regulations-Restrictions</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
(456125) Sacramento River and tributaries above Keswick Dam (Shasta and Siskiyou Cos. <u>cos.</u>).	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
(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. <u>Saturday preceding Memorial Day through September 30.</u>	5 trout per day. 10 trout in possession.	F1
	<u>October 1 through the Friday preceding Memorial Day. Only artificial lures may be used.</u>	<u>2 trout</u>	I3
(C) Sacramento River mainstem (excluding tributaries) and tributaries from the Scarlett Way bridge downstream to the county bridge at Sweetbriar <u>downstream to Shasta Lake.</u>	Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used. <u>All year. Only artificial lures may be used.</u>	0 trout <u>2 trout</u>	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	

Body of Water	<u>Open Season and Special Regulations-Restrictions</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
(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
(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

Body of Water	<u>Open Season and Special Regulations-Restrictions</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
	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 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.	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 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	

Body of Water	<u>Open Season and Special Regulations-Restrictions</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
		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.	
(157) Sagehen Creek (Nevada Co.).			
(A) From the stream gauging station (located about <u>1/8</u> one-eighth mile below Sagehen Creek Station Headquarters) upstream to about <u>1/8</u> 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. <u>All year. Only artificial lures with barbless hooks may be used.</u>	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	HSS

Body of Water	Open Season and Special Regulations <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
		steelhead** in possession.	
(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 7.50(b)(128).	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
(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 <u>Saturday preceding Memorial Day through September 30.</u> <u>Only artificial lures with barbless hooks may be used.</u>	5 trout0 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	HSS

Body of Water	Open Season and Special Regulations <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
		steelhead** in possession.	
(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 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.	HSS
(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	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	HSS

Body of Water	Open Season and Special Regulations	Daily Bag and Possession Limit	<u>Menu option</u>
Restrictions, Section 8.00(c)(2).		steelhead** in possession.	
(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
(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
<u>(129) San Luis Rey River West Fork (San Diego Co.).</u>	<u>All year. Only artificial lures may be used.</u>	<u>2 trout</u>	A3

Body of Water	Open Season and Special Regulations <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
(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
<u>(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.</u>	<u>All year.</u>	<u>5 trout</u>	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

Body of Water	Open Season and Special Regulations <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
(172.5 <u>131</u>) Santa Ynez River and tributaries upstream of <u>Gibraltar</u> Dam (Santa Barbara Co.).	All year.	2 trout. <u>4 trout in possession.</u>	A2
(172.7 <u>132</u>) 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
(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 <u>133</u>) 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 (Siskiyou 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 <u>134</u>) Silver Creek (Mono Co.). tributary to West Walker River, and tributaries upstream from Silver Falls.	Closed to all fishing all year.		J

Body of Water	<u>Open Season and Special Regulations</u> Restrictions	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
(477.5135) Silver Creek between Swonger Lake and Lost Lake and all other tributaries to Swonger Lake (Modoc and Lassen Cos. cos.).	Closed to all fishing all year <u>Saturday preceding Memorial Day through the last day in February. Only artificial lures may be used.</u>	<u>2 trout</u>	G3
(478136) Silver King Creek and tributaries (Alpine Co.) upstream of the confluence with Snodgrass Creek.	Closed to all fishing all year.		J
(137) Silver Lake (Mono Co.).	<u>Last Saturday in April through November 15.</u>	<u>5 trout</u>	B1
(178.5) Sisquoc River and tributaries (Santa Barbara Co.).	Closed to all fishing all year.		HSS
(479138) 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). <u>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.</u>	Aug. 1 through Nov. 15. Only artificial flies with barbless hooks may be used. <u>All year. Only artificial flies with barbless hooks may be used.</u>	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	Fourth Saturday in May through Apr. 30. Only artificial lures with	2 hatchery trout or hatchery	HSS

Body of Water	<u>Open Season and Special Regulations</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
Middle and South forks. Also see Low-Flow Restrictions, Section 8.00(a)(7).	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.	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.	
(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			

Body of Water	Open Season and Special Regulations <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
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.	HSS
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	HSS

Body of Water	Open Season and Special Regulations <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
		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.	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
(180.6139) 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. <u>Saturday preceding Memorial Day through September 30. Only artificial lures with barbless hooks may be used.</u>	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	Closed to all fishing year.		HSS

Body of Water	<u>Open Season and Special Regulations</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
regulations for the Ocean and San Francisco Bay District (see sections 1.53 and 27.00).			
(181.8141) Sonoma Lake (Sonoma Co.).	All year	2 trout. <u>4 trout in possession.</u>	A2
(182.142) Sonoma Lake tributaries (Sonoma Co.).	<u>Last Saturday in April through Apr. 15. Saturday preceding Memorial Day through September 30. Only artificial lures may be use.</u>	2 trout	F3
(184.143) Soulajoule Lake tributaries (Marin Co.).	<u>Last Saturday in Apr. through Nov. 15. Saturday preceding Memorial Day through September 30.</u>	5 trout <u>2 trout. 4 trout in possession.</u>	F2
(144) South Lake (Inyo Co.).	<u>Last Saturday in April through November 15.</u>	<u>5 trout</u>	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. <u>All year. Only artificial lures with barbless hooks may be used.</u>	2 trout <u>0 trout</u>	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**. <u>4 hatchery trout or hatchery steelhead** in possession.</u>	HSS

Body of Water	<u>Open Season and Special Regulations-Restrictions</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
(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.	HSS
(187146) 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. <u>All year. Only artificial lures may be used.</u>	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 <u>All year.</u>	2 trout. <u>4 trout in possession.</u>	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
<u>(147) Stevens Creek and all tributaries upstream of Stevens Creek Reservoir (Santa Clara Co.).</u>	<u>All year. Only artificial lures with barbless hooks may be used.</u>	<u>0 trout</u>	A6
(189148) Stony Creek, and tributaries (including	<u>All year. Only artificial lures with barbless hooks may be used.</u>	<u>0 trout</u>	A6

Body of Water	Open Season and Special Regulations <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
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 Gescos.).			
(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.	<div>Last Saturday in April through Nov. 15.</div> <div>Nov. 16 through the Friday preceding the last Saturday in April. Only artificial lures with barbless hooks may be used.</div>	<div>5 trout per day. 10 trout in possession.</div> <div>0 trout</div>	<div>Del27</div> <div></div>
(B) Stony Creek Middle Fork from Red Bridge upstream.	<div>Last Saturday in April through Nov. 15. Only artificial lures with barbless hooks may be used.</div> <div>Nov. 16 through the Friday preceding the last Saturday in April. Only artificial lures with barbless hooks may be used.</div>	<div>2 trout</div> <div>0 trout</div>	<div>Del27</div> <div></div>
(189.5149) Susan River (Lassen CountyCo.) 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. <u>Saturday preceding Memorial Day through the last day in February.</u>	0 trout <u>5 trout</u>	G1
(189.8) Swamp Creek and all tributaries (Siskiyou Co.).	See McCloud River 7.50(b)(115).		Del28

Body of Water	Open Season and Special Regulations <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
(190) 150) Sweetwater River and tributaries downstream <u>upstream of</u> from the Sweetwater Dam Reservoir (San Diego Co.).	Closed to all fishing all year. <u>All year. Only artificial lures may be used.</u>	<u>2 trout</u>	A3
(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 <u>Saturday preceding Memorial Day through September 30.</u> <u>Only artificial lures with barbless hooks may be used.</u>	5 trout per day. 10 trout in possession. <u>0 trout</u>	F6
(B) Tahoe Lake except (192) (C) below.	All year.	5 trout	SL
(CB) Tahoe Lake within 300 feet of the mouth of its tributaries.	July 1 through Sept. 30. <u>Saturday preceding Memorial Day through September 30.</u> <u>Only artificial lures with barbless hooks may be used.</u>	5, trout but no more than 2 mackinaw trout. <u>0 trout</u>	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

Body of Water	Open Season and Special Regulations <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
(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
(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
(195.1152) 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. <u>Saturday preceding Memorial Day through September 30.</u>	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. <u>October 1 through the Friday preceding Memorial Day. Only artificial lures with barbless hooks may be used.</u>	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
(196153) Truckee River (Nevada, Placer, and Sierra Cos.).			

Body of Water	<u>Open Season and Special Regulations</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
(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.			
(B) Truckee River from the confluence of Trout Creek downstream to the <u>Glenshire Bridge, mouth of Prosser Creek.</u>	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 trout0 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	
	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 trout0 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	

Body of Water	<u>Open Season and Special Regulations</u> <u>Restrictions</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
(DC) 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	
	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)
(197154) Tule River and tributaries (Tulare Co.).	Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used.	0 trout	
(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. <u>lures may be used.</u>	2 trout	A3
(B) All remaining portions of the Tule River and tributaries.	All year.	5 trout per day. 10 trout in possession.	SR
(498155) Tuolumne River (Stanislaus and Tuolumne Cos. <u>cos.</u>); from O'Shaughnessy Dam (Hetch Hetchy Reservoir)	<u>All year. Only artificial lures may be used.</u>	2 trout	<u>A3</u>

Body of Water	Open Season and Special Regulations <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
downstream to Early Intake Dam <u>Clavey River Falls.</u>			
(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 Apr. Only artificial lures with barbless hooks may be used.	0 trout	
(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	2 hatchery trout or hatchery steelhead**. 4 hatchery trout or hatchery steelhead** in possession.	HSS

Body of Water	<u>Open Season and Special Regulations-Restrictions</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
	multiple hooks having a gap between 1/4 and 1/2 inch.		
<u>(156) Twelvemile Creek (Modoc Co.).</u>	<u>Saturday preceding Memorial Day through the last day in February. Only artificial lures with barbless hooks may be used.</u>	<u>0 trout</u>	G6
<u>(157) Twin Lakes (Mammoth, Mono Co.).</u>	<u>Last Saturday in April through November 15.</u>	<u>5 trout</u>	B1
<u>(158) Twin Lakes, Upper and Lower (Bridgeport, Mono Co.).</u>	<u>Last Saturday in April through November 15.</u>	<u>5 trout</u>	B1
(199) <u>(159) Upper Otay Lake (San Diego Co.).</u>	All year. Only artificial lures with barbless hooks may be used.	0 for all species <u>0 trout</u>	A6
(199.5) <u>(160) Upper Truckee River and tributaries upstream from confluence with Showers Creek (Alpine and El Dorado Cos.).</u>	July 1 through Sept. 30. Only artificial lures with barbless hooks may be used. <u>Saturday preceding Memorial Day through September 30. Only artificial lures with barbless hooks may be used.</u>	<u>0 trout</u>	F6
<u>(161) Virginia Lakes, Upper and Lower (Mono Co.).</u>	<u>Last Saturday in April through November 15.</u>	<u>5 trout</u>	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	2 hatchery trout or hatchery steelhead**. 4	HSS

Body of Water	Open Season and Special Regulations <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
	closing days. Only barbless hooks may be used.	hatchery trout or hatchery steelhead** in possession.	
(202) Van Duzen River (Humboldt Co.). (203.5) Waddell Creek (Santa Cruz Co.) from mouth to Highway 1 bridge. Also see Low Flow Restrictions, Section 8.00(c)(3).	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
(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
(204.5162) 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
(205163) 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.	42 trout	B5

Body of Water	<u>Open Season and Special Regulations-Restrictions</u>	<u>Daily Bag and Possession Limit</u>	<u>Menu option</u>
	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	
(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
(206.5164) 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. <u>Saturday preceding Memorial Day through September 30.</u>	2 trout <u>5 trout</u>	F1
	Saturday preceding Memorial Day through Sept. 30.	5 trout per day. 10 trout in possession	

Body of Water	Open Season and Special Regulations <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
(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 artificial lures with barbless hooks may be used.	0 trout	Del32
(208.5165) 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. <u>All year. Only artificial flies with barbless hooks may be used.</u>	0 trout	A7
(208.6166) 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.		
(209167) 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. <u>Saturday preceding Memorial Day through the last day in February. Only artificial lures with barbless hooks may be used.</u>	2 trout <u>0 trout</u>	G6
(210168) Yuba River, Middle Fork (Nevada and Sierra Cos.) from Jackson Meadows Dam downstream to Milton Lake.	See Milton Lake 7.50(b)(97).		
(211169) Yuba River, North Fork (Sierra and Yuba Cos.) (A) From <u>from</u> the western boundary of Sierra City to	Last Saturday in Apr. through Nov. 15. Only artificial lures with barbless hooks may be used. <u>All year. Only artificial lures may be used.</u>	2 trout	A3

Body of Water	Open Season and Special Regulations <u>Restrictions</u>	Daily Bag and Possession Limit	<u>Menu option</u>
the confluence with Ladies Canyon Creek.			
(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
(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.

§ 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.). (A) Alameda Creek <u>mainstem</u> , and <u>all</u> tributaries downstream of San Antonio, Calaveras, and Del Valle Reservoirs <u>reservoirs</u> 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 <u>reservoirs</u> .	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	

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)
							spawning fish, or to achieve fast action or trophy fisheries.	
(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.), <u>except Caples Creek.</u> (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 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	Kokanee Salmon are no longer stocked in the reservoir and no salmon are present in the 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)
							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.) 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.

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)
(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.).	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 <u>and</u> 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.

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)
(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.

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)
(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.
(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.

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)
* (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 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	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)
	artificial lures with barbless hooks may be used.							
(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.
(39.5) Cedar 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	Wild Rainbow Trout in Clear Lake tributaries encounter diversions, poor water quality and high temperatures. The proposed bag

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)
							use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	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 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 to protect spawning trout populations.

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) 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.
(48) Cottonwood Creek (Inyo Co.) <u>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.</u>					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.

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)
(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.
(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.

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)
(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).								
(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.

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)
(53.5) Davis Creek (<u>Goose Lake tributary</u>) 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.).								
(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	-					

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)
* (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 concern regarding harvest with minimal threat to total population.	Essentially no change to the current regulation, except for the removal of the requirement for barbless hooks.
(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	Special regulation to protect Warner Lake Redband Trout.

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)
							spawning fish, or to achieve fast action or trophy fisheries.	
(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, 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.).								

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)
* <u>(X) Eel River above Lake Pillsbury and tributaries to Lake Pillsbury (Lake Co.).</u>					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								
* <u>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 downstream of Dinsmore (Humboldt and Trinity cos.)</u>	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.
(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).								
* <u>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.)</u>	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.

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)
3. Middle Fork and tributaries above mouth of Uhl Creek <u>Eel River Middle Fork and tributaries upstream of mouth of Uhl Creek (Trinity Co.)</u>	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.	.
4. Balm of Gilead Creek, and tributaries above falls 1 ¼ miles from mouth (Trinity Co.) <u>upstream of falls located 1.2 miles from mouth and one mile downstream of Wright's Valley Trail crossing (Trinity Co.)</u>	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.) <u>Eel River North Fork of the Middle Fork upstream of mouth of Willow Creek (Trinity Co.)</u>	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 <u>Complex</u> (Shasta Co.).								Public input to add terminology "Complex" to better describe the unique watercourse and simplify the regulations.

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) 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 <u>PG&E Pit #1 Diversion Dam, including all lakes, tributaries, and springs, excluding Bear Creek.</u>	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.
					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.

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)
(68.2) Feather River North Fork from Belden Bridge downstream to Cresta Powerhouse (excluding reservoirs) (Butte and Plumas Cos., 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.).								
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.

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)
* 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.
* (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,		Alignment with traditional season, previous district regulations, and Commission Policy, for both wild and stocked fisheries with a goal of sustainable harvest, while allowing	Grass Valley Creek Reservoir is located behind a locked gate. The only access is from walk-in anglers. Minimal harvest/mortality

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)
					streams, and creeks SR		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.	changes expected from the proposed regulation.
*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.

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)
* (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 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.
(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.).								

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) 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.	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 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.

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)
* (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.
* 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. <u>cos.</u>). 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).

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)
(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.
(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,		Alignment with traditional season, previous district regulations, and Commission Policy, for both wild and stocked fisheries with a goal of	Sequoia National Park (SNP) sets its own regulations. Current SNP regulations below 9,000 feet in elevation have a 0 bag limit on

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)
					streams, and creeks SR		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.	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.
(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.).								
* (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 join 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.

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						
* (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.).								

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) 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.

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)
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 and all its tributaries (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.

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)
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.	
(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.

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) 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 barbless hooks may be used.	0	-	-				Covered under new “Goose Lake and tributaries” regulation.

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)
(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 spawning fish, or to achieve fast action or trophy fisheries.	Aligns with other Mono Lake tributaries. Rush, Parker, Walker all catch and release. LADWP monitoring sites.
(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	The low seasonal flow and sporadic densities of small wild trout is the purpose for reducing the take of trout on Little Butano 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)
							spawning fish, or to achieve fast action or trophy fisheries.	
(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 artificial lures with barbless hooks may be used.	0						Moved to a year-round regulation.
* (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.

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 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 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.
* 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.).	Last Saturday in May through Nov. 15.	5 per day, 10 in possession	Move to statewide reg		Move to statewide reg for rivers,		Alignment with traditional season, previous district regulations, and Commission Policy, for both wild and stocked fisheries with a goal of	Provides opportunity for catch and release angling in the winter.

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)
(E) Mad River and tributaries above Ruth Dam.					streams, and creeks SR		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.	
*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 the last day in February	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 angling, or stocked fisheries with maximum sustainable harvest.	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 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.,) 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		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.

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)
					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.	
(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 Cescos.)								
(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	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

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)
					through Nov. 15 B			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 Sheephaven 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.
(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) - <u>Sheephaven Creek</u>					Closed to all fishing all year J			Added newly named stream to protect McCloud Redband Trout. Officially named Sheephaven Creek by USGS.
NEW (F)- <u>Bull Creek and tributaries</u>					Closed to all fishing all year			Protection for McCloud Redband Trout.

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)
					J			
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) 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.
					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) 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.

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)
(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.).								
(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		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	Stocked water. Through campground, pack station, and trailhead. Provides opportunity for catch and release angling in the winter.

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)
					SR		increase angling opportunities while reducing population level effects stemming from over-harvest and or associated hooking mortality.	
(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).
(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.).								

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) 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 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	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	Proposed regulation creates additional angling opportunity. Inaccessible Dec. through May in normal year. Lahontan Cutthroat

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)
confluence with Lost Cannon Creek.							or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	Trout water. Enough fish to handle catch and release fishing. Inaccessible Dec. through May in normal year.
* 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.).	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.								

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) 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	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.	Proposed regulation will increase angler opportunity and closely aligns with the season for Nacimiento River upstream of Nacimiento Lake to the southern boundary of Fort Hunter-Liggett.
(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.

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)
(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 ameliorate angling effects over

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)
								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 <u>Crowley Lake.</u>	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 fisheries where the maximum catch can be harvested sustainably.	Allow take in summer. Lake level varies. Consistent with upper Owens River in fall, winter and spring.

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)
			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) 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.
	Oct. 1 through Dec. 31. Only artificial lures with barbless	0			November 16 through the Friday preceding the last	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	Below PVR, above wild trout section. Through popular campground. Allow limited take in traditional campground fishing area. Consistent with entire Owens

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.				Saturday in April. C		and fall spawning. A zero bag limit to eliminate harvest of spawning fish.	River open year-round. Catch and release in winter to protect spawning fish.
(ED) 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.
(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.							

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) 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.
(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	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

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)
							stemming from over-harvest and or associated hooking mortality.	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 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.

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.
(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 with barbless hooks may be used.	0						Moved to a year-round regulation.
(D) From Pit No. 7 dam downstream 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.

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)
* (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.
(147) Putah Creek (Solano and Yolo 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.

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)
	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).
	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.

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)
(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 where the maximum catch can be harvested sustainably.	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 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.).	Also see Sierra District General Regulations (See Section 7.00(b)).							

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)
(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.
			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

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)
(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 <u>1/8 one-eighth</u> mile below Sagehen Creek Station Headquarters) upstream to about <u>1/8 one-eighth</u> 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 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	Change to catch and release angling to protect spawning steelhead populations that congregate below Salmon Falls.

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)
							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.

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)
							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.

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)
* 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.
(181) Sonoma Creek and tributaries (Sonoma Co.). (A) Sonoma Creek and	Last Saturday in Apr. through Nov. 15.	5	Saturday preceding Memorial	0 trout, artificial lures with barbless hooks	Saturday preceding Memorial	0 trout, artificial lures with barbless hooks	A summer only angling season to protect spring and fall spawning fish populations. Maximum restrictions on	Sonoma Creek tributaries fishery is dependent upon wild trout populations above a natural

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)
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).			Day through September 30		Day through September 30 F	6	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.	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.
(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

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)
								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) downstream to and including Tom Dew Creek.	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.

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)
(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 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	Last Saturday in April through Nov. 15. Only artificial lures	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	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

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)
<u>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.).</u>	with barbless hooks may be used.						or sensitive populations, mitigate high use areas, seasonally eliminate harvest of spawning fish, or to achieve fast action or trophy fisheries.	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.
(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	0						Moved to a year-round regulation.

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)
	with barbless hooks may be used.							
(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.
(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 <u>upstream of from the Sweetwater Dam Reservoir</u> (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.

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)
(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.
(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) 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.

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)
(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.
(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.	

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)
(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. <u>cos.</u>).								
(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	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.
	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	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.

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						
(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.

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)
(DC) 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.	
	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.
(DC) 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	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)
	hooks may be used.							
(197) 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.	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.

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)
<u>(198) Tuolumne River (Stanislaus and Tuolumne cos.) (A) From from O'Shaughnessy Dam (Hetch Hetchy Reservoir) downstream to Early Intake Dam Clavey River Falls.</u>	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 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.
(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.

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) 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 hooks may be used.	0	-	-	-	-		Combined former paragraphs (A) through (C) into (198) for Tuolumne River for simplification purposes.
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.

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)
* 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. <u>cos.</u>).	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 spawning fish, or to achieve fast action or trophy fisheries.	Proposed change provides angling opportunity in June with continued protection for spring spawners.
* 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.

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)
* (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 AND ARROW FISHING FOR CARP ONLY IS PERMITTED.	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.
	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	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	Recreational fishing and stocked water.

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.						reducing population level effects stemming from over-harvest and or associated hooking mortality.	
(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 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 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.

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)
(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.
(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.

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)
(210) Yuba River, Middle Fork (Nevada and Sierra Cos.) from Jackson Meadows Dam downstream to Milton Lake.	See Milton Lake 7.50(b)(120).							No change to current regulation.
(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.

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 state-wide regulation

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

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%)	<ul style="list-style-type: none"> • More catch-and-release waters (41%) • Decrease bag size (50%)
Enforcement (10%)	<ul style="list-style-type: none"> • Greater presence needed (85%) • Increase fine amount (11%)
Gear (10%)	<ul style="list-style-type: none"> • Increased use of barbless hooks (42%) • Increased use of artificial lures (29%) • Increased use of single-hooks (14%)
Season (6%)	<ul style="list-style-type: none"> • Longer seasons (35%) • Closed during spawning (20%) • Closed during winter (18%) • Shorter seasons (11%)
Other (51%)	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> Keep fly fishing only.
Crowley Lake	186	Mono Co.	<ul style="list-style-type: none"> 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.	<ul style="list-style-type: none"> Change the area boundary to protect Kern River Trout. Don't change the regulations.
Golden Trout Wilderness	116	Tulare Co.	<ul style="list-style-type: none"> 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.	<ul style="list-style-type: none"> Don't open to year-round fishing. Protect spawning fish. Don't change the regulations.
Carson River	76	Alpine Co.	<ul style="list-style-type: none"> Keep catch and release fishing only.
McGee Creek	67	Mono Co.	<ul style="list-style-type: none"> Keep closed during fall and spring to protect spawning fish.
McCloud River and tributaries	55	Shasta and Siskiyou cos.	<ul style="list-style-type: none"> Don't change the regulations.
Merced River	47	Mariposa Co.	<ul style="list-style-type: none"> 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.	<ul style="list-style-type: none"> • 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.

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

STD. 399 (Rev. 10/2019)

ECONOMIC IMPACT STATEMENT

DEPARTMENT NAME Fish and Game Commission	CONTACT PERSON Margaret Duncan	EMAIL ADDRESS margaret.duncan@wildlife.ca.gov	TELEPHONE NUMBER (916) 704-3215
DESCRIPTIVE TITLE FROM NOTICE REGISTER OR FORM 400 Amend \$3.00, 4.00...; Add 5.84, 5.89, 7.40, T14, CCR, re: Simplification Statewide Inland Sport Fishing Regs			NOTICE FILE NUMBER Z

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

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

- ☒ a. Impacts business and/or employees
 ☐ e. Imposes reporting requirements
☒ b. Impacts small businesses
 ☐ f. Imposes prescriptive instead of performance
☒ c. Impacts jobs or occupations
 ☒ g. Impacts individuals
☐ d. Impacts California competitiveness
 ☐ h. None of the above (Explain below):

Indirectly affects businesses and/or employees; see Addendum*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.***Fish and Game Commission**2. The _____ estimates that the economic impact of this regulation (which includes the fiscal impact) is:
(Agency/Department)

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

3. Enter the total number of businesses impacted: 1,000s indirectlyDescribe the types of businesses (Include nonprofits): Fishing boat owners, tackle stores, guides, food, fuel, lodging, camping vendorsEnter the number or percentage of total businesses impacted that are small businesses: 80%4. Enter the number of businesses that will be created: none eliminated: noneExplain: Anticipated changes in fishing activity are not expected to be large enough to induce business loss/creation.

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

6. Enter the number of jobs created: none and eliminated: noneDescribe the types of jobs or occupations impacted: Indirectly: Fishing guides, retail sales clerks in sport fish-serving businesses such as: tackle stores, outdoor recreational merchandise, food, fuel, lodging, and camping vendors

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

If YES, explain briefly: _____

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

STD. 399 (Rev. 10/2019)

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

1. What are the total statewide dollar costs that businesses and individuals may incur to comply with this regulation over its lifetime? \$ 0
- a. Initial costs for a small business: \$ 0 Annual ongoing costs: \$ 0 Years: 1
- b. Initial costs for a typical business: \$ 0 Annual ongoing costs: \$ 0 Years: 1
- c. Initial costs for an individual: \$ 0 Annual ongoing costs: \$ 0 Years: 1
- d. Describe other economic costs that may occur: N/A, Proposed regulation does not impose new costs on businesses or individuals. Season length, bag/possession limits are generally increased, gear and/or bait with no compliance costs. See Addendum.
2. If multiple industries are impacted, enter the share of total costs for each industry: N/A
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 Code (FGC) sections 200 and 205
- 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: This action should result in the continued sustainability of the inland trout fisheries that benefit sport anglers and the area businesses that support sport fishing activities. See Addendum for additional explanation.
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 (FGC sections 200 & 205).
3. What are the total statewide benefits from this regulation over its lifetime? \$ 1.5 B see Addendum
4. Briefly describe any expansion of businesses currently doing business within the State of California that would result from this regulation: Any changes in fishing activity levels are not expected to be sufficient enough 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: 1) No separation of trout from anandromous regs; remain confusing. 2) No Change to the Regs would not simplify regs which could contribute to decline in # of fishery participants. See water-by-water Alts considered and rationale for retaining or rejecting in Appendix A to ISOR.

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

STD. 399 (Rev. 10/2019)

ECONOMIC IMPACT STATEMENT (CONTINUED)

2. Summarize the total statewide costs and benefits from this regulation and each alternative considered:

Regulation: Benefit: \$ 1.5 B Cost: \$ 0Alternative 1: Benefit: \$ 1.5 B or less Cost: \$ 0Alternative 2: Benefit: \$ 1.5 B or less Cost: \$ 0

3. Briefly discuss any quantification issues that are relevant to a comparison of estimated costs and benefits for this regulation or alternatives:

Regulation is hoped to maintain or avert the trend of declining #s of fishing participants. Alt 1 & 2 could maintain status quo or provide less help to slow the continued decline in fishing #s.

4. Rulemaking law requires agencies to consider performance standards as an alternative, if a regulation mandates the use of specific technologies or equipment, or prescribes specific actions or procedures. Were performance standards considered to lower compliance costs?

☐ YES☒ NOExplain: Fisheries management regulations traditionally involve setting season length, bag and possession limits, 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 through 12 months after the major regulation is estimated to be fully implemented?

☐ YES☒ NO*If YES, agencies are required to submit a Standardized Regulatory Impact Assessment (SRIA) as specified in Government Code Section 11346.3(c) and to include the SRIA in the Initial Statement of Reasons.*

5. Briefly describe the following:

The increase or decrease of investment in the State: _____

The incentive for innovation in products, materials or processes: _____

The benefits of the regulations, including, but not limited to, benefits to the health, safety, and welfare of California residents, worker safety, and the state's environment and quality of life, among any other benefits identified by the agency: _____

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

STD. 399 (Rev. 10/2019)

DRAFT
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

 **Farrell, Dennis@Wildlife**

Digitally signed by Farrell, Dennis@Wildlife
DN: DC=Gov, DC=Ca, DC=Dfg, DC=AD, OU=DFG Divisions, OU=AD, OU=Users, CN="Farrell, Dennis@Wildlife"
Reason: I am the author of this document
Location: your signing location here
Date: 2020.06.03 10:12:45
Foxit PhantomPDF Version: 9.6.0

DATE

6/3/2020

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

DRAFT

STD399 CALCULATIONS WORKSHEET ADDENDUM

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, California Code of Regulations

Re: Simplification of Statewide Inland Sport Fishing Regulations

Economic Impact Statement

Regulations on the take of sport fish in California have been enacted since the late 1800s. For years, the Fish and Game Commission (Commission) and the California Department of Fish and Wildlife (Department) have heard from anglers about the complexity of freshwater sport fishing regulations.

The purpose and necessity of the proposed regulation changes described in the Initial Statement of Reasons (ISOR) are to address anglers' concerns regarding the complexity of the current 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 will provide benefits by maintaining or increasing trout fishing opportunity, where possible, through the 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.

Since some current and potential recruits to fishing have reportedly been dissuaded from fishing due to actual or perceived difficulty in complying with the regulations, the proposed simplifications are anticipated to maintain or perhaps even increase the current level of fishing activity. That outcome would translate to neutral economic impacts, with the potential for small positive economic impacts.

It is anticipated that angling participation will spread out or rise to fill previously off-season periods, and that the potential for reduced crowds in the field will be attractive to some anglers. A 2018 survey on fishing participation trends reported that "overcrowded fishing spots" was cited by 24.4% of survey participants, after 36% citing "poor weather," as the top "barriers to fishing participation" (Recreational Boating & Fishing Foundation and Outdoor Foundation, 2018).

Affected Parties

The proposed regulations amend sections regarding trout sport fishing around the state, and thus would directly affect an estimated 782,000 currently active trout anglers. Of resident and non-resident fishing license-holders, 59 percent of anglers fish for trout in California, making trout the most popular fish to pursue (Table 1).

Table 1. California sport fishing license holders (2019)

• Resident & Non-Resident Fishing License-Holders	1,635,950	100%
• Saltwater	752,537	46%
• Freshwater	1,325,120	81%
• Freshwater Trout Anglers	781,821	59%

Sources: CDFW License and Revenue Branch Statistics, U.S. Department of the Interior, U.S. Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau, 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation; USFWS Service License Statistics. Note: Figures do not total to 100% because the categories of sport anglers overlap as many fish in both saltwater and freshwater.

Indirectly-Affected Parties

Businesses that support sportfishing activities would be indirectly affected through any changes in angler spending for goods and services in route to and within various fishery locales. Such businesses include fishing equipment and supply stores, fishing guides, motels, campgrounds, restaurants, convenience and grocery stores, and fuel stations. These types of businesses fall into the North American Industrial Classification Code System (NAICS) codes for Retail, Food and Accommodations, and Hunting and Fishing. Many (~80%) may be small businesses per California Government Code Article 2, Section 11342.610.

Economic Impact Baseline

Trout fishing days in California comprise about 54 percent of all freshwater fishing days, which is above the nationwide average of 27 percent of all freshwater fishing days (USFWS, 2011). In a typical year, trout anglers' trip and equipment expenditures constitute approximately \$1.1 billion in the state (Table 2). Since we have estimates of angler spending per day, the economic impact of potential changes in trout fishing activity is characterized by changes in "angler days".

Table 2. Trout Fishing Total Annual Expenditures in California (2019\$)

• Total Recreational Inland Fishing Days	16,993,612	100%
• Trout Days	9,381,846	54%
• Trout spending per day	115	
• Annual Total Expenditures	\$1,078,912,297	

Sources: U.S. Department of the Interior, U.S. Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau, 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation; U.S. Department of the Interior, *In-River Sport Fishing Economics Technical Report*, National Oceanographic and Atmospheric

Administration, National Marine Fisheries Service, September 2011; CDFW Fisheries Branch Creel survey results.

The total annual economic output of trout fishing in California, derived with multipliers for inland sportfishing, is approximately 1.5 billion, as shown in Table 3 (multipliers source: U.S. Department of the Interior, 2011). Careful analysis of consumer, business, and employee spending patterns informs the specification of multipliers that trace the degree of impact that an initial direct expenditure will have in an area. “Direct expenditure” dollars become “indirect impact” when businesses or entrepreneurs receive payment which they then spend on business expenses, both material inputs and employee wages. When employees spend wages, that is counted as “induced impact”. All these components sum up to the “total economic impact.”

Table 3. Annual Economic Impacts of California Trout Fishing Expenditures (2019\$)

• Direct Expenditure	\$1,078,912,297
• Indirect Impact	\$303,433,294
• Induced Impact	\$18,555,727
• Total Economic Impact	\$1,517,166,472
• Jobs	12,370

Sources: U.S. Department of the Interior, U.S. Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau, 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation; U.S. Department of the Interior, *In-River Sport Fishing Economics Technical Report*, National Oceanographic and Atmospheric Administration, National Marine Fisheries Service, September 2011, Hughes, 2003.

Smaller, more rural areas where the fishing areas are located generally have much smaller multipliers for total economic impact because spending “leaks” out of the area as businesses and individuals purchase inputs that are not produced locally (Hughes, 2003). The impact of the proposed regulations on the total economic output figures is expected to cause no decline, no change, or possibly a small increase.

Changes in Seasons, Restrictions, and Angler Days

The proposed regulation affects the number of restrictions regarding trout fishing opportunity and potential angler days as follows:

- 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.

Trends in fishing participation and surveys of anglers’ motivations to fish suggest that the re-designation of seasons, thereby increasing potential angling days, may not necessarily translate to proportional changes in actual (realized) angler days. The

frequency and timing of fishing trips is influenced by many factors, such as broad socioeconomic, demographic, and urbanization trends that appear to have a large impact on fishing participation rates (USFWS, 2011). Trip timing may be more influenced by factors such as: weather; fishing quality, work/school schedules, disposable income, and other competing vacation plans, than by the particularities of state fishing regulations (Recreational Boating & Fishing Foundation and Outdoor Foundation, 2018; Schramm, et al., 2004).

This regulatory action is intended to reduce impediments to fishing due to excessively complex sport fishing regulations that may have been influencing angler choices to fish. But the cumulative economic and fiscal impacts are difficult to predict as angler preferences, and the various other factors that influence the timing and frequency of fishing trips, are beyond the purview of CDFW and the proposed regulations revisions.

EXPLANATION OF RESPONSES IN STD. 399

Section A. Estimated Private Sector Cost Impacts

1. The proposed rulemaking introduces no new costs that a representative private person or business would necessarily incur in reasonable compliance with the proposed simplification of inland sport fishing regulations. The regulations under consideration are intended to reduce regulatory complexity and increase inland sportfishing opportunities.

2. The Commission estimates that the economic and fiscal impact of this regulation is below \$10 million. There has been extensive public outreach and exchange during the development of the proposed revisions to inland sportfishing regulations. In numerous instances, concerns about potential adverse social, economic, and/or fiscal impacts were accommodated in the final proposed regulatory text to minimize the potential for adverse impacts. For there to be a \$10 million loss in direct expenditures, there would have to be approximately 87,000 fewer angler days per year, or about 12,422 fewer days per month of the seven traditional trout months. Drops in trout angler days are not anticipated, as the number of available days for fishing have been increased. However, more opportunity is not necessarily matched with more anglers fishing more days. It is possible that the same number of anglers will fish the same number of days, just at different times of the year. No change, or a small increase in angler days is anticipated.

3. The total number of businesses impacted is difficult to specify because the proposed regulations apply to individual private anglers engaged in recreational sportfishing. Those individuals may then engage various sportfish and travel-related businesses for goods and services, in that way, businesses are indirectly impacted by the regulation to the extent that the regulation alters angler spending choices. The U.S. Bureau of Census reports the number of business establishments throughout the state and in the counties more impacted by trout sportfishing. If one considers only some of the business establishments identified that support sportfishing (fishing equipment and supply stores; guides; hotels and campgrounds; restaurants, convenience and grocery stores; and fuel vendors), the total number would be several thousand.

4. The Commission does not anticipate any adverse impacts on the creation of new business or the elimination of existing businesses, as the proposed regulatory action is not anticipated to curtail the number of anglers, and thus probable angler expenditures

in the fishery areas in the state. The proposed revisions are anticipated to result in no change to a possible small increase and spreading out of fishing trips to various areas of the state throughout the year. Additionally, the long-term intent of the proposed regulatory action is to increase sportfishing opportunity while maintaining the sustainability of fishable stocks and, consequently, the long-term viability of businesses that support sportfishing activities.

5. The geographic extent of the impacts would be statewide. Although trout fishing is concentrated more in some areas over others, anglers drive from all over the state (and out of state) to engage in sportfishing, and their expenditures along the way provide some economic impact to businesses and governments along the way.

6. The Commission does not anticipate any adverse impacts on the creation or elimination of jobs, as the proposed regulations simplification is not anticipated to curtail the number of anglers and thus probable angler expenditures in the fishery areas in the state. The proposed revisions are anticipated to result in no change to a possible increase in jobs, and spreading out of fishing trips to various areas of the state throughout the year.

Section B. Estimated Costs

1. What are the total statewide dollar costs that businesses and individuals may incur to comply with this regulation over its lifetime? \$0

The proposed regulation does not impose new costs for compliance on businesses or individuals for increased fishing opportunity at new or different times and places. The regulations under consideration are intended to reduce regulatory complexity and increase inland sportfishing opportunities with no new compliance costs.

Section C. Estimated Benefits

1. Briefly summarize the benefits of the regulation.

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.

Section D. Alternatives to the Regulation

1. List alternatives considered and describe below.

1) No Separation of Trout from Anadromous Regulations

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 in Title 14, Section 7.50(b), Special Fishing Regulations. The purpose for separating the inland trout waters and anadromous waters into two tables in the proposed regulation is to make it easier for anglers to locate the body of water they intend to fish.

2) 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.

2. Summarize the total statewide costs and benefits from this regulation and each alternative considered.

There are no anticipated new costs introduced by the proposed regulation or the alternatives considered.

The proposed regulation and alternatives address the organization of trout regulations, and are not certain to translate into any increase in the overall number of angler days. The benefits of this regulation are maintenance of, or possible increase in, the historical average of \$1.5 billion total economic impact due to angler utilization and satisfaction. The alternatives maintain the status-quo, and the regulations would continue to be confusing and overly complex.

However, the proposed regulation may be viewed as having a higher likelihood to provide greater benefits at less costs because simplifying the statewide regulations is anticipated to help to maintain or induce a small increase in fishing activity, which has been declining gradually over time.

Alternatives 1 and 2 would not contribute as much as the proposed regulation toward reducing or reversing the trend of declining fishing participation in the state.

FISCAL IMPACT STATEMENT

Fiscal Impact Baseline

The fiscal impacts are driven by impacts on individuals' and businesses' spending patterns. Spending on various goods and services, purchases of licenses, as well as potential changes the level of fishing days will be reflected in fiscal impacts by way of local and state taxes, costs or savings to local and state governments, and potentially federal funding to the state.

The proposed regulations are anticipated to have a neutral to small positive fiscal impact on local government, state government, and federal funding of state programs.

Table 4. Annual Fiscal Impact Baseline: Trout Fishing Expenditures (2019\$)

- Expenditures \$ 1,078,912,297
- Local Tax \$ 15,843,282
- Local TOT \$ 1,348,942
- State Tax \$ 4,734,738

Sources: California State Board of Equalization; County Treasurer Tax Collectors.

A. Fiscal Effect on Local Government

1. Tax Revenue Impact Projections Methods

Trout sportfishing expenditures in the retail, food and accommodations, automotive service and fuel, outdoor recreational merchandise sales/rent/lease, and recreational services sectors generate local sales and transient occupancy tax for local governments throughout California. As the regulation was being developed, attention was given to maintain and or increase positive fiscal effects by increasing fishing opportunities throughout the year, or to maintain certain season windows. For instance, in response to the socioeconomic concerns voiced by some areas of the state, the traditional opener date of the last Saturday in April in some areas was retained to allow for the customary economic/fiscal pulse that is vital to local businesses and local governments.

a. Local Sales Tax

The California State Board of Equalization reports local sales tax rates for all cities and counties in California. The statewide tax rate is 7.25%, and local sales tax rates vary across cities and counties. The impact is expected to be neutral, however there is a potential for changes in visitor spending due to more sport angler day trips and overnight stays that could result in some increase in local sales taxes. The total local taxes generated by trout fishing averages about \$15.8 million annually throughout the state (Table 4). That figure is not anticipated to be adversely impacted as a result of the proposed regulations.

b. Transient Occupancy Tax (TOT)

Sport anglers' survey responses reveal that those who travel a greater distance to the fishery area are more likely to choose to stay overnight in the area. Those who live in the closest proximity to fishery sites and those who fish in the earliest hours of the day show a lower likelihood of staying overnight. State or federal campgrounds do not collect TOT, however, overnight stays are often at private campgrounds, motels, and hotels, all of which collect TOT. County treasurer tax collectors report the TOTs, with rates in cities and counties ranging from 8% to 12%. Counties and cities located in tourism-dominated areas rely quite a bit on TOT revenues for their general funds (2009, Mono County Department of Economic Development and Special Projects).

The estimated impact of the proposed regulation on TOT revenue to local governments is expected to be neutral. It is hoped that this action will help to maintain the average \$1.3 million in TOT taxes collected annually (Table 4).

B. Fiscal Effect on State Government

1. State Government Sales Tax Revenue

The state sales tax rate is currently 7.25%. The proposed regulation is not anticipated to induce any change in the typical quantity of state sales tax generated by trout fishing, which is approximately \$4.7 million per year (Table 4).

2. California Department of Fish and Wildlife Revenue Impact

The proposed regulation is expected to help to maintain the license sales revenue to CDFW. It is possible that the sale of the various types of sport fishing license items could increase in response to the increase in fishing opportunity and the simplification of the regulations. The time in which license items are purchased could vary by type (especially the per day type of permits) due to the extension of seasons and changes to opener days for some waters in the state.

However, the times in which fishing trips are taken appear to be largely influenced by the quality of fish populations, the weather, work and school vacations, or other factors unrelated to the proposed regulation - such that the timing of fishing trips may be relatively unchanged for many anglers (Recreational Boating & Fishing Foundation and Outdoor Foundation, 2018).

Between 2015 and 2019, California issued approximately 1.6 million sport fishing licenses annually (Table 1). Including the sale of additional validations and report cards, license sales generated an average \$68.2 million for fisheries management and protection. Most license items are purchased and issued on an annual basis, except for lifetime license packages.

C. Fiscal Effect on Federal Funding of State Programs

Federal Grant Funding to CDFW

The proposed regulation is not expected to affect CDFW's federal grant funding from the United States Fish and Wildlife Service (USFWS), which is partially based on fishing license sales. The Sport Fish Restoration Act (SFRA) fund is generated from a federal excise tax on sales of sport fishing tackle and motorboat fuels. Each state is allocated a portion of the SFRA fund according to a number of variables. The factors impact the allocation amount variously: 60% sport fish license sales (number of paid licensed anglers in California in proportion to national total) and 40% land area (includes inland and coastal water area). A tiered system is then used to allocate grants to the states. For example, in 2020, Alaska and Texas received the maximum grant of \$18,486,258. California received the second highest grant of \$17,703,209, followed by the states of Florida and Minnesota, which received \$12,949,384 and \$13,330,3473, respectively.

Thus, due to the complexity in the formula used by the USFWS to calculate grant distribution, it is difficult to estimate how the potential for increases in fishing activity and

increases in the excise taxes collected on fishing tackle and motorboat fuel sales may translate to changes in the relative allocation of funds to the state of California.

References:

Alkire, C., Environmental Economics and Policy Consulting for California Trout, January 2008, The Value of Recreational Fishing in California: Direct Financial Impacts.

California Department of Fish and Wildlife (CDFW) License and Revenue Branch Statistics, 2014-2019. Available from <https://wildlife.ca.gov/Licensing/Statistics>

Hughes, D.W., 2003. Policy Uses of Economic Multiplier and Impact Analysis, Choices: The Magazine of Food, Farm, and Resource Issues, Agricultural and Applied Economics Association, vol. 18(2), pages 1-6.

Mono County Department of Economic Development and Special Projects, January 2009. The Economic & Fiscal Impacts and Visitor Profile of Mono County Tourism in 2008.

Schramm, H. L. Jr. and Gerard, P. D., 2004. Temporal Changes in Fishing Motivation Among Fishing Club Anglers in the United States, Fisheries Management and Ecology, V.11, 313–321. <https://onlinelibrary.wiley.com/doi/pdf/10.1111/j.1365-2400.2004.00384.x>

U.S. Department of Commerce, U.S. Census Bureau, 2017 County Business Patterns, Release Date: 07/31/2019.

U.S. Department of Commerce, U.S. Census Bureau, 2014-2018 American Community Survey (5-year estimates), California Counties, Incorporated Cities, and Census Designated Places: Income Poverty, Employment.

U.S. Department of the Interior, U.S. Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau, 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.

U.S. Department of the Interior, U.S. Fish and Wildlife Service, and U.S. Department of Commerce, U.S. Census Bureau, 2011 California Report.

USFWS Service License Statistics, Wildlife and Sport Fish Restoration Program (WSFR), <https://www.fws.gov/wsfrprograms/subpages/licenseinfo/fishing.htm> .

Recreational Boating & Fishing Foundation and Outdoor Foundation, 2018, Special Report on Fishing.

OSBORN STRATEGIES LLC

April 14, 2020

Eric Sklar, President
California Fish and Game Commission
1416 Ninth St., Suite 1320
Sacramento, CA 95814

SUBJECT: Agenda Item # 23 – Wildlife Resources Committee, Simplification of inland sport fishing regulations.

Dear President Sklar:

I must apologize to the Commission and the Department for our late engagement on this issue. Being an active follower of Commission and Department actions, I am very much aware of the significant outreach and the several meetings conducted to inform the public of this pending regulation change. But even the best of outreach does not reach every potential stakeholder. Such is the case with my client, Montna Farms, and others. Mr. Montna only very recently learned of the effort to simplify inland sport fishing regulations at which time he engaged me to represent Montna Farms.

I will not belabor this issue with a lengthy letter, but please see the attached letter from Al Montna of Montna Farms, which goes into depth on the following points:

- Conservation of fishery resources in the Truckee River should be of paramount concern.
- Most of the Truckee River has been designated a Wild Trout Water by the Commission and is deserving of protection as such.
- Catch and release fishing (zero take) on the Truckee River is justified from Trout Creek downstream to the Nevada state line.
- Currently, only barbless artificial flies are allowed on the stretch of the River where Mr. Montna worked with Trout Unlimited to construct about 30 habitat structures under permit from the Department reinforcing the reason the work was permitted in the first place.
- Artificial lures are much more lethal than flies, even when debarbed.

Granting what Mr. Montna is requesting serves the aspirations of the Wild Trout Water designation bestowed on the Truckee River almost 50 years ago. At the very least, I ask that the Department be directed by the Commission to include Mr. Montna's request as an option for Commission consideration in the regulatory package.

Thank you for your consideration.

Sincerely,


George L. Osborn

cc: Members, Fish and Game Commission
Director Chuck Bonham, Department of Fish and Wildlife
Melissa Miller-Henson
Ari Cornman





April 13, 2020

Chuck Bonham, Director
Department of Fish and Wildlife
1419 Ninth St., 12 Floor
Sacramento, CA 95814

Dear Chuck,

I need your help on a conservation matter important to me.

As you know, Montna Farms is not just a rice-growing ranch. Montna Farms is a leading conservation enterprise. Our dedication to agriculture and wildlife resulted in the first ever wildlife-friendly agriculture easement in California. Montna Farms was awarded the Aldo Leopold Award for conservation in 2010. Today, we have working lands under an easement that will be in agriculture forever and provide water for waterfowl migrating along the Pacific Flyway. In addition, Montna Farms has been actively participating with Cal Trout and UC Davis Center for Watershed Sciences to produce fish food and provide rearing habitat in our rice fields to assist with salmon recovery efforts.

In keeping with my commitment to conservation, I have helped fund several habitat structures on the Truckee River below Trout Creek by partnering with Trout Unlimited. These projects were all permitted by the Department. We are seeing the results of this improved habitat in the large number of wild trout observed around these structures, both Browns and Rainbows. I fish with barbless flies and practice catch and release when I fish the Truckee River as do all my friends. As the mortality of fish using artificial lures is four times more¹ than that of artificial flies, I urge the Department to require the more conservation-oriented flies-only gear in this specific regulation change.

I have had an opportunity to review your Department's draft for the *Simplification of Statewide Inland Fishing Regulations*. To advance the conservation impact of the proposed regulations I am requesting a couple of small changes.

First, as proposed by the Department, Title 14, CCR, Section 7.50(b)(196)(B) reads as follows:

¹ George J. Schisler & Eric P. Bergersen (1996) Postrelease Hooking Mortality of Rainbow Trout Caught on Scented Artificial Baits, North American Journal of Fisheries Management, 16:3, 570-578, DOI: [10.1577/1548-8675\(1996\)016<0570:PHMORT>2.3.CO;2](https://doi.org/10.1577/1548-8675(1996)016<0570:PHMORT>2.3.CO;2)

Body of Water:

Truckee River from the confluence of Trout Creek downstream to the mouth of Prosser Creek.

Open Season and Special Regulations:

All year. Only artificial lures with barbless hooks may be used.

Daily Bag and Possession Limit:

0 trout.

In the interest of conservation, I support reduction of the bag limit on this stretch of the Truckee River from two fish to zero fish. But, also in the interest of conservation, I ask that the regulation be more conservation minded and that only artificial flies with barbless hooks may be used. It seems inconsistent with conservation principles to reduce take while expanding to a more destructive gear type, which also dramatically increases mortality of fish, even with catch and release.

Please delete the reference to “barbless lures” and substitute “artificial barbless flies” in this section so that the section that declares **Open Season and Special Regulations** reads as follows:

“All year. Only artificial barbless flies may be used.”

Secondly, as proposed by the Department, Title 14, CCR, Section 7.50(b)(196)(C) reads as follows:

Body of Water:

Truckee River from the Mouth of Prosser Creek downstream to the Nevada State Line.

Open Season and Special Regulations:

All year. Only artificial lures may be used.

Daily Bag and Possession Limit:

2 trout.

This proposed change is troubling in that it will allow take of two trout from November to April where the current regulation is zero and allow barbed artificial lures where barbed artificial lures are currently prohibited. Increasing take from zero to two trout in six months of the year moves in the opposite direction of conservation. Allowing artificial lures with barbed hooks rather than artificial barbless lures will result in greater mortality in released trout. If enacted, as I understand it, this regulation would even allow barbed treble hooks on artificial lures, which are many times more destructive.

I request that this stretch of the Truckee River be made catch and release with zero take all year to conserve this resource and encourage more and bigger wild fish. I also strongly oppose expanding the allowed gear type to include barbed hooks. The current regulation allows for barbless lures and should remain in place.

Most of the Truckee River from Trout Creek to the Nevada state line has been designated as "Wild Trout Waters." In the early 1970's, the California Fish and Game Commission (CFGC) adopted a Wild Trout Policy that provides for the designation of aesthetically pleasing and environmentally productive streams and lakes to be managed exclusively for wild trout, where the trout populations are managed with appropriate regulations to be "largely unaffected by the angling process." Certainly, the Truckee River is one of the most "aesthetically pleasing and environmentally productive" streams left remaining in California. I read "largely unaffected" by anglers to mean catch and release with as little harm as possible to hooked fish so that they can be safely released back into the River. Changing regulations to more destructive gear and allowing more take violates CFGC policy on Wild Trout Waters.

The work I (and others) helped Trout Unlimited do with habitat structure in the River has enhanced that environment so that many more wild fish now are observed in the River. For these areas of the River, where fish habitat has been improved, restricting angling to barbless flies only would promote and be consistent with the objectives of the work that the Department permitted.

The small changes requested above to these proposed regulations would advance the conservation goals of both the Department of Fish and Wildlife, the Fish and Game Commission and anglers and will not adversely impact the scientific grounding for this regulation change or the regulation simplification overall. It will honor the Truckee River designation as a Wild Trout Water deserving of the protection we all should be seeking.

I know, Chuck, that you share my views on conservation so I would like to discuss this with you at your earliest convenience.

Thank you for considering my views.

Sincerely,

A handwritten signature in black ink, appearing to read "Al Montna", with a stylized flourish at the end.

Al Montna

cc: President Eric Sklar, Fish and Game Commission, WRC Co-chair
Commissioner Russ Burns, WRC Co-chair



May 15, 2020

California Fish and Game Commission
1416 Ninth Street, Suite 1320
Sacramento, CA 95814

RE: Simplifications of inland sportfishing regulations

Dear President Sklar, Vice President Murray, and members of the Fish and Game Commission,

On behalf of the Northern California Guides and Sportsmen's Association I am writing to provide feedback on the Department's proposed simplification of inland sportfishing regulations, specifically those proposed on the Truckee River.

NCGASA is an association of over 600 licensed guides and over 4,000 sportsmen and women that work together to protect and increase hunting and fishing opportunities throughout California. NCGASA acts as a voice to represent all people who use California's waterways and lands. We work closely with many other conservation organizations to make sure we leave a legacy to our children and grandchildren; the same access to outdoor recreation and appreciation for abundant wildlife and fisheries that was instilled in so many of us. More specifically for this letter, we represent the sportsmen's voice of the recreational angler, and the guiding community the relies on California's recreational fisheries to support and feed our families.

We have been engaged in and watching the creation of the inland sportfishing regulation package during its two-plus year development. We have engaged, as have countless other organizations and individuals, working with the Department to promote angler opportunity and access, to simplify the confusing framework of when, where, and how someone can fish. For the most part, we agree that the Department has done a great job of balancing various diverse perspectives among various communities.

On April 14th, 2020, we became aware of a last minute petition by Al Montna, Montna Farms, urging the Commission to reject the Department's proposed actions for sections of the Truckee River, and replace them with Mr. Montna's personal preferred alternative, essentially converting the river to a barbless dry-fly fishery. After discussion among our leading guides and membership in the Tahoe region, we wish to inform you that we oppose this request, and support the Department's original proposal, as outlined in their draft simplifications package.

Mr. Montna's request covers two sections of the Truckee River. For simplification I will refer them as A (Trout Creek to Prosser) and B (Prosser to State Line).

Relative to A: Guides are supportive of the Department's recommended 0 fish bag limit, and also support artificial lures as proposed by the Department.

Relative to B: We agree with the Department's proposed two fish bag limit recommendation, and we support the Department's recommendation for barbed artificial lures.

In our opinion, California's greatest need is to expand opportunities for children and novice anglers to drop a line and lure in the water and experience the thrill of catching a fish. This foundation is critical to our ability to meet the goals of the R3 program: Recruit, Reactivate, and Retain. While we support all manner of fishing, including fly fishing, even our fly fishing guide members in the Tahoe area agree that the proposed restrictions on this section of the Truckee River, some of which is stocked by private parties, is too restrictive and reduces angler opportunity.

For these reasons we support the Department's original proposal on the Truckee River from Trout Creek to Prosser, and Prosser to the State Line, and urge you to adopt the simplifications as proposed.

Thank you for considering our comments. We look forward to discussing this item further during upcoming meetings.

Sincerely,

A handwritten signature in cursive script that reads "James M. Stone".

James Stone
President
Northern California Guides and Sportsmen's Association

Cc: Chuck Bonham, Director, CDFW
Stafford Lehr, Deputy Director, CDFW
Melissa Miller-Henson, Executive Director, FGC

STATE CAPITOL
ROOM 5108
SACRAMENTO, CA 95814
TEL (916) 651-4007

DISTRICT OFFICE
51 MORAGA WAY, SUITE 2
ORINDA, CA 94563
TEL (925) 258-1176

SENATOR.GLAZER@SENATE.CA.GOV

California State Senate

SENATOR
STEVEN M. GLAZER
SEVENTH SENATE DISTRICT



RECEIVED
CALIFORNIA
FISH AND GAME
COMMISSION

2020 JUN 11 AM 7:47

CHAIR
BUSINESS, PROFESSIONS &
ECONOMIC DEVELOPMENT
SELECT COMMITTEE ON
STUDENT SUCCESS

COMMITTEES
AGRICULTURE
EDUCATION
GOVERNMENTAL ORGANIZATION
INSURANCE

Eric Sklar
President
California Fish and Game Commission
P.O. Box 944209
Sacramento, CA 94244-2090

Dear Mr. Sklar,

June 9, 2020

I am writing to comment on the Commission's consideration of a plan to change fishing regulations on a stretch of the Truckee River between the town of Truckee and the Nevada state line as part of the proposal known as "Simplification of Statewide Inland Fishing Regulations."

As you know, most of this part of the river is wild and subject to limited takes and prohibitions on the use of barbed hooks.

While I appreciate the commission's desire to simplify the regulations, I do not believe that the changes proposed for the Truckee are an improvement. Nor would they help preserve the wild trout population that uses this river as its habitat.

The current regulations are simple: only artificial lures with barbless hooks can be used along this entire stretch, with the further restriction that only barbless artificial flies may be used between Glenshire Bridge and the mouth of Prosser Creek. A maximum of two fish per day can be taken in the spring, summer and fall, and no fish can be taken from November through April.

The proposed new regulations would allow fishing year round from Trout Creek to Prosser Creek with artificial lures and barbless hooks while allowing no take of fish from this part of the river. The new regulations would also remove the requirement that only barbless flies be used between Glenshire Bridge and the mouth of Prosser Creek.

From Prosser Creek to the Nevada State line, the proposal would allow the use of artificial lures with barbed hooks and a two-trout-per-day limit year round.

Despite banning the taking of fish from Trout Creek to Prosser Creek, this proposal seems likely to dramatically increase the number of trout killed along the entire stretch of the river. On the section east of Prosser Creek, the state would now be allowing lures with barbed hooks and a take of two fish per day year-round. And as you know, allowing barbed hooks means far more fish will die, because many anglers will fatally injure a fish while trying to remove a barbed hook.

I suggest you amend these regulations to reflect the proposal by Mr. Al Montna to preserve barbless fly-fishing from Glenshire Bridge to Prosser Creek and eliminate the change allowing barbed hooks on the river between Prosser Creek and the Nevada Line. Mr. Montna's proposal is supported by many anglers and other conservation-minded organizations

This change will preserve more fish while making the regulations less complex. If simplification and preservation are truly your goals, you could go further by allowing only barbless flies and zero take from April to November on the entire stretch of the river from Trout Creek to the Nevada state line.

If you have any questions about this issue, please direct them to my chief of staff, Daniel Weintraub, at daniel.weintraub@sen.ca.gov

Sincerely,



Steven Glazer

Senator, 7th District

CC: Melissa Miller-Henson

NORTHERN CALIFORNIA COUNCIL



May 21, 2020

Mr. Eric Sklar, President
California Fish and Game Commission
1419 Ninth St., Suite 1320
Sacramento, CA 95814

Re: Regulation changes to the Truckee River as part of changes to inland trout waters

Dear President Sklar,

I write you on behalf of the Northern California Council, Fly Fishers International, our 21 member fly fishing clubs, and more than 6,000 members. The fly fishing community in general, and our organization and members specifically, have long advocated for and supported our wild and native trout fisheries. We have worked with and support our Department of Fish and Wildlife staff, and their efforts to promote a catch and release ethic and regulations and use of single barbless hooks in wild trout waters around our state. We also know that catch and release regulations have allowed wild trout fisheries to rebound from diminished populations to more stable and healthy fisheries, containing larger fish and healthier breeding populations. We strongly support this approach and know that the benefits to fly fishers is the opportunity to catch and release larger and healthier trout, which brings more anglers to our state, and helps the communities around these fisheries be more economically stable.

We are troubled by the recommended changes on the main stem of the Truckee River between Boca Reservoir and the Nevada Stateline. These changes would allow a two-fish take limit year-round with no size restrictions, and also permit the use of barbed hooks. The large rainbow and brown trout in the river serve as critical brood stock for sustaining the Truckee's wild trout populations, and we think it is unwise to deplete these fish through increased take and the increased mortality that would be caused by barbed hooks.

The region around the Truckee River has many put-and-take fisheries, and opening a catch-and-kill fishery in this section of the Truckee is both inappropriate and unnecessary. **We respectfully request and urge you to NOT make these regulation changes in the Trout Creek to Nevada Stateline stretch.** This section of the Truckee should be designated zero kill and limited to single point barbless hooks, fly only water. Making this stretch of the Truckee River a fly only, catch-and-release, barbless single hook point location will bring anglers from around the country to fish in this beautiful stretch of river. It would become a '*target fishery*' for fly fishers far and wide.

One of our member clubs, Tahoe Truckee Fly Fishers, partners with the Truckee Chapter of Trout Unlimited, and they are working on a project that will plant fish in the section of the Truckee River from Tahoe City to the Town of Truckee. They have vetted the idea with CDFW & USFS, and are in the process of completing the stocking application and raising the money needed. This would provide a close location where anglers can partic-

TM

FLY FISHERS INTERNATIONAL
Conserving - Restoring - Educating Through Fly Fishing

ipate in a catch-and-keep fishery, while also having a trophy catch-and-release fishery close by. Nearly all of our members do not fish in catch-and-take waters and focus their time on the water in locations that have native and large trout. We do not oppose catch-and-take, just want some waters that protect wild fisheries so large and healthy fish are available to fly fishers to enjoy and release to fight another day.

Simply stated, there are many trout waters in California, and not all need to be catch-and-release, but some, like the section of the Truckee from Trout Creek to the Nevada stateline, need to be protected. We urge you to reject the current regulation recommendations from DFW in this stretch, recognize there will be adequate catch-and-keep waters close by, and protect the fishery of the Trout Creek to the Nevada Stateline section of the Truckee River.

Sincerely,

A handwritten signature in cursive script that reads "C. Mark Rockwell, D.C." on a light-colored rectangular background.

Dr. C. Mark Rockwell, D.C., President.
Northern California Council,
Fly Fishers International



TM

FEDERATION OF FLY FISHERS
Conserving - Restoring - Educating Through Fly Fishing

To: Eric Sklar, President -California Fish & Game Commission
1419 Ninth St., Suite 1320 Sacramento, CA 95814

From: Truckee River Fishing Guides

Re: Proposed Changes of 2020 Truckee River Regulations

June 2, 2020

In 2007 the CA Fish and Wildlife Commission changed regulations on the Truckee River from Trout Creek to the NV state line. This was done to protect the fishery on this designated Wild Trout portion of the Truckee and to enhance recreational angling. In our opinion and experience, those regulations contributed to an increase in trout population, average size of trout caught, increased angler use days and an overall increase in the health of this fishery. Even through severe drought conditions for several years, where fish populations were seriously compromised, the river and its inhabitants have not only survived but come back in impressive fashion.

Fast forward to 2020 and the new proposed regulations for this section of the Truckee River. It appears that we are backtracking by taking away more restrictive regulations in favor of more liberal ones. It is our request, as professionals who work on the Truckee River throughout the year, that the following be considered, if the regulations must change from what is currently in place.

Truckee River from confluence of Trout Creek to the Nevada state line:

Open season would be year around

- Zero limit
- Fly fishing only with barbless hooks

The Wild Trout status of the Truckee River in California below the confluence of Trout Creek warrants stricter regulations to protect this fishery. The area from just below Lake Tahoe to the town of Truckee has regulations that allow bait and the taking of trout in that portion of the river. Since this area is stocked from time to time by the state, those regulations work. Below Trout Creek there is no stocking by the state of California, the trout population depends on natural reproduction and therefore warrants more protection.

The guides listed below appreciate the opportunity to be heard in this process and hope that you will give our recommendations your consideration.

Sincerely,

Dave Stanley – Truckee River Outfitters – [REDACTED]

Tim Haddon – Truckee River Guide Service – [REDACTED]

Joe Heuseveldt –Ex-Calif. Guide Service – [REDACTED]

Jarrold Beer – Alpine Fly Fishing – [REDACTED]

Brendan Burnside – Alpine Fly Fishing – [REDACTED]


Dave Stanley
Tim Haddon
Joe Heuseveldt
Jarrold Beer
Brendan Burnside

Mike Anderson – Reno Fly Shop - [REDACTED]





Trent Kirschner – Tahoe Wild Trout – [REDACTED]

Brian Slusser - Four Seasons Fly Fishing [REDACTED]





Peter Stanley – Peter Stanley Fly Fishing – [REDACTED]

cc: Members, California Fish and Game Commission
Director Chuck Bonham, California Department of Fish and Wildlife
Roger Bloom, Chief, DFW Fisheries Branch
Karen Mitchell, DFW

Simplification of Statewide Inland Sport Fishing Regulations



Photo by Mike Mamola

California Fish and Game Commission Meeting
June 25, 2020
Roger Bloom - Fisheries Branch



Problem

- Some regulations are too complex
- District boundaries are confusing
- Many regulations are not geared towards management objectives

6.35. SIERRA DISTRICT DEFINITION. The Sierra District consists of all of Modoc, Lassen, Shasta, Sierra, Plumas, Alpine, Inyo and Mono counties; Tulare County east of the west boundaries of Sequoia National Forest and Sequoia National Park; Fresno County east of the west boundaries of Sierra and Sequoia National Forests (excluding Pine Flat Lake); Madera County east of the west boundary of Sierra National Forest; Mariposa, Tuolumne, Calaveras, Amador, El Dorado, Placer and Nevada counties east of Highway 49 (excluding Don Pedro, McClure and New Melones lakes); the portion of Siskiyou County southeast of a line drawn between Mt. Eddy and the Black Butte summit railroad crossing of Interstate 5 and east of Interstate 5 between the railroad crossing and Weed and east of Highway 97 between Weed and the Oregon border; and Tehama County excluding Black Butte Lake. Those waters excluded above are part of the Valley District (see section 6.36).

CALIFORNIA SPORT FISHING DISTRICTS



Goals Through Revision

- Maintain or increase angling opportunity
- Improve regulatory consistency across waters
- Align regulations with current fisheries management goals and objectives
- Reduce complexity and confusion
- Protect the resources

Key Areas for Change

- District General Regulations - Title 14, Section 7.00
- Special Fishing Regulations - Title 14, Section 7.50(b)
- Freshwaters Sport Fishing Booklets
 - Inland waters booklet
 - Anadromous waters booklet

Approach

- Reduce/justify number of seasons, gear restrictions, and size limits
- Evaluate and revise trout regulations based on current management goals and objectives
- Uncouple trout waters from the District General Regulations
- Create a statewide regulation for trout
- Vet proposed changes through public

Trout Menu

- Suite of regulations (seasons, bag limits, size limits, and gear restrictions)
 - Biologically justifiable
 - Based on current fisheries management goals and objectives
 - Biologically and locally relevant
 - Endorsed by Fish and Game Commission

Public Outreach

- Townhalls (2018 and 2019)
- Online and in-person surveys
- Press release
- Social media
- Public review of draft regulatory changes
- 7 total Fish and Game Commission WRC and TC meetings (2019 and 2020)
- 2 Fish and Game Commission meetings (2019 and 2020)

Public Outreach Summary

- 2019 Townhall summary of attendance (336)
 - Bishop (132 members of the public)
 - Redding (33 members of the public)
 - Fresno (21 members of the public)
 - Rancho Cucamonga (78 members of the public)
 - Sacramento (21 members of the public)
 - Truckee (51 members of the public)

Public Outreach Summary

- Online surveys = approximately 3500
- Hard copy surveys = approximately 27
- Emails = approximately 150
- Phone calls = approximately 150
- Letters = approximately 100

Key Revisions

- Public input
 - Biological, social, economic, and public safety concerns
- Split new statewide regulation: (1) rivers and streams; (2) lakes and reservoirs
- Added bins to Trout Menu
 - Traditional trout opener (last Saturday in April)
 - Artificial flies, barbless hooks
- Updated black bass special regulations to align with new trout regulations

Summary of Changes

- Eliminated the need for District regulations
- Established a statewide trout regulation
- Expanded statewide angling opportunities
- Reduced the # of seasons from 33 to 6
- Reduced the # of size classes from 8 to 2
- Considered management, social, economic, and safety concerns through stakeholder input

Next Steps

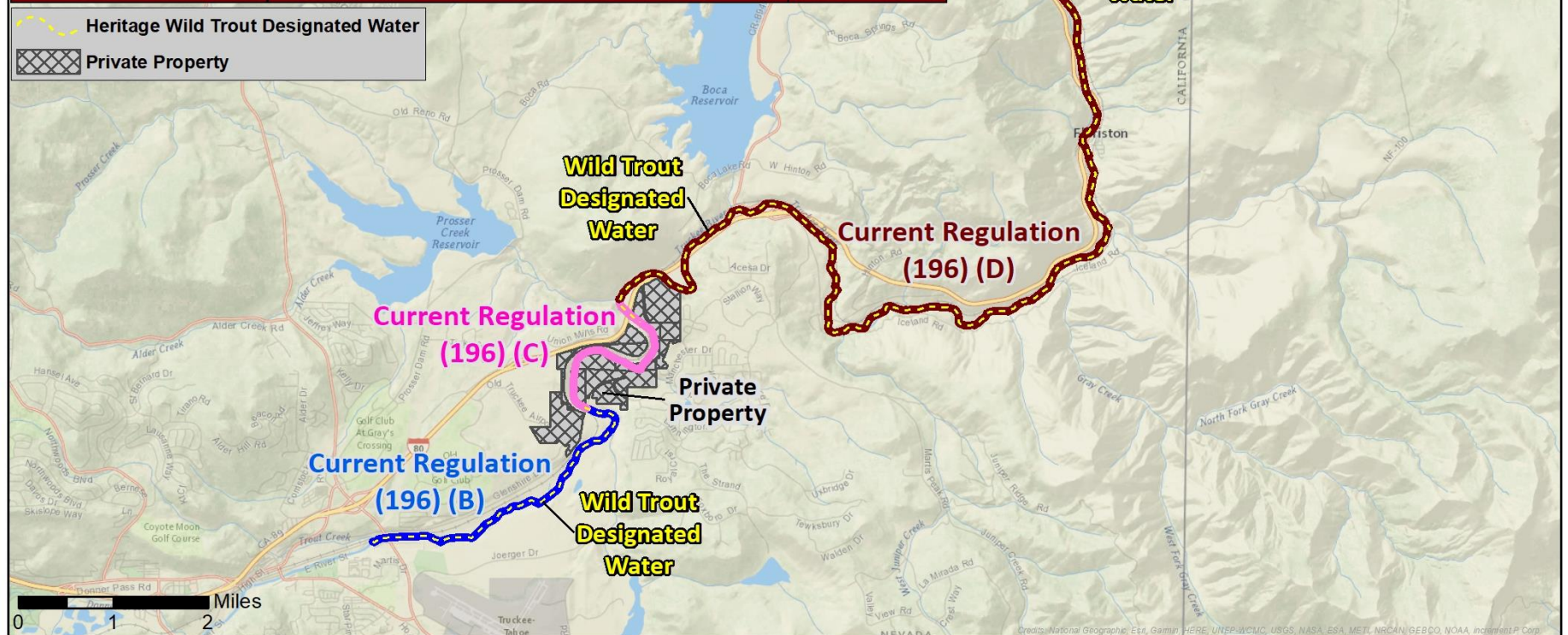
- Fish and Game Commission meetings
- Maintain running list of comments/input
- Develop monitoring portfolio based on interest, outcome, and need
- Work adaptively into the future to assess regulation effects
- Follow-up with second phase for anadromous waters
- Consider non-regulatory options to improve public understanding

Truckee River Options

- Department Proposal
 - Trout Creek to Prosser Creek – All year, 0 trout, **artificial lures with barbless hooks**
 - Prosser Creek to Nevada State Line – All year, **2 trout, artificial lures**
- Mr. Montna's Proposal
 - Trout Creek to Prosser Creek – All year, 0 trout, **artificial barbless flies**
 - Prosser Creek to Nevada State Line – All year, **0 trout, artificial lures with barbless hooks**

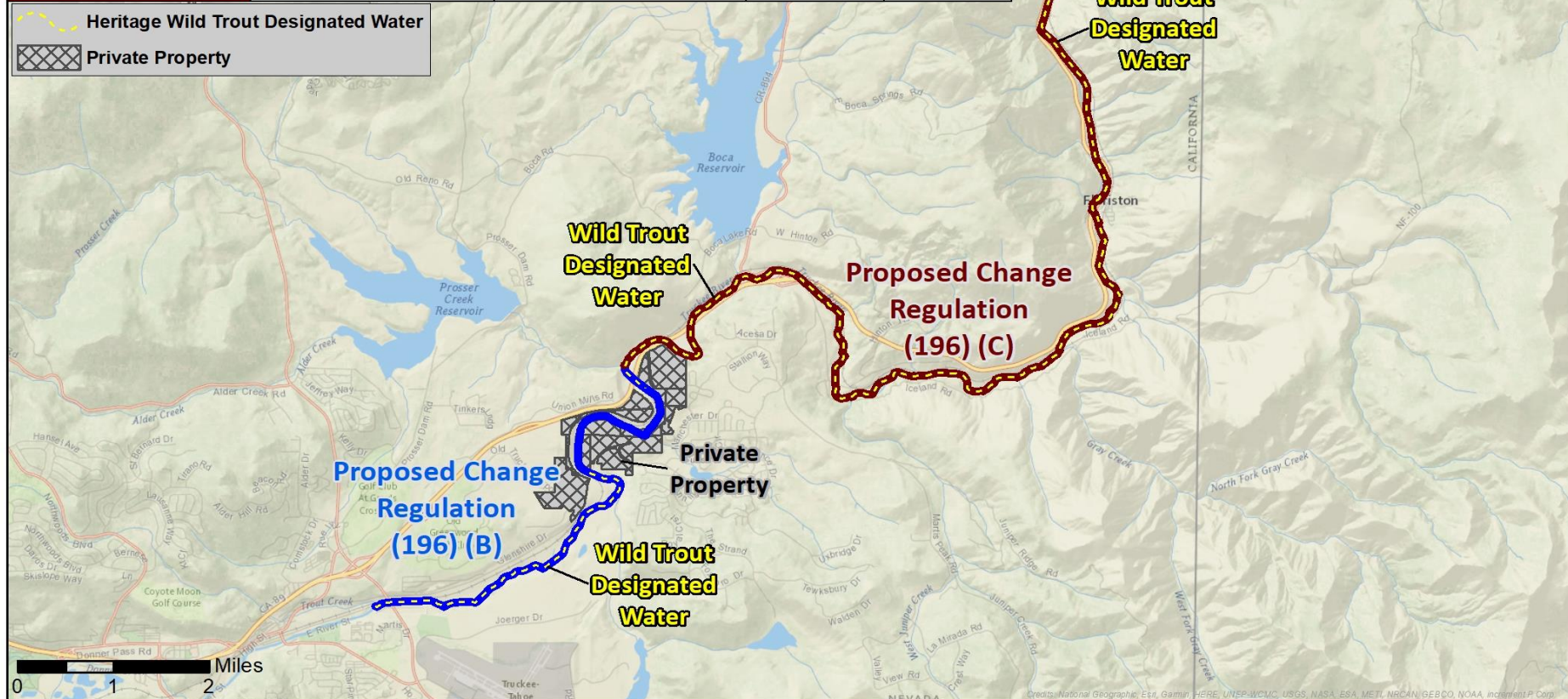
Truckee River Current Regulations

Body of Water	Open Season and Special Regulations	Daily Bag and Possession Limit
196(B) Truckee River from the confluence of Trout Creek downstream to the Glenshire Bridge.	Last Saturday in Apr. through Nov. 15. Minimum size limit: 14 inches total length. Only artificial lures with barbless hooks may be used.	2 trout
	Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used.	0 trout
196(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
	Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial flies with barbless hooks may be used	0 trout
196(D) 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 trout
	Nov. 16 through the Friday preceding the last Saturday in Apr. Only artificial lures with barbless hooks may be used	0 trout



Truckee River Proposed Regulations

Body of Water	Open Season and Special Regulations		Daily Bag and Possession Limit	
	Department Proposed Changes	Public Proposed Changes	Department Proposed Changes	Public Proposed Changes
196(B) Truckee River from the confluence of Trout Creek downstream to mouth of Prosser Creek.	All year. Only artificial lures with barbless hooks may be used.	All Year. Only artificial flies with barbless hooks may be used.	0 trout	0 trout
196(C) Truckee River from the mouth of Prosser Creek downstream to the Nevada State Line	All year. Only artificial lures may be used.	All year. Only artificial lures with barbless hooks may be used.	2 trout	0 trout



Questions / Thank You



M e m o r a n d u m

Date: February 7, 2020

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

From: Charlton H. Bonham
Director

Subject: **Five-Year Status Review of Riparian Brush Rabbit**

The California Department of Fish and Wildlife (Department) prepared the attached Five-Year Status Review of the Riparian Brush Rabbit 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 prepared this Five-Year Status Review to evaluate whether conditions that led to the original listing of the Riparian Brush Rabbit are still present.

In completing this Five-Year Status Review, the Department finds there is enough scientific information to indicate that many of the conditions that led to the listing of Riparian Brush Rabbit as endangered in 1994 have not changed. The scientific information available to the Department indicates the Riparian Brush Rabbit remains in danger of extinction in all or a significant portion of its range due to one or more causes. Therefore, the Department recommends that no change be made to the Riparian Brush Rabbit's endangered status.

If you have questions or need additional information, please contact Kari Lewis, Branch Chief, Wildlife Branch at (916) 373-6613, or by e-mail at Kari.Lewis@wildlife.ca.gov.

Enclosure

ec: California Department of Fish and Wildlife

Valerie Termini,
Chief Deputy Director
Valerie.Termini@wildlife.ca.gov

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

Melissa Miller-Henson, Executive Director
Fish and Game Commission
February 7, 2020
Page 2

Kari Lewis, Branch Chief
Wildlife Branch
Kari.Lewis@wildlife.ca.gov

Kevin Shaffer, Branch Chief
Fisheries Branch
Kevin.Shaffer@wildlife.ca.gov

Richard Macedo, Branch Chief
Habitat Conservation Planning Branch
Richard.Macedo@wildlife.ca.gov

Erin Chappell
Environmental Program Manager
Nongame Wildlife Program
Erin.Chappell@wildlife.ca.gov

State of California
Natural Resources Agency
Department of Fish and Wildlife

REPORT TO THE FISH AND GAME COMMISSION

FIVE-YEAR STATUS REVIEW OF RIPARIAN BRUSH RABBIT (*Sylvilagus bachmani riparius*)

February 21, 2020



Riparian Brush Rabbit, Lee Eastman/USFWS

Charlton H. Bonham, Director
Department of Fish and Wildlife



TABLE OF CONTENTS

I. EXECUTIVE SUMMARY	3
II. INTRODUCTION	4
A. Five-Year Status Review.....	4
B. Listing and Status Review History	5
III. BIOLOGY	5
A. Taxonomic and Physical Description.....	5
i. Physical Description	5
ii. Taxonomy	6
B. Life History and Ecology	6
i. Food Habits and Foraging Behavior	6
ii. Home Range and Population Densities	6
iii. Reproduction and Survival	7
iv. Activity Patterns and Dispersal	7
v. Predators, Competitors, and Disease	8
C. Habitat Necessary for Species Survival	8
IV. DISTRIBUTION AND ABUNDANCE	9
A. Range and Distribution.....	9
i. Historic Range and Distribution	9
ii. Current Range and Distribution	9
B. Population Trend and Abundance	10
i. Historic Abundance	10
ii. Current Populations.....	12
V. THREATS AND SURVIVAL FACTORS	13
A. Factors Affecting Ability to Survive and Reproduce	13
i. Present or Threatened Modification or Destruction of Habitat.....	13
ii. Overexploitation	13
iii. Predation.....	14
iv. Competition	14
v. Disease	14
vi. Small Populations.....	14
vii. Flooding	14
viii. Wildfire	15
ix. Invasive Species	15
x. Rodenticides	15
xi. Recreation.....	15

xii. Climate Change.....	15
B. Degree and Immediacy of Threats	16
i. Present or Threatened Modification or Destruction of Habitat.....	16
ii. Overexploitation	19
iii. Predation.....	20
iv. Competition	21
v. Disease	21
vi. Small Populations.....	22
vii. Flooding	24
viii. Wildfire	28
ix. Invasive Species	31
x. Rodenticides	31
xi. Recreation.....	32
xii. Climate Change.....	32
VI. MANAGEMENT AND RECOVERY	33
A. Impact of Existing Management Efforts	33
i. Captive Propagation	33
ii. San Joaquin River National Wildlife Refuge	34
iii. Regional Habitat Conservation Plans	35
iv. Caswell Memorial State Park.....	36
B. Recommendations for Management Activities and Other Recommendations for Recovery of the Species	36
i. Establishment of Additional Flood-secure Populations	36
ii. Secure South Delta Populations.....	37
iii. Complete a Recovery Plan.....	37
iv. Basic Research on Biology and Ecology	37
v. Fuel Management on Caswell Memorial State Park	38
vi. Update Closed Hunting Zone	38
VII. RECOMMENDATION TO THE COMMISSION.....	38
VIII. SOURCES.....	39
A. Literature Cited	39
B. Personal Communication	45
C. Other.....	46
IX. LIST OF FIGURES	46

I. EXECUTIVE SUMMARY

The riparian brush rabbit (*Sylvilagus bachmani riparius*) is currently listed as endangered in California. Pursuant to Fish and Game Code § 2077, subdivision (a), the California Department of Fish and Wildlife (Department) has prepared this Five-Year Status Review to evaluate whether conditions that led to the original listing of riparian brush rabbit are still present. This review is based on the best scientific information currently available to the Department regarding each of the components listed under § 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)).

After reviewing the best available scientific information, the Department determined the following:

The riparian brush rabbit (*Sylvilagus bachmani riparius*), a subspecies of brush rabbit (*S. bachmani*), was listed as endangered under the California Endangered Species Act in 1994 and listed as endangered under the federal Endangered Species Act in 2000. Riparian brush rabbits are relatively small, brownish, and lack the conspicuous white tail of similar cottontail rabbits. Riparian brush rabbits live in dense riparian (streamside/riverside) vegetation in the San Joaquin Valley and Delta and forage on herbaceous vegetation including grasses, sedges, clover, forbs, shoots, and leaves. They seldom venture more than a few meters from brushy cover and occupy small home ranges (<2 ha [<5 ac.]). They breed seasonally, have low reproduction rates relative to other rabbit species, and most individuals do not live longer than one year in the wild. Predation is the cause of most mortality under normal conditions and they are preyed upon by a wide variety of native and non-native predators. Riparian brush rabbits compete with desert cottontails (*Sylvilagus audubonii*) in much of their range and are subject to a wide variety of potentially deadly diseases.

Little is known about the historical distribution of riparian brush rabbits, although they likely occupied most of the riparian habitat along San Joaquin Valley rivers and streams. Today they are limited to areas of the southern San Joaquin River Delta, remnant and restored riparian zones along the lower San Joaquin River north of the Tuolumne River, and riparian forests of the lower Stanislaus River. The subspecies population has fluctuated widely in recent times due to severe population crashes during periodic flood events, and the actual population size is unknown. An ambitious habitat restoration and repatriation effort in the early 2000s has resulted in a significant increase in occupancy within the historical range and increase in the population.

The major threats to the persistence of riparian brush rabbits include the dramatic historic and ongoing loss of San Joaquin Valley riparian habitat; fragmentation of remaining habitat patches which limits the ability of rabbits to disperse and exchange genetic material; catastrophic periodic flood events coupled with the limited availability of high elevation habitat for rabbits to

retreat to during floods; habitat loss and mortality from wildfires; predation from native and non-native predators; environmental and genetic threats inherent to small, isolated populations; climate impacts; and rodenticide exposure.

Recent management efforts have substantially expanded the occupied area within the historical range and improved the viability of southern riparian brush rabbit populations. From 2002 -2013, an intensive captive propagation and translocation effort resulted in the release of 1,496 riparian brush rabbits onto the San Joaquin River National Wildlife Refuge (Refuge). During the same period, the Refuge was dramatically expanding in size and restoring vast areas of farmland to riparian brush rabbit habitat. Despite these important recovery actions, most of the extant riparian brush rabbit populations remain threatened by catastrophic flood events. Future management of the riparian brush rabbit must address the range-wide risk of flooding by securing flood-safe riparian habitat adjacent to existing local populations. Other future management needs include the development of a riparian brush rabbit recovery plan, basic biological research on the diet and ecology of the subspecies, and the development of efficient monitoring techniques.

The Department recommends no change to the riparian brush rabbit's endangered status.

II. INTRODUCTION

A. Five-Year Status Review

This Five-Year Status Review addresses the riparian brush rabbit (*Sylvilagus bachmani riparius*) (Orr 1935), 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 § 670.5, subd. (a)(6)(A)). 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)). The riparian brush rabbit is also listed as endangered under the federal Endangered Species Act. Pursuant to Fish and Game Code § 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 status review with their five-year review process. The USFWS is currently preparing a Species Status Assessment which will be used as part of a federal five-year status review in the near future (Stephanie Prevost pers. comm. 6/13/2019).

Using the best scientific information available to the Department, this Five-Year Status Review includes information on the following components pursuant to § 2072.3 and § 2077(a) of the Fish and Game Code and § 670.1(d) of Title 14 of the California Code of Regulations: 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

Riparian brush rabbits were listed as endangered under CESA in 1994. At the time of the initial listing the main identified threats to the species included: extensive loss of historically occupied habitat to agricultural development; small population sizes threatened by floods, fires, and other environmental events; deleterious genetic trends associated with small populations; and competition with desert cottontails (*S. audubonii*). The Department has not previously conducted a 5-year Review of this subspecies.

A 1998 federal Recovery Plan for the Upland Species of the San Joaquin Valley discussed the riparian brush rabbit. However, the subspecies was not listed under the federal Endangered Species Act at that time and therefore, while the plan included directed actions to improve riparian brush rabbit populations, recovery criteria were not included (USFWS 1998). On February 23, 2000 the subspecies was listed as endangered under the federal Endangered Species Act of 1973 (16 U.S.C. § 1531 et seq.).

This Five-Year Status Review was prepared by Daniel Applebee in the Department's Wildlife Branch Nongame Program with input from Jennifer Rippert (Bay Delta Region), Henry Lomeli (North Central Region), Reagan O'Leary (Central Region), Stephanie Prevost (USFWS Sacramento Field Office), and mapping support from Kristi Cripe (Wildlife Branch).

III. BIOLOGY

A. Taxonomic and Physical Description

i. Physical Description

Riparian brush rabbits are small, brownish, cottontail-like rabbits with white bellies, relatively short ears, and small inconspicuous tails. Adults are about 300-375 mm (11.8-14.8 in.) long. The hind legs are short and hind feet are slender and not covered with long or dense hair. The pelage (fur) is pale gray on the sides, darker on the back. The ears lack dark areas at the tips which are typical of the more ubiquitous desert cottontail (also known as Audubon's cottontail), (Orr 1935, 1940; Ingles 1965; Chapman 1974). The riparian brush rabbit can be distinguished from other subspecies by its relatively pale color, gray sides, and darker back (Orr 1935), its restricted range and habitat requirements, and skull characteristics (Orr 1935, 1940).

The similar desert cottontail occurs within the range of the riparian brush rabbit and can be found inhabiting the same patches of riparian habitat. Desert cottontails are found in a wider variety of habitat types, are slightly larger, have larger eyes and ears, are more yellowish in coloration, and have dark-tipped ears and a very conspicuous tail (Ingles 1965).

ii. Taxonomy

The riparian brush rabbit is recognized as a distinct subspecies of the brush rabbit. There are 13 recognized subspecies of brush rabbit, eight of which occur in California (Hall 1981). Brush rabbits are found along the Pacific Coast of North America from the Columbia River to the tip of Baja California and from the western slope of the Cascade-Sierra Nevada Range west to the Pacific Ocean (Orr 1935, 1940; Chapman 1974; Hall 1981). Orr (1935) described the riparian brush rabbit with the type locality designated as the west side of the San Joaquin River, two miles northeast of Vernalis, Stanislaus County, California.

B. Life History and Ecology

The information below is largely reproduced from the Department's 1993 Status Review (CDFG 1993) which summarized what is known about riparian brush rabbits from technical information provided in Orr (1935, 1940), Chapman (1974), Chapman et al. (1982), Williams (1986, 1988, 1993), Williams and Basey (1986) and Basey (1990). Where new information is presented it is referenced.

i. Food Habits and Foraging Behavior

Riparian brush rabbits forage on a wide variety of herbaceous vegetation, including grasses, sedges, clover, forbs, shoots, and leaves. The vegetation is generally clipped off using the teeth while the animal moves slowly along the ground. Occasionally, an animal will rise up on its hind legs to reach a slightly elevated item, but edible items are not manipulated by the forepaws. Vegetation is eaten in available areas within or very close to brushy cover, usually along trails, fire breaks, or at the edge of brushy areas. They seldom venture more than several meters from brushy cover, and do not forage in large open areas. Foraging activity occurs during the early morning and early evening hours. Basey (1990) observed brush rabbits feeding on a variety of vegetation including wild rose (*Rosa* spp.), blackberry (*Rubus* spp.), blue elderberry (*Sambucus nigra* ssp. *caerulea*), California wild grape (*Vitis californica*), dried oak leaves (*Quercus* spp.), and grasses, including bermudagrass (*Cynodon* spp.). Grasses appeared to be the most important food source when available, followed by the growing tips of wild rose and blackberry shoots. Brush rabbits are known to practice coprophagy (re-ingestion of feces), presumably to extract additional nutrition from incompletely digested food (Chapman and Litvaitis 2003).

ii. Home Range and Population Densities

Home ranges of male and female riparian brush rabbits become larger during the breeding season (Kelt et al. 2014). At Caswell Memorial State Park (hereafter referred to as "Caswell Park"), Basey (1990) found the mean male home range (0.096 ha [0.24 ac.]) to be larger than the mean female home range (0.02 ha [0.06 ac.]). Male home ranges overlapped several female home ranges, but the activity centers of female home ranges did not overlap. Densities ranged from 2-14 rabbits per ha, (2.47 ac.), depending on habitat quality.

Hamilton's (2010) study of translocated riparian brush rabbits on the San Joaquin River National Wildlife Refuge (hereafter referred to as the "Refuge") documented considerably larger home

ranges, averaging 1.79 ha (4.4 ac.), with male home ranges only slightly larger than female home ranges. Riparian brush rabbit home ranges were slightly larger during the breeding season than in the non-breeding season - 1.97 ha (4.87 ac.) versus 1.60 ha (3.95 ac.). Hamilton (2010) observed a reduction in average home range sizes over the three year course of her study and postulated that rabbits may have spent the first season following translocation in search of suitable habitat or potential mates; but as the local population on the Refuge increased through additional releases and local births, suitable habitat might have become limited, resulting in smaller home ranges.

iii. Reproduction and Survival

Riparian brush rabbits breed seasonally, unlike the desert cottontail which can breed all year (Mossman 1955; USFWS 2000). Williams (1988) and Basey (1990) found that wild riparian brush rabbits breed from February to May or June. In breeding enclosures, riparian brush rabbits were polygynous, with one male dominating the mating of most females, but not to the exclusion of all other males. In captivity, female promiscuity was observed, with some litters fathered by more than one male (Williams et al. 2005; Williams et al. 2008).

Hamilton (2010) estimated the proportion of breeding females in the wild local population on the San Joaquin National Wildlife Refuge was approximately 46%. Williams et al. (2008) found some females in captive propagation facilities produced up to four litters per season; however, most females had only one or two litters. Breeding females produced an average of 5.3 young each season, while only 2.8-2.9 young per pregnancy survived more than a few weeks after birth (Williams et al. 2005; Williams et al. 2008).

Shallow ground nests are typically located under large clumps of dense blackberry vines. Constructed and found burrows may also be used (Orr 1940; Williams et al. 2008). The gestation period is 27-30 days. Young open their eyes ten days after birth and leave the nest at about two weeks, although the female may continue to suckle her young two to three weeks after their birth (Orr 1940, 1942). Young riparian brush rabbits reach adult size in approximately four to five months and in captivity reach sexual maturity at approximately four months (USFWS 2000; Wittmer et al. 2016). Kelly and Holt (2011) monitored one captive-bred translocated riparian brush rabbit on the Refuge for over three years, but most reproductive rabbits do not survive to the next breeding season due to predation, disease, and other causes (Williams et al. 2008).

iv. Activity Patterns and Dispersal

Riparian brush rabbits are crepuscular, typically active in the evening between sunset and 0200 hrs., and in the morning from 0600-1030 hrs. Between active periods, they groom and rest in small depressions or elevated on downed logs and may sun themselves during sunny afternoons. These resting locations are connected by a maze of well-used runways. When being chased, riparian brush rabbits are difficult to flush into the open and instead stick to dense cover or climb up into vegetation. They will also climb into small trees or snags when necessary to escape flooding.

Dispersal patterns are generally unknown. It is assumed that animals may travel a very short distance when necessary to find a suitable unoccupied home range within riparian habitat during the breeding season. They are closely restricted to dense brushy cover and are probably unable or unwilling to disperse through large open areas. Studies of the closely related subspecies, *S. bachmani ubericolor* found rabbits that were displaced > 350 m (1,148 ft.) from their home range had difficulty returning to their original territory. Due to this rather short homing ability, animals displaced by floods may not be able to return to their original location.

v. Predators, Competitors, and Disease

Riparian brush rabbits are preyed upon by various native raptorial and carnivorous species that normally occur within riparian habitat, such as hawks, owls, coyotes (*Canis latrans*), foxes, long-tailed weasels (*Mustela frenata*), and snakes. They are also susceptible to predation by feral dogs (*Canis familiaris*) and cats (*Felis catus*) (Williams 1988). Predation was the greatest cause of deaths in translocated rabbits on the Refuge (Williams et al. 2008).

The riparian brush rabbit's main competitor for food resources is the desert cottontail. Riparian brush rabbits are subject to diseases and parasites that typically affect North American rabbit species, many of which are contagious and fatal. Amongst captive and translocated rabbits, when disease was determined to be the likely cause of death, *Baylisascaris* spp. (a parasitic roundworm) was most often implicated. Other diseases implicated in deaths were necrotizing typhlitis, and intestinal lymphoma (Williams et al. 2008).

C. **Habitat Necessary for Species Survival**

Riparian brush rabbits are restricted to the native San Joaquin Valley riparian habitat originally found on the valley floor in the floodplain of the San Joaquin River and tributaries. Historically, periodic flooding occurred during natural variations in precipitation and snowmelt (Das 2013). These floodplain areas were uneven, with enough topography that upland areas with appropriate vegetative cover were available for retreat during flooding (Katibah 1984). Riparian brush rabbits are strictly confined to patches of habitat with dense brushy and herbaceous groundcover totaling $\geq 460 \text{ m}^2$ (5,000 ft^2). They seldom venture > 1-2 m (3.3-6.6 ft.) from brushy cover. Open areas and areas where willows predominate but ground cover and litter are regularly removed by scouring flood flows and prolonged inundation, are not typically used by riparian brush rabbits.

Riparian brush rabbits inhabit two types of riparian vegetative communities; old-growth riparian forest (primarily dominated by valley oak, *Quercus lobata*) with dense shrub and vine understories, and riparian communities dominated by thickets of willows (*Salix* spp.), wild roses, blackberries, California grape, and other successional trees and woody plants (Kelly et al. 2011). Kelt et al. (2014) found a disproportionate preferential use of the latter type. Herbaceous forbs at the edge of shrub cover appear to be an important habitat feature, providing both cover and forage. Important forb species include mugwort (*Artemisia douglasiana*), stinging nettle (*Urtica dioica*), and gumplant (*Grindelia camporum*). While riparian brush rabbits do not venture far from dense cover to forage, open fields in close proximity to cover are used (Kelly et al. 2011). Vegetative structure is also important; the presence of trees

and shrubs that grow to heights above periodic floods is critical during temporary high-water conditions. Tall trees and shrubs are also important, providing structural scaffolding for blackberry and rose to climb (Kelly et al. 2011).

IV. DISTRIBUTION AND ABUNDANCE

A. Range and Distribution

i. Historic Range and Distribution

The historical distribution of riparian brush rabbits is largely unknown. Orr (1940), based on only five records, believed riparian brush rabbits occupied the native riparian forests within the natural floodplain along the northern portion of the San Joaquin River and its tributaries from Stanislaus County to the Delta. Williams and Basey (1986) speculated that riparian brush rabbits were historically distributed within riparian forests where there was likely ample brushy understory and suitable upland areas for cover and retreat from annual floods within the San Joaquin Valley floor. In the mid-1980's the area of potentially occupied riparian habitat along the San Joaquin River and its tributaries north of the confluence of the San Joaquin and Merced Rivers was estimated to have totaled approximately 39,800 ha (98,300 ac.) (Katibah 1984).

At the time the riparian brush rabbit was listed by the State of California, Caswell Memorial State Park contained the only known population of the subspecies. Caswell Park is located on the northern bank of the Stanislaus River in southern San Joaquin County and contains one of the largest remaining fragments of mature riparian forest habitat within the San Joaquin Valley, totaling 104 ha (258 ac.). In 1998, a few riparian brush rabbits were discovered persisting in scattered local populations in the southern portion of the Sacramento-San Joaquin River Delta (South Delta) (Williams et al. 2008). Since that time, riparian brush rabbits have been discovered in approximately nine other small South Delta remnant riparian patches (Williams and Hamilton 2002; Lloyd and Williams 2003; Hamilton 2010).

Recognizing the known population areas were small and isolated from other suitable habitat, USFWS initiated a controlled propagation program in 1999 in partnership with the Endangered Species Recovery Program of California State University Stanislaus and other partners (Williams et al. 2002). In 2001, captive-breeding began. The program trapped riparian brush rabbits in the South Delta and temporarily placed them in three large outdoor pens where offspring could be easily collected for translocation. Healthy young rabbits were released into suitable habitat on the Refuge adjacent to Caswell Park beginning in July 2002. By the time the captive propagation program concluded in December 2013, 1,496 rabbits had been released on the Refuge which now contains the largest extant local population of riparian brush rabbits as well as the largest area of suitable habitat (Kelly 2018).

ii. Current Range and Distribution

Currently, riparian brush rabbits are distributed in two broad regions (Figure 1). The largest is the population consisting of the offspring of translocated rabbits on the Refuge and the native

rabbits of the adjacent Caswell Park. This local population spans 15 km (9.3 mi.) in the riparian communities along the San Joaquin River from approximately 2.7 km (1.7 mi.) south of the confluence of the Tuolumne and San Joaquin Rivers to approximately 4 km (2.5 mi.) north of the confluence with the Stanislaus River, and spans approximately 7 km (4.2 mi.) east along the Stanislaus River. Suitable habitat in this area totals approximately 1,416 ha (3,500 ac.) of native and restored riparian habitat which is relatively contiguous (Eric Hopson pers. comm. 8/27/2019).

The other broad region consists of disjunct local populations scattered throughout the South Delta from approximately 2.7 km (1.7 mi.) south of the Interstate 5 Mossdale Bridge over the San Joaquin River northwest approximately 11 km (6.8 mi.) along Paradise Cut and north approximately 9 km (5.6 mi.) along the San Joaquin River. Genetic testing recently confirmed two rabbit carcasses discovered in 2017 along Middle River were riparian brush rabbits (Stephanie Prevost pers. comm. 10/22/2019). If a viable population is confirmed at this location it would expand the known occupied range several kilometers further north along the Middle River. As currently understood, the entire South Delta population area likely totals no more than a few hundred hectares (Williams et al. 2008).

B. Population Trend and Abundance

i. Historic Abundance

Wide-spread alteration of the native riparian forests in the San Joaquin Valley began in the mid-1800s, prior to any mammalogical surveys, and before a full description of brush rabbit subspecies was completed. The Department estimated the historic abundance of riparian brush rabbits by extrapolating William's (1993) local population density estimate from Caswell Park (3 rabbits/ha [3 rabbits/2.47 ac.]) to the estimated 36,700 ha (90,688 ac.) of riparian forest thought to exist along the San Joaquin River and its tributaries from its confluence with Merced River to just outside Stockton in pre-settlement times (Katibah 1984). Based on this information, it was estimated that as many as 10,000 individuals may have existed historically. Prior to the subspecies listing under CESA, local riparian brush rabbit populations were known to have crashed repeatedly during flood events. For example, floods in the spring of 1986 covered most of Caswell Park. The following summer, the only areas with evidence of regular riparian brush rabbit use totaled approximately 3.6 ha (8.9 ac.) (Williams 1988). At that time, the population was estimated to be 6-31 rabbits (Williams 1988).

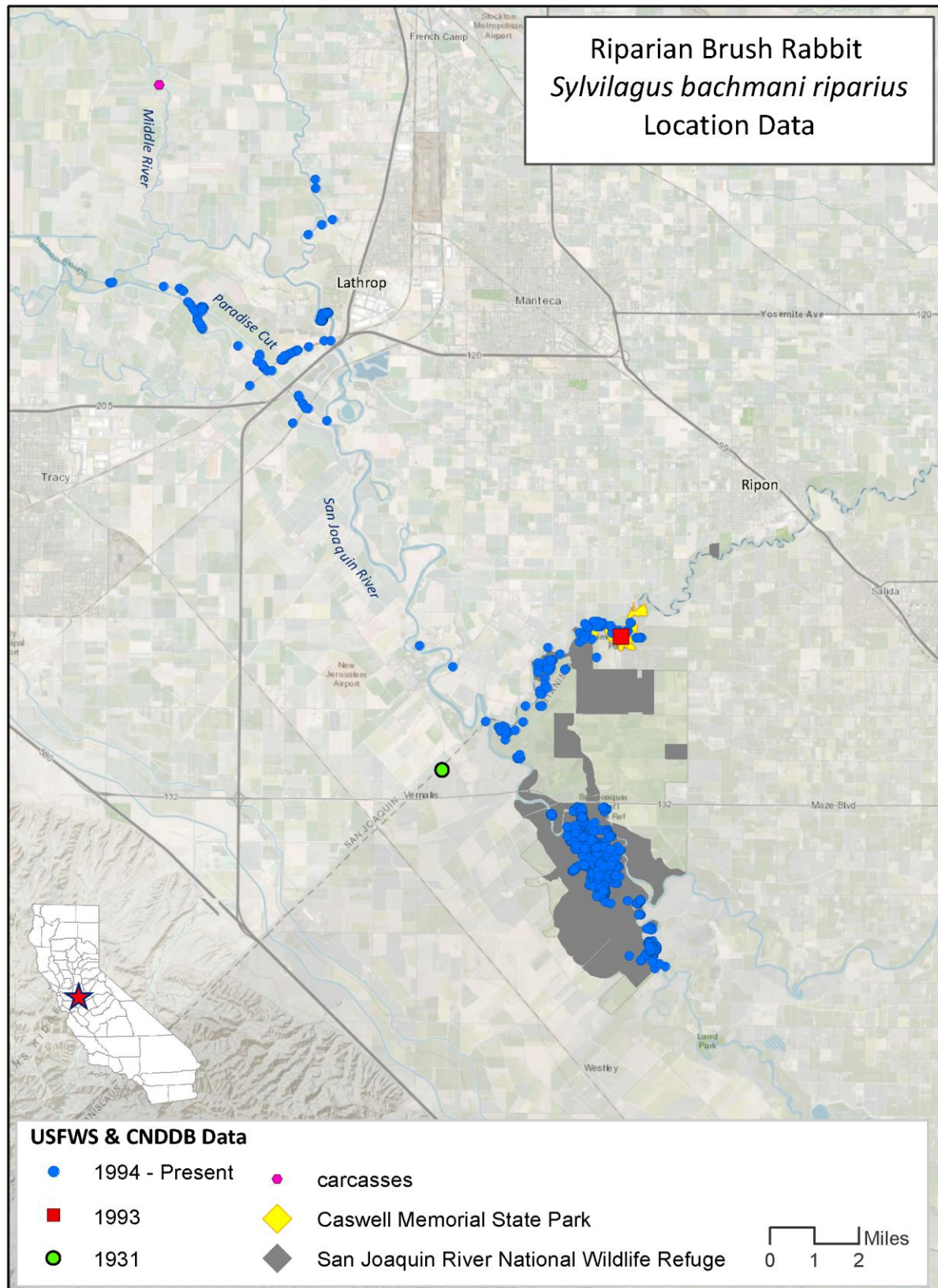


Figure 1. Distribution of riparian brush rabbit records.

ii. Current Populations

There are no contemporary estimates of the riparian brush rabbit population. In 1993, the last time the Caswell Park population was estimated, 43 individuals were captured resulting in a population estimate of 241 rabbits (Constable et al. 2011). Since that time, the number of animals trapped per effort in the Park has declined significantly, with the most recent efforts resulting in six trapped rabbits in 2005 and nine in 2006 (Constable et al. 2011). Elsholz (2010), anecdotally observed that riparian brush rabbits were common in his Caswell Park study areas from 2004-2005 but following a flood in 2006 rabbit sightings were “extremely rare”. In 2007 only four rabbits were observed on his 125 study sites. Caswell Park staff observed only one rabbit between 2008 and 2010 (Elsholz 2010). Annual rabbit surveys at Caswell have not been conducted since February 2008.

There has never been an attempt to census or estimate the size of the South Delta local populations. Approximately 238 riparian brush rabbits were trapped in the South Delta 1999-2010 as breeding stock for the captive propagation effort (Constable et al. 2011). Williams et al. (2008) believed populations in the South Delta totaled “at most a few hundred rabbits”. These small local populations have proven persistent. Williams et al. (2008) speculated that frequent disturbances from farming and flood control actions have maintained early successional riparian plant-communities in the South Delta which sustain riparian brush rabbits.

From 2002-2013 nearly 1,500 captive-bred riparian brush rabbits were released on the West Unit of the Refuge (Kelly 2018). Census trapping in 2005 captured a higher proportion of Refuge-born rabbits than translocated captive-bred individuals and resulted in a relatively high overall capture rate, indicating translocated captive-bred rabbits were effectively surviving long enough to reproduce on the Refuge (Kelly and Lloyd 2009). This early success was set back when the Refuge flooded during the spring and summer of 2006 and the newly established local population crashed. No rabbits were captured during census efforts on the Refuge in the fall 2006 and spring of 2007 (Ibid.). However, by the spring 2008 census, the capture rate of Refuge-born rabbits was again nearly equal to the capture rate of captive-bred rabbits, and from 2008-2010 each census captured more Refuge-born individuals than captive-bred individuals (Kelly and Lloyd 2010). High overall capture rates indicated the local population in the West Unit was well established; so further releases in the area were suspended. However, release of small numbers of captive-bred rabbits continued in other areas of the Refuge through 2013 (Kelly 2018).

Wittmer et al. (2016) used survival estimates and reproductive parameters derived from monitoring 325 translocated riparian brush rabbits released on the Refuge from 2002 to 2005 to model the viability of the local population. Several different scenarios were modeled, including continued translocations, suspended translocations, and different frequencies and severities of flood events. They found very high probabilities of local extinction under all examined scenarios, including scenarios that excluded flood events which suggested the local population was not self-sustaining. The authors noted, however, that the model results did not reconcile with observations of riparian brush rabbit persistence on the Refuge following the suspension of translocations and the persistence in the small South Delta and Caswell Park populations. This

disagreement suggests survivorship and reproduction rates in the established population on the Refuge were higher than the rates observed in translocated rabbits.

A significant flood event occurred in late March of 2011 and a salvage effort was initiated to rescue riparian brush rabbits from flooded and vulnerable areas and relocate them to higher ground (Kelly and Holt 2011). The fall 2011 census capture rate indicated the Refuge riparian brush rabbit population was dramatically reduced by the flood. A similar flood event occurred in 2017, again prompting salvage efforts by Endangered Species Recovery Program researchers and Refuge staff. Rabbit survival appears to have been higher through the 2017 flood compared to earlier floods. This was most likely due to the presence of newly constructed high elevation earthen mound refugia (popularly referred to as bunny mounds), efforts to plant vegetation on the upper slopes of levees to provide cover and forage for rabbits retreating from flooded lowlands, and the salvage and supplemental feeding of stranded rabbits by researchers and Refuge staff (Kelly 2018; Eric Hopson pers. comm. 8/27/2019). Increased survival through the flood event would be expected to facilitate more rapid population recovery following the flood. However, the regular census was suspended in 2013, so no data is available on the post-flood local population size, nor on the current population size and trend (Kelly 2018).

V. THREATS AND SURVIVAL FACTORS

A. Factors Affecting Ability to Survive and Reproduce

i. Present or Threatened Modification or Destruction of Habitat

The major cause of the decline in the riparian brush rabbit subspecies population is the loss, fragmentation, and degradation of San Joaquin Valley native riparian communities from their historic range (Williams and Basey 1986; Basey 1990). Intact San Joaquin Valley riparian forest has been reduced to <1% of its historical extent, primarily through the clearing of natural vegetation, irrigated cultivation, and the impoundment and channelization of rivers (Williams et al. 2008). Much of the remaining San Joaquin Valley riparian habitat is fragmented and regularly subjected to prolonged flooding, which limits the ability of riparian brush rabbits to occupy suitable habitat patches. In addition, riparian communities degraded by vegetation removal, fires, and invasive species are unlikely to support viable riparian brush rabbit populations due to modified cover, decreased forage availability, and increased predation pressure.

ii. Overexploitation

Hunting of riparian brush rabbits is prohibited by law; however, it is possible that riparian brush rabbits may be taken inadvertently on occasion by hunters pursuing desert cottontails. Riparian brush rabbits could also be taken by landowners attempting to control desert cottontails which damage crops and irrigation tubing. Finally, riparian brush rabbits can be killed or injured during handling related to research and captive propagation.

iii. Predation

Documented predators of brush rabbits include red-tailed hawk (*Buteo jamaicensis*), Cooper's hawk (*Accipiter cooperi*), barn owl (*Tyto alba*), great horned owl (*Bubo virginianus*), California scrub jay (*Aphelocoma californica*), bobcat (*Felis rufus*), coyote, raccoon (*Procyon lotor*), gray fox (*Urocyon cinereoargenteus*), striped skunk (*Mephitis mephitis*), mink (*Neovison vison*), long-tailed weasel, western rattlesnake (*Crotalus viridus*), and gopher snake (*Pituophis catenifer*) (Bryant 1918; Foster 1927; Hall 1927; Orr 1940; Sumner 1929 as summarized in Basey 1990). Non-native predators include black rats (*Rattus rattus*), feral cats, and feral dogs (Williams 1988; Patrick Kelly pers. comm. 8/28/2019).

iv. Competition

The only significant competitor with riparian brush rabbits for food resources are desert cottontails, which are sympatric (occur in the same areas) with riparian brush rabbits throughout most of the riparian brush rabbit's range (Basey 1990).

v. Disease

Riparian brush rabbits are subject to the common rabbit diseases that occur in California (Williams 1988), such as tularemia, plague, myxomatosis, silverwater virus, encephalitis, listeriosis, Q-fever, and brucellosis. In the captive riparian brush rabbit population, the most commonly implicated fatal disease was *Baylisascaris* spp. (a parasitic roundworm that infests the intestines and nervous system). Other diseases implicated in rabbit deaths were necrotizing typhlitis (inflammation and necrosis in the lower intestinal tract), and intestinal lymphoma (Williams 2008).

vi. Small Populations

The extant riparian brush rabbit subspecies population is small and exists in several small patches of suitable habitat isolated from each other. Small, isolated local populations are inherently vulnerable to extinction due to the loss of genetic variability, inbreeding depression, genetic drift, reduced genetic capacity to respond to changes in the environment, and demographic stochasticity (changes in age and sex ratios resulting in less than optimal breeding opportunities) from random variation in birth and death rates (Primack 1993; Reed and Frankham 2003). Additionally, the smaller the population size, the more likely it is that any of the threats acting on it alone or in combination will drive the population to extinction (Primack 2010).

vii. Flooding

Riparian brush rabbits, being dependent on riparian habitat, are vulnerable to flooding. In the last few decades, the lower San Joaquin River and South Delta have experienced major floods in 1995-1996, 1996-1997, 1998, 2005, 2006, 2011 and 2017. Because elevated land is extremely limited within the extant range of the riparian brush rabbit, floods result in numerous drownings. Rabbits that are able to climb vegetation above flood level or find refuge on levees

and other high ground are subjected to increased predation pressure and often starve due to limited forage (Williams and Basey 1986; Williams 1988; Basey 1990).

viii. Wildfire

Due to the extremely limited remaining amount of suitable riparian shrub and riparian forest habitat, wildfires occurring within the remaining habitat can cause direct mortality and easily destroy a large proportion of the remaining habitat (Williams and Basey 1986; Williams 1988; Basey 1990; Williams 1993).

ix. Invasive Species

Several known invasive plant species have been documented on the Refuge and likely occur elsewhere along the San Joaquin River and in the South Delta. These species include wisteria (*Wisteria* sp.), tree of heaven (*Ailanthus altissima*), giant reed (*Arundo donax*), pampas grass (*Cortaderia selloana*), tamarisk (*Tamarix* sp.), and edible fig (*Ficus carica*). Changes in the vegetative community imposed by invasive species may render habitat less suitable for riparian brush rabbits by reducing available forage and cover (USFW 2014).

x. Rodenticides

Riparian brush rabbits outside of the Refuge and Caswell Park may be exposed to rodenticides that can kill individuals and potentially limit range expansion.

xi. Recreation

Riparian brush rabbits, primarily within Caswell Park, likely experience disturbance due to the presence of recreating humans and may be impacted by land management practices such as campground clearing, fuel treatments, and trail maintenance that adversely modify habitat.

xii. Climate Change

Anthropogenic changes in climate will likely impact riparian brush rabbits chiefly through changes in the San Joaquin Basin hydrologic regime. Climate projections indicate the frequency and severity of flood events will increase in coming decades (Das et al. 2013). This factor is discussed further under section V.vii. Climate change is also likely to result in more frequent droughts and droughts of longer duration (He et al. 2018). Droughts could impact riparian brush rabbits by causing compositional and structural changes in the vegetative communities they rely upon and increasing the frequency and severity of wildfires (Westerling and Bryant 2006; Bedsworth et al. 2018). In addition, projected temperature increases could result in lethal heat stress (Hinds 1973).

B. Degree and Immediacy of Threats

i. Present or Threatened Modification or Destruction of Habitat

Riparian forest communities in the San Joaquin Valley have been reduced to <1% of their historical extent, primarily through the conversion of native communities to agricultural production and impoundment and channelization of streams and rivers (Williams et al. 2008). These changes were made possible by the construction of dams on tributary rivers (e.g. New Exchequer Dam on the Merced River [completed 1967], New Melones Dam on the Stanislaus River [completed 1978], and New Don Pedro Dam on the Tuolumne River [completed 1971]), which collectively reduced the frequency and severity of flooding in the San Joaquin Valley. The construction of reservoirs and flood control levees allowed farmers to clear, level, and cultivate San Joaquin Valley floodplains and adjacent shrublands (Williams and Basey 1986). Prior to large-scale land conversion, many valley riparian zones had uneven topography with adjacent shrub-covered uplands elevated above typical flood levels that provided refuge to riparian brush rabbits during flood events (Williams and Basey 1986). These elevated shrubland rabbit refuge areas no longer exist. High ground is now primarily limited to levee tops that provide little cover from predators and limited forage (Williams and Basey 1986).

The Refuge and Caswell Park population is not at risk of further habitat loss from agricultural, commercial, or residential conversion; however, the majority of the Refuge was cleared, leveled, and farmed prior to being acquired by the USFWS and therefore provides few elevated areas for rabbits outside of levees and constructed flood refugia (i.e. bunny mounds).

South Delta local populations are at risk of further habitat fragmentation and destruction as they occur largely on privately owned lands (Williams et al. 2008). Large-scale residential and commercial development projects have recently been approved in this area. The Mossdale Village, Central Lathrop, and River Islands at Lathrop Specific Plan Areas in the City of Lathrop allow for the development of approximately 3,035 ha (7,500 ac.) in the South Delta (City of Lathrop 2019), (Figure 2). The largest of these Specific Plans is the River Islands at Lathrop, roughly bounded by Interstate 5, the San Joaquin River, Old River, and Paradise Cut. The City of Lathrop is a signatory to the San Joaquin County Multi-Species Habitat Conservation and Open Space Plan, which requires the complete avoidance of occupied riparian brush rabbit habitat. However, development in this area near the juncture of several local South Delta populations further fragments already isolated remaining occupied habitat. Loss of habitat in this rapidly developing area also significantly impacts the conservation and recovery of the subspecies because local populations in this area are more flood-secure than populations elsewhere (see Figure 4). Although occupied habitat is protected under the Habitat Conservation Plan, local riparian brush rabbits will be subject to the impacts associated with nearby residential development (e.g. human trespass into occupied habitat, predation by domestic dogs and cats and non-native rats, nighttime lighting, and potentially more frequent fire ignitions resulting in habitat degradation and loss [Syphard et al. 2007; Kelly 2018]). Residential and commercial development in the area occupied by South Delta riparian brush rabbit populations effectively precludes future habitat restoration opportunities within the development footprint.

In the same general location, a major flood control project is under consideration. The Paradise Cut Flood Management Project is in the planning stages (Figure 3). This project would expand the flood zone west of Paradise Cut and install a 305 m (1,000 ft.) weir at the junction of Paradise Cut and the San Joaquin River to allow water managers to open the floodway during flood events. The project is projected to result in a 0.6 m (2 ft.) reduction in peak flood stage in the lower San Joaquin River (California Department of Water Resources 2017). This reduction in peak flood elevation may benefit riparian brush rabbit populations locally and upstream by increasing the area of dry refugia during floods and slightly shortening the duration of flood events. The project concept also includes the creation of 202 ha (500 ac.) of riparian scrub and wetland habitat which could provide some benefit to local riparian brush rabbit populations. However, the new habitat would be subject to periodic flooding and therefore is unlikely to contribute to recovery of the subspecies. The planned flood bypass area includes the locations where the majority of the breeding stock used in the captive propagation project were captured (Kim Forrest pers. comm. 9/20/2019).

Another less common but potentially significant source of habitat loss is from illegal marijuana grows. Illegal grows were found in riparian habitats at the captive propagation pens in San Joaquin County and have been found within the Refuge in the past (USFWS 2006; Kelly 2018). The degree of threat posed by this activity is unknown.

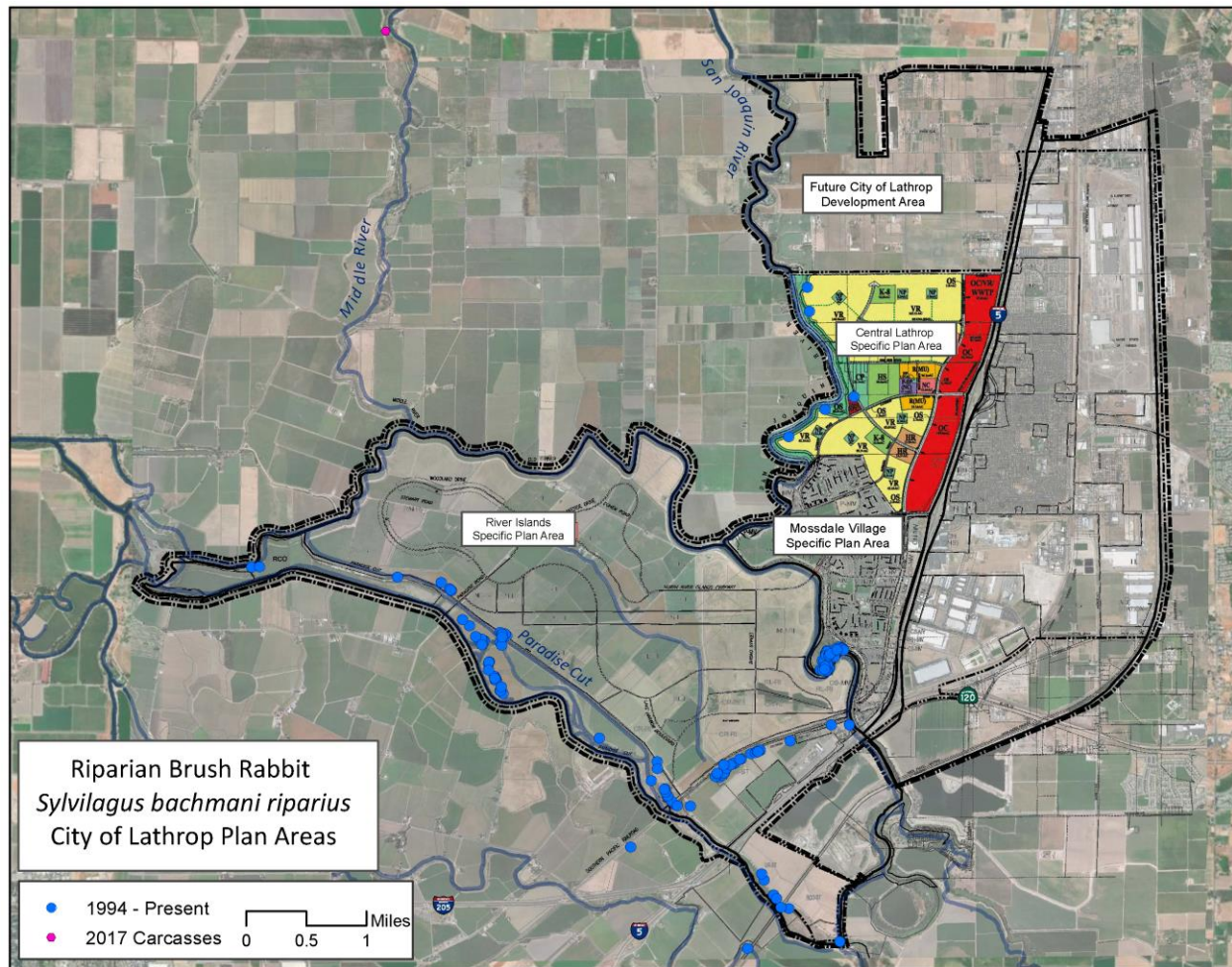


Figure 2. City of Lathrop planned development areas.

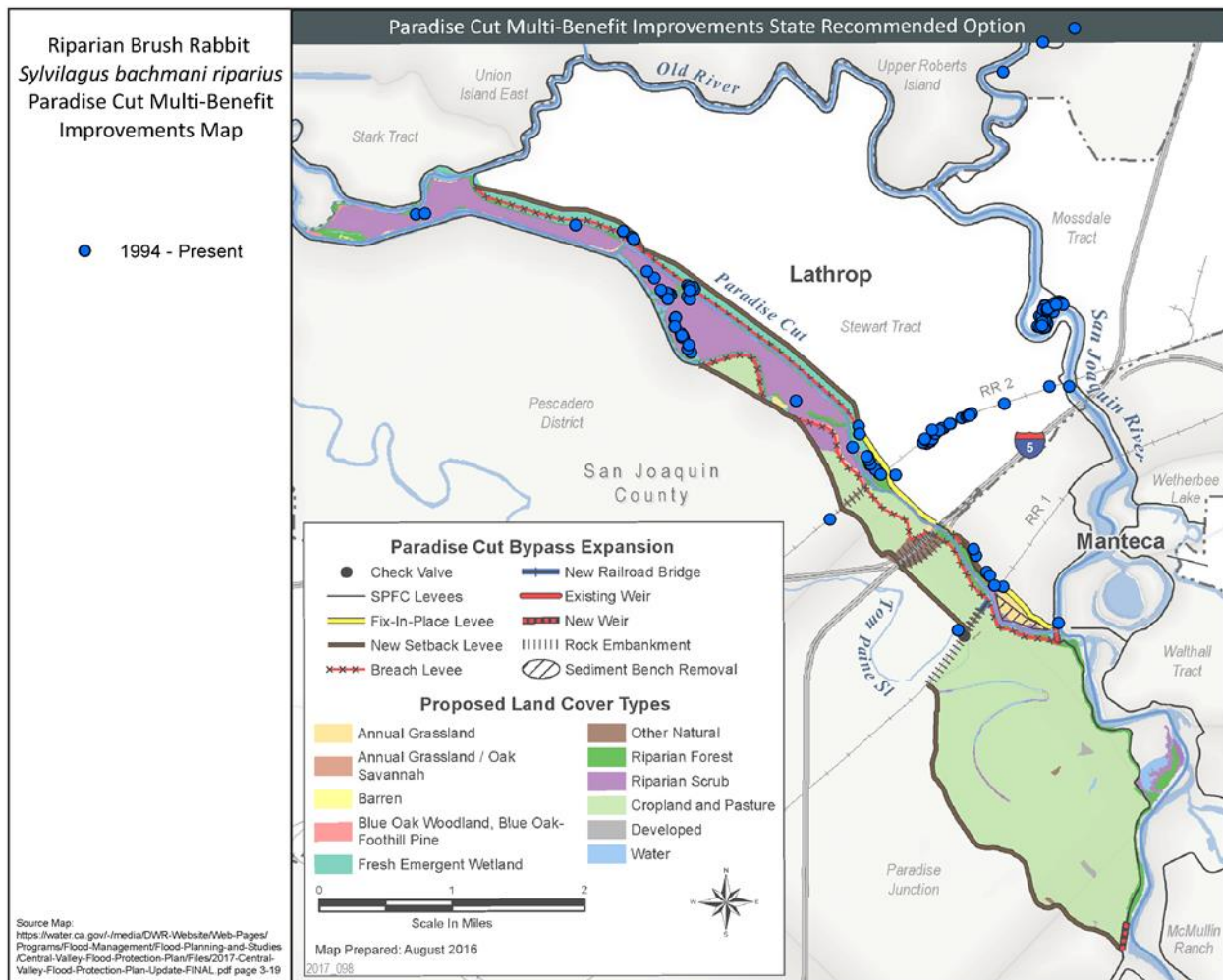


Figure 3. Proposed Paradise Cut Flood Management Project.

ii. Overexploitation

As a CESA-listed species, the hunting of riparian brush rabbits is prohibited (Fish and G. Code § 2080), and approximately half of the South Delta local population area lies within a rabbit hunting closed zone which was designated in 2002 to protect the known occurrences of riparian brush rabbits outside of Caswell Park as they were understood at that time (Cal. Code Regs. tit.14 § 308(d)). Additionally, all hunting is prohibited in Caswell Park, the 12 ha (30 ac.) Oxbow Preserve in Lathrop, and all rabbit hunting is prohibited on the Refuge. Nonetheless, it is possible that hunters occasionally mistakenly take endangered riparian brush rabbits when pursuing legally huntable rabbit species outside of areas closed to hunting. Since 2002, additional small local populations of riparian brush rabbits were discovered north and south of the closure zone in areas open to rabbit hunting. However, the Department Wildlife Officers who collectively patrol the entire occupied riparian brush rabbit range in San Joaquin and Stanislaus Counties reported they rarely observe rabbit hunting in the two counties, nor had they ever encountered hunters in pursuit of riparian brush rabbits (Warden Adam Cahn, Capt. Ryan Detrick, Warden Jeffrey Moran, Lt. Eric Vielhauer pers. comm. 6/17/2019).

Take of cottontail rabbits is known to occasionally occur in San Joaquin County to curtail the destruction of drip irrigation lines in vineyards (Capt. Eric Vielhauer, pers. comm. 6/17/2019). It is possible that endangered riparian brush rabbits could be mistakenly taken when landowners are controlling destructive cottontails. However, with the exception of the margins of vineyards adjacent to riparian habitat, riparian brush rabbits would be unlikely to venture into vineyards due to their lack of dense shrubby cover. Therefore, the accidental take of riparian brush rabbits is most likely minimal.

Researchers are required to report take of riparian brush rabbits to the Department as a condition of the Memoranda of Understanding to handle the subspecies. The Department was notified of several mortalities related to the captive propagation and translocation effort. Most of the reported mortalities resulted from trauma sustained in traps. A few animals also succumbed to radio-collar related trauma, and others from unknown trauma. Since the captive propagation and translocation effort concluded in 2013, no additional research-related take has been reported to the Department. Currently only two researchers are permitted by the Department to handle riparian brush rabbits, and no active research efforts are underway. At this time, overexploitation does not pose a significant threat to the subspecies population.

iii. Predation

Predation is the primary cause of mortality in many rabbit and hare species and was identified as the cause of most attributable mortalities in released captive-bred riparian brush rabbits on the Refuge (Williams et al. 2008; Hamilton 2010). Riparian brush rabbits are known to be preyed upon by a wide variety of avian, mammalian, and reptilian predators (see Predation section above). Predation in unaltered natural systems is unlikely to result in prey extinction (Krebs et al. 1995); however, when the prey species' environment is altered abruptly or systematically at a rate above normal background change (e.g. the dramatic reduction in San Joaquin Valley riparian forests), increased predation may drive populations to extinction (Sodhi et al. 2009).

Predation rates on riparian brush rabbits near Caswell Park are believed to be high due to the presence of feral cats and black rats. Black rats are thought to be significant predators of newborn rabbits in nests (Williams et al. 2002; Patrick Kelly pers. comm, 8/28/2019). The USFWS (2000) concluded that any predation on small, isolated riparian brush rabbit populations was a significant threat to the subspecies population.

Although little is known about local riparian brush rabbit populations in the South Delta, Williams et al. (2002) believed feral cats, long-tailed weasels, and coyotes were likely the most abundant predators in the area. Kelly et al. (2011) noted that predation risk in the South Delta was elevated in many areas due to adjacent residential properties supporting cats, rats, and dogs, as well as the existence of roads and waterways, which provide easy access to predators.

Predation throughout the occupied range is elevated during the frequent flood events that impact the San Joaquin Valley. When rabbits seek refuge from floodwaters in trees and on the limited areas of levee tops and constructed bunny mounds they are subject to extreme predation pressure because they are concentrated in small areas which often lack the dense

shrub, and tree cover that brush rabbits normally seek for protection from predators. Researchers and Refuge staff have observed coyotes swimming to flood refugia during flood events to prey on stranded rabbits (Eric Hopson pers. comm. 8/27/2019; Patrick Kelly pers. comm. 8/28/2019). Over the course of a prolonged flood event in 2017, Refuge staff monitored rabbits (a mix of desert cottontails and riparian brush rabbits) stranded on the upper portions of a 3.2 km (2 mi.) long levee. The monitored population declined from 487 rabbits observed in March to less than 100 in July when flood waters had receded enough to allow stranded rabbits to disperse. The dramatic population decline was most likely due to a combination of predation and starvation (Katherine Heffernan pers. comm. 6/4/2019).

Riparian brush rabbits face high predation rates from native predators as well as potentially significant additional predation pressure from introduced predators such as feral cats, dogs, and black rats that are supported by residential development (Williams 1988; Basey 1990; Kelly et al. 2011; Kelly 2018). Habitat fragmentation has likely created more favorable conditions for generalist predators such as coyotes to gain access to riparian brush rabbits. The limited availability of flood-safe habitat compounds predation pressure by concentrating rabbit populations in small areas that lack adequate cover during flood events. Predation significantly threatens the survival and recovery of the riparian brush rabbit subspecies population.

iv. Competition

Riparian brush rabbits are sympatric (co-occur) with desert cottontails throughout their range, except possibly within the mature riparian forests in the interior of Caswell Park (Basey 1990). Both species are found associated with riverside brush thickets and forage on the same types of plants (Ingles 1965); however, desert cottontails can also be found in a broad range of habitats far from rivers: dense grass, hedge rows, rock piles, and man-made structures (Basey 1990). Desert cottontails also move further from cover when foraging, have larger home ranges, and have greater fecundity than riparian brush rabbits (Dixon et al. 1981; Chapman et al. 1982). Interestingly, a lower proportion of desert cottontails appear to survive long-term stranding on small patches of dry land during major flood events compared to riparian brush rabbits (Kim Forrest pers. comm. 9/20/2019). However, due to their use of a wider range of habitats, longer movements, and greater fecundity, desert cottontails are more able to survive when displaced from riparian habitat by floods and fires, and are able to rapidly recolonize recently flooded or burned habitat (Basey 1990). In the altered and fragmented riparian habitat remaining in the San Joaquin Valley and Delta, competition from desert cottontails may pose a significant challenge to the persistence of riparian brush rabbits (Williams and Basey 1986; Basey 1990).

v. Disease

Brush rabbits are subject to common rabbit diseases in California (Williams 1988), such as tularemia, plague, myxomatosis, silverwater virus, encephalitis, listeriosis, Q-fever, and brucellosis; some of which can reach epidemic proportions (Chapman 1974, Williams 1988, Williams et al. 2002). Of these, the bacterial disease tularemia has the greatest potential to negatively impact riparian brush rabbits at the population level. Tularemia has been implicated in population regulation of the closely related eastern cottontail (*S. floridanus*) and is known to

be endemic in brush rabbit populations (Woolf et al. 1993; Williams et al. 2002). Although tularemia is typically enzootic in rabbit populations (i.e. present, but effecting only a small proportion of the population at a given time), it occasionally becomes epizootic (rapidly spreads through a population in an outbreak) and can cause drastic die offs in rabbit populations (Woolf et al. 1993). Tularemia is frequently fatal, and it is thought to be the most frequent cause of cottontail mortality with the exception of predation. Isolated populations are at greater risk of severe population declines from tularemia epizootics than large contiguous populations (Woolf et al. 1993). Tularemia is transmitted through contact with infected tissue, ingestion of aerosolized particles, and contact with infected soil or water. It can infect most vertebrate species. Riparian brush rabbits could easily be exposed to the bacterium through contact with infected desert cottontails or other sympatric species (USFWS 2000). It is of additional concern because it is a known zoonotic (transmissible to humans), (Williams et al. 2002).

Myxomatosis is a mildly pathogenic viral disease which is endemic in California brush rabbit populations and is known to have become epizootic in California brush rabbits from the San Francisco Bay to Baja California, Mexico in the 1960s. More than 95% of a brush rabbit population in southern California was found to be infected by the virus, although mortality rates were low (Regnery and Miller 1971).

In the captive riparian brush rabbit population, the most commonly implicated fatal disease was *Baylisascaris* spp. infection (a parasitic roundworm which infests the intestines and nervous system). *Baylisascaris* spp. roundworms are spread through eggs in the feces of infected raccoons and skunks and ingested by rabbits (and other vertebrate hosts, including humans). Once ingested, eggs hatch and some larvae migrate to the host's central nervous system and cause debilitation and death (Gavin et al. 2005). Other diseases implicated in rabbit deaths were necrotizing typhlitis (inflammation and necrosis in the lower intestinal tract), and intestinal lymphoma (Williams 2008). The captive propagation and reintroduction program did not identify infectious disease problems in the source population, captive rabbits, or reintroduced riparian brush rabbits as a significant source of mortality (Gilardi et al. 2004). However, if exposure to infected desert cottontails or other species were to result in tularemia epidemics in the small, isolated, riparian brush rabbit populations, rapid extirpations (local extinctions) could occur (Williams 1988).

vi. Small Populations

No recent estimates of the riparian brush rabbit subspecies population exist. However, the population size is undoubtedly so small that genetic and environmental factors present significant threats to its viability. As recently as 1993, the total population was estimated at 241 animals, although at that time only the Caswell Park population was known (Constable et al. 2011). Since then, additional small local populations have been discovered in the South Delta and over 1,500 riparian brush rabbits were released over a period of 11 years on the Refuge; however, their fates and the fates of their offspring are largely unknown and there have been significant flood events since their release (Kelly 2018). Likely no more than a few thousand riparian brush rabbits exist today in fragmented populations that remain vulnerable to periodic crashes during flood events (Constable 2011).

Random fluctuations pose risk to small populations due to demographic stochasticity (random variation in sex ratios, reproductive output, and survival amongst individuals from year to year). In small populations, this variation can cause the population size to fluctuate randomly up or down (Primack 1993). The smaller the population size, the more pronounced the effect. Once a population size drops, its next generation is even more susceptible to further stochasticity and random inequalities in the sex ratio, resulting in fewer mating opportunities and a declining birth rate (Primack 1993). Due to their small population sizes (particularly following flood events), riparian brush rabbits are likely vulnerable to these effects.

Unpredictable changes in the natural environment and biological communities can cause the size of small populations to vary dramatically, whereas larger, more widely distributed populations remain more stable because such changes normally effect only a small proportion of the population (Primack 1993). For example, unpredictable local changes in a species' food resources or predator populations, climate, vegetative community, or disease and parasite exposure can cause the size of a small, isolated population to fluctuate wildly, and possibly lead to extinction (Primack 1993). Additionally, natural disasters such as droughts, fires, and floods can lead to dramatic population changes if the population is small and localized such that the disaster impacts all or most of the individuals.

The loss of genetic diversity inherent to small, isolated populations can be expected to increase their risk of extinction as small, inbred populations have reduced genetic capacity to adapt to changing environments (Frankham 2005). In populations with a limited breeding pool, genetic drift (the variation in the relative frequency of different alleles in the population due to the chance disappearance of particular alleles from inbreeding and lack of immigrants) becomes likely (Hedrick and Kalinowski 2000). In large populations, maladaptive genes do not accumulate in the population since random mate pairings are frequent and less fit offspring survive and reproduce less frequently through natural selection. However, in small, isolated populations natural selection can have less of an effect on the population genotype than genetic drift. When this happens, deleterious alleles can become fixed in the population, resulting in inbreeding depression (decreased reproductive fitness in all individuals), and potentially negative population growth (Hedrick and Kalinowski 2000; Frankham 2005).

The loss of genetic diversity and the accumulation of deleterious alleles can largely be mitigated by the exchange of breeding individuals between population centers (Primack 1993). When individuals disperse from their natal population to new population areas, the novel alleles they introduce can balance the effects of genetic drift and inbreeding depression. As few as one migrant per generation in a population of 120 individuals can negate the effects of genetic drift (Primack 2010). Consequently, habitat fragmentation can seriously increase the genetic risks to isolated local populations, and habitat connectivity between local populations can substantially mitigate these risks.

Two studies of microsatellite DNA markers concluded that the South Delta local riparian brush rabbit population is genetically distinct from the Caswell Park local population. The studies found greater genetic diversity in the South Delta population, likely due to recent genetic bottlenecks (severe population crashes) in the Caswell population (Williams et al. 2002;

Constable et al. 2011). More recent mitochondrial DNA sequencing, microsatellite analysis, and single nucleotide polymorphism analysis by Matocq et al. (2017) further elucidated genetic relationships between riparian brush rabbit local populations. This analysis confirmed significant genetic structure (differences in allele frequencies between populations) between the Caswell Park local population and the South Delta local population. The genetic differentiation between populations was found to be significant, only slightly less than that found between the riparian brush rabbit and *S. bachmani macrorhinus*, a subspecies of the California Coast Range. This indicates geographic distance and barriers to rabbit movement between Caswell Park and the South Delta have likely limited contemporary gene flow between the two local population groups (Matocq et al. 2017). It appears the isolated populations differentiated through the effects of genetic drift (Rippert 2017). Within the South Delta populations, Matocq et al. (2017) also detected genetic differentiation between rabbits on the west side of the Delta along Paradise Cut and rabbits to the east near Mossdale, suggesting discontinuous habitat between the two areas.

The genetic composition of the introduced riparian brush rabbit population on the Refuge is intermediate to the South Delta and Caswell Park local populations, indicating gene flow between the Refuge rabbits of South Delta parentage and the native rabbits of Caswell or other undocumented local native populations (Matocq et al. 2017; Rippert 2017). This genetic exchange, facilitated by restored habitat connections, suggests continued recovery and restoration efforts are likely the best option for management and recovery of this subspecies. (Rippert 2017).

A variety of threats inherent to small populations may threaten riparian brush rabbits. Environmental and genetic effects can work in concert to amplify other threats. As populations get smaller, they become more vulnerable to demographic variation, environmental variations, genetic drift, and inbreeding depression. Each of these effects can amplify the impact of the other effects, further reducing population size and accelerating the species towards extinction in what has been termed an extinction vortex (Primack 1993).

vii. Flooding

The entire riparian brush rabbit subspecies population is at risk of periodic flood events, with nearly all known occurrences within a projected 100-year flood zone mapped by the Federal Emergency Management Agency in its National Flood Hazard Layer (Figure 4).

The San Joaquin River and its tributary rivers are regulated by a series of flood control and irrigation storage dams that prevent flooding in typical water years. Occasionally however, atmospheric river rainfall events or periods of rapid snowmelt (often in combination) overwhelm the system and reservoir operators must release flood-level flows resulting in prolonged flood events (Phillip Williams and Associates 2001). Floods have occurred on the lower San Joaquin River in 1950-51, 1952, 1955-56, 1962-63, 1976, 1982-83, 1985-86, 1995, 1996-1997, 1998, 2005, 2006, 2011, and 2017 (Williams 1988; Hamilton 2010; Kelly 2018).

Climate projections indicate flooding will become more frequent and more severe with warming temperatures. The frequency of extreme precipitation atmospheric river events is projected to

increase nearly three-fold and the amount of precipitation delivered during extreme storm events projected to increase by 15%-39% by the end of the century (Warner et al. 2014).

Das et al. (2013) evaluated an ensemble of 16 global climate models under two future emissions scenarios and found an increased flood risk in central Sierra Nevada rivers (e.g. Stanislaus, Tuolumne, and Merced Rivers, which are tributary to the lower San Joaquin River and Delta) in a large majority of the projections. The projected increases in flood intensity and frequency are attributed to stronger storm intensities and warmer temperatures resulting in more precipitation falling as rain, which runs off rapidly, rather than snow which accumulates and melts gradually.

In the San Joaquin River watershed, the magnitude of 50-year peak flow flood events is projected to increase by 50-100% to levels that exceed current flood infrastructure design standards (Das et al. 2013). These changes in flow magnitude are projected to progressively increase through the next century with significant increases realized by 2025-2035. These changes will challenge California's reservoir managers who strive to balance flood control with irrigation storage, likely resulting in more frequent and intense flood flows released to the lower San Joaquin River (Das et al. 2013).

Floods can drown riparian brush rabbits, concentrate rabbits in small areas above floodwaters, such as levee tops and man-made bunny mounds where they are vulnerable to predators and starvation for several months until floodwaters recede. Floods can also damage riparian habitat by scouring vegetative cover and forage plants, and killing vegetation intolerant of prolonged inundation such as coyote bush (*Baccharis pilularis*), blue elderberry, wild rose, and California blackberry (Singleton et al. 2007). Post-flood surveys conducted in Caswell Park and the Refuge indicate high levels of brush rabbit mortality occur during floods. A flood event in the spring of 2006 inundated much of the Refuge under 1-3 m (3.3-9.8 ft.) of water for up to 17 weeks, resulting in the deaths of 91% of radio-collared rabbits (Lloyd et al. 2011). Regular flood events along the San Joaquin River have resulted in repeated drastic population declines. For example, in 1976 the Caswell Park population was reported to number less than 20 individuals following that year's flood event (CDFG 1993), and after the next severe flood in the winter of 1985-1986, Williams (1988) estimated only 6 to 31 individuals remained.

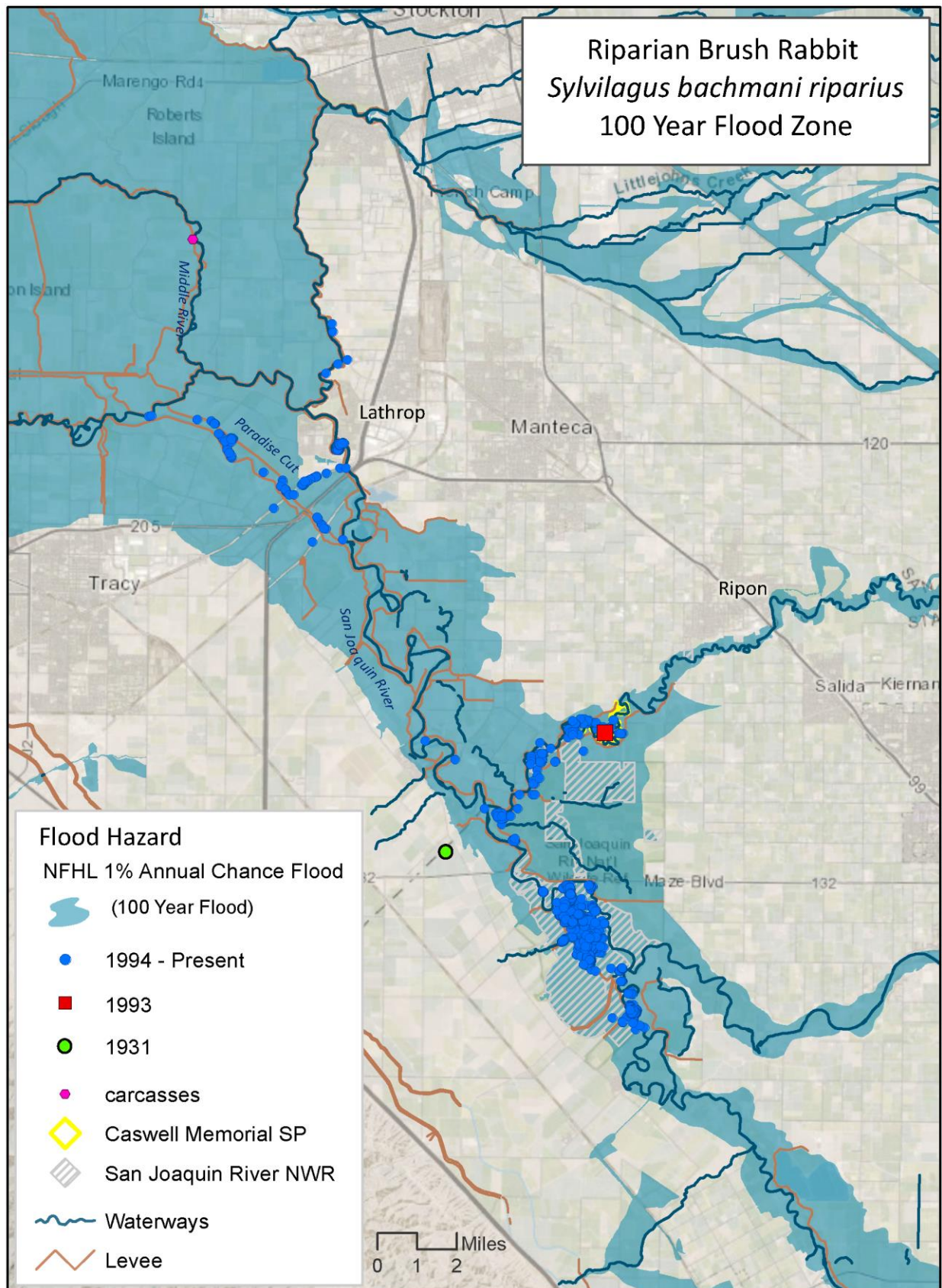


Figure 4. Federal Emergency Management Agency 100-year flood hazard zone.

Following the catastrophic flood of 2006, Refuge staff constructed several earthen mounds (bunny mounds) and planted the mounds and the tops of levees with riparian shrub and tree species to create flood refugia for riparian brush rabbits (Lloyd et al. 2011) (Figure 5). During a subsequent flood of similar magnitude in 2011 riparian brush rabbits were observed using the bunny mounds and vegetated levees. Approximately 50% of brush rabbits appeared to survive the event, suggesting the additional high elevation habitat was beneficial (Kelly and Holt 2011). However, bunny mounds and levees alone do not provide enough forage and cover from predators to support high numbers of riparian brush rabbits through prolonged flood events. Refuge staff and researchers have repeatedly resorted to rescuing individual stranded rabbits by boat and feeding stranded rabbits to keep them alive through flood events (Eric Hopson pers. comm. 8/27/2019; Patrick Kelly pers. comm. 8/28/2019). Riparian brush rabbit managers and researchers do not believe bunny mound and levee refugia alone are adequate to ensure the long-term persistence of the subspecies on the Refuge. Much larger patches of high elevation flood refugia with adequate cover and food resources to sustain a substantial number of rabbits through prolonged flood events are needed (Eric Hopson pers. comm. 8/27/2019; Patrick Kelly pers. comm. 8/28/2019; K. Forrest pers. comm. 9/20/2019).

Little is known about the impact of flooding on riparian brush rabbits in the South Delta. While much of the remaining riparian habitat along levees and river channels is periodically inundated, limited areas of occupied habitat along railroad rights of way generally remain above floodwaters (P. Kelly pers. comm. 8/28/2019). As continuing residential development and flood control infrastructure development further isolate and restrict access to flood refugia in the face of projected flood events of greater magnitude and frequency, flooding will likely pose a serious threat to the South Delta local populations in the coming decades.

Recovery of the riparian brush rabbit will require several self-sustaining viable populations to exist in flood-secure areas. These areas must provide high quality refuge during flood events, including adequate forage to sustain stranded rabbits for several months at a time, as well as adequate cover from predators. Flood refuge areas must be secure from flood events which are projected to increase in magnitude and duration compared to the current flood regime. Until such conditions exist, the subspecies population will likely continue to repeatedly crash during catastrophic flood events, slowly rebuild, and crash again during the next flood. Following population crashes, the risk of extirpation from all threats is elevated. The riparian brush rabbit subspecies population, as distributed today, remains at risk of extinction from a single catastrophic flood event.

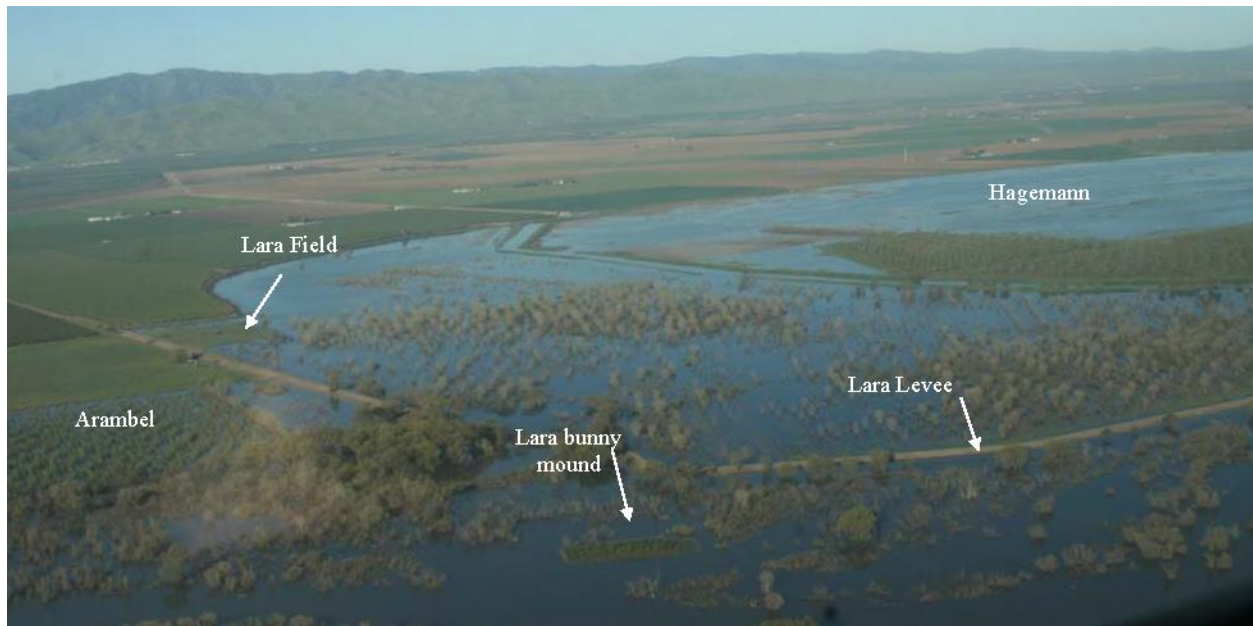


Figure 5. Portion of the San Joaquin River National Wildlife Refuge during 2011 flood showing bunny mound and levee refugia.

viii. Wildfire

Wildfires pose a serious threat to the riparian brush rabbit subspecies population through both direct mortality and through the destruction and modification of brush rabbit habitat (Williams 1988, Kelly 2018). Apart from the Refuge, remaining habitat patches are small and isolated, exposing riparian brush rabbits fleeing from fires to great risk of predation and starvation.

Wildfires occur regularly within the range of riparian brush rabbits. Prior owners of lands now part of the Refuge reported regular occurrence of wildfires, with approximately one fire every ten years (USFWS 2006). Between 1975 and 1987, ten small wildfires were reported within Caswell Park (Williams 1988). Recent large fires on the Refuge included the 607 ha (1,500 ac.) Pelican Fire in 2004 which burned approximately 58% of the Refuge, including 300 ac. of highly suitable riparian brush rabbit habitat; and the 235 ha (580 ac.) River Fire in 2008 (Phillips et al. 2005, Kelly 2018) (Figure 6). The area burned by wildfires, the number of large fires, and the length of the wildfire season have all increased in the western U.S. over the last half century. These changes were largely attributable to anthropogenic climate change (Abatzoglou and Williams 2016). These trends are expected to continue in the coming decades and wildfire is likely to frequently impact riparian brush rabbit populations.

Wildfires appear to result in limited rabbit injuries and deaths. Hamilton et al. (2010) found only three fire-related mortalities and few injured rabbits following the 2004 Pelican fire. The home range size of riparian brush rabbits under study by Hamilton et al. (2010) did not change significantly following the fire, although it should be noted that only 34% of the dense riparian habitat in the study area burned. In the year following the Pelican Fire, Kelt et al. (2014) noted high mortality rates near the burned area, although they could not identify a fire-related cause. An increase in high-severity wildfires would likely result in a far greater impact on surviving

rabbits due to removal of cover and forage which would expose them to increased predation and starvation. Long-term fire-related impacts on riparian brush rabbit habitat vary.

Woody plants burned in the Pelican Fire resprouted the following growing season and within a few years many areas had largely returned to structural and species composition conditions similar to what existed before the fire (River Partners 2006). Spring monitoring following a 2008 wildfire found basal sprouting from burned willows and shrubs as well as low levels of valley oak mortality, although treetops and shrubs had significantly died back (River Partners 2009).

To reduce wildfire threat, land managers attempt to reduce fuel loads through vegetation management. Unfortunately, areas of dense vegetation most vulnerable to fire are particularly important habitat for brush rabbits (Williams 1988). For example, much of Caswell Park is overgrown with decadent shrubs and forest floors contain large quantities of woody litter, creating a dangerous fuel load and increasing the likelihood of high severity wildfires (Williams 1988). When Park managers cleared brush and litter to reduce fire threat, riparian brush rabbits ceased use of the cleared areas (Williams 1988). Despite such fire prevention efforts, a dense understory of shrubs, a layered tree canopy and accumulated leaf litter remains in much of the Park, putting it at risk of catastrophic wildfire. The surrounding intensively farmed row crops offer little cover for escaping rabbits in the event of a large fire.

The threat of a large, catastrophic wildfire on the Refuge is partially attenuated by the presence of Refuge firefighting staff, the support of mutual aid firefighting agencies, and the presence of fuel breaks (Kelly 2018). Restored suitable habitat patches on the Refuge are generally larger and better connected with other areas of suitable habitat compared to the remaining habitat patches in the South Delta and Caswell Park. This connectivity on the Refuge should allow rabbits fleeing fires access to suitable cover and increase survival rates.

The fragmented nature of the remaining habitat in the South Delta makes it unlikely that a single large wildfire would impact the entire local riparian brush rabbit population. However, this habitat fragmentation also reduces the likelihood that rabbits displaced by a local fire would survive for long in surrounding agricultural and urban landscapes. Additionally, the close proximity of most remaining patches of habitat in the South Delta to roads, railways, canals, and residential areas increases the probability of human-caused wildfire ignitions (Syphard et al. 2007; Balch et al. 2017).

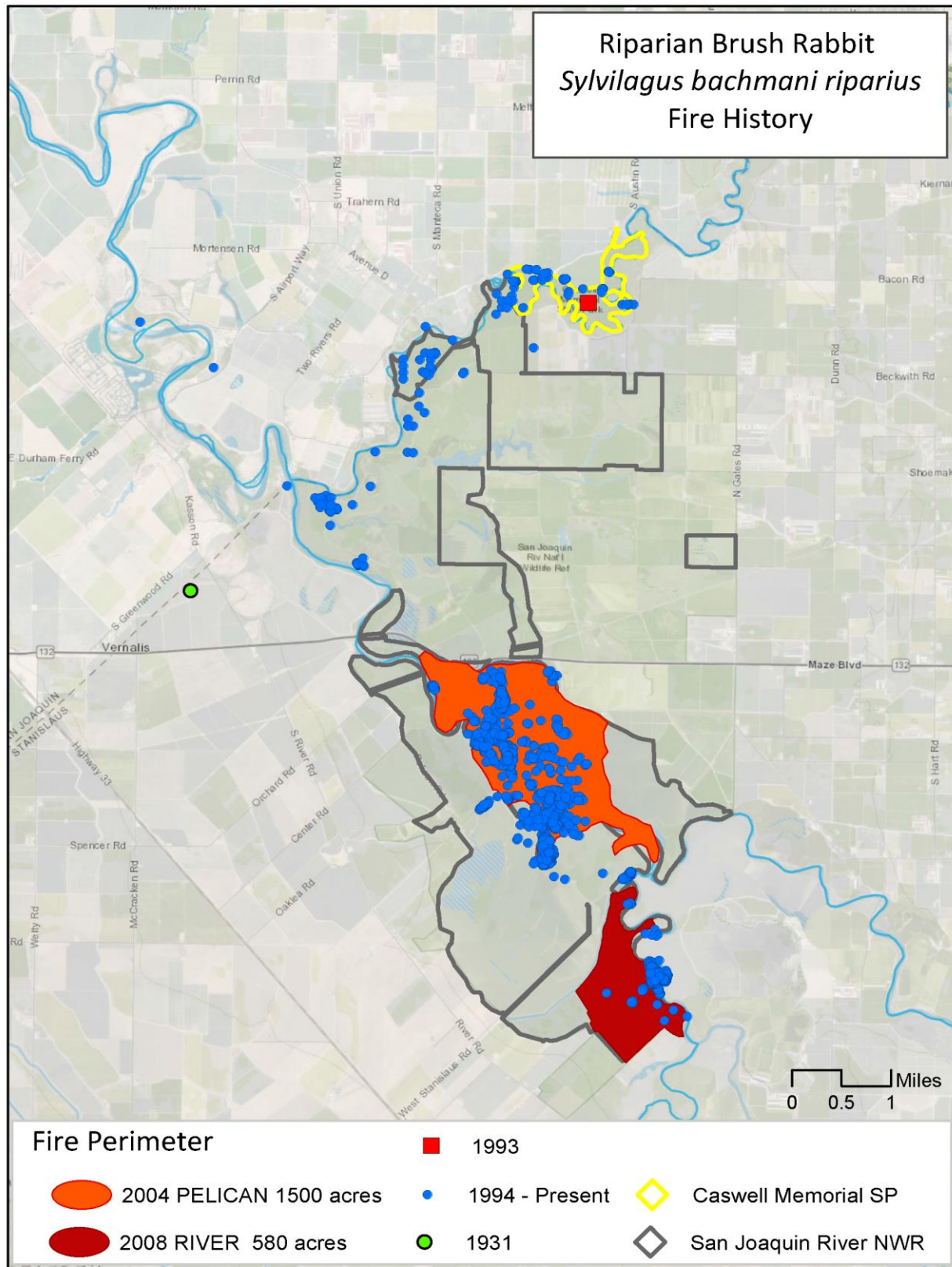


Figure 6. Areas burned in recent fires on the San Joaquin River National Wildlife Refuge.

ix. Invasive Species

The degree to which introduction of non-native and invasive plant and animal species in altered vegetation communities impacts the riparian brush rabbit populations is unknown. It is likely invasive species will continue to increase in abundance over time and impact native fauna to a greater degree (USFWS 2013). The degree to which invasive plant species can be utilized as cover and forage is unknown, although riparian brush rabbits are commonly found in Himalayan blackberry cover (*Rubus armeniensis*). The impact of invasive mammalian predators is discussed under Predation above.

x. Rodenticides

Anticoagulant rodenticides such as brodifacoum, bromodiolone, chlorophacinone, diphacinone, and warfarin are highly toxic to mammals. Second-generation anticoagulant rodenticides such as brodifacoum and bromodiolone, which were introduced when rodents developed resistance to first-generation compounds in the 1970s, are particularly deadly (Gabriel et al. 2012, 2013; Thompson et al. 2014). First-generation compounds generally require several doses to cause intoxication, while second-generation anticoagulant rodenticides, which are more acutely toxic, often require only a single dose to cause intoxication or death and persist in tissues and in the environment (Gabriel et al. 2012). In the San Joaquin Valley and Delta, rodenticides are used to protect crops from California ground squirrels (*Otospermophilus beecheyi*) and other rodents and to prevent burrowing mammals from damaging levees and other water conveyance structures (Polo. Morelo pers. comm. 9/30/2019). Highly toxic rodenticide use is also commonly associated with illegal cannabis cultivation sites. Illegal cultivation sites have been found on the Refuge and at the riparian brush rabbit captive propagation breeding pens in San Joaquin County (USFWS 2006, Kelly 2018).

At one time, Caswell Park used broadcast rodenticides within the Park to control California ground squirrels (Basey 1990) and rodenticides were regularly used along the river levee north of the Park (Williams 1988). The Park no longer uses rodenticides to control ground squirrels. Similarly, the San Joaquin River National Wildlife Refuge utilizes integrated pest management to minimize pesticide use on Refuge lands so that exposure to rodenticides on Park and Refuge lands is not likely to pose a threat to riparian brush rabbits (USFWS 2000, USFWS 2006). However, riparian brush rabbits outside of these areas and individuals that disperse outside of the Park and Refuge remain threatened by rodenticide use (USFWS 2000).

The U.S. Environmental Protection Agency and the California EPA Department of Pesticide Regulation have cooperatively developed Pesticide Use Interim-Measures Bulletins to reduce the impact of pesticide use on listed species. These bulletins are supplemental pesticide labels which specify additional use limitations in and near listed species habitats in certain geographic areas (Polo Moreno pers. comm. 9/30/2019). One such limitation designed to provide protection for riparian brush rabbits specifies that a ≥ 15.2 m (50 ft.) cleared area must exist between the edge of dense riparian vegetation and the application of pelletized rodent bait. Alternatively, a T-shaped tube feeder must be used to dispense bait and be capped at night. Compliance with the bulletins is largely voluntary, although some county Agricultural Commissioners do incorporate

the protective measures into applicator permits making the provisions enforceable. Additionally, the US EPA has added endangered species considerations to certain rodenticides labels (e.g. chlorophacinone treated grain and diphacinone treated grain) which directs applicators to follow the relevant bulletins and allows Agricultural Commissioners to enforce the bulletin conditions. However, the labels of many common rodenticides do not yet reference endangered species considerations (e.g. zinc phosphide and wax block). Additionally, as the Pesticide Use Interim-Measures Bulletins for riparian brush rabbits only apply near dense riparian vegetation, they may not provide adequate protection for riparian brush rabbits occupying isolated blackberry-patches or riparian vegetation not deemed “dense” by applicators.

The number of riparian brush rabbits killed by rodenticides is unknown, but exposure to rodenticides may be a significant threat to riparian brush rabbits outside of Caswell Park and the Refuge. Rodenticides may prevent riparian brush rabbits from dispersing out of protected areas and limit the subspecies’ capacity to expand its range.

xi. Recreation

Information on the effects of recreational activities on riparian brush rabbits is mixed. Orr (1940) observed that brush rabbits ceased foraging for an average of 6 minutes following disturbance from humans which suggests repeated human disturbance may adversely affect riparian brush rabbits. Kelly (2018) noted that camping and day use activities in Caswell Park negatively impacted the local brush rabbit population. Conversely, Williams (1988) observed that riparian brush rabbits were common in campground areas and trailside thickets following a flood. However, it should be noted that Williams’ observations were made when park visitors were not likely to be present. The seasonal presence of recreating humans likely renders some portions of the Park temporarily unusable for rabbits. Outside of the Park, impacts to rabbits from recreation are likely negligible.

xii. Climate Change

Climate change is expected to impact riparian brush rabbits significantly through changes in flood frequency and magnitude due to changing precipitation patterns (see Flooding section above) and more frequent wildfires (see Wildfire section above). Climate change will likely impact riparian brush rabbit populations through other pathways as well, including drought, sea level rise, and acute heat stress.

Droughts in California have become increasingly extreme in recent years and are projected to become more frequent (Bedsworth et al. 2018; He et al. 2018). Although little is known about the impact of droughts on riparian brush rabbits, droughts could result in significantly reduced growth of the plant species riparian brush rabbits forage on, and prolonged droughts could result in substantial mortality in the shrub and tree species rabbits rely on for cover and food. Thorne et al. (2016) modeled a 15-24% reduction in the area that is currently climatically suitable for Central Valley riparian forest tree species by the end of the century under two future climate models using two future emissions scenarios, in part due to decreases in precipitation. Limited riparian brush rabbit population data from Caswell Park indicate a seven-year drought in the late 1980s and early 1990s did not negatively impact the local riparian brush rabbit

population (Williams 1993; Williams et al. 2000). This suggests the subspecies has some capacity to weather droughts within the normal range of historical variation, but the subspecies' ability to survive the projected unprecedented droughts of the future is unknown.

Mean sea levels in the San Francisco Bay are projected to rise 0.30-0.45 m (0.98-1.48 ft.) by year 2050, and 0.90-1.40 m (2.95-4.59 ft) by year 2100 from year 2000 levels (Cayan et al. 2012). As mean sea levels rise, the probability of flooding in the South Delta and lower San Joaquin River system increases when high tides and wet winter storms combine. By 2050, Delta levees may fail to meet the federal levee height standard of 0.46 m (1.5 ft.) freeboard above 100-year flood levels, and widespread flooding could occur in the South Delta and lower San Joaquin River (Bedsworth et al. 2018).

The mean annual maximum temperature in the San Joaquin Valley is projected to increase by 2.0-3.0°C (3.6-5.4°F) over the 1951-2013 mean by year 2050, and by 2.3-4.6°C (4.1-8.3°F) by the end of the century (He et al. 2018). No information exists regarding the riparian brush rabbit's ability to tolerate high temperatures, but the closely related desert cottontail becomes hyperthermic at temperatures above 30°C (86°F) and body temperatures begin to rise in relation to ambient temperatures. When body temperatures approach 45°C (113°F) desert cottontails die (Hinds 1973). Temperatures in the San Joaquin Valley have historically exceeded a heat index (a measure of how heat feels to organisms based on temperature and humidity) of 40.6° C (105° F) three days per year on average (calculated from Fresno, CA data). Projections indicate a heat index of 40.6° C will be exceeded an average of 59 days per year by the end of the century if no further action is taken to slow anthropogenic warming. Furthermore, conditions hotter than historically preceded (roughly equivalent to a heat index >58.3°C [137°F]) will be reached as many as 10 days per year in the northern San Joaquin Valley (Dahl et al. 2019). Such conditions would likely result in substantial brush rabbit mortality and possibly threaten the subspecies.

VI. MANAGEMENT AND RECOVERY

A. Impact of Existing Management Efforts

i. Captive Propagation

The Recovery Plan for the riparian brush rabbit set a goal of maintaining or establishing three self-sustaining, wild populations outside of Caswell Park within the historical range of the species (USFWS 1998). In 2001, a captive propagation and reintroduction program was initiated. This program was largely run by the Endangered Species Recovery Program of California State University Stanislaus in partnership with the USFWS, U.S. Bureau of Reclamation, California Department of Fish and Wildlife, California Department of Water Resources, California Department of Parks and Recreation, U.C. Davis Wildlife Health Center and Veterinary Medical Teaching Hospital, Sacramento Zoo, Center for Natural Lands Management, and River Partners with cooperation from private landowners in the South Delta who provided access for trapping breeding stock (Williams et al. 2002; Kelly 2018).

The program captured riparian brush rabbits in the South Delta, held them temporarily in outdoor breeding pens, and released their offspring into newly restored riparian habitat on the Refuge once they reached weights $\geq 400\text{g}$ and were screened by veterinarians (Kelly 2018). Releases began in 2002 and continued through 2013. During the initial five years of releases rabbits were fitted with radio collars, and information on dispersal, habitat use, and survivorship was collected. Rabbits were released into newly acquired Refuge lands and easements along the San Joaquin and Stanislaus Rivers which are contiguous with Caswell Park – connecting the Refuge population to the existing Park population. Over the course of the propagation program 1,496 riparian brush rabbits were released on Refuge lands (Kelly 2018). The riparian brush rabbit subspecies population has likely been dramatically augmented by this effort, although no quantitative monitoring has occurred to estimate the size of re-established populations since the captive propagation project was suspended in 2013 (Eric Hopson pers. comm. 8/27/2019, Patrick Kelly pers. comm. 8/28/2019). The increase in riparian brush rabbit distribution and abundance resulting from the captive propagation effort has increased the probability of more individuals surviving future flood events and other threats to breed and begin rebuilding populations. However, as noted above, essentially all of the current riparian brush rabbit range remains at risk of catastrophic flooding.

ii. San Joaquin River National Wildlife Refuge

The San Joaquin River National Wildlife Refuge was established 1987 to protect Aleutian Canada geese wintering on pastures and wetlands in north-central Stanislaus County (USFWS 2014). At the time, riparian brush rabbits were only known from the nearby Caswell Park. Beginning in 2002, captive-bred riparian brush rabbits were released on the Refuge as part of a comprehensive captive propagation program. The program continued through 2013 with a total of 1,496 riparian brush rabbits released. Today the Refuge has grown to approximately 4,047 ha. (10,000 ac.) of fee title and conservation easement land and it contains the largest extant local riparian brush rabbit population. Management for the recovery of the subspecies is now one of the Refuge's main objectives (USFWS 2014; Eric Hopson pers. comm. 8/27/2019).

Much of the Refuge is former farmland and dairy land which was converted from native land as early as the 1920s (Griggs 2012). In areas with suitable soils and hydrology, 1,093 ha (2,700 ac.) of Refuge land have been restored to riparian vegetation through the planting of native Fremont cottonwood (*Populus fremontii*), arroyo willow (*Salix lasiolepus*), black willow (*Salix nigra*), blue elderberry, coyote bush, Oregon ash (*Fraxinus latifolia*), and valley oak trees and by planting forbs and shrubs to establish an understory of mugwort, gumplant, and wild rye (*Elymus* sp.) (Griggs 2012). Within a few years of establishment, restored areas could support riparian brush rabbits. Along with riparian restoration, 34 flood refuge bunny mounds elevated approximately ten feet above the surrounding land were constructed on the Refuge. These refugia were planted with native tree and shrub species to provide food and cover to rabbits stranded by flood events (Griggs 2012, Kelly 2018).

The Refuge encompasses 324 ha. (800 ac.) of native riparian brush rabbit habitat and an additional 1,093 ha (2,700 ac.) of restored riparian forest at various stages of maturity. River Partners currently owns an additional 850 ha. (2,100 ac.) of riparian land at various states of restoration near the Tuolumne River – San Joaquin River confluence with the intent of annexing the land to the Refuge (Eric Hopson pers. comm. 8/27/2019). The USFWS was recently authorized to expand the Refuge by an additional 4,346 ha. (10,738 ac.) including approximately 3,440 ha (8,500 ac.) of additional riparian habitat (USFWS 2014). The authorized expansion includes lands extending approximately 34 km (21 m.) south from the existing Refuge boundary to provide connection to the Department's China Island Unit of the North Grasslands Wildlife Area (USFWS 2016). The North Grasslands is part of the Grasslands Ecological Area, a 64,750 ha (160,000 ac.) mosaic of protected San Joaquin River floodplain between Interstate 5 and State Highway 99 in Merced County. The area is a network of freshwater marshes (permanent and seasonal), alkali grassland, and riparian thickets conserved through conservation agreements with private duck clubs and land acquisitions by California State Parks (Great Valley Grasslands, Hatfield State Recreation Area), the Department (Volta, Los Banos, and North Grasslands Wildlife Areas), and the USFWS (San Luis and Merced National Wildlife Refuges and Grasslands Wildlife Management Area). Although only limited areas of the Grasslands Ecological Area are covered with riparian shrubs or forest, future expansion of the Refuge to connect to the ecological area would provide potential opportunities for riparian brush rabbits to disperse and significantly expand the area occupied by the subspecies.

The creation of the Refuge, ongoing riparian habitat restoration on the Refuge, and the continued expansion of the Refuge, coupled with the Refuge's role in the captive propagation program has greatly improved the viability of the riparian brush rabbit subspecies, although rabbits on the Refuge remain at substantial risk from flooding, fires, and other threats (Wittmer et al. 2016, Kelly 2018).

iii. Regional Habitat Conservation Plans

Areas of the riparian brush rabbit occupied range are covered by habitat conservation plans. Habitat conservation plans are regional plans approved by the USFWS that allow for regional development and specify avoidance, minimization, and mitigation measures for sensitive species. Habitat conservation plans can be used by signatories to authorize take of federally listed species under § 10(a)(1)(B) of the Endangered Species Act. The San Joaquin County Multi-Species Habitat Conservation and Open Space Plan covers the entire range of the riparian brush rabbit north of the Stanislaus-San Joaquin County line. Riparian brush rabbits are covered in the Plan, but the Plan does not authorize any take of the subspecies nor does it authorize the conversion of occupied habitat (San Joaquin Council of Governments 2000). Over the 50-year life of the plan, no more than 1.2 ha (3 ac.) of potential riparian brush rabbit habitat may be converted to other uses. Therefore, the riparian brush rabbit is protected from direct development-related impacts; however, other conversions of agricultural land to industrial and residential uses authorized under the plan effectively precludes opportunities for the future restoration of currently unoccupied lands and may limit opportunities for expanding occupancy in the County.

The Pacific Gas and Electric Company's (PG&E) San Joaquin Valley Operation & Maintenance Habitat Conservation Plan covers PG&E's lands, and gas and electrical transmission and distribution facilities on 111,835 ha (276,350 ac.) of the San Joaquin Basin (PG&E 2007). This Plan authorizes temporary and permanent impacts to a total of 0.6 ha (1.5 ac.) of riparian brush rabbit habitat over the 30-year life of the Plan. All activities are precluded from areas within 30.5 m (100 ft.) of occupied habitat as determined by a qualified biologist. Therefore, activities authorized under the Plan are unlikely to result in significant impacts to the riparian brush rabbit subspecies.

iv. Caswell Memorial State Park

A Resources Management Plan for the Sensitive Species of Caswell Memorial State Park was prepared by the California Department of Parks and Recreation in 1989 (Blankenship 1989). Portions of the plan related to riparian brush rabbits were largely based on the recommendations in Ecology and Management of the Riparian Brush Rabbit in Caswell Memorial State Park (Williams 1988). Actions in the plan include biannual monitoring of the local riparian brush rabbit population, control of feral cats and dogs, improving fuel breaks and fire lanes, and constructing flood refugia mounds. Caswell Park has been unable to implement riparian brush rabbit management activities in recent years because management funds are extremely limited and the status of the Caswell Park local population is currently unknown (Patrick Kelly pers. comm. 8/28/2019; Heather Reith, pers. comm. 8/29/2019).

B. Recommendations for Management Activities and Other Recommendations for Recovery of the Species

The Department's recovery objective remains unchanged from the 1993 Status Review: the protection and expansion of the existing subspecies population and reintroduction of a sufficient number of additional viable riparian brush rabbit populations in restored and permanently protected sites to insure their long-term survival within their native habitat and range. In order to achieve recovery, the remaining populations and any reintroduced populations must be free from significant threats, protected, monitored, and proven to be self-sustaining to the satisfaction of the Department and the Commission. The below management activities and recommendation are believed to be the most urgently needed to further the recovery of the riparian brush rabbit at this time.

i. Establishment of Additional Flood-secure Populations

The largest extant local riparian brush rabbit population on the Refuge is highly exposed to catastrophic flooding events, which are projected to become more frequent and severe. Other occupied areas in Caswell Park, the lower San Joaquin River, and the South Delta are also at risk from flooding. Bunny mounds and vegetated levees do not provide enough cover or forage to sustain large numbers of rabbits through prolonged flood events. There is an urgent need to establish riparian brush rabbit populations in large patches of high elevation suitable upland habitat. To achieve this goal the Refuge should consider acquiring high elevation parcels with potential to support riparian shrub and tree communities through the Refuge expansion process. Additionally, state and federal agencies should explore conservation easements and

management agreements with owners of high elevation land adjacent to occupied habitat to incentivize the establishment of brush rabbit cover and forage on portions of their land to act as refugia during flood events. Refuge staff should opportunistically translocate riparian brush rabbits to currently unoccupied areas of restored habitat within the Refuge such as the Dos Rios Ranch near the Tuolumne Confluence when animals are salvaged during flood events. Finally, state and federal wildlife managers should explore translocation of rabbits to suitable habitat on other refuge units such as the San Luis National Wildlife Refuge, the West Hilmar State Wildlife Area and units of the North Grasslands State Wildlife Area. Until large patches of suitable habitat above flood elevation can be secured, the limited existing high elevation flood refugia (e.g. bunny mounds and levees) should be planted with a mix of species selected to provide high quality forage during the typical mid-winter to early summer inundation period.

ii. Secure South Delta Populations

South Delta local populations continue to be under threat from habitat loss and fragmentation related to residential and commercial development and flood control projects. Very little of this genetically distinct population area currently exists on protected conservation lands. State and federal agencies should endeavor to acquire fee title or conservation easements from willing sellers to protect existing suitable habitat and to restore habitat on multiple large parcels with an emphasis on conserving genetically representative local populations.

iii. Complete a Recovery Plan

Prior to the subspecies' listing under the federal ESA, riparian brush rabbits were covered in the Recovery Plan for the Upland Species of the San Joaquin Valley (USFWS 1998). However, the plan did not include recovery criteria, and the plan was written prior to the captive propagation and translocation effort. The Department is authorized, contingent upon available funding, to develop and implement nonregulatory recovery plans for the conservation and survival of threatened and endangered species (Fish and G. Code § 2079.1(a)). An up to date recovery plan is needed to set goals and objectives and guide management actions for the recovery of the subspecies. Targets for the minimum number of viable populations, geographic distribution, and genetic conservation should be included in the plan, along with criteria for de-listing. The Department should consider collaborating with the USFWS to develop a joint recovery plan which satisfies the requirements of both agencies.

iv. Basic Research on Biology and Ecology

Basic information on the status of the riparian brush rabbit subspecies population and on riparian brush rabbit biology is needed to inform a recovery plan and to guide management. Wittmer et al. (2016) identified the need for research on the interaction between habitats and food availability, rabbit movement patterns, context-dependent predation, and the vital rates of established rabbit populations to inform population viability models. Other identified information needs include detailed studies of riparian brush rabbit diets (e.g. DNA analysis of scat contents and/or feeding trials) to inform planting of high elevation flood refugia, habitat restoration efforts, and land acquisition priorities (Patrick Kelly pers comm. 8/28/2019, Kim Forrest pers. comm. 9/20/2019). In order to inform management efforts to minimize competition between riparian

brush rabbits and desert cottontails, studies of the mechanisms that separate the respective ecological niches the two species are needed. In addition, development of rigorous and efficient surveying and monitoring techniques is needed to monitor the distribution and status of the riparian brush rabbit population (Kim Forrest pers. comm. 9/20/2019).

v. Fuel Management on Caswell Memorial State Park

The riparian brush rabbit habitat provided by the dense, mature, riparian forests of Caswell Park is at high risk of severe wildfire due to the accumulation of fuels at multiple canopy levels. Managing the fuel load in the Park will require carefully balancing the need to reduce the risk of catastrophic habitat loss from wildfire with the risks of degrading currently suitable habitat and fragmenting habitat patches through fuel treatments. The California Department of Parks and Recreation possesses management plans to accomplish these goals, but the agency lacks the funding to implement fuel reduction projects (Heather Reith pers. comm. 8/29/2019). Secure funding for fuels management within the Park is needed.

vi. Update Closed Hunting Zone

California Code of Regulations Title 14 §308(d) which prohibits the take of brush rabbits and cottontail rabbits in portions of San Joaquin County was added to California Code in 2002 with the intent of protecting riparian brush rabbits from hunting take. Since that time, riparian brush rabbits have been detected in additional areas outside of the hunting closure zone. The Department should consider updating the closure zone description such that it encompasses all known occupied habitat and present a regulation change proposal to the California Fish and Game Commission for consideration.

VII. RECOMMENDATION TO THE COMMISSION

Pursuant to Fish and Game Code section 2077, the Department has prepared this Five-Year Status 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 Status Review, the Department submits the following recommendation to the Commission:

In completing this Five-Year Status Review for riparian brush rabbit, the Department finds there is sufficient scientific information to indicate that the conditions that led to the listing of the riparian brush rabbit as endangered are still present. The riparian brush rabbit subspecies population is threatened by catastrophic floods, wildfires, threats related to small populations, predation, diseases, rodenticides, and climate change impacts. The Department recommends no change to the status of riparian brush rabbit on the list of endangered species at this time.

VIII. SOURCES

A. Literature Cited

J.P. Abatzoglou, and A.P. Williams. 2016. Impact of anthropogenic climate change on wildfire across western US forests. PNAS 113:11770-11775.

Balch, J.K., B.A. Bradley, J.P. Abatzoglou, R.C. Nagy, E.J. Fusco, and A.L. Mahood. 2017. Human-started wildfires expand the fire niche across the United States. PNAS 114:2946-2951.

Basey, G.E. 1990. Distribution, ecology, and population status of the Riparian Brush Rabbit (*Sylvilagus bachmani riparius*). Thesis, California State University, Stanislaus, Turlock, CA, USA.

Bedsworth, L., D. Cayan, G. Franco, L. Fisher, and S. Ziaja. 2018. Statewide Summary Report. California's Fourth Climate Change Assessment. California Natural Resources Agency Publication number: SUMCCCA4-2018-013.

Blankenship, D.S. 1989. Caswell Memorial State Park sensitive species management. California Department of Parks and Recreation. Unpublished project status report.

Bryant, H. C. 1918. Evidence on the food of hawks and owls in California. Condor 20:126-127.

California Department of Fish and Game (CDFG). 1993. Report to the Fish and Game Commission: Status Review of the Riparian Brush Rabbit (*Sylvilagus bachmani riparius*) in California. California Department of Fish and Game, Sacramento, CA, USA.

California Department of Water Resources. 2017. Central Valley Flood Protection Plan 2017 Update. California Department of Water Resources, Sacramento, CA, USA.

Cayan, D., M. Tyree, D. Pierce, T. Das. 2012. Climate change and sea level rise scenarios for California Vulnerability and Adaptation Assessment. California Energy Commission Publication number: CEC-500-2012-008.

Chapman, J.A. 1974. *Sylvilagus bachmani*. Mammalian Species No. 34. American Society of Mammalogists.

Chapman, J. A., J.G. Hockman, and W.R. Edwards. 1982. Cottontails: *Sylvilagus floridanus* and allies. Pages 83-123 in J.A. Chapman, G.A. Feldhamer, editors. Wild mammals of North America. Johns Hopkins University Press, Baltimore, MD, USA.

Chapman, J.A., and J.A. Litvaitis. 2003. Eastern cottontail. Pages 101-125 in G.A. Feldhamer, B.C. Thompson, and J.A. Chapman, editors. Wild Mammals of North America: Biology, management, and conservation. Johns Hopkins University Press, Baltimore, MD, USA.

Constable, J., S. Philips, D. Williams, J. Youngblood, and P. Kelly. 2011. Final Report: Characterization of genetic structure and phylogenetic relationships of riparian brush rabbit

populations. Prepared by the Endangered Species Recovery Program, Department of Biological Sciences, California State University Stanislaus, Turlock, CA, USA.

Das, T., E.P. Maurer, D.W. Pierce, M.D. Dettinger, and D.R. Cayan. 2013. Increases in flood magnitudes in California under warming climates. *Journal of Hydrology* 501:101-110.

Dixon, K.R., J.A. Chapman, O. Rongstad, and K.M. Orhelein. 1981. A comparison of home range size of *Sylvilagus floridanus* and *S. bachmani*. Pages 541-548 in K. Myers and C.D. MacInnes, editors. *Proceedings of the world lagomorph conference*. University of Guelph Press, Guelph, Ontario, Canada.

Elsholz, C.R. 2010. Riparian brush rabbit habitat requirements in Caswell Memorial State Park. Thesis, San Jose State University, San Jose, CA, USA.

Foster, G. L. 1927. A note on dietary habits of the barn owl. *Condor* 29:246.

Frankham, R. 2005. Genetics and extinction. *Biological Conservation* 126:131–140.

Gabriel, M.W., L.W. Woods, R. Poppenga, R.A. Sweitzer, C. Thompson, S.M. Matthews, J.M. Higley, S.M. Keller, K. Purcell, R.H. Barrett, G.M. Wengert, B.N. Sacks, and D.L. Clifford. 2012. Anticoagulant rodenticides on our public and community lands: Spatial distribution of exposure and poisoning of a rare forest carnivore. *PloS ONE* 7(7):e40163:1-15.

Gabriel, M.W., G.M. Wengert, J.M. Higley, S. Krogan, W. Sargent, and D.L. Clifford. 2013. Silent forests? Rodenticides on illegal marijuana crops harm wildlife. *The Wildlife Society News*. <http://news.wildlife.org/twp/2013-spring/silent-forests/>

Gavin, P.J., K.R. Kazacos, and S.T. Shulman. 2005. Baylisascariasis. *Clinical Microbiology Reviews* 18:703-718.

Gilardi, K.V.K., K.A. Terio, L.P. Hamilton, E.V. Williams, and D.F. Williams. 2004. Disease monitoring in captively-propagated and reintroduced riparian brush rabbits (*Sylvilagus bachmani riparius*) in California. Pages 297-298 in C.K. Baer, editor. *Heath and conservation of captive and free-ranging wildlife; joint conference of the American Association of Zoo Veterinarians, the American Association of Wildlife Veterinarians, and the Wildlife Disease Association; San Diego, California, USA*.

Griggs, T. 2012. Establishing roots: River Partners' long-term efforts on the San Joaquin River NWR. *River Partners Journal*. 8:5-7. https://www.riverpartners.org/wp-content/uploads/2018/08/Journal_2012-v8n1-winter.pdf

Hall, E. R. 1927. The barn owl in its relation to the rodent population at Berkeley, California. *Condor* 29:274-275.

Hall, E.R. 1981. *The Mammals of North America*, 2nd ed., Vol. 1. John Wiley and Sons, New York, NY, USA.

He, M., A. Schwarz, E. Lynn, and M. Anderson. 2018. Projected changes in precipitation, temperature, and drought across California's hydrologic regions. California's Fourth Climate Change Assessment. California Natural Resources Agency Publication number: CCCA4-EXT-2018-002.

Hedrick, P.W., and S.T. Kalinowski. 2000. Inbreeding depression in conservation biology. *Annual Review of Ecological Systems* 31:139-162.

Hinds, D. 1973. Acclimatization of thermoregulation in the desert cottontail, *Sylvilagus audubonii*. *Journal of Mammalogy* 54(3):708-728.

Ingles, L.G. 1965. *Mammals of the Pacific States*. Stanford University Press, Stanford, California, USA.

Katibah, E.F. 1984. A brief history of riparian forests in the Central Valley of California. Pages 23-29 *in* R.E. Warner and K.M. Hendrix, editors. *California riparian systems ecology, conservation, and productive management*. University of California Press, Berkeley, CA, USA.

Kelly, P.A. 2018. Reintroduction of the riparian brush rabbit in the San Joaquin Valley, California, USA. Pages 210-215 *in* P.S. Soorae, editor. *Global reintroduction perspectives: 2018. Case studies from around the globe*. IUCN/SSC Reintroduction Specialist Group, Gland, Switzerland and Environment Agency, Abu Dhabi, UAE.

Kelly, P.A., T.K. Edgarian, M.R. Lloyd, S.E. Phillips. 2011. Conservation principles for the riparian brush rabbit and riparian woodrat. Unpublished report prepared for the U.S. Fish and Wildlife Service Bay-Delta Fish and Wildlife Office, the California Department of Fish and Game, and the California Department of Water Resources. Prepared by California State University Stanislaus, Endangered Species Recovery Program, Turlock, CA. USA.

Kelly, P.A., and J.L. Holt. 2011. Quarterly report: controlled propagation and release of riparian brush rabbits in the northern San Joaquin Valley, California (1 January to 30 March 2011). Unpublished report prepared for the U.S. Fish and Wildlife Service San Luis National Wildlife Refuge Complex, the U.S. Bureau of Reclamation South Central Area Office, and the California Department of Fish and Game Nongame Wildlife Branch. Prepared by California State University Stanislaus, Endangered Species Recovery Program, Turlock, CA, USA

Kelly, P.A., and M.R. Lloyd. 2009. Draft annual report: controlled propagation and release of riparian brush rabbits in the northern San Joaquin Valley, California (1 July 2008 to 30 June 2009). Unpublished report prepared for the U.S. Fish and Wildlife Service San Luis National Wildlife Refuge Complex, the U.S. Bureau of Reclamation South Central Area Office, and the California Department of Fish and Game Nongame Wildlife Branch. Prepared by California State University Stanislaus, Endangered Species Recovery Program, Turlock, CA, USA.

Kelly, P.A., and M.R. Lloyd. 2010. Quarterly report: controlled propagation and release of riparian brush rabbits in the northern San Joaquin Valley, California (1 April to 30 June 2010). Unpublished report prepared for the U.S. Fish and Wildlife Service San Luis National Wildlife

Refuge Complex, the U.S. Bureau of Reclamation South Central Area Office, and the California Department of Fish and Game Nongame Wildlife Branch. Prepared by California State University Stanislaus, Endangered Species Recovery Program, Turlock, CA, USA.

Kelt, D.A., P.A. Kelly, S.E. Phillips, and D.F. Williams. 2014. Home range size and habitat selection of reintroduced *Sylvilagus bachmani riparius*. *Journal of Mammology* 95(3):516-524.

Krebs, C., S. Boutin, R. Boonstra, A. Sinclair, J. Smith, M. Dale, K. Martin, and R. Turkington. 1995. Impact of food and predation on the snowshoe hare cycle. *Science* 269:1112-1115.

Lloyd, M.R., K. Forrest, P.A. Kelly, J.L. Holt, T.K. Edgarian, and J.R. Rentner. 2011. Utilizing adaptive management in the recovery of the endangered riparian brush rabbit at the San Joaquin River National Wildlife Refuge, California. Poster session presented at Fish and Wildlife Service Conference Conserving the Future; Wildlife Refuges and the Next Generation, Madison, WI, USA.

Lloyd, M.R., and D.F. Williams. 2003. Riparian brush rabbit survey; Mossdale Landing, San Joaquin County, California, February 2003. Unpublished report prepared for Geoff Monk. Prepared by Endangered Species Recovery Program, Department of Biological Sciences, California State University Stanislaus, Turlock, CA, USA.

Matocq, M., P. Kelly, J. Rippert, and S. Phillips. 2017. Population genetic structure of the riparian brush rabbit (*Sylvilagus bachmani riparius*): using multiple marker systems to gain insight into historic and ongoing genetic connectivity. Report submitted to the CVPIA Habitat Restoration Program for Grant Agreement F13AP00564. U.S. Bureau of Reclamation Mid-Pacific Office. Sacramento, CA, USA.

Mossman, A.S. 1955. Reproduction of the brush rabbit in California. *Journal of Wildlife Management* 19:177-184.

Orr, R.I. 1935. Descriptions of three new races of brush rabbit from California. *Proceedings of the Biological Society of Washington* 48:27-30.

Orr, R.I. 1940. The rabbits of California. *Occasional Papers of the California Academy of Sciences* No. 19. California Academy of Sciences, San Francisco, CA, USA.

Pacific Gas and Electric Company. 2007. PG&E San Joaquin Valley Operation & Maintenance Habitat Conservation Plan. San Francisco, CA, USA.
https://ecos.fws.gov/docs/plan_documents/thcp/thcp_838.pdf

Phillips, S.E., L.P. Hamilton, and P.A. Kelly. 2005. Assessment of habitat conditions for the riparian brush rabbit on the San Joaquin River National Wildlife Refuge, California. Unpublished report prepared for the U.S. Fish and Wildlife Service Endangered Species Program, Sacramento, CA. Prepared by the Endangered Species Recovery Program, California State University Stanislaus, Turlock, CA, USA.

- Phillip Williams and Associates. 2001. San Joaquin River National Wildlife Refuge Phase 1: Analysis of proposed levee breaches. Unpublished report prepared for Ducks Unlimited Western Regional Office and the U.S. Fish and Wildlife Service Anadromous Fish Restoration Program, PWA Reference number 1486. Prepared by Philip Williams Associates, Ltd., Corte Madera, CA, USA.
- Primack, R.B. 1993. Essentials of Conservation Biology. Sinauer Associates Inc., Sunderland, MA, USA.
- Primack, R.B. 2010. Essentials of Conservation Biology. Sinauer Associates Inc., Sunderland, MA, USA.
- Reed, D.H., and R. Frankham. 2003. Correlation between fitness and genetic diversity. Conservation Biology 17:230-237.
- Regnery, D.C., and J.H. Miller. 1971. A myxoma virus epizootic in a brush rabbit population. Journal of Wildlife Diseases 8:327-331.
- Rippert, J.S. 2017. Population genetics and functional connectivity of the riparian brush rabbit (*Sylvilagus bachmani riparius*): Implications for the conservation of an endangered lagomorph. Thesis, University of Nevada, Reno, NV, USA.
- River Partners. 2006. Restoration Plan for the Vierra flood protection and environmental enhancement project, San Joaquin River National Wildlife Refuge, San Joaquin River Mile 78L-88L, Stanislaus County, CA. Unpublished report prepared for Department of Water Resources and the U.S. Fish and Wildlife Service San Luis National Wildlife Refuge Complex. River Partners, Modesto, CA, USA.
- River Partners. 2009. Riparian enhancement plan for the Arambel Unit, San Joaquin River National Wildlife Refuge, San Joaquin River Mile 78L-88L, Stanislaus County, CA. Unpublished report prepared for U.S. Fish and Wildlife Service and the U.S. Bureau of Reclamation Central Valley Project. River Partners, Modesto, CA, USA.
- San Joaquin Council of Governments. 2000. San Joaquin County Multi-Species Habitat Conservation and Open Space Plan. Stockton, CA, USA. <http://ca-sjcog2.civicplus.com/DocumentCenter/View/5>
- Singleton, L.A., S.L. Small, and T. Griggs. 2007. Effects of long-duration flooding on a San Joaquin Valley riparian restoration site. Page 30 in Riparian Habitat Conservation and Flood Management in California: Conference Proceedings. Riparian Habitat Joint Venture, CA, USA.
- Sodhi, N.S., B.W. Brook, and C.J.A. Bradshaw. 2009. Causes and consequences of species extinctions. Pages 514-520 in S.A. Smith, editor. The Princeton Guide to Ecology. Princeton University Press, Princeton, NJ, USA.
- Sumner. E.L. Jr. 1929. Comparative studies in the growth of young raptors. Condor 31:85-111.

Syphard, A.D., V.C. Radeloff, J.E. Keeley, T.J. Hawbaker, M.K. Clayton, S.I. Stewart, and R.B. Hammer. 2007. Human influence on California fire regimes. *Ecological Applications* 17(5):1388-1402.

Thompson, C., R. Sweitzer, M. Gabriel, K. Purcell, R. Barrett, and R. Poppenga. 2014. Impacts of rodenticide and insecticide toxicants from marijuana cultivation sites on fisher survival rates in the Sierra National Forest, California. *Conservation Letters* 7(2):91-102.

Thorne, J.H., R.M. Boynton, A.J. Holguin, J.A.E. Stewart, and J. Bjorkman. 2016. A climate change vulnerability assessment of California's terrestrial vegetation. California Department of Fish and Wildlife, Sacramento, CA, USA.

U.S. Fish and Wildlife Service (USFWS). 1998. Recovery Plan for the upland species of the San Joaquin Valley, California. Portland, OR, USA.

U.S. Fish and Wildlife Service (USFWS). 2000. Final rule to list the riparian brush rabbit and the riparian, or San Joaquin valley woodrat as endangered. 65 Fed. Reg. 36:8881-8890.

U.S. Fish and Wildlife Service (USFWS). 2006. San Joaquin River National Wildlife Refuge Final Comprehensive Conservation Plan. U.S. Fish and Wildlife Service California/Nevada Operations Office, Sacramento, CA, USA.

U.S. Fish and Wildlife Service. 2014. Proposed expansion San Joaquin River National Wildlife Refuge Environmental Assessment, Land Protection Plan, and Conceptual Management Plan. Sacramento, CA, USA.

Warner, M.D., C.F. Mass, and E. P. Salathé, Jr. 2014. Changes in winter atmospheric rivers along the North American west coast in CMIP5 climate models. *Journal of Hydrometeorology* 16:118-128.

Williams, D.F. 1986. Mammalian species of special concern in California. California Department of Fish and Game, Wildlife Management Division Administrative Report No. 86-1. Sacramento, CA, USA.

Williams, D.F. 1988. Ecology and management of the riparian brush rabbit in Caswell Memorial State Recreation Area. California Department of Parks and Recreation, Inland Region, Final Report, Interagency Agreement 4-305-6108. Sacramento, CA, USA.

Williams, D.F. 1993. Population censuses of riparian brush rabbits and riparian woodrats at Caswell Memorial State Park during January 1993. California Department of Parks and Recreation, Inland Region, and U.S. Fish and Wildlife Service San Joaquin Valley Endangered Special Recovery Planning Program. Turlock, CA, USA.

Williams, D.F., and G.E. Basey 1986. Population status of the riparian brush rabbit (*Sylvilagus bachmani riparius*), Contract Final Report. California Department of Fish and Game, Wildlife Management Division, Nongame Bird and Mammal Section. Sacramento, CA, USA.

Williams, D.F., P.A. Kelly, and L.P. Hamilton. 2002. Controlled propagation and reintroduction plan for the riparian brush rabbit (*Sylvilagus bachmani riparius*). Unpublished report prepared by the Endangered Species Recovery Program, California State University Stanislaus, Turlock, CA, USA.

Williams D.F., P.A. Kelly, L.P. Hamilton, M.R. Lloyd, E.A. Williams, and J.J. Youngblom. 2008 Recovering the endangered riparian brush rabbit (*Sylvilagus bachmani riparius*): reproduction and growth in confinement and survival after translocation. Pages 349-361 in P.C. Alves, N. Ferrand, and K. Hackländer, editors. Lagomorph Biology. Springer, Berlin, Heidelberg, Germany.

Williams, D.F., M.R. Lloyd, L.P. Hamilton, E. Vincent-Williams, J.J. Youngblom, K. Gilardi, and P.A. Kelly. 2005. Controlled propagation and translocation of riparian brush rabbits: annual report for 2003. Unpublished report prepared for the U.S. Bureau of Reclamation Mid-Pacific Region, the Fish and Wildlife Service Endangered Species Division, and the California Department of Fish and Game Species Conservation and Recovery Program. Prepared by the Endangered Species Recovery Program, California State University Stanislaus, Turlock, CA, USA.

Wittmer, H.U., D.A. Kelt, P.A. Kelly, and D.F. Williams. 2016. Use of simulation modeling to evaluate management strategies for reintroduced riparian brush rabbits in California. *Journal of Fish and Wildlife Management* 7(2):334–346.

Woolf, A., D.R. Shoemaker, and M. Cooper. 1993. Evidence of Tularemia regulating a semi-isolated cottontail rabbit population. *Journal of Wildlife Management*. 57(1):144-157.

B. Personal Communication

Warden Adam Cahn, California Department of Fish and Wildlife, Central Enforcement District, Fresno, CA. 6/17/2019.

Captain Ryan Detrick, California Department of Fish and Wildlife, Central Enforcement District, Fresno, CA. 6/17/2019.

Kim Forrest, Refuge Supervisor, U.S. Fish and Wildlife Service, San Luis National Wildlife Refuge Complex, Los Banos, CA. 9/20/2019.

Katherine Heffernan, Wildlife Biologist, U.S. Fish and Wildlife Service, San Luis National Wildlife Refuge Complex, Los Banos, CA. 6/4/2019 email to Stephanie Prevost, U.S. Fish and Wildlife Service, describing observations of rabbits stranded by flood waters on San Joaquin River National Wildlife Refuge.

Eric Hopson, Wildlife Biologist, U.S. Fish and Wildlife Service, San Luis National Wildlife Refuge Complex, Los Banos, CA. 8/27/2019.

Dr. Patrick Kelly, Endangered Species Recovery Program, Stanislaus State University, Turlock, CA. 8/28/2019.

Warden Jeffrey Moran, California Department of Fish and Wildlife, Central Enforcement District, Fresno, CA. 6/17/2019.

Polo Moreno, Senior Environmental Scientist, California Department of Pesticide Regulation, Sacramento, CA. 9/30/2019.

Stephanie Prevost, Wildlife Biologist, U.S. Fish and Wildlife Service, Listing and Recovery Division, Sacramento Fish and Wildlife Office, Sacramento, CA. 6/13/2019.

Stephanie Prevost, Wildlife Biologist, U.S. Fish and Wildlife Service, Listing and Recovery Division, Sacramento Fish and Wildlife Office, Sacramento, CA. email dated 10/22/2019.

Heather Reith, Senior Environmental Scientist, California Department of Parks and Recreation, Central Valley District, Columbia, CA. 8/29/2019

Lieutenant Eric Vielhauer, California Department of Fish and Wildlife, Central Enforcement District, Fresno, CA. 6/17/19.

C. Other

City of Lathrop. 2019. City of Lathrop, CA Planning Division Specific Plans Information website accessed at <https://www.ci.lathrop.ca.us/planning/page/specific-plans>.

Federal Emergency Management Agency. 2019. National Flood Hazard Layer. Geospatial Data accessed at <https://hazards.fema.gov/gis/nfhl/rest/services/public/NFHL/MapServer>.

IX. LIST OF FIGURES

Figure 1. Distribution of riparian brush rabbit records.....	p. 10
Figure 2. City of Lathrop planned development areas.....	p. 16
Figure 3. Proposed Paradise Cut Bypass flood control project.....	p. 17
Figure 4. Federal Emergency Management Agency 100-year flood hazard zone.....	p. 23
Figure 5. Portion of the San Joaquin River National Wildlife Refuge during 2011 flood showing bunny mound and levee refugia	p. 25
Figure 6. Areas burned in recent wildfires on the San Joaquin River National Wildlife Refuge.....	p. 26



5-Year Species Review:

Riparian Brush Rabbit

(Sylvilagus bachmani riparius)



Fish and Game Commission Meeting

June 24 - 25, 2020

Daniel Applebee

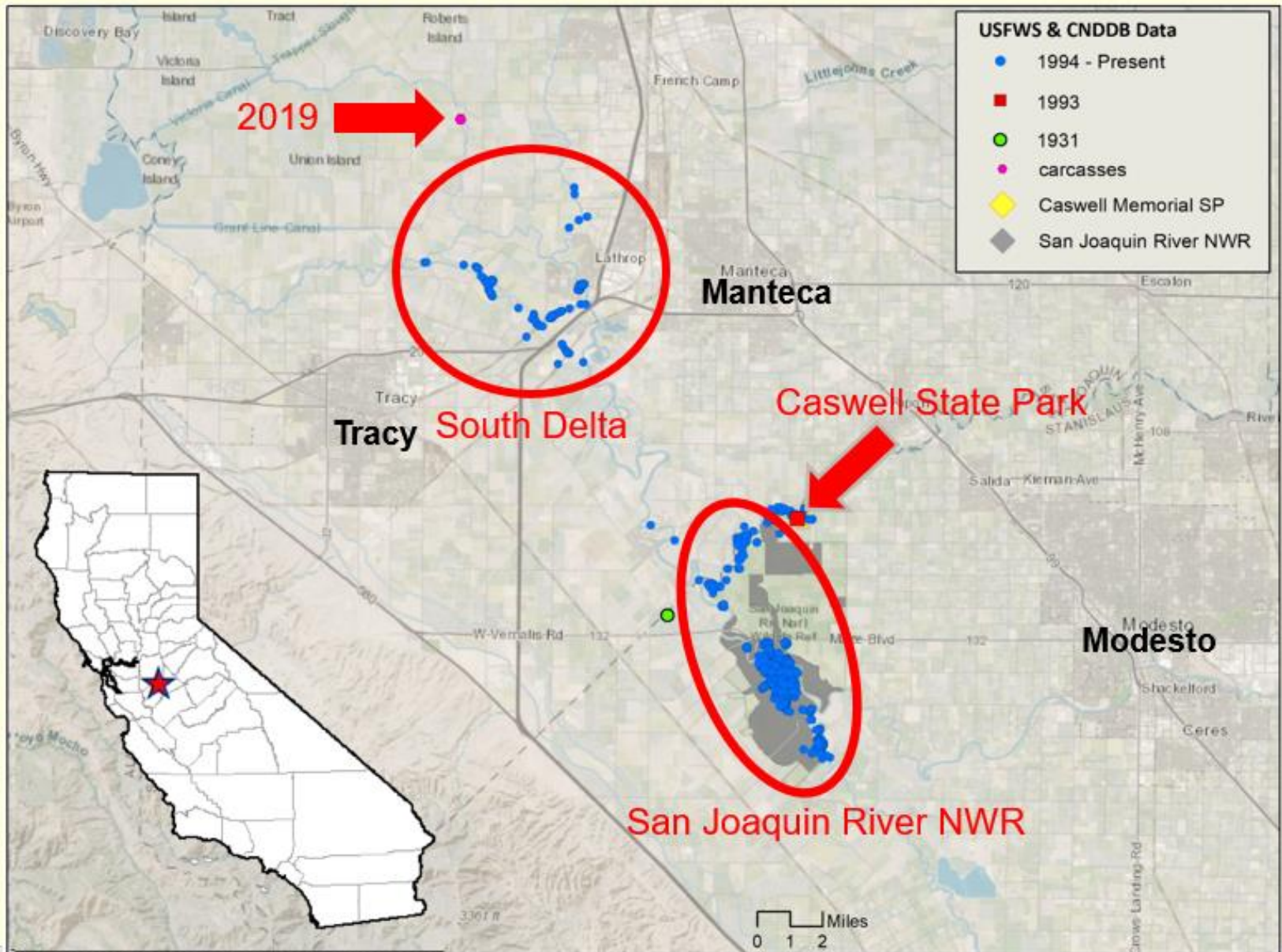
Nongame Wildlife Program

Riparian Brush Rabbit Background

- Listed as Endangered by Commission 1994
- Listed as Endangered by USFWS 2000
- Inhabit dense riparian shrubs, vines and trees
- Eat shrubs, forbs, grasses
- Relatively low reproductive capacity



Riparian Brush Rabbit Distribution



Riparian Brush Rabbit

Identified Threats

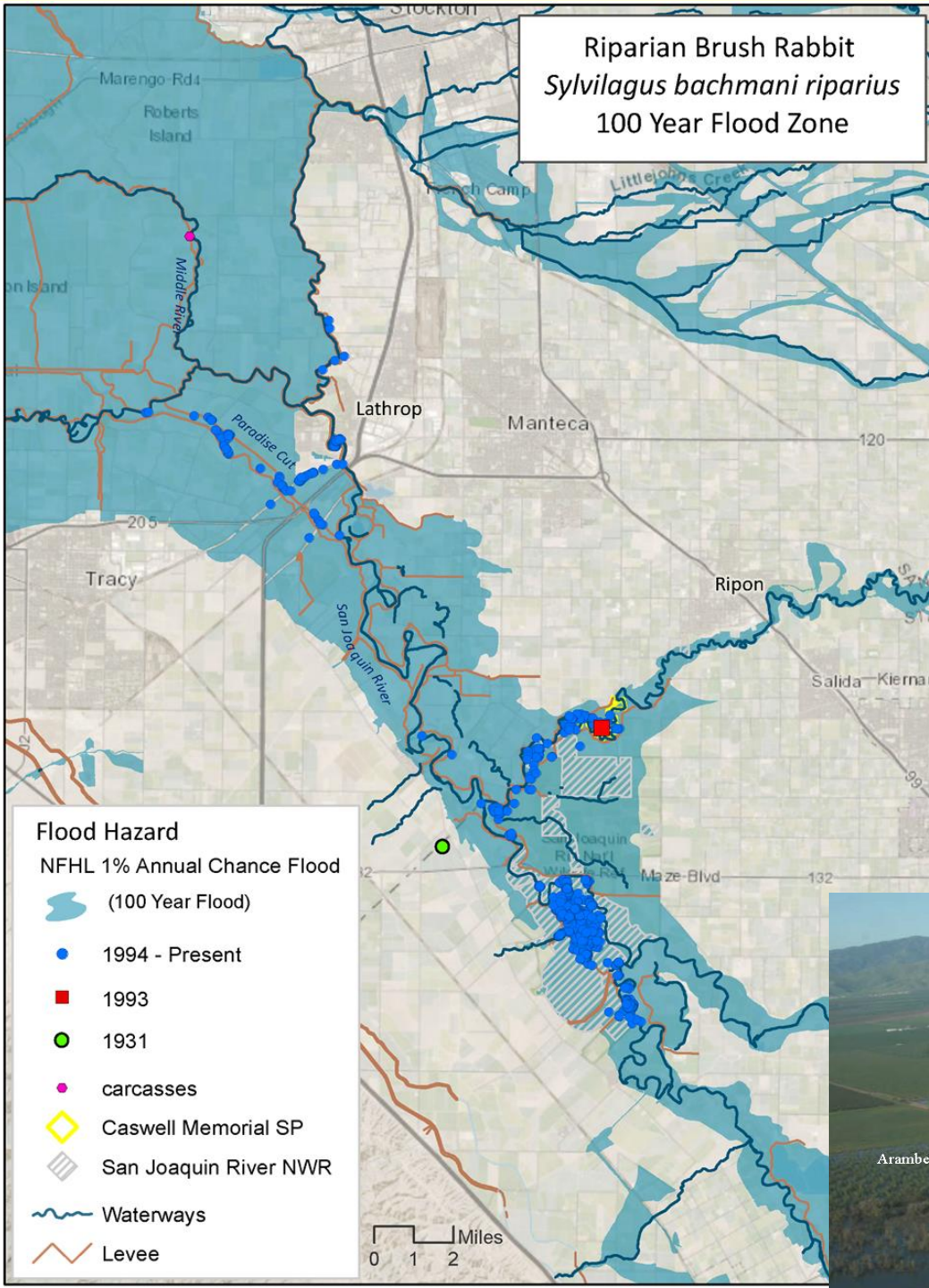
- Habitat Loss
- Habitat Fragmentation
- Flooding
- **Disease**
- Wildfires
- Predation
- Small Populations
- **Climate Change**
- **Rodenticides**



Riparian Brush Rabbit
Sylvilagus bachmani riparius
100 Year Flood Zone

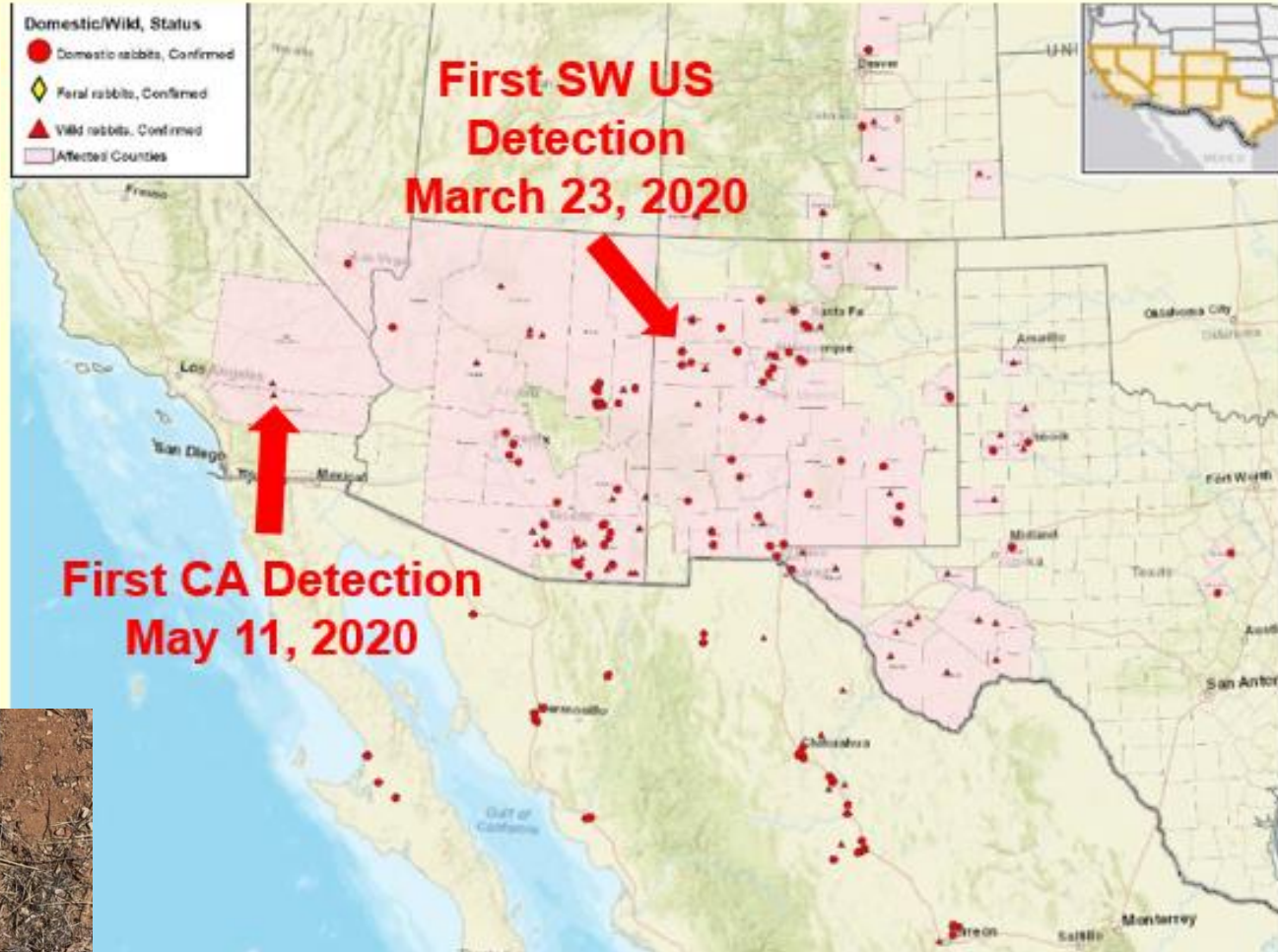
Riparian Brush Rabbit Threats - Floods

- All detections within 100-year flood zone
- Periodic flood events projected to become more frequent and extreme with climate changes
- Past floods resulted in dramatic population declines



Rabbit Hemorrhagic Disease Virus Serotype 2

- Significant new threat
- Highly infectious
- High mortality
- Rapid spread
- CDFW Response plan



Riparian Brush Rabbit

Findings and Recommendation

- The Department finds the conditions that led to the listing of the riparian brush rabbit as endangered are still present, and additional threats have emerged.
- The subspecies is threatened by catastrophic floods, wildfires, diseases, threats related to small populations, predation, rodenticides, and climate change impacts.
- The Department recommends no change to the status of riparian brush rabbit on the list of endangered species at this time.

Questions



Thank You



Daniel Applebee
Nongame Wildlife Program
Daniel.Applebee@wildlife.ca.gov
(916) 373-6634

Riparian Brush Rabbit 5-Year Status Review

- Listed as endangered by the Commission in 1994
- Additional populations have been discovered and a captive propagation and translocation program increased the population and distribution.
- Although the population and range have expanded, the threats identified at the time of listing remain, and new threats have emerged.
- The Department recommends that the status of the species remains unchanged.



California Fish and Game Commission

Wildlife Prosecutor of the Year Policy

It is the policy of the Fish and Game Commission to honor a courtroom champion of California's fish, wildlife and natural resources, a person who tirelessly prosecutes fish, wildlife, natural resource and environmental crimes in California courts. The Commission will recognize this prosecutor through an annual Wildlife Prosecutor of the Year Award.

Eligibility

Any currently seated prosecuting attorney, including, but not limited to, city attorney, district attorney or deputy attorney general, is eligible for nomination and the contribution(s) must have occurred during the previous three years.

Nominations

Based on input from wildlife officers and their experiences in the field, the California Department of Fish and Wildlife's deputy director and chief, Law Enforcement Division, may submit up to four nominations. The nominations must be submitted to a selection committee (identified below) no later than March 15.

Selection Criteria

The award recognizes one attorney who exhibits one or more of the following:

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

Selection Committee

The selection committee will consist of the president and the executive director of the Commission, and the Department of Fish and Wildlife's director and deputy director, Law Enforcement Division.

Award Announcement

The award will be announced at the Commission's meeting in June and presented to the recipient during a future event agreed upon by the selection committee where the prosecutor can be recognized for his or her efforts. The Commission will distribute a news release announcing the prosecutor of the year and showcasing the exemplary work and contributions to protecting California's fish and wildlife resources.

(Adopted: 06/22/2016; Amended: 08/07/2019)



State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Director's Office
P.O. Box 944209
Sacramento, CA 94244-2090
www.wildlife.ca.gov

GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director



March 9, 2020

To: Wildlife Prosecutor of the Year Selection Committee
From: Lieutenant Michael Conely
Subject: Wildlife Prosecutor of the Year

The below statement is from Lieutenant Michael Conely.

I would like to take this opportunity to nominate Fresno County Deputy District Attorney (DDA) Adam Kook as the 2019 Wildlife Prosecutor of the Year. Since taking the reins as the environmental crimes prosecutor for Fresno County, DDA Kook has established a strong working relationship with the Department of Fish and Wildlife (DFW or Department) and specifically the wildlife officers who routinely submit cases to him for prosecution in Fresno County.

Fresno County is a vast area. The county is bordered by coastal mountains to the west. Moving eastward, the county stretches across the broad San Joaquin Valley where it eventually meets the rolling foothills of the Sierra Nevada. The foothills gradually ascend to elevations over 14,000 feet and become the Sierra Nevada Mountain Range. Located within the county is the City of Fresno, the fifth largest city in the State of California and its largest inland city.

DDA Kook is passionate about seeking justice in the many wildlife crimes he handles each year in Fresno County. He works collaboratively with local wildlife officers and actively seeks their input when preparing his cases for court. Some examples of cases routinely handled by DDA Kook include: illegal commercialization of wildlife, wildlife trafficking, hunter casualty investigations, restricted species cases, stream bed alteration cases, littering and pollution cases, illegal poaching of big game, weapons violations associated with the illegal taking of wildlife, decoy cases, and extreme over-limit cases involving salmon and other sport fish. In 2019, DDA Kook prosecuted approximately 50 DFW cases, and approximately \$30,000 in fees were ordered paid to the Department.

A few examples of the cases handled by DDA Kook include several salmon snagging cases that at first were not taken seriously by defense attorneys and judges. DDA Kook had to explain the salmon life cycle and the vulnerable condition the salmon were in when snagged (during spawning). In several of the cases, the suspects were purposely snagging the salmon to harvest the eggs. DDA Kook was able to make the courts understand and appreciate the impact this illegal method of take had on the salmon population. DDA Kook's willingness to educate the courts on this issue resulted in increased penalties and fines.

Conserving California's Wildlife Since 1870

During 2019, DDA Kook secured numerous hunting and fishing bans on serious poachers ranging from 6 months to lifetime bans. The cases involved a variety of wildlife species including deer, bear, pig, and non-game mammals such as bobcat. DDA Kook understands that taking away a lawbreaker's privilege to hunt and fish sends a message to the community that serious poaching offenses will not be tolerated in Fresno County.

During this last year, DDA Kook has also emphasized harsher sentences for repeat offenders. He has created a sentencing structure that holds defendants accountable by having them enter pleas, pay fines to DFW, perform community service (at the hatchery), and, as outlined above, imposes fishing or hunting bans when appropriate.

DDA Kook recently shared a story that is a great example of his tenacious efforts in prosecuting resource violations in Fresno County. The case involved a subject who was cited for littering and fishing violations. Courts are often inundated with dockets filled with very serious crimes against persons and property. Fishing and littering violations are often not taken seriously, and there is pressure on the DA to settle these cases. In the above case, DDA Kook stood his ground and refused to give in to the defendant's repeated attempts to get the case dismissed in a sympathetic court. Despite the judge's best efforts to get DDA Kook to dismiss the case, DDA Kook was steadfast in holding the defendant responsible for his actions.

The frustrated judge was forced to order a jury panel to the courtroom, and the wheels were set in motion for a trial. DDA Kook was prepared to go the distance. The defendant and his defense team soon realized that their "bluff" to take the case to trial was not going to work. As the jury panel convened, the defendant finally threw in the towel and pled to numerous charges including littering. Admittedly this was excellent brinkmanship by the defense, however DDA Kook related that when it comes to polluting our waterways, he refuses to blink.

Another significant case handled by DDA Kook in recent years involved three suspects who were trafficking large amounts of sport-caught Striped Bass for profit. The case involved significant surveillance by local wildlife officers and resulted in two search warrants being served at the suspects' residences. During the service of the warrants, a quantity of drugs and one firearm were seized along with evidence related to the wildlife trafficking crimes. DDA Kook was ultimately successful in prosecuting the case. All three suspects involved received lifetime bans on fishing privileges as well as over 60 days total in jail.

If prosecuting wildlife crimes was not enough, DDA Kook also worked on drafting and getting AB 2369 (the addition of FG 12012.5 and the amendment to FG 12000) passed and enacted in 2019, which increased fines and penalties for poaching in Marine Protected Areas.

To further his knowledge of resource law enforcement, DDA Kook has agreed to accompany one of the local wildlife officers on a backcountry horse patrol in the

Sierra National Forest this summer. Although he admittedly has little-to-no horseback experience, DDA Kook reportedly called the officer to advise he had already bought a pair of cowboy boots and some Wrangler jeans in preparation for the trip!

In closing, I would like to thank DDA Adam Kook for his tireless work in protecting the State's natural resources through various criminal justice channels including prosecution, education, and legislation.

On behalf of the Department of Fish and Wildlife, I respectfully nominate Fresno County Deputy District Attorney Adam Kook as the 2019 Wildlife Prosecutor of the Year.

Respectfully Submitted,

A handwritten signature in dark ink, appearing to read "Michael Conely", with a stylized flourish at the end.

Lieutenant Michael Conely

CALIFORNIA FISH AND GAME COMMISSION PETITIONS FOR REGULATION CHANGE - ACTION

Revised 6/15/2020

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?
2020-003	2/6/2020	Walter Lamb	Public uses of Ballona Wetlands Ecological Reserve	Eliminate authorized recreational uses in Area C and currently allowed parking in existing designated areas.			4/15-16/2020	6/24-25/2020	DENY: FGC concurs that, as a public use, it does have the authority to regulate both parking on DFW lands and recreational uses. However, DFW is using parking areas and Area C consistent with current regulation and FGC declines to enact a change. FGC will work with DFW on implementation of the Ballona Restoration Plan.	Wildlife
2020-004	3/10/2020	Kyle De Julio	Trinity steelhead	Change the season opening for steelhead from April 1 to January 1 on the Trinity River mainstem from 250 feet downstream of Lewiston Dam to the Old Lewiston Bridge, and restrict boat access, except for those with disabilities.			4/15-16/2020	6/24-25/2020	DENY: Steelhead seasons and other fishing restrictions on the Trinity River will be analyzed during the upcoming simplification regulatory revision for anadromous waters.	Wildlife
2020-005 AM 1	4/9/2020	Mark Smith	Striped bass slot limit	Establish a slot limit on striped bass from 20-30 inches.			4/15-16/2020	6/24-25/2020	REFER to DFW for review and recommendation.	Wildlife



Tracking Number: (2020-003)

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: Walter Lamb, Ballona Wetlands Land Trust

Address: [REDACTED]

Telephone number: [REDACTED]

Email address: landtrust@ballona.org

2. Rulemaking Authority (Required) - Reference to the statutory or constitutional authority of the Commission to take the action requested: Fish and Game Code Section 1580 ["The commission may adopt regulations for the occupation, utilization, operation, protection, enhancement, maintenance, and administration of ecological reserves."]

3. Overview (Required) - Summarize the proposed changes to regulations: This petition proposes to amend Section 630 of the Code of California Regulations, Title 14 to strike the second sentence from paragraph (h)(3) so that it reads "Pets, including dogs and cats, are prohibited." The purpose of this proposed change is to maximize the native habitat potential for the ecological reserve by terminating incompatible uses. The Fish and Game Commission should evaluate each affected use independently, and make factual findings based on substantial evidence for each use in order to determine if some uses should continue.,

4. Rationale (Required) - Describe the problem and the reason for the proposed change: California taxpayers spent \$139 million 16 years ago to acquire the land which now makes up the Ballona Wetlands Ecological Reserve. This included approximately \$129 million of Proposition O public bond funds and \$10 million of Proposition 12 public bonds funds. Neither of these public bond fund measures was approved by the voters to provide parking space for non-ecological reserve use or to maintain baseball fields.

Section 630 currently provides the Department with discretion as to whether a more appropriate use of affected areas should take precedence over the existing uses. There is no question that these areas can and would be more appropriately used if the Department exercised that discretion, but the Department



has not done so. Instead, the Department has allowed these uses to continue without conducting any analysis to determine whether other uses of the affected land would be more appropriate, despite assuring this Commission in 2005 that it would undertake such an analysis. Therefore the only available remedy available to stakeholders of the ecological reserve is to request this regulatory change.

The Land Trust recognizes that each specific use potentially impacted by this petition has a different set of circumstances. The Commission should adopt separate factual findings, based on substantial evidence, to determine whether each of the following uses furthers the conservation goals of the state:

- Los Angeles County Department of Beaches and Harbors Parking
- Los Angeles Sheriff's Department Parking
- Commercial Parking (currently prohibited, with potential to return)
- Little League Baseball Fields

Los Angeles County currently pays the Department of Fish and Wildlife \$1,608 per year to lease approximately 254 parking spaces, the same amount it has paid since approximately 1995

Existing parking uses violate the public bond fund measures used to acquire the land, violate the temporary Coastal Development Permits issued in or around 1988, and violates the prohibition in the California Constitution against gifts of public funds, given the discrepancy between the fair market value of the parking spaces and what the County actually pays the Department pursuant to the lease agreement.

New Information:

Since the Commission last denied a similar petition at its June 2019 meeting, substantial new information has surfaced. Most notably, the Department's Director assured the Commission in April 2019 that the Department would not include a parking structure in its final environmental impact analysis. However, the final EIR released in December 2019 did, in fact include a parking structure.

At the Commission's December 2017 meeting, multiple Commissioners urged the Department's Regional Manager for Region 5 to include analysis in the final EIR of an alternative that removed some or all of the existing paved parking areas in the ecological reserve. However, the final EIR included no such analysis and instead cited the regulation which the Commission has so far declined to amend as justification for the existing parking areas.

Multiple entities, including the California Coastal Commission, suggested the need for a parking analysis to justify the high number of parking spaces being included in the draft EIR. However the final EIR included no such analysis.

This new information warrants a reconsideration of this issue by the Commission..

SECTION II: Optional Information



5. **Date of Petition: February 06, 2020**
6. **Category of Proposed Change**
☐ Sport Fishing
☐ Commercial Fishing
☐ Hunting
☒ Other, please specify: Ecological Reserves
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): 630
☐ 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 2017-002 and 2019-001**
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: As soon as practically possible, but not an emergency
10. **Supporting documentation:** Identify and attach to the petition any information supporting the proposal including data, reports and other documents: The Land Trust has previously provided a substantial record showing that the parking areas in question were created and maintained to further the interests of the County of Los Angeles, not to further the purposes of the ecological reserve. Those records should be incorporated into this petition by reference. We will provide additional documentation upon request.

The Ballona Wetlands Final EIR and Draft EIR are available on the CDFW site:
<https://www.wildlife.ca.gov/Regions/5/Ballona-EIR>

The archived audio of the 2005 Fish and Game Commission hearing is at http://cal-span.org/media/audio_files/cfg/cfg_05-08-19/cfg_05-08-19.mp3 and the discussion of the parking lots occurs at 223 minutes and 25 seconds (3:43.25).
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: Eliminating the existing parking lease with Beaches and Harbors and the Sheriff's Department would result in the loss of \$1,608 in annual lease payments for each lot, which is substantially below market value. The land Trust has offered to more than offset that amount if the paved lots can be converted to more appropriate use.
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: 2/6/2020

FGC staff action:

- ☐ Accept - complete
- ☐ Reject - incomplete
- ☐ Reject - outside scope of FGC authority

Tracking Number

Date petitioner was notified of receipt of petition and pending action: _____

Meeting date for FGC consideration: _____

FGC action:

- ☐ Denied by FGC
- ☐ Denied - same as petition _____
- ☐ Granted for consideration of regulation change

Tracking Number



Tracking Number: (2020-004)

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: Kyle De Juilio

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: State Special Regulation (14CCR 7.50)

3. Overview (Required) - Summarize the proposed changes to regulations: Change from existing regulation provided below to open dates of January 1 through September 15. Only artificial flies. Restrict boat access limited to those with disability.

Trinity River mainstem from 250 feet downstream of Lewiston Dam to the Old Lewiston Bridge.	April 1 through September 15. Only artificial flies	2 hatchery trout or Hatchery Steelhead
---	---	--

The Commission should consider the recommendation for changing the opening date from April 1 to January 1, independently of the restriction to boat access, excluding those with disability.

4. Rationale (Required) - Describe the problem and the reason for the proposed change: This fishery has been extended in the past related to flow management on the Trinity River, to provide for consistent or increased opportunity. Current flow management considerations merit another review of fishing opportunity in this reach. Additionally, research has shown that the hatchery impacts in this reach of river are high (Quinn and De Juilio 2012). The genetic impacts of straying salmon from the hatchery reduce the fitness of the naturally produced population. Redd superimposition is a concern in this reach of river as it exhibits the highest concentration of spawning for Chinook Salmon in the Trinity River (Gough et al. 2019). Hatchery steelhead spawn after salmon runs and cause impacts to salmon



eggs incubating in the gravels when they spawn in the same locations. Other concerns also include genetic, competition, and predation impacts to naturally produced stocks. There is reason to believe that juvenile salmon and salmon eggs are preyed upon by hatchery steelhead in freshwater environments (Naman 2008). These impacts of the hatchery steelhead program are affecting the most abundant runs of SONCC Coho Salmon, listed as threatened under the federal ESA, and Upper Klamath-Trinity River Spring-run Chinook Salmon, petitioned for listing under CESA and ESA, in California waters, and could be partially mitigated by the propose changes to State Special Regulation 14 CCR 7.50. Hatchery steelhead are released to the Trinity River to increase harvest opportunity, any fish in excess of those required for broodstock at the Trinity River Hatchery should be harvested to reduce their impacts to natural production.

A restriction to boat access, excluding those with disability, in this reach is recommended. This is due to the opinion from several local guides and anglers that those who are fishing from boats in this reach are often targeting holding spring Chinook Salmon during the summer months prior to spawning. These fish are currently petitioned for listing under the Federal ESA and CESA. The life history of these fish makes them vulnerable to fishing for an extended period of time in a limited reach below Lewiston Dam. However, we recognize that restricting boat access to anadromous waters would be a departure from current regulation and ask that you consider this suggestion independently from the change in opening date.

SECTION II: Optional Information

5. Date of Petition: 12/24/2019

6. Category of Proposed Change

- ☒ Sport Fishing
- ☐ Commercial Fishing
- ☐ Hunting
- ☐ Other, please specify:

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): 7.50
- ☐ 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 #2019-009
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: January 1, 2021

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



Naman, S. 2008. Predation By Hatchery Steelhead On Natural Salmon Fry In The Upper-Trinity River, California. A Thesis Presented to the Faculty of Humboldt State University.

Quinn, S. and K. De Juilio. 2012. An Assesment of Adult Hatchery Steelhead Straying Behavior Following Release into the Trinity River from 2009-2011. Yurok Tribal Fisheries Program – Trinity Division.

Gough, S. A., N. A. Som, S. Quinn, W. C. Matilton, A. M. Hill, and W. Brock. 2019. Mainstem Trinity River Chinook Salmon Spawning Survey, 2017. USFWS, Arcata California.

https://www.fws.gov/arcata/fisheries/reports/dataSeries/2017%20SpawningSurveyReport_FINAL.pdf

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: This would likely increase contributions to the local economy of Trinity County by anglers during the months of January, February, and March annually by paying for services including: food services, lodging, guides, tackle, fuel, and others.

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: 3/10/2020 |

FGC staff action:

- ☐ Accept - complete
- ☐ Reject - incomplete
- ☐ Reject - outside scope of FGC authority

Tracking Number

Date petitioner was notified of receipt of petition and pending action: |

Meeting date for FGC consideration: |

FGC action:

- ☐ Denied by FGC
- ☐ Denied - same as petition |
- ☐ Granted for consideration of regulation change

Tracking Number

An Assessment of Adult Hatchery Steelhead Straying Behavior Following Release into the
Trinity River from 2009-2011

Shane Quinn & Kyle De Juilio

Yurok Tribal Fisheries Program – Trinity Division



Abstract. - Current spawning protocols at Trinity River Hatchery (TRH) require that spawned and unspawned adult hatchery-produced steelhead are released back to the Trinity River after weekly egg-take quotas are met. To investigate the effects of this practice, we implanted TRH steelhead with PIT and radio-telemetry tags prior to being released from the hatchery to monitor movement and behavior during the 2009-2011 spawning seasons. During the three year study, tagged TRH steelhead strayed into monitored tributaries at an average rate of 9.9%, for a total of 216 straying incidents. The majority of tributary straying (67.1%) occurred in Deadwood Creek, which is the most proximal tributary to TRH. We observed that 53.5% of tagged TRH steelhead return to the hatchery after release, which corresponds with 874 tagged TRH steelhead that never returned. Of the 874 non-returns, 212 were observed to spend an average of 17.1 days in the uppermost 2 kilometers of the main stem Trinity River near TRH. The tagged steelhead that did return to TRH spent an average of 16.8 days in the river system before returning to the hatchery. We found that the current protocols at Trinity River Hatchery increase the potential for hatchery and natural populations to interact, both in the main stem Trinity River and its tributaries.

Table of Contents

Introduction:.....	4
Methods:	6
Study Area	6
Fish Collection and Tagging.....	7
Data Collection	9
Analysis.....	9
Detection Efficiencies	9
Tag Retention.....	10
Hatchery Returns	10
Straying	10
2010 Radio-telemetry from Willow Creek Weir	11
Results:.....	12
Detection Efficiencies	13
Tag Retention.....	13
Hatchery Returns	13
Tributary Straying.....	16
2010 Radio-telemetry at Willow Creek Weir	17
Discussion:	20
Acknowledgments:	21
Literature Cited:	22

List of Tables

Table 1. Run-size estimates from the CDFG Willow Creek weir for the six years prior to project implementation (2003 to 2008). Estimates are partitioned to include the hatchery and natural proportions of the overall in-river run-size estimates.	4
Table 2. Location, date, and number of adult TRH steelhead tagged.....	8
Table 3. Radio-telemetry monitoring sites for 2010 by section of main stem, plus length of each section (rkm).	11
Table 4. Yearly totals of PIT-tagged adult TRH steelhead during the three-year straying assessment.....	12
Table 5. Forklength data of tagged TRH steelhead	12
Table 6. Antenna detection efficiencies by year for each PIT monitoring site using the "in situ" method.	13
Table 7. Yearly totals of TRH tagged steelhead, returns, and time before recapture.....	14
Table 8. Male and female hatchery return rates and duration at-large after release, by year.	14

Table 9. Total number of tagged steelhead returning multiple times to TRH by year and sex. Number of returns is displayed in the top row.....	15
Table 10. Total number of tagged steelhead detected in monitored tributaries by sex and year.....	16
Table 11. Straying incidents detected in main stem and tributaries by year.....	17
Table 12. Average duration of straying incidents by monitoring site and year.....	17
Table 13. Total number and percentage of radio-tagged steelhead by final detection location moving upriver.....	18
Table 14. CDFG spaghetti tag recovery at TRH from 2006-2010 and tags recovered by the YTFP Steelhead Straying project in 2010*.....	19
Table 15. Average cumulative number of days it took for tagged steelhead to pass through each reach on their upward migration to TRH and the average migration rate through each of the main stem Trinity River radio-telemetry reaches.	19

List of Figures

Figure 1. Map of the study site, including radio-telemetry and PIT monitoring sites. The radio-telemetry sites were used during 2010, whereas PIT monitoring sites were used during all three years of study (2009-2011).....	6
Figure 2. Photo of the upstream antenna at the Rush Creek tributary PIT monitoring site.....	7
Figure 3. A three year comparison of male and female hatchery return rates for tagged TRH steelhead.	15
Figure 4. Tributary straying rates of male and female tagged TRH steelhead by year.	16
Figure 5. Number of tagged TRH steelhead detected at each of the main stem monitoring reaches.	18

Introduction:

Hatcheries were established throughout the Western United States to mitigate for declining salmon and steelhead populations (Hilborn 1992). Recent studies report that mixing hatchery and natural populations have a negative ecological impact on natural populations (McMichael et al. 1999; Kostow and Zhou 2006), and can result in decreased natural production and genetic viability (Reisenbichler and Rubin 1999; Quinn 2001; McLean et al. 2004).

In 1957, the Bureau of Reclamation began construction on the Trinity River Division (TRD) of the Central Valley Project, which transfers water from the Klamath Basin to the Sacramento Basin. The Division consists of a series of dams, lakes, power plants, tunnels, and other related facilities. At times, 90% of the Trinity River's flow was diverted to the Sacramento Basin, contributing to the decline of salmon and steelhead (*Oncorhynchus* spp.) populations (Stene 1994). Lewiston Dam, part of the TRD, was constructed in 1963 near Lewiston, California, and is now the uppermost limit of anadromous fish migration on the Trinity River. Trinity River Hatchery (TRH), located at the base of Lewiston Dam, was constructed to mitigate for the loss of 109 miles of anadromous fish habitat upstream of the dam (CDFG 1963).

Current protocols for TRH steelhead broodstock collection are designed to maintain run-timing characteristics of the natural population through weekly egg-take quotas. As a result, all steelhead arriving at the hatchery (regardless of natural/hatchery origin or spawning condition/ripeness) are released back to the Trinity River once the weekly egg-take quota is achieved. In 2007 and 2008, the two years prior to this project, in-river returns of TRH steelhead *Oncorhynchus mykiss* far exceeded the production goal of 22,000 for the Trinity Basin (Table 1). The increased hatchery return estimates caused concern among stakeholders and managers that hatchery practices could be negatively impacting naturally-produced steelhead stocks in the main stem Trinity River and tributaries. Furthermore, recent spawning surveys suggest TRH steelhead stray into tributaries close to the hatchery at an unknown rate (Hill 2008).

Table 1. Run-size estimates from the CDFG Willow Creek weir for the six years prior to project implementation (2003 to 2008). Estimates are partitioned to include the hatchery and natural proportions of the overall in-river run-size estimates.

Year	Hatchery Estimate	Natural Estimate	% TRH Steelhead of Total Run-size Estimate
2003	14,408	4,650	75.6%
2004	19,245	3,947	83.0%
2005	15,038	4,817	75.7%
2006	14,049	5,363	72.4%
2007	32,609	8,781	78.8%
2008	46,379	7,506	86.1%

During the steelhead spawning seasons of 2009-2011, the Yurok Tribal Fisheries Program (YTFFP) conducted a monitoring effort to determine whether the current protocols at TRH

increase the potential for hatchery and natural populations to interact, both in the main stem Trinity River and its tributaries. To investigate the potential for interaction, YTFP staff implanted TRH steelhead with PIT and radio-telemetry tags prior to being released from the hatchery to monitor movement and behavior.

The objectives of this project were to:

- 1) Verify and quantify straying of TRH-produced steelhead released back to the Trinity River after an initial return to TRH;
- 2) Determine spatial and temporal distribution of hatchery straying after being released back to the Trinity River;
- 3) Enumerate TRH steelhead returning to TRH multiple times;
- 4) Evaluate the stray rate of TRH steelhead prior to hatchery entrance.

Methods:

Study Area

The Trinity River is the largest tributary of the Klamath River Basin, the second largest river system in California, which drains approximately 31,000 km² in Northern California and Southern Oregon, with the Trinity River draining approximately 7,690 km² in California (Figure 1). It once supported large anadromous populations of fall and spring run Chinook salmon *Oncorhynchus tshawytscha*, coho salmon *O. kisutch*, and steelhead, as well as Pacific lamprey (*Lamptera tridentata*) and green sturgeon (*Acipenser medirostris*) that supported commercial and recreational fisheries, as well as cultural, subsistence, and commercial needs of native tribes throughout the region. The Klamath-Trinity River Basin is still an important producer of anadromous salmonids and the number one producer of steelhead in California (Hopelain 1998).

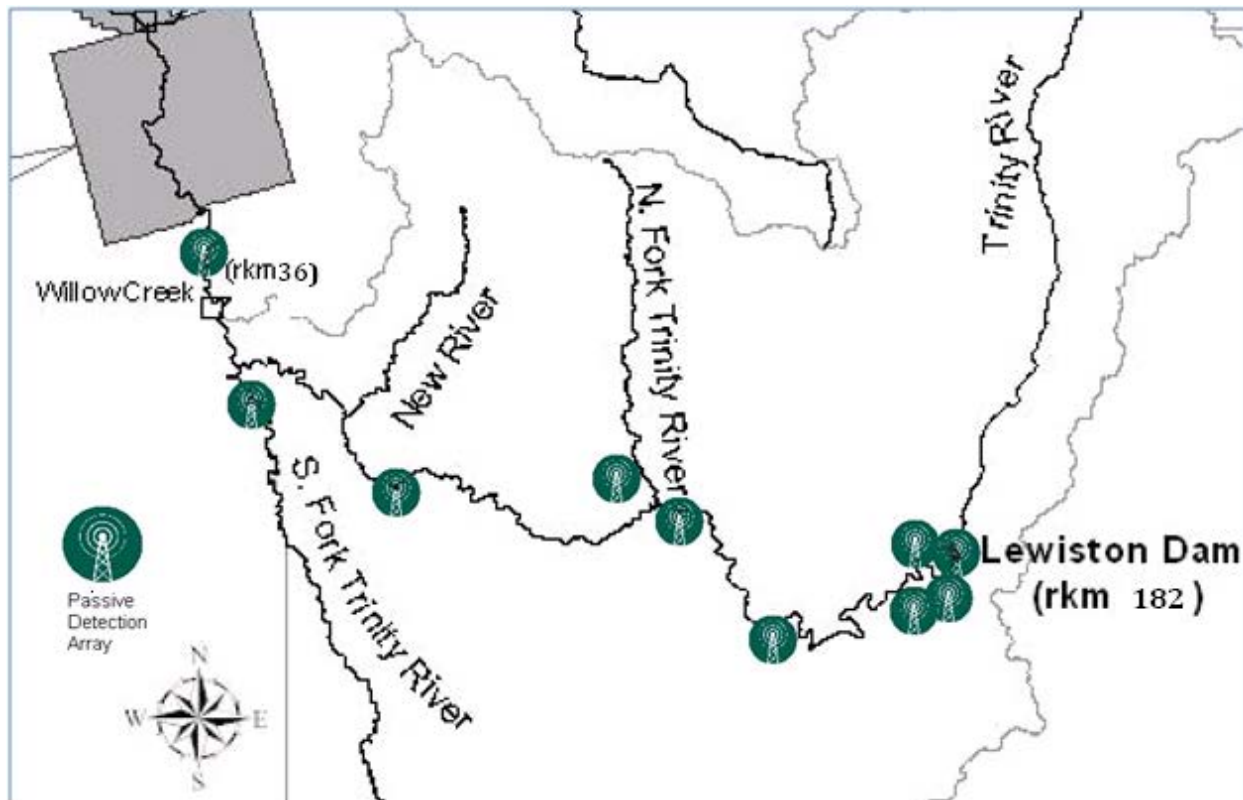


Figure 1. Map of the study site, including radio-telemetry and PIT monitoring sites. The radio-telemetry sites were used during 2010, whereas PIT monitoring sites were used during all three years of study (2009-2011).

The study area extended downstream from river kilometer (rkm) 182 at TRH to below Willow Creek, CA (rkm 36) where the California Department of Fish and Game (CDFG) operate an Alaskan style weir.

This study focused on the upper river and its tributaries found closest to Lewiston Dam, where flow regime is driven by releases from Lewiston Dam and there is very little tributary accretion. During the majority of this study, the water volume released from Lewiston Dam was at base flow, 300

cubic feet per second (cfs), and the end of the study coincided with spring dam releases beginning in late April and range from 2,000-11,000 cfs, depending on the water year type.

The first three streams below Lewiston Dam: Deadwood Creek (DC), Rush Creek (RC), and Grass Valley Creek (GVC), were monitored with Passive Integrated Transponder (PIT) scanning equipment. In addition, the two largest tributaries of the Trinity River, South Fork Trinity River (SFTR) and North Fork Trinity River (NFTR), were monitored using radio-telemetry equipment during 2010. The upper river tributaries (DC, RC, and GVC) were selected due to the increased potential of straying associated with their proximity to TRH, while the lower tributaries (SFTR and NFTR) were chosen because of size and overall importance to the entire Trinity River system.



Figure 2. Photo of the upstream antenna at the Rush Creek tributary PIT monitoring site.

Fish Collection and Tagging

Adult TRH steelhead were tagged with a PIT tag (*Texas Instruments*®: 23mm x 3.85mm, 0.6 g) to monitor their movements after they were released back to the Trinity River. Steelhead were collected during normal CDFG hatchery spawning operations conducted weekly each year beginning the first week of January through the second week of March. Fish entering the spawning facilities are anesthetized using CO₂ and examined to determine species, sex, and reproductive viability,

presence of clips or tags, and forklength. Hatchery personnel select fish for weekly gamete collection and all fish, regardless of whether it was spawned or not, are recycled back to the river by way of an outflow tube that terminates at the bottom of the hatchery fish ladder. To qualify for gamete collection, steelhead must be of hatchery origin, 41 cm in length or larger, and reproductively ripe. Only steelhead that met the hatchery qualifications and were not used during the weekly gamete collection were tagged. All fish were handled and tagged in accordance with industry standard protocols (Columbia Basin Fish and Wildlife Authority 1999). Forklength, sex, ripeness, and PIT tag number were recorded for each steelhead tagged. Tags were injected into the peritoneal cavity of the fish using a surgical grade 8-gauge hypodermic needle. The wound was dressed with *Duro*® quick drying gel adhesive, an effective alternative to applying sutures (Nemetz and Macmillan 1988). All tagged fish were immediately released down the outflow tube, in accordance with normal hatchery protocols.

During the 2009 TRH spawning season, a subsample of PIT-tagged steelhead (see Table 2) were randomly chosen to receive a double-mark, and were implanted with a radio-telemetry tag (*Sigma Eight*® Shark: 45mm x 17mm, 15.7 g). The double-marking technique is essential for evaluating tag retention (Bateman et al 2009). Adult fish could not be sedated using a narcotic agent due to potential human consumption; therefore, gastro-implantation was chosen over the more commonly used surgical implantation method. The gastro-implantation process reduces handling and recovery times in comparison to other surgical techniques (Keefer 2004). Radio-telemetry tags were inserted immediately prior to PIT tag injection. Tags were wrapped with bands of surgical tubing to prevent regurgitation and covered with glycerin to ease insertion into the stomach through the esophagus (Mellas and Haynes 1985).

The 2010 assessment was expanded to include an additional tagging location at the CDFG weir located in Willow Creek, CA. This weir has been operated annually since 1979 to monitor upstream migration timing and provide population estimates of anadromous salmonids for the entire Trinity River Basin. Tagging at the weir was performed during normal CDFG daily weir operations. All fish caught at the weir trap were examined by CDFG personnel to determine species, forklength, and overall health condition. All healthy salmonids were given a spaghetti tag (Floy® Tag FT-4 spaghetti tag) to determine annual run-size estimates for the Trinity River Basin, and a sub-sample of selected steelhead also received PIT and radio-telemetry tags. All tagged fish recovered in a modified fyke net trap in the river current before release above the weir in low flow.

Table 2. Location, date, and number of adult TRH steelhead tagged.

Year/Location	Dates of Tagging	PIT Tags	Radio Telemetry Tags
<i>2009</i>			
TRH	12/11/08 – 2/25/09	473	110
<i>2010</i>			
WC Weir	9/28/09 – 11/20/09	147	132
TRH	12/23/09 – 3/10/10	800	0
<i>2011</i>			
TRH	12/21/10 – 3/8/11	634	0
<i>Total</i>		<i>2054</i>	<i>242</i>

Data Collection

Adult TRH steelhead implanted with a PIT tag could be detected at any PIT monitoring sites in the upper Trinity River including tributaries, the main stem Trinity River, and TRH facilities (Figure 2). A PIT monitoring site is comprised of three components: a multiplexor unit (MUX), one or more in-stream antenna(e), and a power source. The antenna is a loop of insulated copper wire that emits an energy field and is connected to an *Oregon RFID®* MUX. The MUX controls the amperage and frequency of power transmitted to the antenna, and also receives and stores the PIT tag detections (tag ID code, date and time of detection). Tag detections occur when a tag is activated by coming into contact of the energy field, or “read range”, of the antenna and broadcasts its unique ID code. The read range of an antenna is determined by the size and shape of the antenna, the distance between the antenna and the multiplexor, and by localized electrical interference (e.g. nearby power lines, iron ore in streambed, etc.). As a result, the read ranges between antennas varied considerably with a range of 6” to 5’. All sites were installed with two antennae, so that directional movements (i.e. upstream/downstream) could be ascertained. The power source for each site was deep-cycle 12 V batteries connected to a solar panel (50w – 85w), or AC power was used if available. Data (detection histories) would be collected weekly by connecting the MUX to a laptop PC or PDA equipped with *PTLogger* software and performing a download.

The 242 steelhead that were double-tagged in 2009 & 2010 could also be detected by fixed-site and mobile radio tracking, in addition to detection at PIT monitoring sites. Fixed sites were equipped with a 3-element YAGI antenna connected to either a *Lotek®* SRX400 receiver or *Orion®* receiver and powered by deep-cycle 12 V batteries connected to a solar panel (50w – 85w). Antennas were placed two to three meters above the ground to maximize reception at each site (Mech 1983). Radio tags were programmed to broadcast over one frequency (164 MHz) using four separate channels, which reduced the scan time of the receivers. Receivers stored detection events, but had limited memory and were downloaded weekly with WINhost (*Lotek®*) or OrionTool (*Grant Systems Engineering®*) software. Mobile radio tracking was conducted by foot, boat, or car on a semi-weekly basis using a *Lotek®* receiver attached to a collapsible directional antenna. Tag detections were recorded by date and location (rkm), and monitored to determine if it was moving or stationary, potentially indicating regurgitation or mortality.

Analysis

Detection Efficiencies

Detection efficiencies of PIT antenna arrays are essential to determine the correct proportion of fish that exhibit a particular trait (Horton et al. 2007). In this study, low antenna detection efficiencies would potentially result in the underestimation of straying events. The primary method used to determine antenna efficiencies at each monitoring site is called ‘in situ efficiency’, and is commonly used in PIT studies (Zydlewski et al. 2006). This method provides efficiency estimates using detections at each site to compare antenna efficiencies at each site. Below is the antenna efficiency (E) equation used for either antenna, in this case it is the efficiency for antenna1:

$$E_{\text{antenna1}} = (d_{\text{common}}) / (d_{\text{unique antenna2}} + d_{\text{common}})$$

Where:

d_{common} = the number of tags detected by both antennae

$d_{\text{unique antenna2}}$ = the number of tags detected only at antenna2

In 2010, a second method to determine efficiencies was conducted with dummy tags by simulating a detection event at each tributary site and the hatchery ladder site. The same tags implanted in TRH steelhead were inserted into a rectangular piece of wood. The float test was performed at least twice at each site tested by releasing ten dummy tags roughly 30 feet upstream of the antennae array. The percentage of successful detections was then determined for both antennae by dividing the number of detections at each antenna by the number of tags that were known to have passed by the antenna.

Tag Retention

In 2010, a study of PIT and radio-telemetry tag retention was conducted. A total of 51 steelhead (26 male, 25 female) were processed, tagged, and released into a hatchery raceway instead of the outflow tube. In addition, 26 of the 51 (13 male, 13 female) were also implanted with radio tags. Tagged fish were held in the raceway and examined weekly to determine retention rates. Retention rate was estimated by dividing the number of tags detected each week by the total number of tags originally implanted.

Hatchery Returns

The number of tagged TRH steelhead that returned to the hatchery was determined by the number of valid tag detections at the final hatchery antenna at the entrance of the hatchery trap. To qualify as a valid hatchery return, the tag must be initially detected by the antenna at the exit of the hatchery outflow tube that recycles fish back to the river, then later detected at the final ladder antenna without any subsequent detections at the antenna placed “down-ladder” below the hatchery trap. This would indicate movement up the hatchery ladder without descending the ladder.

Multiple returns are defined as tagged TRH steelhead that return to the hatchery more than once after tagging. To qualify as a multiple return there needed to be at least two valid hatchery returns that were separated by hatchery spawning dates.

Hatchery return rates were determined by the number of tagged TRH steelhead that returned to the hatchery divided by the total number of TRH steelhead tagged. Return timing was calculated by summing the number of days between the date that the tagged steelhead returned to TRH spawning facilities and the date it was tagged. Since the return couldn't occur until the tagged fish returned to inside the spawning shed, the shortest time it would take to return would be roughly seven days (depending on holidays, scheduling changes, etc.) because the hatchery spawned steelhead only once per week. Differences in return rates and timing for males and females were analyzed using basic two-tailed *t*-tests.

Straying

The number of tagged TRH steelhead that strayed was determined from PIT detections at tributary monitoring sites and also the main stem PIT monitoring site located two kilometers downstream from TRH. A “main stem stray” was any tagged fish that spent at least 14 days above the Old Lewiston Bridge monitoring site and was not detected at TRH facilities or any tributary sites. No assumptions were made of undetected tagged fish. Straying rate was determined by the number of detections at a given PIT monitoring site divided by the total number of tagged steelhead. Duration of tributary straying incidents was determined by the

number of days from the first to the last detection within the tributary, while main stem straying duration was the days between tagging date and the last detection at the main stem antenna.

2010 Radio-telemetry from Willow Creek Weir

In 2010, an additional effort was conducted to assess migrational movements and straying of TRH steelhead prior to entrance into TRH facilities. A total of 132 TRH steelhead were tagged at the Willow Creek weir with radio-telemetry and PIT tags, and released after a brief recovery period. Seven stationary radio-telemetry sites and five passive pit arrays spread throughout 145 km of the main stem Trinity River and five different tributaries tracked migrational movements and potential straying of tagged TRH steelhead through six sections of the main stem Trinity River (Table 3). Additional movement information was gathered from manual radio tracking and information provided from anglers claiming reward tags. Migration rates (rkm/day) were also calculated from time elapsed between different site detections.

Table 3. Radio-telemetry monitoring sites for 2010 by section of main stem, plus length of each section (rkm).

Section	Lower Site	Upper Site	Length (in rkm)
1	WC Weir	Willow Creek	5
2	Willow Creek	Burnt Ranch	35
3	Burnt Ranch	North Fork	41
4	North Fork	Brown's Creek	25
5	Brown's Creek	Old Lewiston Bridge	35
6	Old Lewiston Bridge	Trinity River Hatchery	4

Results:

A total of 2,054 adult TRH steelhead were PIT-tagged over the three-year project. All fish were tagged at either TRH spawning facilities or at the Willow Creek weir (Table 4). Over 65% of tags were detected at least once (Figure 1).

Table 4. Yearly totals of PIT-tagged adult TRH steelhead during the three-year straying assessment.

Year	Tagging Dates	Total Tagged	Females Tagged	Males Tagged	Detection %
2009	12/4/2008 to 2/25/2009	473	231	242	64.7%
2010 Weir	9/28/2009 to 11/20/2009	147	64	83	38.1%
2010 TRH	12/23/2009 to 3/10/2010	800	385	415	75.1%
2011	12/21/2010 to 3/8/2011	634	365	269	61.0%

All tagged steelhead had forklength, sex, and spawning condition recorded. Average forklength remained fairly consistent throughout the three years of study (Table 5). Mean forklength for all steelhead was 62 cm (SD = 6 cm; range = 40-86 cm), with males at 63 cm (SD = 7 cm; range = 40-86 cm), and females at 62 cm (SD = 5 cm; range = 43-81 cm). Differences in average forklength between sexes was not significant ($P > .05$).

Table 5. Forklength data (including mean, range, and standard deviation) of tagged TRH steelhead

Year	Mean FL	Range	Standard Deviation
2009	65 cm	42 - 86 cm	6 cm
2010	62 cm	40 - 80 cm	4 cm
2011	61 cm	40 - 80 cm	7 cm
<i>Total</i>	<i>62 cm</i>	<i>40 - 86 cm</i>	<i>6 cm</i>

Detection Efficiencies

Antenna detection efficiencies using the “in situ” method ranged from 60% for the main stem site to 100% in the tributaries and at the hatchery ladder (Table 6). Due to a change in antenna configurations at the OB Main site in 2011, efficiencies could not be calculated for either antenna. No antenna was installed at GVC in 2009.

Efficiencies using the “dummy tag” method were 100% for all antennas tested. Sites tested consisted of TRH, DC, RC, and GVC. No tests were performed at the main stem site because of logistical constraints.

These antenna efficiencies were well within the typical antenna efficiencies described in the literature (Zydlewski et al. 2001; Connolly et al. 2008). Low detection efficiencies could have resulted in grossly underestimating the total amount of straying or hatchery returns, but with tributary and hatchery antennae efficiencies between 90-100% the straying and return estimates are likely to be close to the true value.

Table 6. Antenna detection efficiencies by year for each PIT monitoring site using the "in situ" method.

Location / Antenna	2009	2010	2011
TRH / A2	98.0%	100.0%	97%
OB Main / A1	86.1%	80.0%	N/A
OB Main / A2	63.6%	60.0%	N/A
DC / A1	100.0%	100.0%	100%
DC / A2	100.0%	100.0%	100%
RC / A1	90.9%	100.0%	90%
RC / A2	87.5%	100.0%	100%
GVC / A1	N/A	86.7%	88%
GVC / A2	N/A	86.7%	100%

Tag Retention

Weekly retention rates for PIT tags dropped from 100% the first week to 98% the second week, and down to 84% the final week. Retention rates for females and males were 84% and 96%, respectively. Radio tag retention rates were similar: 100% the first week, then down to 88% the second week. Male and female retention rates were 92% and 85%, respectively. All radio-tagged fish were released after two weeks due to deteriorating health conditions developed in the hatchery raceways.

Hatchery Returns

During the three-year project, 1,878 adult TRH steelhead were PIT-tagged after an initial return to TRH. An additional 29 tagged fish were not included in the hatchery return analysis because they were released on the last day of hatchery spawning operations and had no chance of returning to TRH. In total, 53.5% ($N = 1,004$) returned to TRH after being tagged. Returning

fish spent an average of 16.8 days in the river before returning to TRH. Total steelhead tagged, hatchery return rate, and duration spent at large varied between the three years of study (Table 7).

Table 7. Yearly totals of TRH tagged steelhead, returns, and time before return to TRH facilities.

Year	Tagged	Returns	Return Rate	Duration
2009	473	211	44.6%	17.1 days
2010	792	490	61.9%	17.1 days
2011	613	303	49.4%	16.2 days
<i>Total</i>	<i>1878</i>	<i>1004</i>	<i>53.5%</i>	<i>16.8 days</i>

In each year male steelhead returned at a significantly higher rate ($P = < .05$) than females (Figure 3). Female return rates ranged from 41.9% to 47.9%, while male return rates ranged from 47.1% to 74.8% (Table 8). Males took longer to return to TRH, with an average at-large duration of 18.4 days compared to 14.8 days for females.

Table 8. Male and female hatchery return rates and duration at-large after release, by year.

Year	Female Return Rate	Male Return Rate	Female Duration	Male Duration
2009	41.9%	47.1%	16.6 days	17.5 days
2010	47.9%	74.8%	14.4 days	18.7 days
2011	45.7%	54.3%	14.2 days	18.4 days
<i>Total</i>	<i>45.7%</i>	<i>61.6%</i>	<i>14.8 days</i>	<i>18.4 days</i>

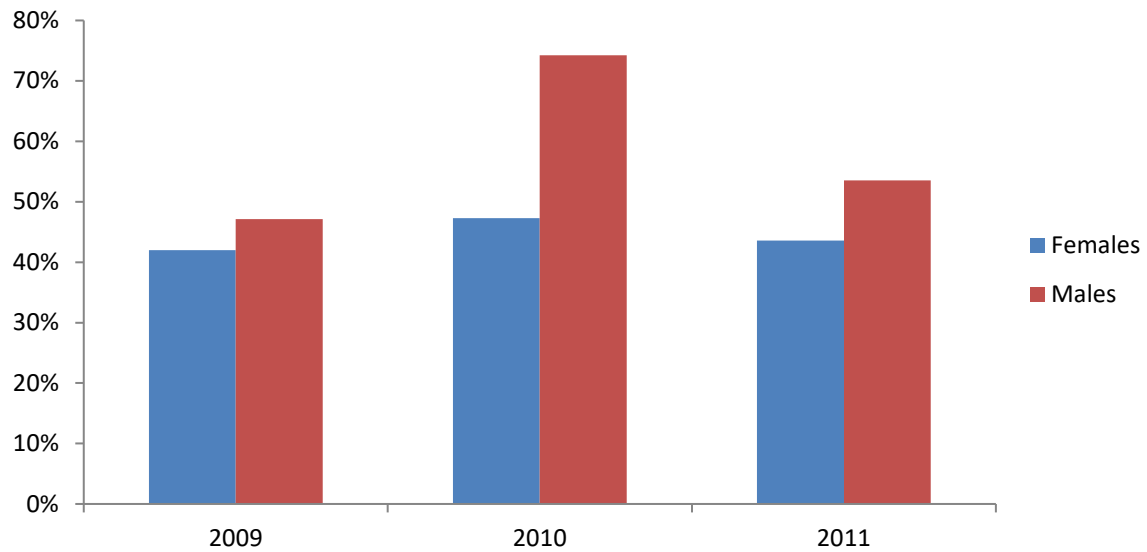


Figure 3. A three year comparison of male and female hatchery return rates for tagged TRH steelhead.

A total of 393 (20.9%) of all tagged steelhead returned multiple times to TRH (Table 9), and 39.1% of fish returning once made multiple returns. Males returned multiple times at a rate of 33.3%, while 9.1% of females returned multiple times.

Table 9. Total number of tagged steelhead returning multiple times to TRH by year and sex. Number of returns is displayed in the top row.

Year	1	2	3	4+
2009	211	61	7	1
2010	490	239	125	63
2011	303	93	36	15
<i>Males</i>	<i>566</i>	<i>306</i>	<i>147</i>	<i>77</i>
<i>Females</i>	<i>438</i>	<i>87</i>	<i>21</i>	<i>2</i>
<i>Total</i>	<i>1004</i>	<i>393</i>	<i>168</i>	<i>79</i>

Tributary Straying

A total of 189 TRH steelhead strayed into the three monitored tributaries (Table 10), for an overall straying rate of 9.9%, with females straying at a rate of 5.4% and males at a rate of 14.7%. Steelhead straying varied annually, but males always strayed at a greater rate than females (Figure 4). In 2009, the total straying rate was 4.4%, with males straying at a rate of 5.8% and females at a rate of 3.0%. In 2010, the total straying rate was 16.3%, with males straying at a rate of 22.6% and females at a rate of 9.2%. In 2011, the total straying rate was 6.6%, with males straying at a rate of 10.7% and females at a rate of 2.7%.

Table 10. Total number of tagged steelhead detected in monitored tributaries by sex and year.

Year	Tagged	Tributary Strays	Male Strays	Female Strays
2009	473	21	14	7
2010	800	129	93	36
2011	634	39	29	10
<i>Total</i>	<i>1907</i>	<i>189</i>	<i>136</i>	<i>53</i>

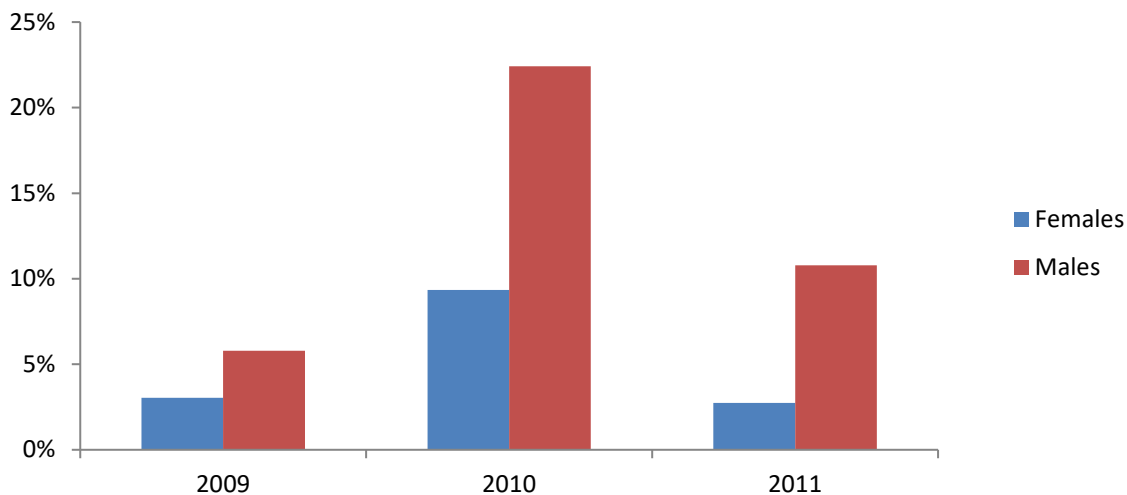


Figure 4. Tributary straying rates of male and female tagged TRH steelhead by year.

Straying incidents occurred each year in all of the tributaries that were monitored during this study (Table 11). Deadwood Creek had the greatest incidence of tributary straying, comprising 67.1% of all tributary straying detections. Rush Creek and Grass Valley Creek experienced similar amounts of straying during the two years that both tributaries were monitored (Table 11).

Main stem straying was defined in this study as any tagged fish that was detected at the Old Lewiston Bridge monitoring site and had spent at least 14 days in the reach directly below the hatchery and was never detected in a tributary. There was a higher occurrence of main stem straying than tributary straying in 2009 and 2011, but not in 2010 (Table 11).

Table 11. Straying incidents detected in main stem and tributaries by year.

Year	Main stem Below TRH	Deadwood Creek	Rush Creek	Grass Valley Creek
2009	88	13	10	n/a
2010	63	107	22	22
2011	61	25	8	9
<i>Total</i>	<i>212</i>	<i>145</i>	<i>40</i>	<i>31</i>

The average duration of each straying incident was similar throughout the monitored tributaries (Table 12), with the exception of Rush Creek in 2009 where one female remained upstream of the PIT antennae for 28 days. This female was witnessed building a redd above the monitoring site by the field crew.

Table 12. Average duration of straying incidents by monitoring site and year.

Year	Main Stem Below TRH	Deadwood Creek	Rush Creek	Grass Valley Creek
2009	15.8	5.8	10.2	n/a
2010	16.4	5.9	4.9	4.9
2011	19.4	4.1	4.8	3
<i>Avg.</i>	<i>17.1</i>	<i>5.5</i>	<i>6.5</i>	<i>4.2</i>

2010 Radio-telemetry at Willow Creek Weir

Of the 132 radio-tagged fish, a total of 99 (75%) were detected at least once upstream of the weir, four (3%) were found dead on the weir from tagging mortalities, six (4.5%) were detected by manual tracking downstream of the weir but never above the weir, and 23 (17.5%) were never detected by either tag type at the 12 monitoring locations, or by manual tracking.

Three tagged TRH steelhead (2.3%) were detected straying into tributaries prior to entry into TRH, including one female detected straying into NFTR that was never detected again, and two males that strayed into RC and DC for less than two days, then continued upstream to TRH.

Forty-five (35%) of 128 tagged steelhead successfully completed the upstream migration from Willow Creek weir to TRH. Therefore, 83 (65%) didn't fully migrate upstream (i.e. returned to ocean, shed both tags, caught in the sport fishery, strayed, or were mortalities). Reaches 1 and 6 had significantly higher tag disappearances than other reaches combining for 66.2% of all the missing tags (Figure 5, Table 13).

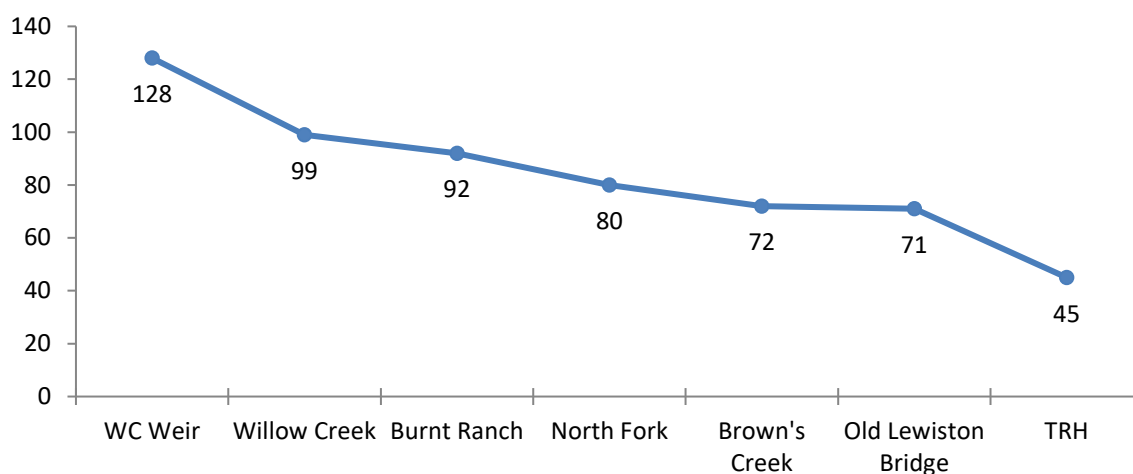


Figure 5. Number of tagged TRH steelhead detected at each of the main stem monitoring reaches.

Table 13. Total number and percentage of radio- tag loss (or final known location) of tagged steelhead migrating upstream.

	Reach 1	Reach 2	Reach 3	Reach 4	Reach 5	Reach 6
Tags Disappeared Within Reach	29	7	12	8	1	26
% of Total Disappeared Tags	34.9%	8.4%	14.5%	9.6%	1.2%	31.3%

The tag recovery rate at TRH of 35% of tagged steelhead from the Willow Creek weir is within the 17% to 42% spaghetti tag recovery rate reported by CDFG from 2006 to 2010, although it is on the higher end (Table 14).

Table 14. CDFG spaghetti tag recovery at TRH from 2006-2010. “*” indicates tags recovered by the YTFP Steelhead Straying project in 2010.

Year	2006	2007	2008	2009	2010	2010*
Total Tagged	1975	3404	4216	775	1437	128*
Recovered at TRH	828	949	892	128	332	45*
% Recovered	42%	28%	21%	17%	23%	35%*

Upriver migration rates of steelhead were highly variable between reaches (Table 15), averaging 1.41 km/day from the weir to TRH (102.7 total days). The maximum migration rate was 4.8 km/day between Brown’s Creek and the Old Lewiston Bridge main stem monitoring sites. The minimum migration rate was 0.88 km/day in the uppermost reach between Old Lewiston Bridge and TRH.

Table 15. Average cumulative number of days it took for tagged steelhead to pass through each reach on their upward migration to TRH and the average migration rate through each of the main stem Trinity River radio-telemetry reaches.

Reach	1	2	3	4	5	6
Average Day	7.2	22.2	64.2	72.5	89.1	102.7
Average Migration Rate (km/day)	2.4	4.6	4.1	2.9	4.8	.88

Discussion:

We found that the current protocols at Trinity River Hatchery increase the potential for hatchery and natural populations to interact, both in the main stem Trinity River and its tributaries. Our results show that TRH steelhead stray into tributaries after being released back into the Trinity River at a rate of 9.9%, and when main stem strays are included, the straying rate increases to over 21%, and can be directly attributed to the current hatchery practice of releasing TRH-produced steelhead back to the Trinity River because if they were not released back to the river, there would be no additional opportunity for these fish to stray. In other river systems it has been observed that the straying of hatchery fish pose threats to wild salmon and steelhead populations (Quinn 1993). The majority of detected straying incidents occurred within two kilometers of the TRH ladder, though tributary straying was detected in all monitored tributaries. This practice conflicts with the Steelhead Restoration and Management Plan for California (McEwan 1996) that states, “Existing hatchery and rearing programs will be operated to minimize impacts to natural stocks to the maximum extent possible”. There was no documentation found that listed any specific reason why TRH steelhead are released back into the Trinity River.

Radio-telemetry data provided by tagging at the Willow Creek weir suggests there is a low rate (2.3%) of tributary straying by TRH steelhead prior to returning to the hatchery. Compared to the 9.9% straying rate of TRH steelhead released from TRH back to the river, it is clear that the current TRH protocol of releasing adult TRH steelhead back into the Trinity River greatly increases the hatchery impact on the natural salmon and steelhead populations within the Trinity River, especially in the upper river and tributaries. The most significant impact from the current TRH protocol is the addition of more hatchery fish to the natural spawning population, but at a minimum, the current protocol increases the number of hatchery steelhead in the river system and it has been observed that increased numbers of hatchery fish pose conservation risks to wild salmonids (Waples 1991; Currens et al. 1997). These concerns include potential negative competitive interactions (Flagg et al. 2000; Kostow and Zhou 2006; Kostow 2009), disease transfer (Currens et al. 1997; Amos and Thomas 2002), and interbreeding with wild salmonids (Waples 1991; Kostow et al. 2003; Hayes et al. 2004; Araki et al. 2007).

According to the straying data, male TRH steelhead have a greater impact on the natural salmon and steelhead populations within the Trinity River because of the increased straying rate versus female TRH steelhead (14.7% to 5.4%). Also, hatchery return data showed that 33.3% of male TRH steelhead returned to the hatchery multiple times, which provides an opportunity for male TRH steelhead to be used multiple times throughout the season’s spawning procedures.

The Willow Creek weir migration data provided hatchery return rates similar to tag recovery data provided by the CDFG spaghetti tagging effort. The 35% hatchery return rate of the radio-telemetry tags fell within the range of spaghetti tag recoveries from the past five year (17% to 42%), and the radio-telemetry data provided insight into where most of these tags are lost. Tag loss can be defined as tags that fail to continue upstream migration, whether this is due to predation, sport fishing, straying, or actual tag loss. Our data showed that there were two areas where the majority of tags were lost: either during the first five kilometers above the Willow Creek weir or during the last five kilometers below Trinity River Hatchery. The 31.3% tag loss observed in the upper reach below the Lewiston Dam is most likely main stem straying of hatchery produced steelhead, which has been the reach documented as having the greatest

occurrence of straying for all salmonid species in the Trinity River (Chamberlain et al. 2012). The 22% loss of radio-telemetry tags below the weir represent an even greater insight into the spaghetti tag estimates provided by CDFG, and the possibility that CDFG is not adequately estimating the number of spaghetti tagged fish that fail to continue their upstream migration after being caught at the weir. The spaghetti tags are used to estimate the total in-river escapement for the Trinity River basin, including the proportions of natural and hatchery produced salmon and steelhead that spawn in natural areas. If the CDFG spaghetti tag data is comparable to our radio telemetry data, and 22% of the spaghetti-tagged fish at the Willow Creek weir turn downstream and never migrate past the weir, then the in-river and natural area spawner estimates of hatchery produced steelhead provided by CDFG may be grossly over-estimated.

We recommend that the managers of TRH change the current hatchery protocol that requires all TRH steelhead to be released back to the Trinity River. The current protocols are negatively influencing the natural salmon and steelhead populations within the Trinity River and its tributaries by providing additional opportunity for interaction. These practices may also be having a deleterious genetic effect on the TRH steelhead population from allowing male TRH steelhead to contribute on multiple spawning occasions: so, male TRH steelhead should be removed from the system once they return to the hatchery, or at least all re-run male steelhead should not be spawned. Also, we recommend that further evaluation is needed on the CDFG weir spaghetti tagging effort, and the possibility of the spaghetti tag data drastically over-estimating the in-river return estimates due to run-back steelhead that return downstream after being caught at the weir.

Acknowledgments:

The authors of this report and the Yurok Tribe would like to express their gratitude and appreciation to the all of the people who provided the access and support necessary to complete this project. This effort would have never been possible without the cooperation of land owners such as, Eugenia Hardt, Jennette and Dennis Palla, West Valley Sand and Gravel, Willow Creek Community Service District, the Burnt Ranch Transfer station, Bureau of Land Management, California Department of Fish and Game, and the District of Water Resources. We would like to thank Wade Sinnen, Mary Claire Kier, Laird E. Marshal, Jr., Larry Glenn, and Linda Radford from CDFG for granting us access to hatchery steelhead at both the Willow Creek weir and the Trinity River Hatchery. We would like to extend a special thanks to Warren Leach from Oregon RFID for providing excellent technical support throughout the study. The continued support of Tim Hayden and Dave Hillemier allowed us to see this project to fruition. Thank you to Nina Hemphill of the Bureau of Reclamation for providing funding for this project.

Literature Cited:

- Amos, K., and J. Thomas. 2002. Disease interaction between wild and cultured fish: observations and lessons learned in the Pacific Northwest. *Bulletin of the European Association of Fish Pathologists* 22: 95-102.
- Araki, H., W. R. Ardren, E. Olsen, B. Cooper, and M. S. Blouin. 2007. Reproductive success of captive-bred steelhead trout in the wild: evaluation of three hatchery programs in the Hood River. *Conservation Biology* 21: 181-190.
- Bateman, D. S., R. E. Gresswell, and A. M. Berger. 2009. Passive integrated transponder tag retention rates in headwater populations of coastal cutthroat trout. *North American Journal of Fisheries Management* 29: 653-657.
- Berntson, E. A., R. W. Carmichael, M. W. Flesher, E. J. Ward, P. Moran. 2011. Diminished reproductive success of steelhead from a hatchery supplementation program. *Transactions of the American Fisheries Society* 140: 685-698.
- California Department of Fish and Game. 1963. The Trinity River Salmon and Steelhead Hatchery. California Department of Fish and Game, Sacramento.
- Chamberlain, C. D., S. Quinn, and W. Matilton. 2012. Distribution and abundance of Chinook salmon redds in the main stem Trinity River 2002 to 2011. U.S. Fish and Wildlife Service. Arcata Fish and Wildlife Office, Arcata Fisheries Technical Report TR 2012-16, Arcata, California.
- Columbia Basin Fish and Wildlife Authority. 1999. PIT tag marking procedures manual. Prepared by: Columbia Basin Fish and Wildlife Authority PIT Tag Steering Committee. Version 2.0.
- Connolly, P. J., I. G. Jezorek, K. D. Martens, and E. F. Prentice. 2008. Measuring the performance of two stationary interrogation systems for detecting downstream and upstream movement of PIT-tagged salmonids. *North American Journal of Fisheries Management* 28: 402-417.
- Currens, K. P., A. R. Hemmingsen, R. A. French, D. V. Buchanan, C. B. Schreck, and H. W. Li. 1997. Introgression and susceptibility to disease in a wild population of rainbow trout. *North American Journal of Fisheries Management* 17: 1065-1078.
- Hayes, S. A., M. H. Bond, C. V. Hanson, and R. B. Macfarlane. 2004. Interactions between endangered wild and hatchery salmonids: can the pitfalls of artificial propagation be avoided in small coastal streams? *Journal of Fish Biology* 65: 101-121.
- Hilborn, R. 1992. Hatcheries and the future of salmon in the Northwest. *Fisheries* 17:1-8.
- Hill, A. 2008. Trinity River tributaries steelhead spawning survey report. Anadromous Fisheries Resource Assessment Monitoring Program, California Department of Fish and Game, Sacramento.
- Hopelain, J. S. 1998. Age, growth, and life history of Klamath River Basin steelhead (*Oncorhynchus mykiss irideus*) as determined from scale analysis. California Department of Fish and Game, Inland Fisheries Division. Administrative Report 98-3.

- Horton, G. E., T. L. Dubreuil, and B. H. Letcher. 2007. A model for estimating passive integrated transponder (PIT) tag antenna efficiencies for interval-specific emigration rates. *Transactions of the American Fisheries Society* 136: 1165-1176.
- Keefer, M. L., C. A. Peery, R. R. Ringe, and T. C. Bjornn. 2004. Regurgitation rates of intragastric radio transmitters by adult Chinook salmon and steelhead during upstream migration in the Columbia and Snake rivers. *North American Journal of Fisheries Management* 24: 47-54.
- Kostow, K. E., A. R. Marshall, and S. R. Phelps. 2003. Naturally spawning hatchery steelhead contribute to smolt production but experience low reproductive success. *Transactions of the American Fisheries Society* 132: 780-790.
- Kostow, K. E., and S. Zhou. 2006. The effect of an introduced summer steelhead hatchery stock on the productivity of a wild winter steelhead population. *Transactions of the American Fisheries Society*, 135:825-841.
- Kostow, K. 2009. Factors that contribute to the ecological risks of salmon and steelhead hatchery programs and some mitigating strategies. *Reviews in Fish Biology and Fisheries* 19: 9-31.
- Lindsay, R. B., K. R. Kenaston, and R. K. Schroeder. 2001. Reducing impacts of hatchery steelhead programs. Oregon Department of Fish and Wildlife, Portland.
- McEwan, D., and T. A. Jackson. 1996. Steelhead restoration and management plan for California. California Department of Fish and Game, Sacramento.
- McLean, J. E., P. Bentzen, and T. P. Quinn. 2004. Differential reproductive success of sympatric, naturally spawning hatchery and wild steelhead, *Oncorhynchus mykiss*. *Environmental Biology of Fishes* 69: 359-369.
- McMichael, G. A., T. N. Pearsons, and S. A. Leider. 1999. Behavioral interactions among hatchery-reared steelhead smolts and wild *Oncorhynchus mykiss* in Natural Streams. *North American Journal of Fisheries Management* 19: 948-956.
- Mech, L. D. 1983. Handbook of animal radio-tracking. University of Minnesota Press, Minneapolis.
- Mellas, E. J., and J. M. Haynes. 1985. Swimming performance and behavior of rainbow trout (*Salmo gairdneri*) and white perch (*Morone Americana*): effects of attaching telemetry transmitters. *Canadian Journal of Fisheries and Aquatic Sciences* 42: 488-493.
- Nemetz, T. G., J. R. Macmillan. 1988. Wound healing of incisions closed with a cyanoacrylate adhesive. *Transactions of the American Fisheries Society* 117/2: 190-195.
- Quinn, T. P. 1993. A review of homing and straying of wild and hatchery-produced salmon. *Fisheries Research* 18: 29-44.
- Reisenbichler, R. R., and S. P. Rubin. 1999. Genetic changes from artificial propagation of Pacific salmon affect the productivity and viability of supplemented populations. *ICES Journal of Marine Science* 56: 459-466.

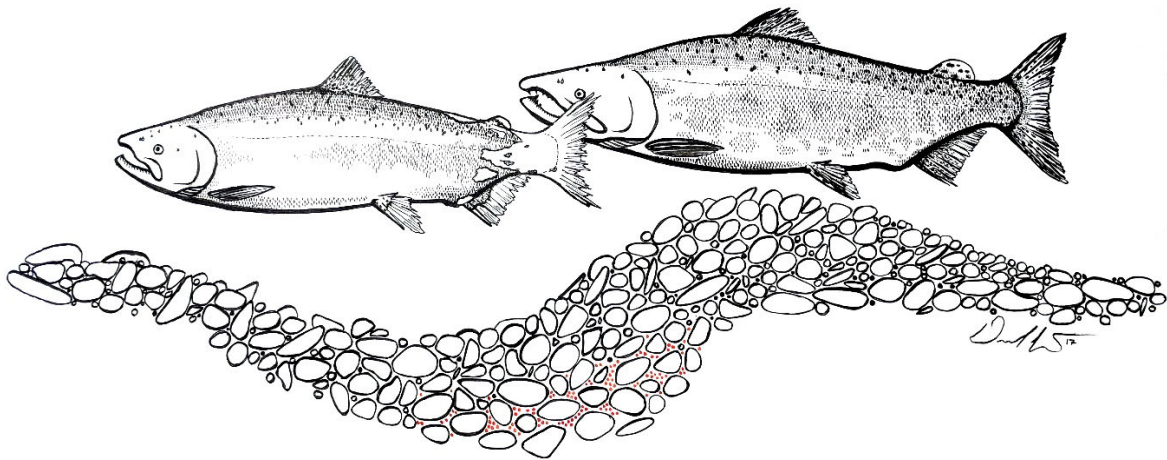
- Schemmel, E., S. Clements, C. Schreck, and D. Noakes. 2012. Using radio telemetry to evaluate the success of a hatchery steelhead recycling program. *American Fisheries Society Symposium* 76: 371-378.
- Stene, E. 1994. Central Valley Project Trinity River Division. Bureau of Reclamation History Program. Available at www.usbr.gov/dataweb/html/trinity.html (January 2004).
- Waples, R. S., G. A. Winans, F. M. Utter, and C. Mahnken. 1990. Genetic approaches to the management of Pacific salmon. *Fisheries* (Bethesda) 15(5): 19-25.
- Waples, R. S. 1991. Genetic interactions between hatchery and wild salmonids: lessons from the Pacific Northwest. *Canadian Journal of Fisheries and Aquatic Sciences* 48: 124-133.
- Zydlewski, G. B., A. Haro, K. G. Whalen, and S. D. McCormick. 2001. Performance of stationary and portable passive transponder detection systems for monitoring of fish movements. *Journal of Fish Biology* 58: 1471-1475.
- Zydlewski, G., G. E. Horton, T. L. Dubreuil, B. H. Letcher, S. Casey, and J. Zydlewski. 2006. Remote monitoring of fish in small streams: a unified approach using PIT tags. *Fisheries* 31: 492-502.

U.S. Fish & Wildlife Service

Arcata Fisheries Data Series Report DS 2019-62

Mainstem Trinity River Chinook Salmon Spawning Survey, 2017

Stephen A. Gough¹, Nicholas A. Som¹, Shane Quinn², William C. Matilton³,
Andrew M. Hill⁴, and William Brock⁵



U.S. Fish and Wildlife Service¹
Arcata Fish and Wildlife Office
1655 Heindon Road, Arcata, California 95521
(707) 822-7201

Yurok Tribal Fisheries Program²
Willow Creek, California 95573
(530) 629-3333

Hoopa Valley Tribal Fisheries Department³
Hoopa, California 95546
(530) 625-4267

California Department of Fish and Wildlife⁴
Weaverville, California 96093
(530) 623-5309

U.S. Forest Service⁵
Shasta-Trinity National Forest
Weaverville Ranger District
Weaverville, California 96093
(530) 623-2121



July 2019



Arcata Fish and Wildlife Office participation in this study was funded by the U.S. Fish and Wildlife Service. Participation of the Yurok Tribal Fisheries Program, Hoopa Valley Tribal Fisheries Department, and California Department of Fish and Wildlife was funded by the U.S. Bureau of Reclamation and the U.S. Fish and Wildlife Service. Shasta–Trinity National Forest participation was funded by the U.S. Forest Service.

Disclaimer: The mention of trade names or commercial products in this report does not constitute endorsement or recommendation for use by the Federal Government.

The Fish and Aquatic Conservation Program of the Arcata Fish and Wildlife Office reports its study findings through two publication series. The **Arcata Fisheries Data Series** was established to provide timely dissemination of data to managers and for inclusion in agency databases. **Arcata Fisheries Technical Reports** publish scientific findings from single and multi-year studies that have undergone more extensive peer review and statistical testing. Additionally, results of Program studies may be published in a variety of peer-reviewed technical journals. To ensure consistency with Service policy, Arcata Fisheries Data Series and Technical Reports are distributed electronically and made available in the public domain. Paper copies are no longer produced and circulated.

key words: carcass, Chinook Salmon, escapement, hatchery, pre-spawn mortality, redd, restoration, Trinity River

The correct citation for this report is:

Gough, S. A., N. A. Som, N. S. Quinn, W. C. Matilton, A. M. Hill, and W. Brock. 2019. Mainstem Trinity River Chinook Salmon spawning survey, 2017. U.S. Fish and Wildlife Service. Arcata Fish and Wildlife Office, Arcata Fisheries Data Series Report Number DS 2019–62, Arcata, California.

Table of Contents

	Page
List of Tables.....	iv
List of Figures	v
List of Appendices.....	vi
Introduction	2
Methods.....	4
Survey Area and Timing.....	4
Redd Identification.....	4
Carcasses Estimation.....	4
Pre-Spawn Mortality	5
Redd–Carcass Relationship	7
Trends in Redd Abundance and Distribution	7
Results.....	11
Survey Success and Conditions	11
Salmon Carcasses.....	11
<i>Carcass Estimates</i>	14
<i>Pre-spawn Mortality</i>	14
Salmon Redds.....	16
<i>Redd–Carcass Relationship</i>	19
<i>Redd Abundance and Distribution: System Scale</i>	19
<i>Redd Abundance and Distribution: Reach Scale</i>	22
<i>Redd Abundance and Distribution: Site Scale</i>	22
Discussion	28
Acknowledgements.....	30
Literature Cited	31
Appendices	33

List of Tables

	Page
Table 1. Reach boundaries [and river kilometer (rkm)] for the mainstem Trinity River, California, salmon spawning surveys.	6
Table 2. The reach- and site-scale sections used for redd abundance and distribution analysis within the restoration reach.	9
Table 3. River sections [with river kilometer (rkm)] used for the reach-scale analysis of redd abundance.	10
Table 4. Summary of fresh (conditions 1 and 2) Chinook Salmon carcass data by survey reach, 2017 Trinity River surveys.	12
Table 5. Coded-wire tag (CWT) information retrieved from fresh adipose fin-clipped Chinook Salmon carcasses, 2017 Trinity River surveys.	12
Table 6. Summary of fresh (conditions 1 and 2) Coho Salmon carcass data by survey reach, 2017 Trinity River surveys.	13
Table 7. Pre-spawn mortality rates of Chinook Salmon in the Trinity River below Lewiston Dam (Reaches 1–14) and in the restoration reach (Reaches 1–7), 2009–2017 surveys.	14
Table 8. Pre-spawn mortality rates of natural- and hatchery-origin Coho Salmon, Trinity River surveys, 2009–2017.	15
Table 9. Redd counts (before species differentiation) by week and reach, Trinity River surveys 2017.	16
Table 10. Estimated numbers and bootstrap-generated 95% confidence intervals of salmon redds by species and origin observed in the mainstem Trinity River, 2017.	17

List of Figures

	Page
Figure 1. Survey Reaches 1–14 (Lewiston Dam to Weitchpec) on the mainstem Trinity River, California.	5
Figure 2. The ten sections of the mainstem Trinity River used for reach-scale analyses of Chinook Salmon redd distribution.	10
Figure 3. Distribution of coded-wire-tagged (CWT) spawned female Chinook Salmon carcasses by brood type (spring and fall) located in the mainstem Trinity River downstream of Lewiston Dam in 2017.	13
Figure 4. Weekly pre-spawn mortality from fresh (conditions 1 and 2) female Chinook Salmon carcasses, Trinity River surveys 2017.	15
Figure 5. Spatiotemporal distribution of mainstem Trinity River salmon redds from Lewiston Dam to Weitchpec, 2017.	18
Figure 6. Relationship between counts of <i>ln</i> -transformed Chinook Salmon redds and <i>ln</i> -transformed estimates of spawned female Chinook Salmon carcasses in Survey Reaches 1 and 2 (solid line), 2012–2017.	19
Figure 7. Estimated number of redds constructed in the entire mainstem Trinity River (left), within the restoration reach (center), and downstream (DS) of the restoration reach (right) by all Chinook Salmon (top), natural-origin Chinook Salmon (middle), and hatchery-origin Chinook Salmon (bottom) from 2002 to 2017.	20
Figure 8. Mean distance from Lewiston Dam of redds constructed by natural- (left) and hatchery-origin (right) Chinook Salmon females between Lewiston Dam and Cedar Flat (0–102.8 km from Lewiston Dam; Reaches 1–10) on the mainstem Trinity River, 2002–2017.	21
Figure 9. Estimated number of mainstem Trinity River natural-origin Chinook Salmon redds within ten reach-scale sections, 2002–2017.	24
Figure 10. Proportions of mainstem Trinity River natural-origin Chinook Salmon redds relative to the total mainstem count of natural-origin Chinook Salmon redds within ten reach-scale sections, 2002–2017.	25
Figure 11. Estimated number of mainstem Trinity River hatchery-origin Chinook Salmon redds within ten reach-scale sections, 2002–2017.	26
Figure 12. Proportions of mainstem Trinity River hatchery-origin Chinook Salmon redds relative to the total mainstem count of hatchery-origin Chinook Salmon redds within ten reach-scale sections, 2002–2017.	27

List of Appendices

	Page
Appendix A. Trinity River water visibility by week and reach throughout the 2017 survey period.	33
Appendix B. Trinity River mean daily discharge at Lewiston (USGS Gage 11525500) and Hoopa, California (USGS Gage 11530000) during the 2017 survey season.	34
Appendix C. Pre-spawn mortality numbers by week and reach of unmarked and ad-clipped fresh (conditions 1 and 2) female Chinook Salmon carcasses, mainstem Trinity River surveys 2017.	35
Appendix D. Proportion of TRRP restoration reach natural-origin Chinook Salmon redds within site-scale sections, 2002–2017.	36
Appendix E. Proportion of natural-origin Chinook Salmon redds within site-scale sections in the TRRP restoration reach that encompass mechanical channel rehabilitation locations, 2002–2017.	42
Appendix F. Natural-origin Chinook Salmon redd counts versus estimates of pre-spawn mortality from Lewiston Dam to the North Fork confluence, Trinity River surveys, 2009–2017.	45

Mainstem Trinity River Chinook Salmon Spawning Survey, 2017

Stephen A. Gough¹, Nicholas A. Som¹, Shane Quinn², Billy C. Matilton³,
Andrew M. Hill⁴, and William Brock⁵

¹ U.S. Fish and Wildlife Service, Arcata Fish and Wildlife Office
1655 Heindon Road, Arcata, California 95521
steve_gough@fws.gov
nicholas_som@fws.gov

² Yurok Tribal Fisheries Program
Highway 96 Box 36, Willow Creek, California 95573
squinn@yuroktribe.nsn.us

³ Hoopa Valley Tribal Fisheries Department
P.O. Box 417, Hoopa, California 95546
bmatilton@hoopa-nsn.gov

⁴ California Department of Fish and Wildlife
80 Nugget Lane, Suite A, Weaverville, California 96093
andrew.hill@wildlife.ca.gov

⁵ U.S. Forest Service, Shasta-Trinity National Forest
360 West Main Street, Weaverville, California 96093
wbrock@fs.fed.us

Abstract.— Salmon redds and carcasses were surveyed on the mainstem Trinity River, California from Lewiston Dam to the confluence with the Klamath River, during the 2017 spawning season to map spawning abundance and distribution, evaluate pre-spawn mortality, and characterize redds by species and spawner origin. The total redd count in 2017 was 1,982. We applied generalized additive models to the spatiotemporal distribution of unmarked and hatchery-marked spawned female salmon carcasses to apportion redd counts by natural- and hatchery-origin Chinook Salmon *Oncorhynchus tshawytscha* and Coho Salmon *O. kisutch*. This methodology only allows for the partitioning of redds constructed by hatchery- and natural-produced females and does not account for the origin of the male spawners. We estimated that 1,600 (95% c.i.: 1,435–1,762) redds were constructed by natural-origin Chinook Salmon, 348 (95% c.i.: 186–513) by hatchery-origin Chinook Salmon, and the remaining 34 were attributed to Coho Salmon. Natural-origin Chinook Salmon spawned throughout the mainstem river while the distribution of redds constructed by hatchery-origin Chinook Salmon was highly skewed toward Lewiston Dam and the Trinity River Hatchery (about 59% were within 10 km of the

dam). Pre-spawn mortality of female Chinook Salmon was 1.8% for carcasses observed in all reaches and 2.0% within an intensively managed ‘restoration reach’, which is a focal area for habitat restoration improvements being implemented by the Trinity River Restoration Program (TRRP). Long-term trend analyses from 2002 to 2017 showed no significant change in the abundance of natural-origin Chinook Salmon redds constructed in the mainstem Trinity River, while the number of hatchery-origin Chinook Salmon redds decreased. The proportion of total annual natural-origin Chinook Salmon redds decreased in the reaches nearest to Lewiston Dam and increased in reaches farther downstream from 2002 to 2017, while the annual component of hatchery-origin Chinook Salmon redds remained almost completely within the two reaches nearest to Lewiston Dam.

Introduction

The Trinity River, California, once supported large populations of naturally produced anadromous salmonids, including spring- and fall-run Chinook Salmon *Oncorhynchus tshawytscha* (USFWS and HVT 1999). Prior to the construction of Trinity and Lewiston dams, the spawning of spring- and fall-run Chinook Salmon was separated temporally and spatially due to the timing of adult upstream migration of each race and the hydrology of the river. In 1940s, Moffett and Smith (1950) noted that “almost without exception, Trinity River salmon migrating above the South Fork spawn in the 72 miles of river between the North Fork and Ramshorn Creek.”

Following construction of Lewiston Dam [river kilometer (rkm 182.2)], spring- and fall-run Chinook Salmon spawning in the mainstem Trinity River exhibited considerable spatial and temporal overlap due to lack of access to historic spawning areas for the spring-run. High redd densities became frequent within the upper-most portions of the river below the dam, where presumably hatchery-origin salmon and their progeny comingled and spawned with naturally produced fish. Trinity River Hatchery (TRH), located at the base of Lewiston Dam, is operated to mitigate for the loss of Chinook Salmon, Coho Salmon *O. kisutch*, and steelhead *O. mykiss* production upstream of the dam. Rogers (1972) documented that in 1970 more than 50% of Chinook Salmon spawned in the two miles (3.2 km) below Lewiston Dam and 80% spawned above Douglas City (around rkm 150.1). Redd surveys in the 1980s and 1990s between North Fork Trinity River (rkm 118.2) and Cedar Flat (rkm 79.1) documented variable spawning use in these reaches, with redd counts ranging from a low of 187 in 1998 to a high of 928 redds in 1997 (USFWS 1986, 1987; Quihillalt 1999). Chamberlain et al. (2012) noted that the mean distance from Lewiston Dam of natural-origin Chinook Salmon redds upstream of Cedar Flat increased from 2002 to 2011. Rupert et al. (2017a) noted that when the mainstem Trinity River was divided into reach-scale sections, natural-origin Chinook Salmon spawning activity decreased near Lewiston Dam and increased in sections of the river farther downstream.

In an effort to restore the fishery resources of the Trinity River, the Secretary of the Interior signed the Trinity River Mainstem Fishery Restoration Record of Decision (ROD) in 2000 (USDOI 2000) and the Trinity River Restoration Program (TRRP) was established. The goal of the TRRP is to:

“...restore and sustain natural production of anadromous fish populations downstream of Lewiston Dam to pre-dam levels, to facilitate dependent tribal, commercial, and sport fisheries’ full participation in the benefits of restoration via enhanced harvest opportunities” (TRRP and ESSA 2009).

To achieve this goal, the TRRP implements a suite of actions (flow management, mechanical channel rehabilitation, coarse sediment augmentation, and watershed restoration) to restore riverine habitats and restore habitat-creating alluvial processes (USFWS and HVT 1999; USDOJ 2000). Collectively, these actions are intended to increase and maintain salmonid habitats in the 64-km section of the Trinity River from Lewiston Dam downstream to the North Fork Trinity River (restoration reach), which was severely degraded due the operation of the Trinity River Division (TRD) of the Central Valley Project. Downstream of the North Fork confluence, the Trinity River valley narrows and accretions of flow and sediment from tributaries attenuate many of the morphological impacts that have occurred in the restoration reach (USFWS and HVT 1999).

The Integrated Assessment Plan (IAP; TRRP and ESSA 2009) sets forth a list of objectives to evaluate the effectiveness of TRRP restoration actions. Salmon spawning surveys are preformed to provide data to address Objective 3, specifically sub-objectives 3.1 and 3.3:

Objective 3: Restore and maintain natural production of anadromous fish populations.

Sub-objective 3.1: Increase spawning, incubation, and emergence success of anadromous spawners.

Sub-objective 3.3: Minimize impacts of predation and genetic interactions between and among hatchery and natural anadromous fish.

The IAP proposes assessing spawning at three spatial scales: system, reach, and site scales. Each of these spatial scales evaluates the effects of restoration efforts on Chinook Salmon spawning at different resolutions. System-scale analysis evaluates the response to all restoration activities combined over time. Reach-scale analysis evaluates the response to management actions within sections of the river that have unique hydrology and sediment supplies. Finally, site-scale analysis provides insight on changes in spawning distribution/abundance within restoration sites and the localized effects of mechanical channel rehabilitation. The IAP also states that “increased spawner success will likely occur within 3–4 brood cycles following completion of channel rehabilitation and subsequent fluvial and geomorphic evolution.”

This report details the results from salmon spawning survey data collected in 2017 on the mainstem Trinity River. Surveying salmon carcasses provides pre-spawn mortality data and carcass estimates and reflect the species and origin composition of spawned salmon. Surveying salmon redds provides the location and spawn timing of individual redds. When analyzed together, each year’s data produces a spatially and temporally explicit set of observed redd locations with each redd having an associated probability of construction by female natural-origin Chinook Salmon, hatchery-origin Chinook Salmon, natural-origin Coho Salmon, and hatchery-origin Coho Salmon. We define ‘hatchery-origin’ as fish produced and released from Trinity River Hatchery (TRH), and ‘natural-origin’ as fish that emerge from a redd, regardless of parental origin. These data sets facilitate an array of

analyses over a range of spatial and temporal scales, which we use to investigate spawning distribution and abundance. Where applicable, we use the performance measures set forth by the IAP to evaluate changes in spawning as responses to the restoration actions of the TRRP.

Methods

Survey Area and Timing

The Trinity River from Lewiston Dam to its confluence with the Klamath River was delineated into 14 survey reaches ranging in length from 3.3 to 21.3 km (Figure 1, Table 1). Reach breaks were based on river access locations and channel distances that could be surveyed in a day. Two whitewater sections were not surveyed: the 9.7-km Pigeon Point run (Reach 8) and the 15.6-km section that includes the Burnt Ranch Gorge (Reach 11). In 2016, the boundary separating Reaches 5 and 6 was moved from Roundhouse (rkm 135.7) to Evan's Bar (rkm 137.4) because of a change in private landowner permission to use their river access.

Reaches 1–7 were surveyed weekly and Reaches 9–14 (excluding Reach 11) were surveyed every other week, as conditions permitted, for salmon carcasses and redds as described in Rupert et al. (2017a). Surveys in 2017 began August 30 and concluded December 20. This period was intended to encompass the majority of Chinook Salmon spawning activity.

Redd Identification

Chinook and Coho salmon spawning periods temporally overlap and natural- and hatchery-origin salmon spawn in the same areas in the mainstem Trinity River. Given that redds are not visually distinguishable by these species and origin types, the estimated proportion and spatial distribution of fresh female carcasses of hatchery- and natural-origin Chinook and Coho salmon were used to infer the probability of redd construction by species and origin. Since only female carcasses are used in the hatchery–natural analysis, the estimates of redds constructed by natural-origin females do not account for hatchery-produced males spawning with naturally produced females. Therefore natural-origin spawning estimates should be considered maximum values given that estimates were not adjusted downward to account for hatchery–natural mating pairs. Generalized Additive Models (GAM) were used with the spatiotemporal distribution of carcasses to estimate the longitudinal gradient in proportional distribution of spawned females by species (Chinook or Coho salmon) and origin (hatchery or natural) along the river channel and over time (Rupert et al. 2017a). Cumulative redd counts were arranged by survey day within reach boundaries and season total estimates of redds by species and origin were calculated by summing predicted probabilities of construction for each species–origin category (Rupert et al. 2017a).

Carcasses Estimation

Carcass abundance estimates for Reaches 1 and 2 were generated via a hierarchical latent variables model as described in Rupert et al. (2017a). This model assumes a latent (unobservable) ecological process interacts with a detection process to produce the observed counts of carcasses (Kery and Schaub 2012). For this survey, the latent process is the true

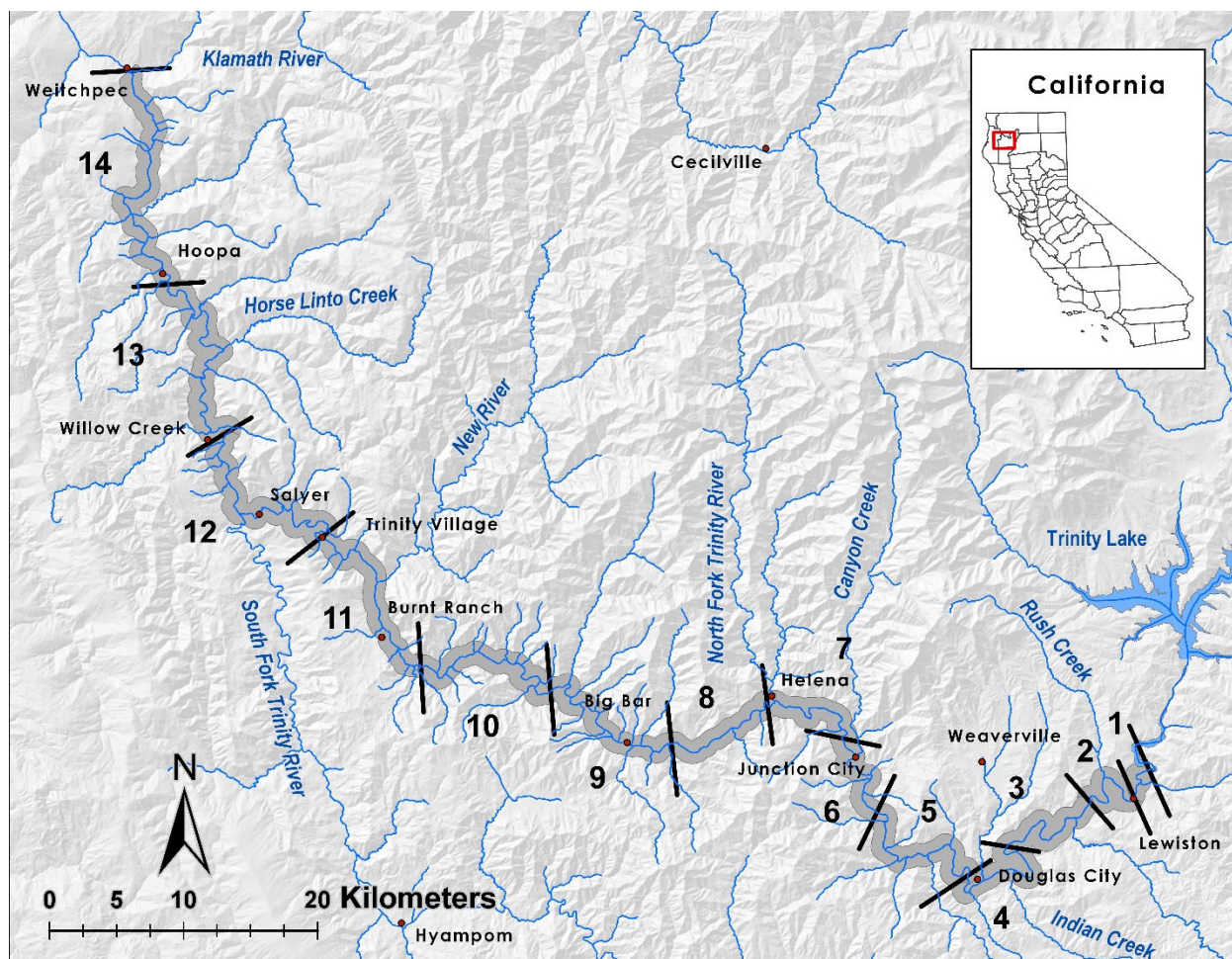


Figure 1. Survey Reaches 1–14 (Lewiston Dam to Weitchpec) on the mainstem Trinity River, California. Dangerous whitewater conditions precluded surveys in Reaches 8 and 11.

abundance of carcasses. As not all carcasses are observed (imperfect detection), a separate observation process links the unobserved latent process to the observed data. In essence, annual carcass estimates were generated by first estimating weekly detection probabilities. Next, weekly counts of fresh carcasses (those arriving since the prior survey) were assumed to arise from a binomial process, which allows the estimation of weekly abundances. Finally, weekly estimates were summed to create an annual abundance estimate as a derived parameter.

Pre-Spawn Mortality

Fresh carcasses were described as spawned ($\leq 1/3$ eggs retained), partially spawned ($1/3$ – $2/3$ eggs retained), or unspawned ($\geq 2/3$ eggs retained). These spawning condition data were used to assess levels of pre-spawn mortality. Female carcasses designated as ‘spawned’ and ‘partially spawned’ were considered successful spawners. Unspawned carcasses were considered pre-spawn mortalities. Measurement of pre-spawn mortality is limited to occurrence within the time and space of the surveys. Therefore, pre-spawn mortality in the lower Klamath River of Trinity River-bound fish and pre-spawn mortality of spring-run Chinook Salmon prior to the first survey are not reflected in our data and analyses.

Table 1. Reach boundaries [and river kilometer (rkm)] for the mainstem Trinity River, California, salmon spawning surveys. Agencies involved in data collection include California Department of Fish and Wildlife (CDFW), Shasta–Trinity National Forest (USFS), U.S. Fish and Wildlife Service (USFWS), Yurok Tribal Fisheries Program (YTFP), and Hoopa Valley Tribal Fisheries Department (HVT).

Reach	Boundaries		Surveying agency
	Upstream	Downstream (rkm)	
1	Lewiston Dam (rkm 182.2) ^a	Old Lewiston Bridge (178.7)	USFS, YTFP, CDFW
2	Old Lewiston Bridge	Bucktail River Access (171.6)	CDFW, YTFP
3	Bucktail River Access	Steel Bridge River Access (160.7)	CDFW, YTFP
4	Steel Bridge River Access	Douglas City Campground (150.1)	CDFW, YTFP
5	Douglas City Campground	Evan's Bar (137.4) ^b	CDFW, YTFP
6	Evan's Bar ^b	Junction City Campground (127.1)	USFWS, HVT
7	Junction City Campground	Pigeon Point Campground ^c (117.4)	USFWS, HVT
8	Pigeon Point Campground ^c	Big Flat River Access (107.6)	NOT SURVEYED
9	Big Flat River Access	Del Loma River Access (93.8)	USFWS, HVT
10	Del Loma River Access	Cedar Flat River Access (79.1)	USFWS, HVT
11	Cedar Flat River Access	Hawkins Bar (63.4)	NOT SURVEYED
12	Hawkins Bar	Camp Kimtu in Willow Creek (42.6)	USFWS, HVT
13	Camp Kimtu in Willow Creek	Roland's Bar in Hoopa Valley (21.3)	USFWS, HVT
14	Roland's Bar in Hoopa Valley	Weitchpec (Trinity mouth; 0.0)	USFWS, HVT

^a The spillway and pool directly downstream of Lewiston Dam were not surveyed and presumed to have no redds.

^b In 2015 and earlier the river access separating Reaches 5 and 6 was at Roundhouse (rkm 135.7).

^c Pigeon Point Campground access is 0.8 km downstream of the North Fork Trinity River confluence (rkm 118.2). The primary area where Trinity River Restoration Program actively manages to improve channel morphology and salmon habitat is in Reaches 1–7.

Redd–Carcass Relationship

Spawning density was hypothesized to affect the crews' ability to observe redds and carcasses with equal efficiency, especially in the high spawning density areas of Reaches 1 and 2 (Bradford and Hankin 2012). This hypothesis would be supported if the number of redds surveyed in an area was not proportional to the number of spawned female carcasses found in that same area. To determine if this occurred, the estimates of spawned female Chinook Salmon carcasses were compared with corresponding counts of Chinook Salmon redds from Reaches 1 and 2. These values were log-transformed and analyzed using linear regression. These two variables would be considered proportional if the slope of their linear relationship was not significantly different than '1'. A slope that is significantly different than '1' would indicate that these variables are not proportional and some density-dependent observer error could be inferred.

Trends in Redd Abundance and Distribution

Data from 2017 were combined with the preceding fifteen years (2002–2016) of mainstem Trinity River redd data from Chamberlain et al. (2012) and Rupert et al. (2017a, 2017b) for long-term analyses of redd abundance and distribution. Past years' data availability was sometimes limited since not all variables analyzed were previously collected (i.e., spatially explicit redd data are not available for Reaches 12–14 prior to 2007). Redd abundance and distribution were analyzed at three spatial scales: the system (~50–100 km sections), reach (~10–20 km sections), and site (~1–2 km sections) scales. The 2017 data were examined and, when applicable, included with previous years' data for multi-year trend analyses.

For spatial analyses, the river was partitioned into individual segments based on morphology and referred to as 'riffle units' (Rupert et al. 2017b). A riffle unit is defined as a section of river that corresponds to a singular pool–riffle–pool sequence that typically ranges between 0.1 and 0.5 km in length. These units were delineated by this sequence for redd abundance analyses because Chinook Salmon typically build redds in patches proximate to riffle crests. Therefore, riffle units generally contain an undivided group of redds. Riffle unit designations were based on the 'morphological units' delineated by Gaeuman et al. (2016). Where Gaeuman et al. (2016) used hydraulic controls (i.e., riffles) to delineate morphological units, the deepest locations (i.e., pools) between these hydraulic controls were used to split riffle units. As a result, the morphological units from Gaeuman et al. (2016) were shifted slightly upstream. Aerial photography was used to construct riffle units downstream of the restoration reach (excluding Reaches 8 and 11) because the morphological units developed by Gaeuman et al. (2016) were limited to the restoration reach. In total, the mainstem Trinity River was divided into 482 riffle units.

The riffle unit method described in this report refers to the method used for partitioning the river in Rupert et al. (2017b). In Rupert et al. (2017a), the smallest spatial units were based on contiguous 400-m (and occasionally 200-m) sections of the Science Advisory Board dataframe (SAB units; Buffington et al. 2014). This change in methodology is an improvement over that used in Rupert et al. 2017a because redd groupings are no longer split and the three spatial scale sections better reflect local spawning habitat and TRRP channel rehabilitation sites or suites of sites. The upstream and downstream site-, reach-, and system-scale section boundaries changed slightly as a result to reflect the newer riffle

unit divisions. The complete 2002–2017 data set was analyzed using the newer riffle unit-based divisions at each spatial scale.

Contiguous groups of riffle units were combined to create the sections used for the site-scale analysis (Table 2). These site designations were generally based on the TRRP site designations of the Science Advisory Board dataframe (Buffington et al. 2014). However, the total count of site-scale units was reduced from 57 to 44 by merging the smallest site-scale sections of the SAB dataframe into the most appropriate adjacent site-scale sections. This spatial scale was used to evaluate changes in natural- and hatchery-origin Chinook Salmon redd abundance at a scale similar to TRRP restoration sites or suites of sites. Changes in spawning abundance within these sites was analyzed using linear regression of the annual proportion (number of redds in the site / sum of redds in the restoration reach) of redds.

Ten reach-scale sections were also used to evaluate long-term trends in natural- and hatchery-origin Chinook Salmon redd abundance (Figure 2, Table 3). These reaches consisted of groups of sites and were intended to evaluate redd abundance at a spatial scale that was an intermediate between the system and site scales. Our reach-scale designations closely resemble those defined by HVT et al. (2011), who partitioned the restoration reach into five ‘rehabilitation reaches’ that were delineated by differences in hydrology and sediment supply characteristics. Boundaries of the other five river sections downstream of the restoration reach were set similarly. Changes in spawning abundance within these reaches were analyzed using linear regression analyses of both the annual number and proportion (number of redds in reach / sum of redds in all reaches) of natural- and hatchery-origin Chinook Salmon redds.

Changes in redd abundance and distribution at the system scale were evaluated over the entire mainstem and also separately for the restoration reach (Reaches 1–7) and remaining surveyed river downstream of the restoration reach (Reaches 9–10 and 12–14). Linear models were used to detect trends in redd abundance. Mean distance from Lewiston Dam of natural- and hatchery-origin Chinook Salmon redds built upstream of Cedar Flat were evaluated using linear regression models.

Table 2. The reach- and site-scale sections used for redd abundance and distribution analysis within the restoration reach. Sites are listed with the approximate location of their upstream boundary, shown as distance from the Klamath River confluence (rkm).

Reach	Site (rkm)	TRRP Rehabilitation	Length (km)
Lewiston	Hatchery (182.20)	2006	0.69
	Sven Olbertson (181.51)	2008	1.28
	Old Bridge (180.22)	2008	1.75
	Sawmill (178.47)	2009	1.60
	Upper Rush Creek (176.87)		1.46
Limekiln	Lower Rush Creek (175.41)		1.33
	Dark Gulch (174.08)	2008	2.81
	Lowden Ranch (171.27)	2010	1.73
	Trinity House Gulch (169.54)	2010	0.72
	Tom Lang Gulch (168.82)		1.48
	Poker Bar (167.34)		2.30
	China Gulch (165.05)		1.47
	Limekiln Gulch (163.57)	2015	2.38
	Steel Bridge (161.20)		1.67
	McIntyre Gulch (159.53)		1.53
	Vitzthum Gulch (158.00)	2007	2.02
	Upper Indian Creek (155.98)	2007	0.56
Douglas City	Lower Indian Creek (155.42)	2007	1.52
	Upper Douglas City (153.90)	2007, 2015	0.83
	Douglas City (153.07)	2013	1.30
	Reading Creek (151.77)	2010	1.77
	Upper Steiner Flat (150.00)		1.26
	Lower Steiner Flat (148.74)	2012	1.90
	Lorenz Gulch (146.83)	2013	1.49
	The Canyon (upstream) (145.34)		2.17
Junction City	The Canyon (downstream) (143.18)		2.23
	Dutch Creek (140.95)		2.56
	Evan's Bar (138.38)		1.28
	Soldier Creek (137.11)		0.89
	Chapman Ranch (136.22)		1.10
	Deep Gulch (135.13)		1.11
	Sheridan Creek (134.02)		1.15
	Oregon Gulch (132.87)		0.76
	Sky Ranch (132.12)		1.20
	Upper Junction City (130.91)	2012	0.89
	Lower Junction City (130.01)	2014	0.67
North Fork	Hocker Flat (129.34)	2005	1.88
	Upper Conner Creek (127.46)		1.12
	Conner Creek (126.34)	2006	1.71
	Wheel Gulch (124.63)	2011	1.05
	Valdor Gulch (123.58)	2006	1.84
	Elkhorn (121.74)	2006	1.50
	Pear Tree Gulch (120.24)	2006	1.33
	Bagdad (118.92) ^a		1.52

^a the downstream boundary of the Bagdad site was at rkm 117.4

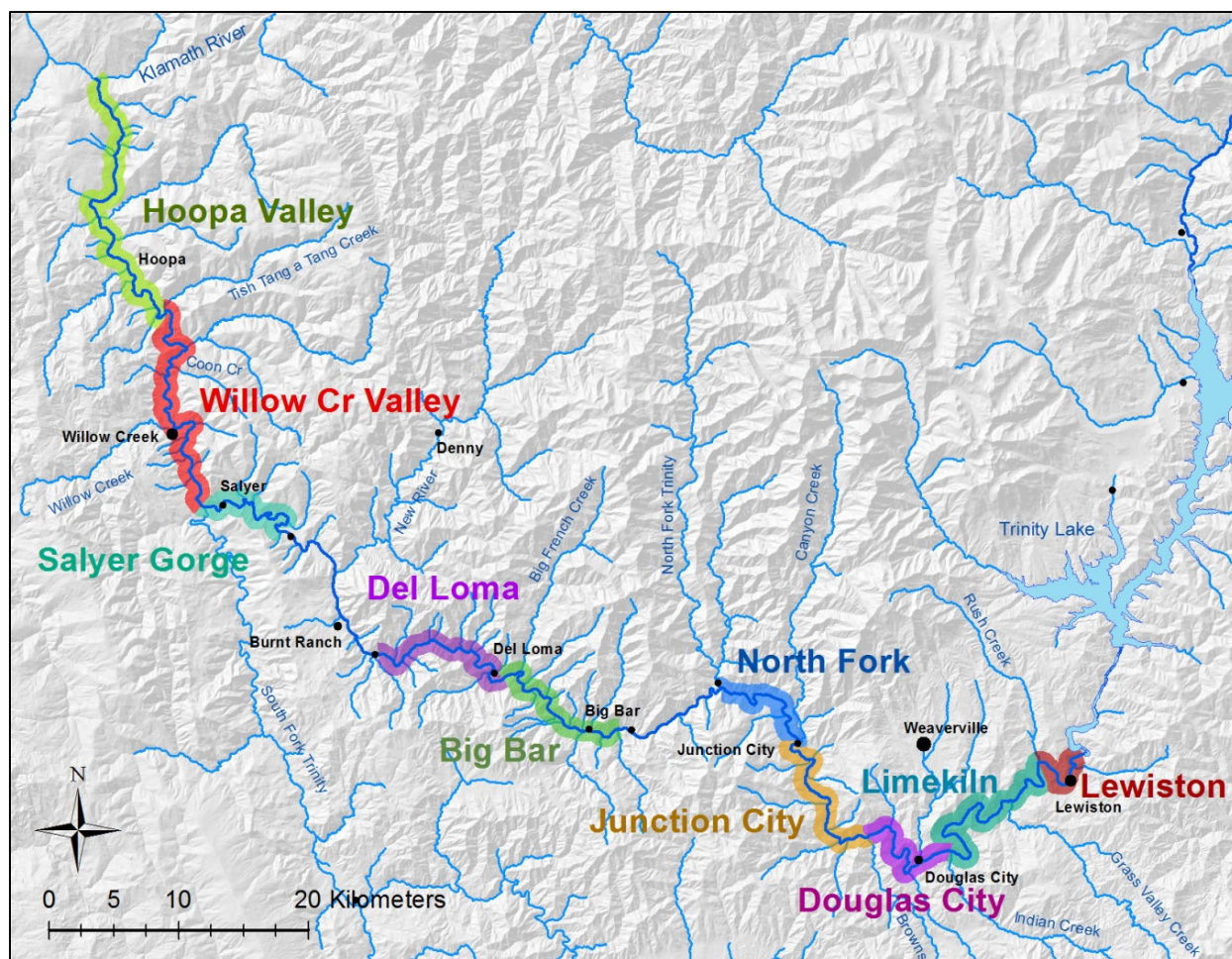


Figure 2. The ten sections of the mainstem Trinity River used for reach-scale analyses of Chinook Salmon redd distribution.

Table 3. River sections [with river kilometer (rkm)] used for the reach-scale analysis of redd abundance.

Section	Boundaries		Length (km)
	Upstream (rkm)	Downstream (rkm)	
Lewiston Rehab	Lewiston Dam (182.20)	Rush Creek (175.41)	6.79
Limekiln Rehab	Rush Creek	Indian Creek (155.42)	19.99
Douglas City Rehab	Indian Creek	Browns Creek (143.18)	12.25
Junction City Rehab	Browns Creek	Canyon Creek (129.34)	13.84
North Fork Rehab	Canyon Creek	North Fork Trinity River (117.40)	11.94
Big Bar	Big Flat access riffle unit (107.82)	Del Loma access riffle unit (94.03)	13.79
Del Loma	Del Loma access riffle unit	Cedar Flat access riffle unit (79.31)	14.72
Salyer Gorge	Hawkins Bar river access (63.76)	South Fork Trinity River (50.33)	13.41
Willow Creek Valley	South Fork Trinity River	Tish Tang a Tang Creek (26.95)	23.40
Hoopa Valley	Tish Tang a Tang Creek	Weitchpec (Trinity River mouth; 0.0)	26.95

Results

Survey Success and Conditions

Crews were able to complete 86% of the originally scheduled surveys in 2017, including missed surveys that were rescheduled for the following week (Appendix A). The first scheduled surveys on Reaches 4–7 were cancelled due to wildfires causing smoky air conditions and road and river access closures. Other missed surveys, which were mostly for Reach 6 and downstream from mid-November to early December, were usually cancelled due to rain events causing increased turbidity and poor visibility. Additionally, surveys on Reaches 1–4 and 13 were completed the week of December 17, which was one week more than initially scheduled.

Trinity River discharge at Lewiston, California, was about 13.1 m³/s during the first half of the survey season before dropping to about 9.0 m³/s in mid-October, at which it remained for the remainder of season (Appendix B). At Hoopa, California, mean daily flows on the mainstem Trinity River ranged between 18.2 and 31.4 m³/s from the start of the survey season to early November before rain events caused flows to increase in mid-November. Mean daily flow peaked at 277.5 m³/s on November 21 before coming back down to about 36.0 m³/s by mid-December.

Crews reported water visibility between 1.5 and 3.0 m during most of the surveys in 2017 (Appendix A). Visibility was occasionally higher (>3.0), particularly in the lower reaches. Visibility was lower (0.9–1.5 m) during some early season surveys and less than 0.9 m once in Reach 9 in early September after a project in Sheridan Creek temporarily increased turbidity.

Salmon Carcasses

During the 2017 surveys, 527 fresh (conditions 1 and 2 as described in Rupert et al. 2017a) Chinook Salmon carcasses were examined (Table 4). Of these fresh carcasses, 333 (63.4%) were females, 39 (7.4%) were adipose fin-clipped ('ad-clip'), and 32 (6.1%) had been marked with a spaghetti tag at the Willow Creek or Junction City weir operated by the California Department of Fish and Wildlife. Chinook Salmon released from the TRH are batch-marked with coded-wire tags (CWT) and externally marked using an ad-clip at a constant fractional mark rate of about 25%. From the 39 ad-clipped fresh Chinook Salmon carcasses observed, 31 head samples were collected (Table 5). Data from CWT recoveries yielded an average annual production multiplier (i.e., tagging rate) of 0.240 in 2017.

Of the 333 fresh female Chinook Salmon carcasses recovered, 25 (7.5%) were ad-clipped, and of these, 20 heads were collected. CWTs were recovered and read from all 20 (100%) of these heads. Of the spawned female hatchery-origin Chinook Salmon carcasses (spring and fall broods combined) with associated CWT data, 90% (18 of 20) were recovered within 10 km of Lewiston Dam (Figure 3).

Relatively few (six) Coho Salmon carcasses were recovered during the 2017 surveys (Table 6). Of these, three were fresh and of these, none (0%) were right maxillary-clipped, which would indicate hatchery origin. Only one of the Coho Salmon carcasses was a fresh spawned female. The limited number of spawned female Coho Salmon carcasses recovered inhibited the ability to differentiate Coho Salmon redds by origin in 2017.

Table 4. Summary of fresh (conditions 1 and 2) Chinook Salmon carcass data by survey reach, 2017 Trinity River surveys.

Reach	Total	Males	Females	Female proportion	Ad-clipped	Weir-tagged
1	120 ^a	33	85	72.0%	17	9
2	119	43	76	63.9%	13	9
3	76	38	38	50.0%	3	4
4	38	18	20	52.6%	1	1
5	53	24	29	54.7%	4	3
6	62	18	44	71.0%	1	1
7	20	6	14	70.0%	0	0
9	25	9	16	64.0%	0	3
10	13	3	10	76.9%	0	2
12	0	0	0	-	0	0
13	1	0	1	100.0%	0	0
14	0	0	0	-	0	0
Total	527 ^a	192	333	63.4%	39 ^b	32

^a includes two carcasses of unknown sex^b head samples were collected from 31 of the 39 fresh ad-clipped Chinook Salmon carcasses

Table 5. Coded-wire tag (CWT) information retrieved from fresh adipose fin-clipped Chinook Salmon carcasses, 2017 Trinity River surveys.

Carcasses	CWT	Brood Year	Run type	Release type	Production multiplier	Production multiplier
1	060605	2013	Spring	Advanced fingerling	4.24	0.236
1	060606	2013	Spring	Advanced fingerling	4.15	0.241
1	060609	2013	Fall	Fingerling	4.12	0.243
2	060612	2013	Spring	Yearling	4.22	0.237
1	060615	2014	Fall	Fingerling	4.13	0.242
2	060689	2014	Spring	Advanced fingerling	4.27	0.234
1	060691	2014	Spring	Advanced fingerling	4.14	0.242
6	060692	2014	Fall	Advanced fingerling	4.09	0.244
5	060693	2014	Fall	Advanced fingerling	4.08	0.245
1	060694	2014	Fall	Fingerling	4.28	0.233
1	060696	2014	Spring	Yearling	4.27	0.234
2	060697	2014	Fall	Yearling	4.18	0.239
1	060775	2015	Fall	Fingerling	4.27	0.234
4	060780	2015	Fall	Yearling	4.25	0.236
1	068849	2013	Spring	Fingerling	4.18	0.239
1	-- Missing CWT/head --				NA	NA
					Mean = 4.17	Mean = 0.240

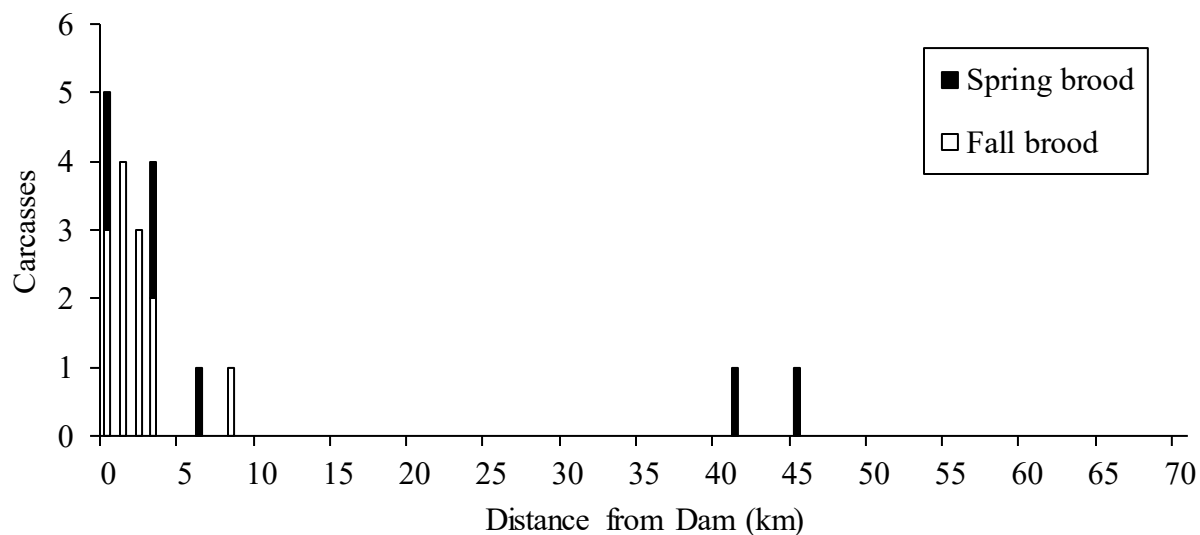


Figure 3. Distribution of coded-wire-tagged (CWT) spawned female Chinook Salmon carcasses by brood type (spring and fall) located in the mainstem Trinity River downstream of Lewiston Dam in 2017.

Table 6. Summary of fresh (conditions 1 and 2) Coho Salmon carcass data by survey reach, 2017 Trinity River surveys.

Reach	Total	Males	Females	Female proportion	Maxillary-clipped	Weir-tagged
1	1	1	0	0.0%	0	0
2	0	0	0	-	0	0
3	2	1	1	50.0%	0	0
4	0	0	0	-	0	0
5	0	0	0	-	0	0
6	0	0	0	-	0	0
7	0	0	0	-	0	0
9	0	0	0	-	0	0
10	0	0	0	-	0	0
12	0	0	0	-	0	0
13	0	0	0	-	0	0
14	0	0	0	-	0	0
Total	3	2	1	33.3%	0	0

Carcass Estimates

The hierarchical latent variables model estimated 366 (95% CI: 277–499) Chinook Salmon carcasses in Reach 1 and 498 (95% CI: 356–735) in Reach 2 in 2017. Estimates of spawned female Chinook Salmon carcasses were 250 (95% CI: 186–353) in Reach 1 and 316 (95% CI: 218–475) in Reach 2.

Pre-spawn Mortality

Six fresh unspawned female Chinook Salmon carcasses were found in 2017, all without a hatchery mark, which yielded a pre-spawn mortality rate among female Chinook Salmon throughout the mainstem Trinity River of 1.8% (Table 7). Weekly pre-spawn mortality rates ranged from 0.0% to 8.0% (the first six survey weeks were combined, as were the final three, due to small sample sizes; Figure 4). Annual pre-spawn mortality of female Chinook Salmon in the Trinity River restoration reach was 2.0% in 2017.

The lone (one) fresh female Coho Salmon carcass encountered in 2017 was of natural-origin and had spawned (Table 8). Note that pre-spawn mortality rates were based on data collected through late December, while Coho Salmon are still spawning.

Table 7. Pre-spawn mortality rates of Chinook Salmon in the Trinity River below Lewiston Dam (Reaches 1–14) and in the restoration reach (Reaches 1–7), 2009–2017 surveys. Pre-spawn mortalities by week and reach for unmarked and ad-clipped Chinook Salmon are presented in Appendix C.

Year	Reaches 1-14	Reaches 1-7
	(Lewiston Dam to Klamath River)	(Lewiston Dam to North Fork)
2009	7.9%	6.8%
2010	10.2%	9.5%
2011	4.6%	4.6%
2012	2.4%	2.4%
2013	5.1%	6.1%
2014	11.5%	9.1%
2015	0.8%	0.0%
2016	0.7%	0.8%
2017	1.8%	2.0%

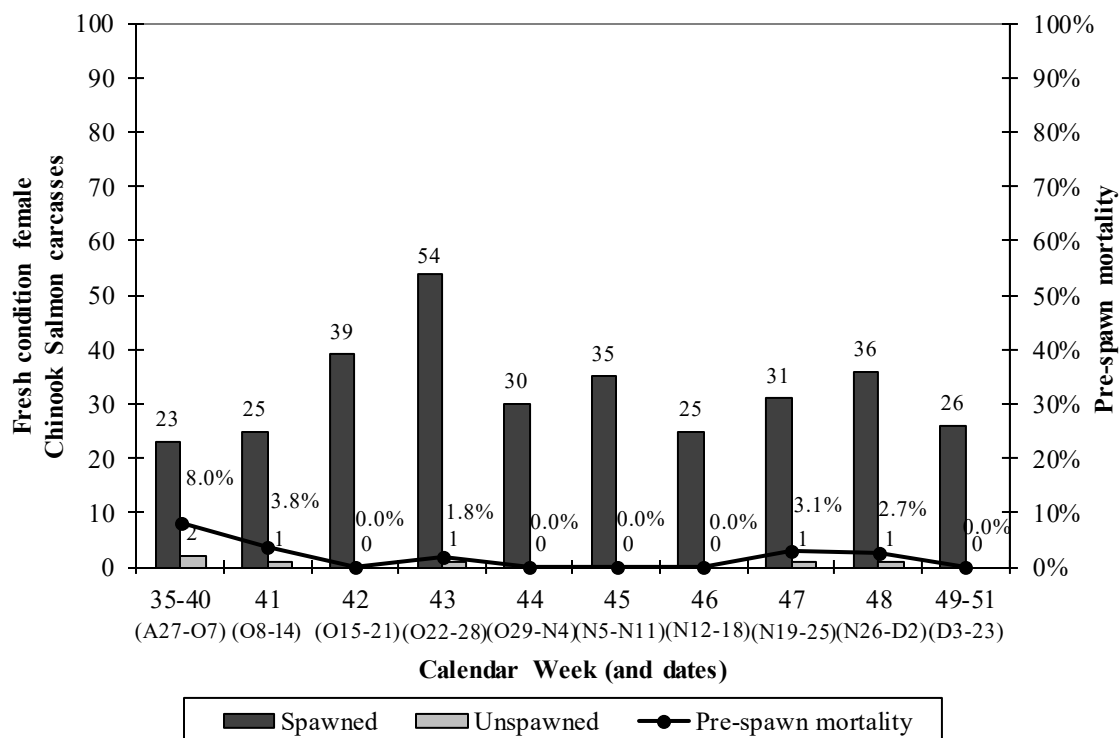


Figure 4. Weekly pre-spawn mortality from fresh (conditions 1 and 2) female Chinook Salmon carcasses, Trinity River surveys 2017. Calendar weeks 36–40 and 48–51 were combined because sample sizes were low in at least one of those weeks.

Table 8. Pre-spawn mortality rates of natural- and hatchery-origin Coho Salmon, Trinity River surveys, 2009–2017. Note that these pre-spawn mortality rates were based on data only collected through late December. Spawning success often varies, typically improving over time, and our surveys did not extend over the entire Coho Salmon spawning period.

Year	Natural-origin	Hatchery-origin	Combined
2009	7.1%	20.3%	16.1%
2010	21.9%	16.2%	17.0%
2011	6.1%	15.1%	11.6%
2012	3.6%	11.8%	10.4%
2013	10.7%	6.1%	6.6%
2014	35.1%	28.5%	29.8%
2015	33.3% ^a	50.0% ^a	40.0% ^a
2016	0.0% ^b	0.0% ^b	0.0% ^b
2017	0.0% ^c	-	0.0% ^c

^a the sample size for Coho Salmon was only five carcasses in 2015

^b the sample size for Coho Salmon was only two carcasses in 2016

^c the sample size for Coho Salmon was only one carcass in 2017

Salmon Redds

During the 2017 surveys, 1,982 salmon redds were identified (Table 9). A majority of the redds (1,600; 80.7%) were estimated to have been constructed by natural-origin female Chinook Salmon, while hatchery-origin female Chinook Salmon accounted for 348 (17.6%) of the total redd count (Table 10). Coho Salmon redds accounted for 34 (1.7%) of the surveyed redds. The low numbers of spawned female Coho Salmon carcasses collected in 2017 precluded the differentiation of hatchery- and natural-origin Coho Salmon redds. Note that Coho Salmon spawning continued beyond our survey season, and our estimates of Coho Salmon redds are included only to differentiate them from Chinook Salmon redds.

Natural-origin Chinook Salmon redds were constructed throughout most of the mainstem Trinity River in 2017, though the lowest numbers were in the downstream-most reaches (Figure 5). Hatchery-origin Chinook and Coho (both origin types) salmon redds were consistently skewed toward Lewiston Dam. Little to no spawning by hatchery-origin Chinook Salmon or Coho Salmon was detected downstream of Reach 7.

Table 9. Redd counts (before species differentiation) by week and reach, Trinity River surveys 2017. NS = No Survey for scheduled surveys that were missed. Dashes (-) represent days when surveys were not scheduled.

Week start	Reach												
	1	2	3	4	5	6	7	9	10	12	13	14	Total
Aug. 27	0	-	-	-	-	-	-	-	-	-	-	-	-
Sep. 3	1	0	0	NS	NS	NS	NS	-	-	-	-	-	1
Sep. 10	6	3	1	1	2	1	0	0	0	-	-	-	14
Sep. 17	13	13	3	10	15	2	1	-	-	-	-	-	57
Sep. 24	8	13	16	34	32	18	NS	3	3	-	-	-	127
Oct. 1	22	52	21	29	24	44	NS	-	-	0	0	0	192
Oct. 8	6	14	26	21	41	53	60	122	3	-	-	-	346
Oct. 15	16	15	21	17	25	37	17	-	-	16	2	NS	166
Oct. 22	8	5	4	17	31	21	54	78	NS	-	-	-	218
Oct. 29	8	6	13	5	43	15	26	-	-	16	32	17	181
Nov. 5	16	8	19	10	15	3	22	111	96	-	-	-	300
Nov. 12	21	25	14	7	8	3	7	-	-	NS	NS	NS	85
Nov. 19	51	18	16	NS	NS	1	NS	NS ^a	NS ^a	-	-	-	86
Nov. 26	21	19	17	10	10	4	2	44	27	NS ^a	NS	NS	154
Dec. 3	8	8	3	0	5	2	0	NS ^a	NS ^a	6	-	-	32
Dec. 10	5	4	0	0	0	NS	NS	1	6	NS ^a	3	2	21
Dec. 17	0	0	1	0	-	-	-	-	-	1	0	-	2
Total	210	203	175	161	251	204	189	359	135	39	37	19	1,982

^a missed survey rescheduled for the following week

Table 10. Estimated numbers and bootstrap-generated 95% confidence intervals of salmon redds by species and origin observed in the mainstem Trinity River, 2017. Natural- and hatchery-origin estimates are for the maternal first generation only.

Species	Origin	Redd estimate	95% confidence limits	
			Lower	Upper
Chinook Salmon	All	1,948 ^b	-	-
	Natural	1,600	1,435	1,762
	Hatchery	348	186	348
Coho Salmon ^a	All	34 ^b	-	-
	Natural	NA ^c	-	-
	Hatchery	NA ^c	-	-

^a The survey season only partially covers the Coho Salmon spawning period

^b Confidence intervals are generated with both Chinook and Coho salmon data. Not enough female Coho Salmon carcasses were found in 2017 to calculate a confidence interval.

^c Not enough Coho Salmon carcasses were observed in 2017 to calculate separate estimates for natural- and hatchery-origin Coho Salmon redds.

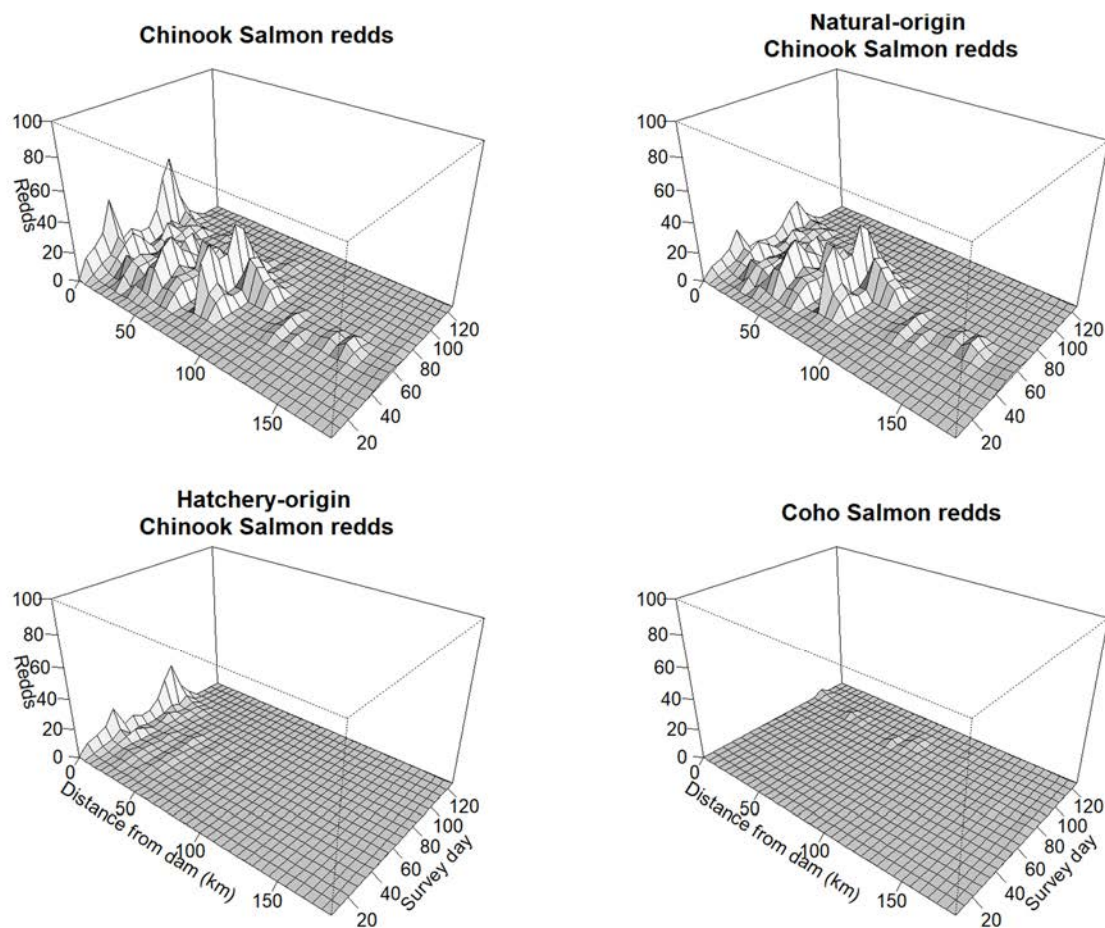


Figure 5. Spatiotemporal distribution of mainstem Trinity River salmon redds from Lewiston Dam to Weitchpec, 2017. Surveys were not conducted in Reaches 8 (rkm 107.6–117.4) and 11 (rkm 63.4–79.1). The Coho Salmon carcass data precluded the differentiation of hatchery- and natural-origin groups. Survey day 1 = September 1.

Redd–Carcass Relationship

Chinook Salmon redds [natural log-(\ln -) transformed] and fresh spawned female Chinook Salmon carcasses (\ln -transformed) in Reaches 1 and 2 from 2012 to 2017 had a positive linear correlation ($R^2 = 0.8387$, $p < 0.001$; Figure 6). A significant difference was detected between a slope of ‘1’ and the slope of the linear regression between log-transformed Chinook Salmon redd estimates and Chinook Salmon carcass estimates (slope = 0.637, 95% CI: 0.465–0.809).

Redd Abundance and Distribution: System Scale

From 2002 to 2017, the number of mainstem salmon redds ranged between 1,671 and 7,588 redds and generally decreased over time ($R^2 = 0.2984$, $p = 0.03$; Figure 7). The number of redds constructed by natural-origin Chinook Salmon in the mainstem Trinity River also generally decreased over time, but with no significant trend ($R^2 = 0.0488$, $p = 0.4$), while the number of redds constructed by hatchery-origin Chinook Salmon trended downward ($R^2 = 0.5175$, $p < 0.001$) over this time frame.

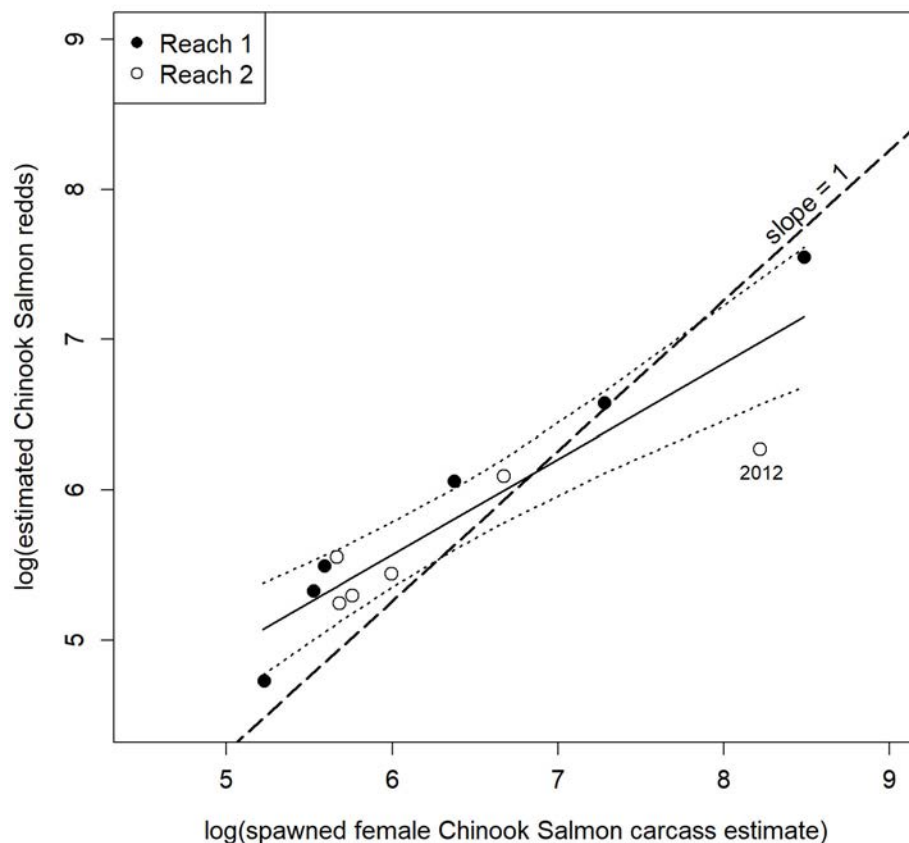


Figure 6. Relationship between counts of \ln -transformed Chinook Salmon redds and \ln -transformed estimates of spawned female Chinook Salmon carcasses in Survey Reaches 1 and 2 (solid line), 2012–2017. The dashed line is included to represent a slope of ‘1’, which would be the slope of two perfectly proportional variables. Dotted lines represent 95% confidence limits of the linear model.

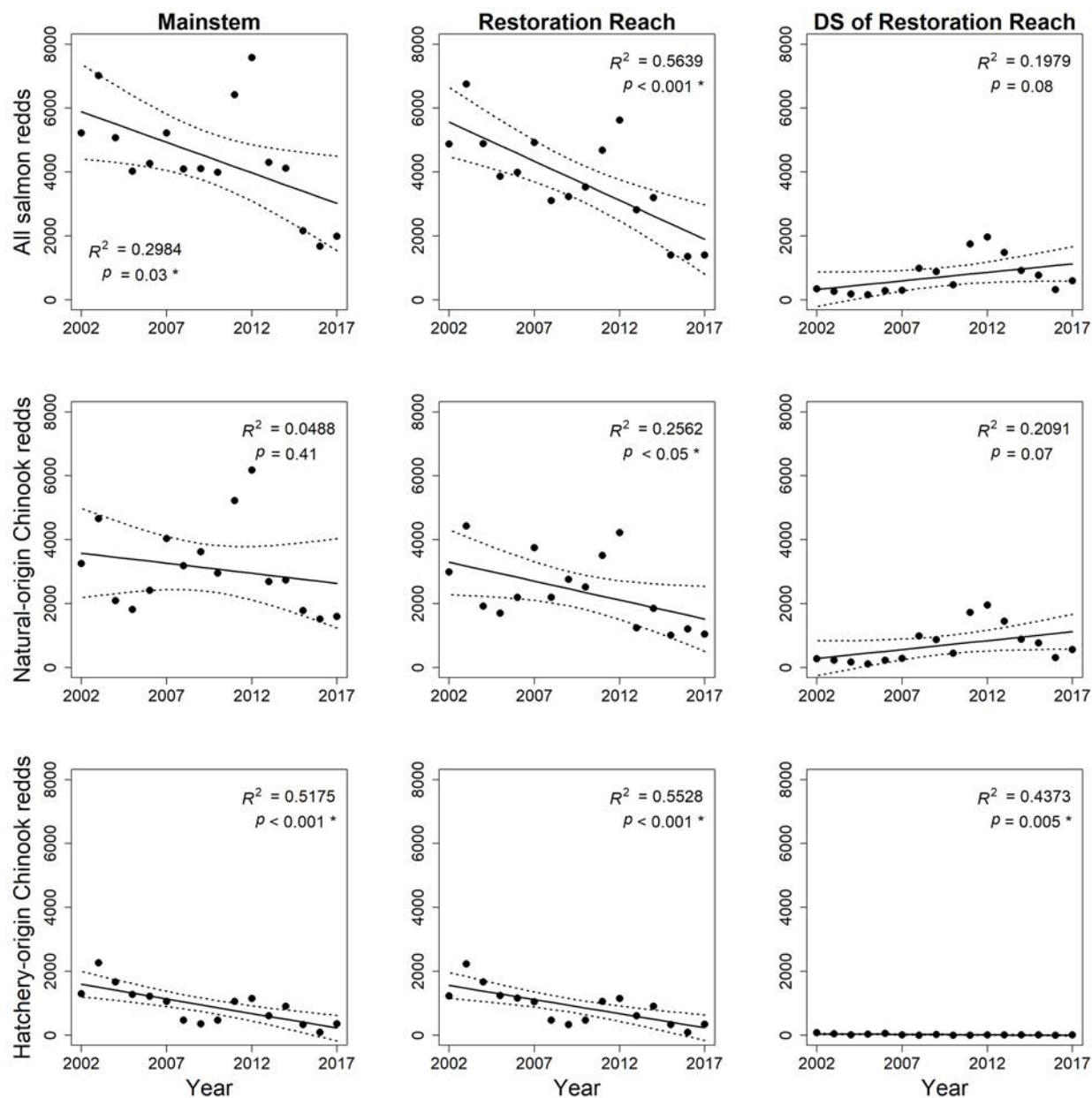


Figure 7. Estimated number of redds constructed in the entire mainstem Trinity River (left), within the restoration reach (center), and downstream (DS) of the restoration reach (right) by all Chinook Salmon (top), natural-origin Chinook Salmon (middle), and hatchery-origin Chinook Salmon (bottom) from 2002 to 2017. Each plot includes a linear model with the R^2 value, p -value (noted with an '*' if <0.05), and 95% confidence limits (dotted lines).

The trends in redd abundance within the restoration reach were similar to the mainstem-wide data (Figure 7). From 2002 to 2017, the number of redds constructed annually by natural- and hatchery-origin Chinook Salmon in the restoration reach were variable but trended downward ($R^2 = 0.2562$, $p < 0.05$ and $R^2 = 0.5528$, $p < 0.001$, respectively).

Downstream of the restoration reach the number of natural-origin Chinook Salmon redds constructed from 2002 to 2017 generally increased but with no significant trend ($R^2 = 0.1979$, $p = 0.07$; Figure 7). A significant decrease in hatchery-origin Chinook Salmon redds was detected downstream of the restoration reach ($R^2 = 0.4773$, $p = 0.005$), but relatively few to no redds were constructed by hatchery-origin Chinook Salmon in this section of river. From 2002 to 2006 between 33 and 72 redds per year were estimated to be constructed by hatchery-origin Chinook Salmon downstream of the restoration reach except for 2004 when none were estimated. From 2007 to 2017 between 0 and 14 redds per year were estimated to be constructed by hatchery-origin Chinook Salmon downstream of the restoration reach and only zero or one redd was estimated in 8 of those 11 years.

In the section of river from Lewiston Dam to Cedar Flat (Reaches 1–10), the mean distance from the dam of redds constructed by natural- (49.2 km) and hatchery-origin (14.2 km) Chinook Salmon were both the highest in the 16-year history of this project. From 2002 to 2016, the mean distance of redds from the dam ranged between 15.3 and 48.9 km for natural-origin and between 2.1 and 7.5 km for hatchery-origin Chinook Salmon. In this section of river, the mean distance from Lewiston Dam of natural-origin Chinook Salmon redds shifted downstream from 2002 to 2017 ($R^2 = 0.7697$, $p < 0.001$; Figure 8). This trend, to a lesser degree, was also evident for redds constructed by hatchery-origin Chinook Salmon ($R^2 = 0.2508$, $p < 0.05$), which also consistently spawned near Lewiston Dam.

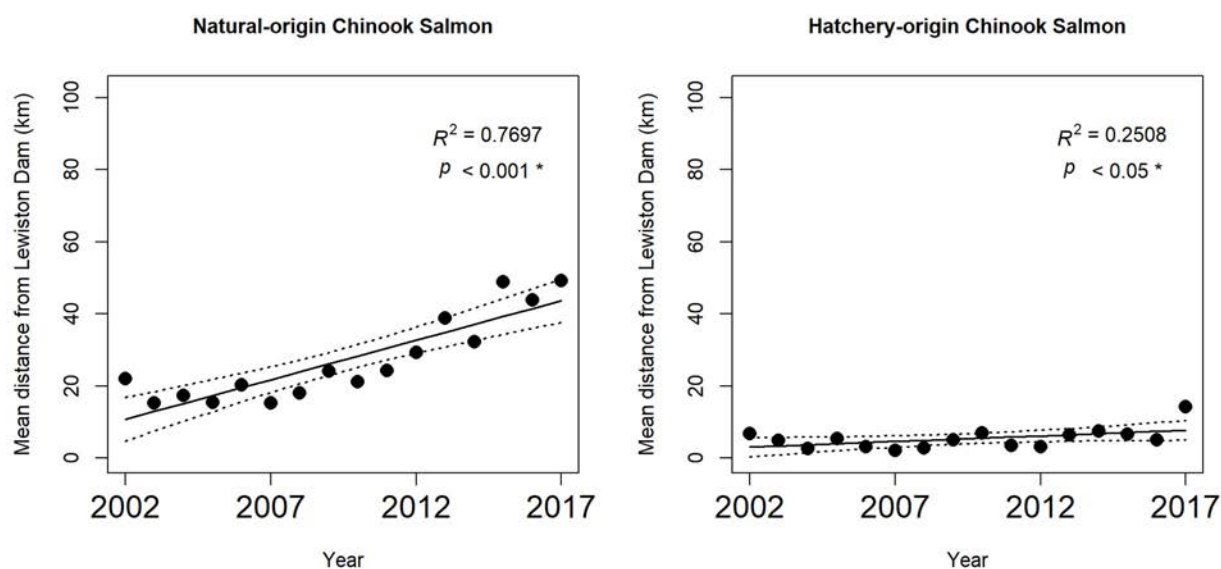


Figure 8. Mean distance from Lewiston Dam of redds constructed by natural- (left) and hatchery-origin (right) Chinook Salmon females between Lewiston Dam and Cedar Flat (0–102.8 km from Lewiston Dam; Reaches 1–10) on the mainstem Trinity River, 2002–2017. Each plot includes a linear model with the R^2 value, p -value (noted with an ‘*’ if < 0.05), and 95% confidence limits (dotted lines).

Redd Abundance and Distribution: Reach Scale

Long-term changes in natural-origin Chinook Salmon redd distribution were detected at the reach scale (~10–20 km). Redds by natural-origin Chinook Salmon most drastically trended downward in the Lewiston ($R^2 = 0.5252$, $p = 0.002$) and Limekiln ($R^2 = 0.3047$, $p = 0.03$) reaches and generally decreased, although not significantly, in the Douglas City reach from 2002 to 2017 (Figure 9). The number of redds between the Junction City and Del Loma reaches generally increased over this time period and generally decreased, although not significantly, in the Salyer Gorge, Willow Creek Valley, and Hoopa Valley reaches over the shorter time period from 2007 to 2017. To account for annual variation in run size, the proportions of natural-origin Chinook Salmon redds within each of the ten reach-scale segments relative to the annual total in the entire mainstem river were compared (Figure 10). This analysis revealed a shift in spawning distribution, where natural-origin Chinook Salmon redds decreased in the two upstream-most reaches [Lewiston ($R^2 = 0.8034$, $p < 0.001$) and Limekiln ($R^2 = 0.4771$, $p = 0.003$)], did not significantly change in the Douglas City reach, and increased in the mid-river reaches [Junction City ($R^2 = 0.5326$, $p = 0.001$), North Fork ($R^2 = 0.5184$, $p = 0.002$), Big Bar ($R^2 = 0.6798$, $p < 0.001$), and Del Loma ($R^2 = 0.7897$, $p < 0.001$) reaches]. The proportion of redds in the downstream-most reaches (Salyer Gorge, Willow Creek Valley, and Hoopa Valley) have not changed significantly.

Most hatchery-origin Chinook Salmon redds were constructed in the Lewiston rehabilitation reach (range = 72–1,888 redds/year, mean = 770 redds/year) and, to a lesser degree, in the Limekiln rehabilitation reach (range = 19–236 redds/year, mean = 84 redds/year) from 2002 to 2017. Over this time frame, the abundance of hatchery-origin Chinook Salmon redds significantly decreased in the Lewiston reach ($R^2 = 0.5648$, $p < 0.001$) and generally decreased in the Limekiln reach (Figure 11). Fewer hatchery-origin Chinook Salmon redds were found downstream of the Limekiln reach to the Del Loma reach where their redd numbers averaged between 7 and 18 per year in each reach and only changed significantly in the Del Loma reach ($R^2 = 0.2753$, $p = 0.04$). No redds were predicted to be associated with hatchery-origin Chinook Salmon downstream of the Del Loma reach.

To account for annual variation in run size, the proportions of hatchery-origin Chinook Salmon redds within each of the reaches were compared to the annual total in the entire mainstem river (Figure 12). The majority of hatchery-origin Chinook Salmon redds were consistently observed in the Lewiston reach (range = 51.7%–95.4%, mean = 82.3%) and, to a smaller degree, in the Limekiln reach (range = 3.5%–30.2%, mean = 11.5%) from 2002 to 2017. The proportion of hatchery-origin Chinook Salmon redds in the Lewiston reach generally decreased while the proportion of redds in the Limekiln reach significantly increased ($R^2 = 0.4229$, $p = 0.006$) over this time period. The mean proportion of hatchery-origin Chinook Salmon redds in each reach downstream of the Limekiln reach ranged between 0.0% and 2.2% and did not change significantly in any of the reaches (Figure 12).

Redd Abundance and Distribution: Site Scale

The proportional abundance of natural-origin Chinook Salmon within the 44 site-scale river sections show a range of long-term (2002–2017) trends. Most sites (21) did not show a significant change, 17 sites showed an increasing trend, and 6 sites showed a decreasing trend (Appendix D). The three upstream-most sites (Lewiston Hatchery, Sven Olbertson, and Old Bridge sites) underwent significant decreases in the proportion of natural-origin

Chinook Salmon redds, followed by a less drastic general decrease at the Sawmill site and significant decrease at the Upper Rush Creek site. Most sections from the Lower Rush Creek site to the Douglas City site did not significantly change. At each site downstream of the Douglas City site, from the Reading Creek site to the Bagdad site, the proportion of natural-origin Chinook Salmon redds either generally or significantly increased.

Of the 22 mechanical channel rehabilitation sites with at least five years of post-construction data, the proportional abundance of natural-origin Chinook Salmon redds trended upward at 7 sites, trended downward at 2 sites, and displayed no significant change at 13 sites (Appendix E). Similar to the long-term trends, the proportional abundance of natural-origin Chinook Salmon redds generally or significantly decreased in the upstream-most sites (Lewiston Hatchery to Sawmill sites), did not change in the middle sites (Dark Gulch to Upper Douglas City sites), and generally or significantly increased in most of the downstream-most sites (Douglas City to Pear Tree Bar sites).

Hatchery-origin Chinook Salmon redds were not distributed throughout the restoration sites and were too few or absent to merit statistical analysis at the site scale. Like at the reach scale, the proportion of hatchery-origin fish were at or close to zero at most sites below the Limekiln reach from 2002 to 2017.

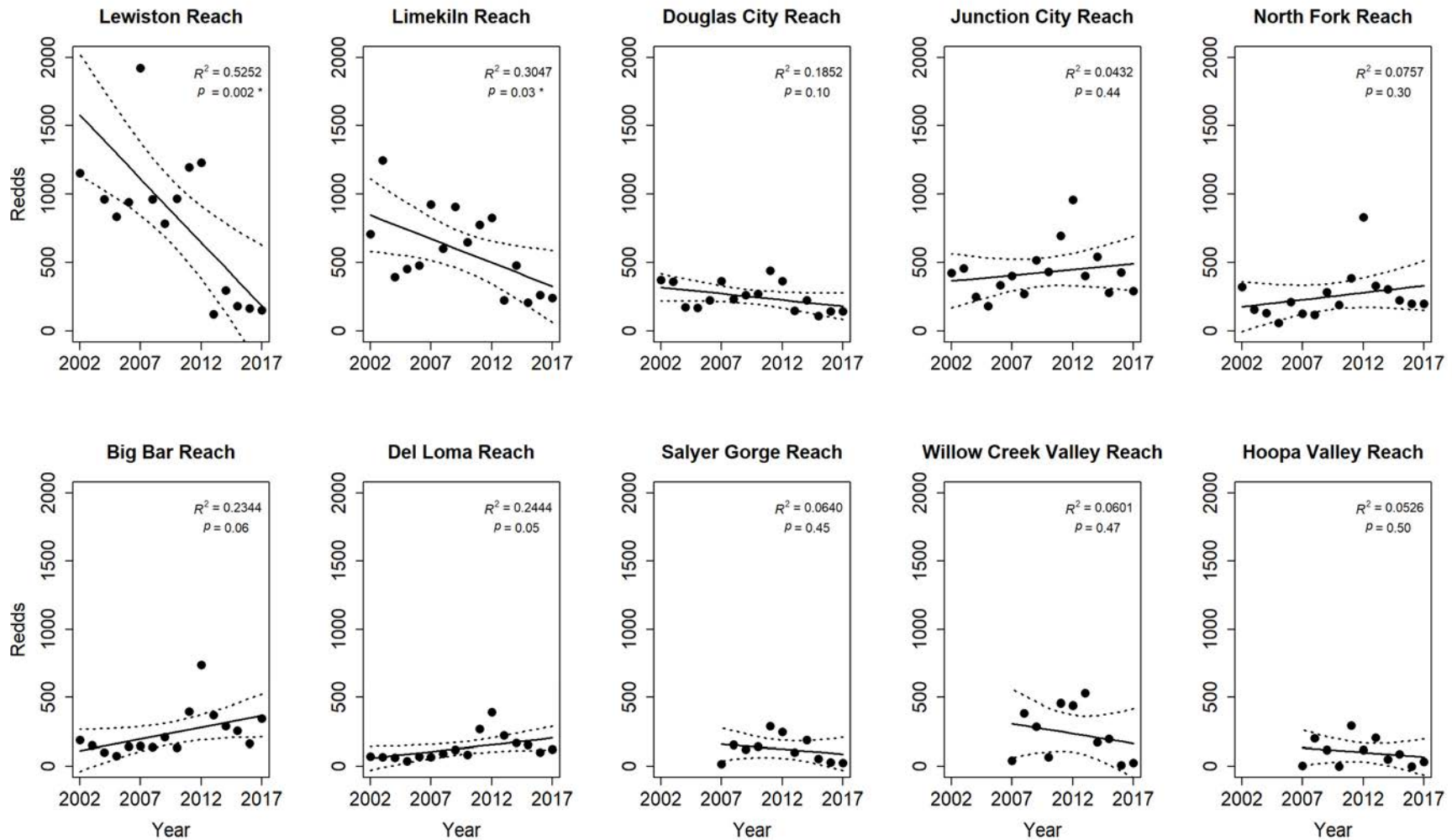


Figure 9. Estimated number of mainstem Trinity River natural-origin Chinook Salmon redds within ten reach-scale sections, 2002–2017. Each plot includes a linear model with the R^2 value, p -value (noted with an '*' if <0.05), and 95% confidence limits (dotted lines).

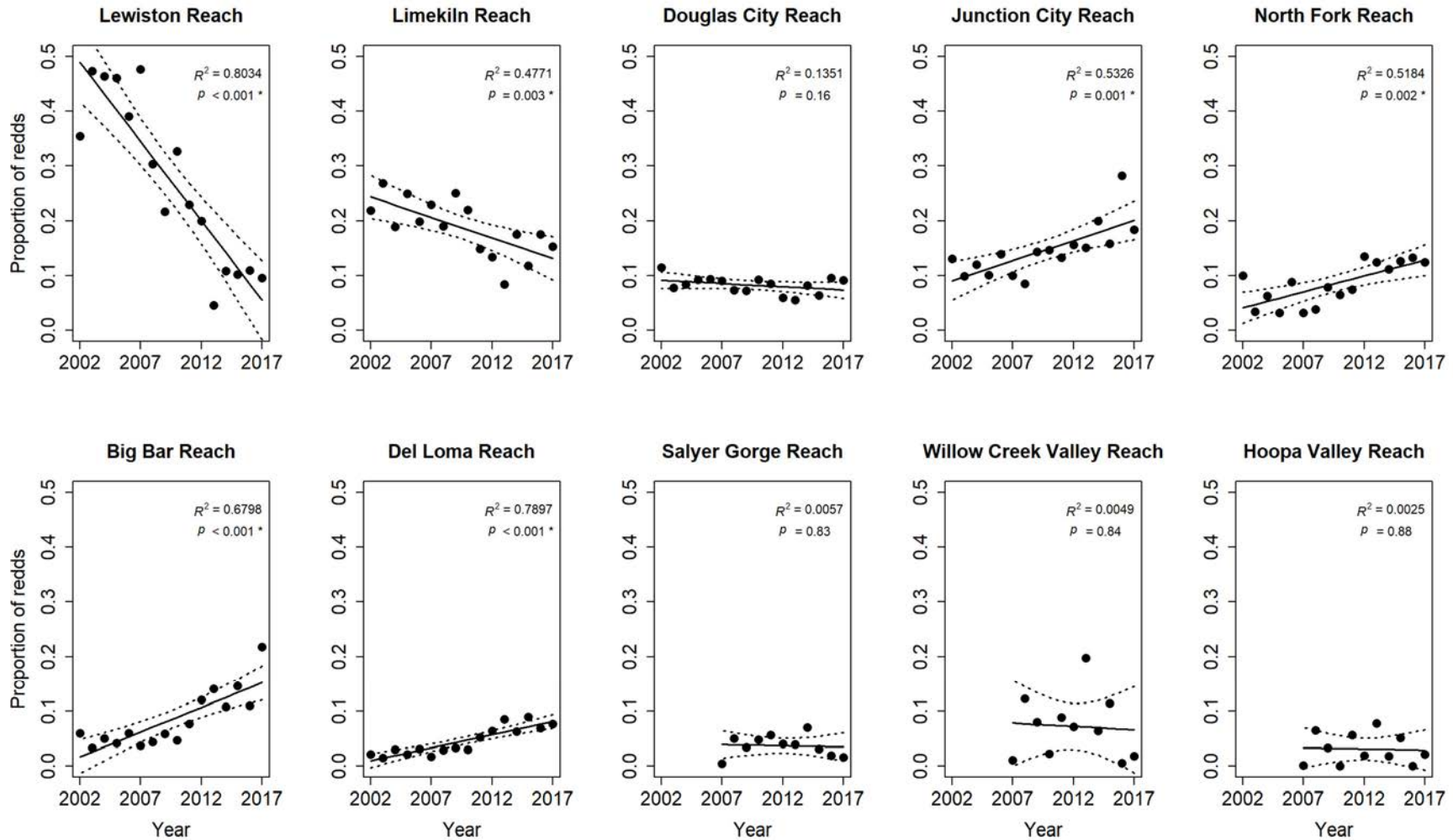


Figure 10. Proportions of mainstem Trinity River natural-origin Chinook Salmon redds relative to the total mainstem count of natural-origin Chinook Salmon redds within ten reach-scale sections, 2002–2017. Each plot includes a linear model with the R^2 value, p -value (noted with an '*' if <0.05), and 95% confidence limits (dotted lines).

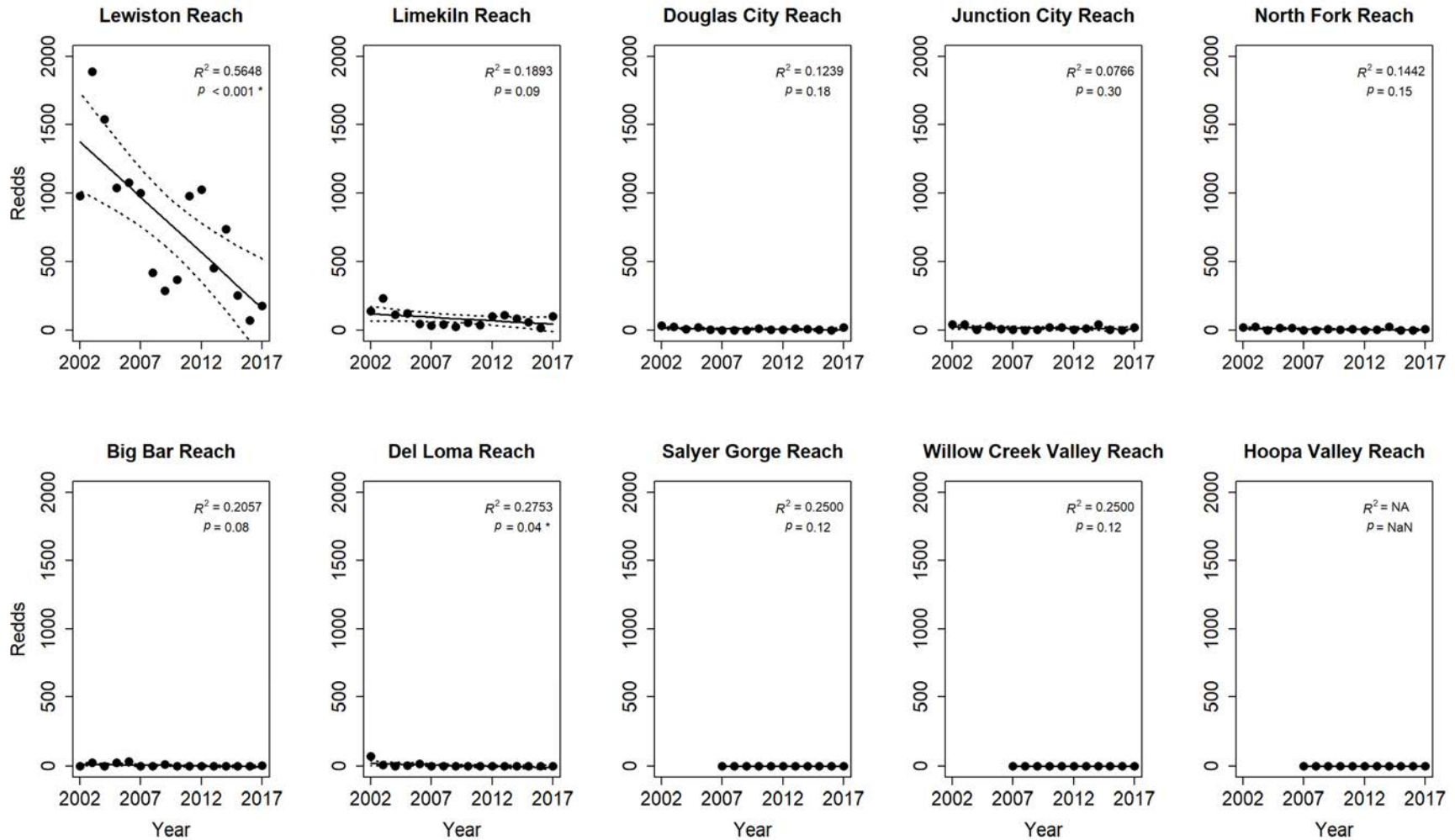


Figure 11. Estimated number of mainstem Trinity River hatchery-origin Chinook Salmon redds within ten reach-scale sections, 2002–2017. Each plot includes a linear model with the R^2 value, p -value (noted with an '*' if <0.05), and 95% confidence limits (dotted lines).

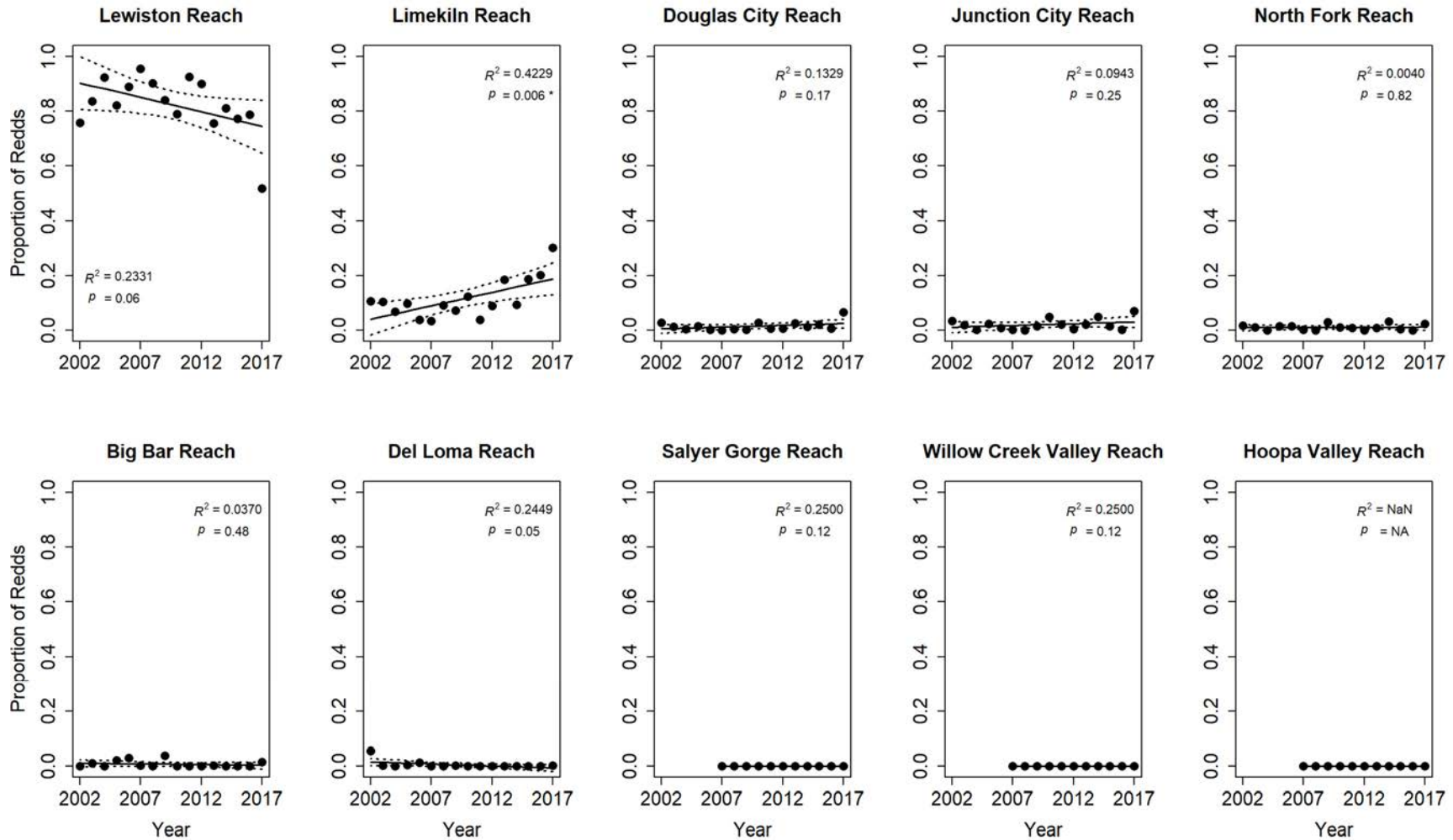


Figure 12. Proportions of mainstem Trinity River hatchery-origin Chinook Salmon redds relative to the total mainstem count of hatchery-origin Chinook Salmon redds within ten reach-scale sections, 2002–2017. Each plot includes a linear model with the R^2 value, p -value (noted with an '*' if <0.05), and 95% confidence limits (dotted lines).

Discussion

Redd counts from the 2017 spawning season were the second lowest since this survey's inception in 2002 and salmon carcass estimates were the third lowest. Our 2017 results are consistent with the California Department of Fish and Wildlife Chinook Salmon natural spawner escapement estimates for the Trinity River Basin, which estimated the third lowest numbers of both spring- and fall-run Chinook Salmon since 2002 (CDFW 2018a, 2018b).

Flows were generally stable throughout the survey period in the upper reaches and most of the survey period in the lower reaches. Rain events elevated water turbidity and the reduced visibility impaired the ability to detect redds and carcasses in the lower reaches from mid- to late November. Though scheduled lower river (Reaches 12–14) surveys in mid- to late November were cancelled due to high flow and poor visibility, spawning is typically sparse in these reaches and any missed redds from this section would likely have only been a minor contribution to the total redd count.

The analyses of long-term data from our spawning surveys provide insight into the dynamics of Chinook Salmon spawning activity on the Trinity River. The main themes that emerge are 1) the overall abundance of natural-origin Chinook Salmon redds did not change significantly from 2002 to 2017, 2) straying and spawning of hatchery-origin salmon is generally confined to areas near the hatchery below Lewiston Dam, 3) the spatial distribution of natural-origin Chinook Salmon spawning continues to change, and 4) pre-spawn mortality has been relatively low in recent years.

The annual natural-origin Chinook Salmon redd count from 2002 to 2017 ranged between 1,516 (in 2016) and 6,170 (in 2012). Spawner abundance was hypothesized to increase following restoration actions (TRRP and ESSA 2009), but the abundance of natural-origin Chinook Salmon redds in the mainstem Trinity River from 2002 to 2017 did not significantly change (Figure 7). Other factors (e.g., harvest, ocean conditions, in-river conditions, etc.) that influence in-river escapement may have masked any responses in spawning activity to river restoration. Shifts in abundance are common to Chinook Salmon populations (Mantua et al. 1997; Brown 2002) and are evident in the Klamath Basin (CDFW 2018a, 2018b). The estimates of Trinity River natural-spawner adult escapement (2,532 spring-run and 6,072 fall-run; CDFW 2018a, 2018b) in 2017 were notably below the TRRP annual river escapement goal of 68,000 natural-origin Chinook Salmon spawners (6,000 spring-run adults and 62,000 fall-run adults).

Although the abundance of natural-origin Chinook Salmon redds did not show a significant trend from 2002 to 2017, the spatial distribution of redds shifted downstream. The increase in mean distance from Lewiston Dam of natural-origin Chinook Salmon redds was previously documented (Chamberlain et al. 2012; Rupert et al. 2017a, 2017b) and data collected in 2017 continue to follow this trend. This shift is consistent with the IAP's suggestion that changes in longitudinal redd distribution would happen within three to four brood cycles following restoration activities (TRRP and ESSA 2009).

The abundance of hatchery-origin Chinook Salmon redds (redds constructed by hatchery-produced females regardless of male origin) decreased significantly from 2002 to 2017, as evident in the Lewiston Reach where the majority of hatchery-origin Chinook Salmon

spawn (Figure 11). Also, even though the distribution of hatchery-origin Chinook Salmon redds has remained skewed towards the TRH (Figure 5), the proportion of hatchery-origin Chinook Salmon redds has generally decreased in the Lewiston Reach and increased in the Limekiln Reach (Figure 12). The number and release timing of hatchery-reared juvenile Chinook Salmon has remained relatively constant over these years, so the reason for the decrease in abundance of hatchery-origin Chinook Salmon redds is unclear. While IAP objectives advocate limiting the genetic interaction of hatchery- and natural-origin Chinook Salmon, and having fewer hatchery-origin Chinook Salmon redds on the spawning grounds does support these objectives, further investigations are suggested to examine the causes for this decrease in hatchery-origin Chinook Salmon redds.

Reach-scale analyses revealed the clearest resolution for analyzing spawning distribution shifts of natural-origin Chinook Salmon. The proportion of natural-origin Chinook Salmon that spawned near TRH and Lewiston Dam (Lewiston and Limekiln reaches) decreased from 2002 to 2017 and more spawned in the mid-river sections (Junction City–Del Loma reaches; Figure 10). This shift is contrary to the IAP hypothesis that redd abundance in the reaches below the North Fork Trinity River would not increase until escapement began to approach restoration goals (TRRP and ESSA 2009). TRRP restoration actions may therefore be influencing a larger portion of the Trinity River than expected. Presumably, flow management is the primary factor for the spawning distribution shift of natural-origin Chinook Salmon since the effects of flow extend downstream much further than the generally localized effects of mechanical channel rehabilitation, coarse sediment augmentation, and watershed (tributaries) restoration.

Changes in redd abundance at the site scale was specifically used to evaluate the effect of TRRP channel rehabilitation activities. Our analysis revealed no clear post-construction response at rehabilitation sites. As reported in Rupert et al. (2017a), despite being the smallest scale used in our analyses, the site scale may still be too spatially broad and too few years have passed since construction to detect responses to restoration. A positive response in the abundance of Chinook Salmon redds to channel rehabilitation may take many generations that encompass several years of geomorphic change and restoration site maturation. TRRP channel rehabilitation sites only secondarily affect spawning habitat since many constructed features are intended to increase and diversify juvenile rearing habitats and/or change the geomorphology of the site. The long-term effects of flow management, however, are intended to increase spawning habitat, though this would presumably affect all sites regardless of channel rehabilitation treatments (TRRP and ESSA 2009).

The relationship between redd counts and the estimated number of spawned female Chinook Salmon in Reaches 1 and 2 using the 2012–2017 data set indicate a density-dependent redd observation bias (Figure 6). This is contrary to the result that Rupert et al. (2017a) found with just the 2012–2014 data set. The Reach 2 data point from 2012, the largest run year, appears to have a negative influence on the slope of the regression line. Large spawning runs in the future may help validate or refute the density-dependent observation bias within this section of the river.

The importance of describing pre-spawn mortality has increased in recent years with ongoing drought conditions and associated higher risks of epizootic events. Aguilar et al. (1996) reported that pre-spawn mortality for Chinook Salmon ranged between 1.1% and 44.9% in the mainstem Trinity River above the North Fork confluence from 1978 to 1982

and 1987 to 1995. In comparison, pre-spawn mortality rates that we measured were relatively low (between 0.0% and 9.5% from 2009 to 2016 and 2.0% in 2017) in this section of the river. Salmon pre-spawn mortality rates are typically highest at the beginning of the spawning season and decrease as the season advances (Aguilar et al. 1996; Gough and Williamson 2012). Too few pre-spawn mortality Chinook Salmon carcasses (six) were observed in 2017 to conduct a temporal analysis. Aguilar et al. (1996) also reported a positive correlation between pre-spawn mortality and run size for Trinity River Chinook Salmon from 1978 to 1995. After adding the data from 2017, which had the second lowest redd count and third lowest pre-spawn mortality rate since 2009, to the data from 2009 to 2016, no correlation was detected between these two parameters in the restoration reach (Appendix F). The lack of correlation suggests that other factors beyond run size (i.e., river conditions, run timing, etc.) may be influencing pre-spawn mortality rates. The 2017 Coho Salmon run size was notably small and the carcasses sample size ($n = 1$ fresh female) was inadequate to assess pre-spawn mortality for this species. Interpretation of results pertaining to spawning success should take into account that pre-spawn mortality occurs outside of the temporal and spatial extent of the surveys. Pre-spawn mortality fish are available to our carcass survey because they expired prior to spawning. The spatiotemporal location of carcass recovery is unlikely to be an accurate depiction of when and where fish were destined to spawn had they survived. For instance, pre-spawn mortality occurring in the Lower Klamath River for Trinity River-bound fish were not detectable during our Trinity River spawn surveys. Likewise, spring-run Chinook Salmon that expired well before the first surveys in September were also undetectable.

Acknowledgements

We extend special gratitude to Charlie Chamberlain (USFWS) for producing the modeling scripts that provide the foundation for this project's analyses and to Derek Rupert [U.S. Bureau of Reclamation (BOR)] for his technical assistance and for the cover art on this report. Thanks to the field personnel that collected the data for this survey, including: Anne Beulke (USFS), Mike Bradford (CDFW), Todd Buxton (USFWS), Alfredo Billy Colegrove (HVT), Axel Erickson IV (YTFP), Amelia Fleitz (USFS), Sterling Fulford (USFWS), Brandt Gutermuth (BOR), Kevin Held (BOR), Kyle Hopkins (YTFP), Dionisio Hurtado (HVT), Yadao Inong (YTFP), Erik Kenas (USFWS), Chris Laskodi (YTFP), Michael Macon (USFWS), Thomas Masten (HVT), Hawk Mattz (YTFP), Albert Perry (HVT), James Rickaby (HVT), David Ruiz (HVT), Derek Rupert (USFWS), Ron Smith (CDFW), Brianna Walsh (USFWS), and William Willson (YTFP).

Literature Cited

- Aguilar, B., L. D. Davis, B. W. Collins, L. Hanson, W. Sinnen, M. Zuspan, and M. Dean. 1996. Annual Report: Trinity River Basin salmon and steelhead monitoring project, 1994–1995 season. R. M. Kano, editor. California Department of Fish and Game, Inland Fisheries Division, Sacramento, California. 223 p.
- Bradford, M., and D. Hankin. 2012. Trinity River Restoration Program adult salmonid monitoring evaluation. Prepared for TRRP. Weaverville, California. 47 p.
- Brown, E. M. 2002. 2000 salmon spawning ground surveys. Pacific Salmon Treaty Program, 538 Award Number NA77FP0445. Idaho Fish Game Report 02-33, Boise, Idaho.
- Buffington, J., C. Jordan, M. Merigliano, J. Peterson, and C. Stalnaker. 2014. Review of the Trinity River Restoration Program following Phase 1, with emphasis on the Program's channel rehabilitation strategy. Prepared by the Trinity River Restoration Program's Science Advisory Board for the Trinity River Restoration Program with assistance from Anchor QEA, LLC, Stillwater Sciences, BioAnalysts, Inc., and Hinrichsen Environmental Services.
- CDFW (California Department of Fish and Wildlife). 2018a. Klamath River Basin fall Chinook Salmon spawner escapement, in-river harvest and run-size estimates, 1978–2017. California Department of Fish and Wildlife, Arcata, Californian.
- CDFW (California Department of Fish and Wildlife). 2018b. Klamath River Basin spring Chinook Salmon spawner escapement, river harvest and run-size estimates, 1980–2017. California Department of Fish and Wildlife, Arcata, Californian.
- Chamberlain, C. D., S. Quinn, and W. Matilton. 2012. Distribution and abundance of Chinook Salmon redds in the mainstem Trinity River 2002 to 2011. U.S. Fish and Wildlife Service. Arcata Fish and Wildlife Office, Arcata Fisheries Technical Report TR 2012-16, Arcata, California.
- Gaeuman, D., R. Stewart, and T. Buxton. 2016. First steps towards a river corridor management strategy. Technical report: TR-TRRP-2016-1. Trinity River Restoration Project, Weaverville, California.
- Gough, S. A., and S. C. Williamson. 2012. Fall Chinook Salmon run characteristics and escapement for the main-stem Klamath River, 2001–2010. U.S. Fish and Wildlife Service, Arcata Fish and Wildlife Office, Arcata Fisheries Technical Report Number TR 2012–14, Arcata, California.
- HVT (Hoopa Valley Tribe), McBain and Trush, and Northern Hydrology and Engineering. 2011. Channel rehabilitation design guidelines for the mainstem Trinity River. Prepared for the Trinity River Restoration Program, Hoopa, California.
- Kery, M., and M. Schaub. 2012. Bayesian population analysis using WinBUGS. Academic Press, Oxford, United Kingdom.

- Mantua, N. J., S. R. Hare, Y. Zhang, J. M. Wallace, R. C. Francis. 1997. A Pacific interdecadal climate oscillation with impacts on salmon production. *Bulletin of the American Meteorological Society* 78(6):1069–1079.
- Moffett, J. W., and S. H. Smith. 1950. Biological investigations of the fishery resources of the Trinity River, California. Special Scientific Report No. 12, U.S. Fish and Wildlife Service. 71 p.
- Quihillalt, R. R. 1999. Mainstem Trinity River fall Chinook Salmon spawning redd survey, 1996 through 1998. U.S. Fish and Wildlife Service, Arcata, California.
- Rogers, D. W. 1972. King Salmon (*Oncorhynchus tshawytscha*) and Silver Salmon (*Oncorhynchus kisutch*) spawning escapement and spawning habitat in the upper Trinity River, 1970. California Fish and Game, Region 1, Anadromous Fisheries Branch Administrative Report Number 73-10.
- Rupert, D. L., C. D. Chamberlain, S. A. Gough, N. A. Som, N. J. Davids, W. C. Matilton, A. M. Hill, and E. R. Wiseman. 2017a. Mainstem Trinity River Chinook Salmon Spawning Survey 2012-2014. U.S. Fish and Wildlife Service. Arcata Fish and Wildlife Office, Arcata Fisheries Technical Report Number TR 2017–52, Arcata, California.
- Rupert, D. L., S. A. Gough, N. A. Som, N. J. Davids, W. C. Matilton, A. M. Hill, and J. L. Pabich. 2017b. Mainstem Trinity River Chinook Salmon Spawning Distribution, 2015 and 2016. U.S. Fish and Wildlife Service. Arcata Fish and Wildlife Office, Arcata Fisheries Technical Report Number TR 2017–56, Arcata, California.
- TRRP and ESSA (Trinity River Restoration Program and ESSA Technologies Ltd.). 2009. Integrated Assessment Plan, Version 1.0 – September 2009. Draft report prepared for the Trinity River Restoration Project, Weaverville, California. 285 p.
- USDOI (U.S. Department of Interior). 2000. Record of Decision: Trinity River mainstem fishery restoration final Environmental Impact Statement / Environmental Report.
- USFWS (U.S. Fish and Wildlife Service). 1986, 1987. Trinity River flow evaluation study, 2 reports. Annual Report, U.S. Fish and Wildlife Service, Sacramento, California.
- USFWS (U.S. Fish and Wildlife Service) and HVT (Hoopa Valley Tribe). 1999. Trinity River flow evaluation, Final Report. U.S. Fish and Wildlife Service, Arcata Fish and Wildlife Office, Arcata, California and Hoopa Valley Tribe, Hoopa, California.

Appendices

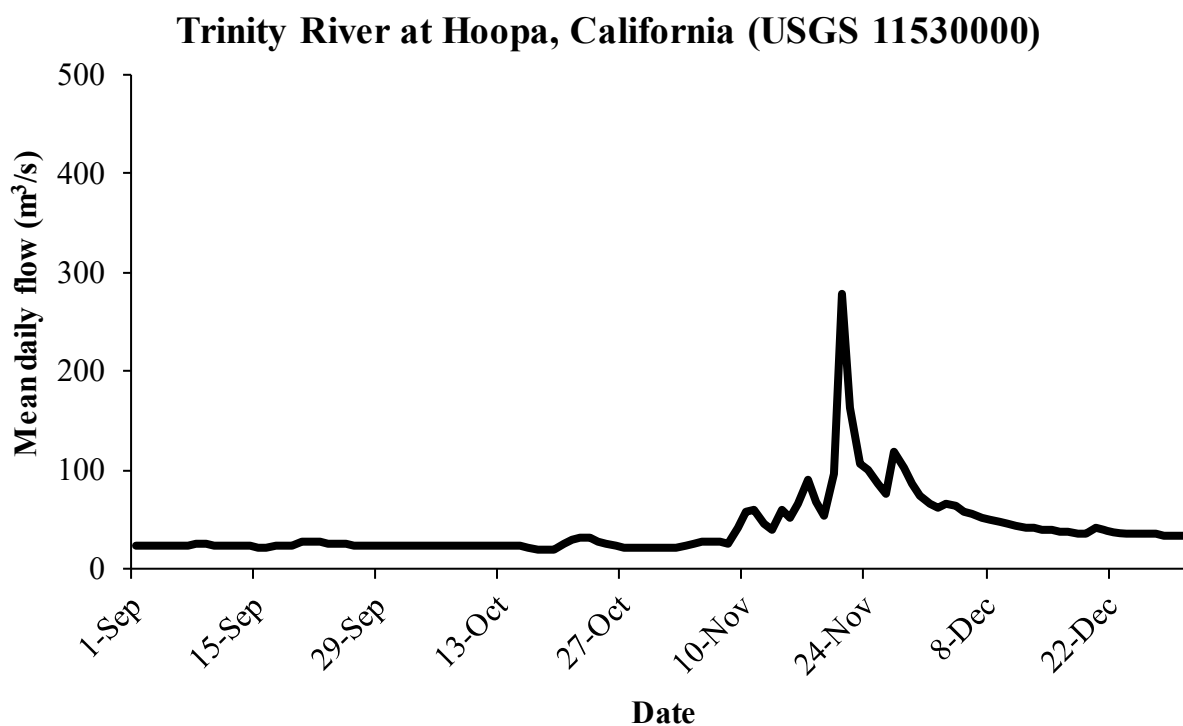
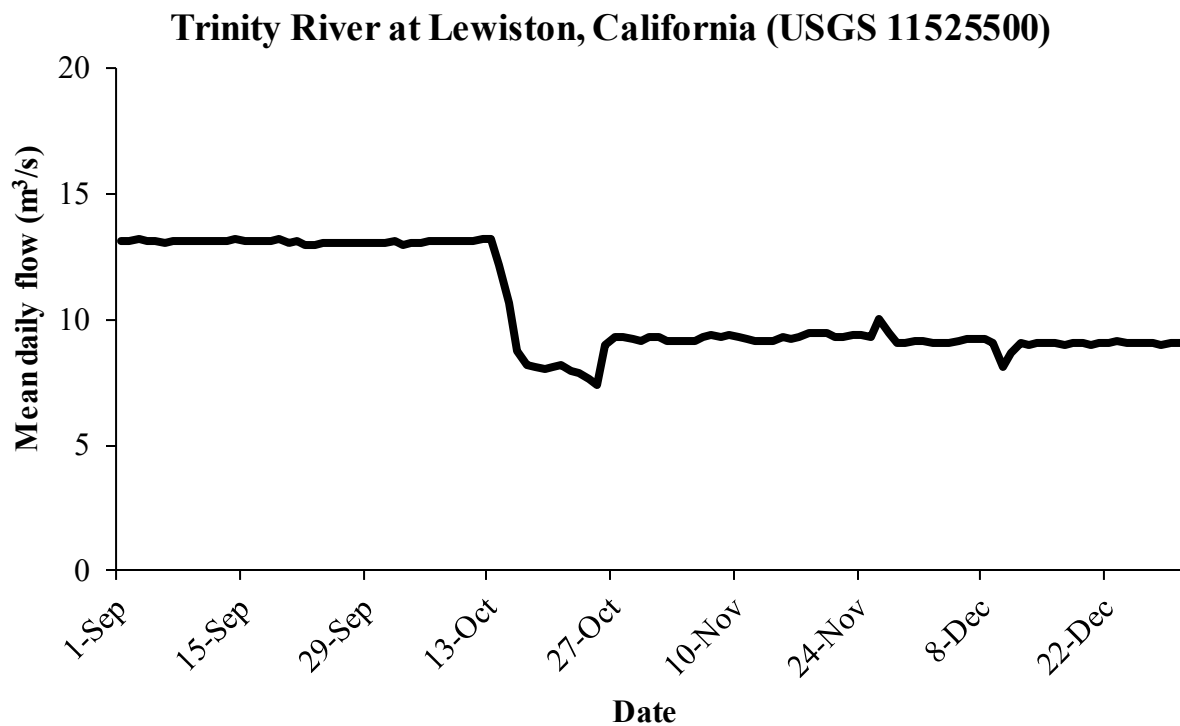
Appendix A. Trinity River water visibility by week and reach throughout the 2017 survey period. Grey boxes represent surveys with sub-optimal visibility. NS = No Survey for scheduled surveys that were missed. Dashes (-) represent days when surveys were not scheduled or performed.

Week start	Reach											
	1	2	3	4	5	6	7	9	10	12	13	14
Aug. 27	1.5-3.0	-	-	-	-	-	-	-	-	-	-	-
Sep. 3	0.9-1.5	0.9-1.5	0.9-1.5	NS	NS	NS	NS	-	-	-	-	-
Sep. 10	1.5-3.0	1.5-3.0	1.5-3.0	1.5-3.0	1.5-3.0	0.9-1.5	0.9-1.5	<0.9	0.9-1.5	-	-	-
Sep. 17	1.5-3.0	1.5-3.0	1.5-3.0	1.5-3.0	1.5-3.0	0.9-1.5 ^b	0.9-1.5 ^b	-	-	-	-	-
Sep. 24	1.5-3.0	1.5-3.0	1.5-3.0	1.5-3.0	1.5-3.0	0.9-1.5	NS	0.9-1.5	0.9-1.5	-	-	-
Oct. 1	1.5-3.0	1.5-3.0	1.5-3.0	1.5-3.0	1.5-3.0	1.5-3.0 ^a	NS	-	-	1.5-3.0	>3.0	>3.0
Oct. 8	1.5-3.0	1.5-3.0	1.5-3.0	1.5-3.0	1.5-3.0	>3.0	>3.0	1.5-3.0 ^b	0.9-1.5	-	-	-
Oct. 15	1.5-3.0	1.5-3.0	1.5-3.0 ^a	0.9-1.5	1.5-3.0 ^a	>3.0	>3.0	-	-	>3.0	>3.0	NS
Oct. 22	1.5-3.0	1.5-3.0	1.5-3.0	1.5-3.0	1.5-3.0	1.5-3.0 ^b	1.5-3.0 ^b	1.5-3.0 ^b	NS	-	-	-
Oct. 29	1.5-3.0	1.5-3.0	1.5-3.0	1.5-3.0	1.5-3.0	1.5-3.0 ^b	1.5-3.0 ^b	-	-	>3.0	>3.0	>3.0
Nov. 5	1.5-3.0	1.5-3.0	1.5-3.0	1.5-3.0	1.5-3.0	>3.0	>3.0	>3.0	>3.0	-	-	-
Nov. 12	1.5-3.0	1.5-3.0	1.5-3.0	1.5-3.0 ^a	1.5-3.0	0.9-1.5	0.9-1.5	-	-	NS	NS	NS
Nov. 19	1.5-3.0	1.5-3.0	0.9-1.5	NS	NS	0.9-1.5	NS	NS ^c	NS ^c	-	-	-
Nov. 26	1.5-3.0	1.5-3.0	1.5-3.0 ^b	1.5-3.0 ^b	1.5-3.0 ^b	1.5-3.0	1.5-3.0	1.5-3.0	>3.0	NS ^c	NS	NS
Dec. 3	1.5-3.0	1.5-3.0	1.5-3.0 ^b	1.5-3.0 ^b	1.5-3.0 ^b	>3.0	>3.0	NS ^c	NS ^c	1.5-3.0	-	-
Dec. 10	1.5-3.0	1.5-3.0	1.5-3.0 ^b	1.5-3.0 ^b	1.5-3.0	NS	NS	1.5-3.0 ^b	>3.0	NS ^c	>3.0	1.5-3.0
Dec. 17	1.5-3.0	1.5-3.0	1.5-3.0 ^b	>3.0	-	-	-	-	-	>3.0	>3.0	-

^a this is the higher visibility reported by the two crews. The other crew reported visibility 0.9-1.5 m

^b this is the lesser visibility reported by the two crews. The other crew reported visibility >3.0 m

^c missed survey rescheduled for following week

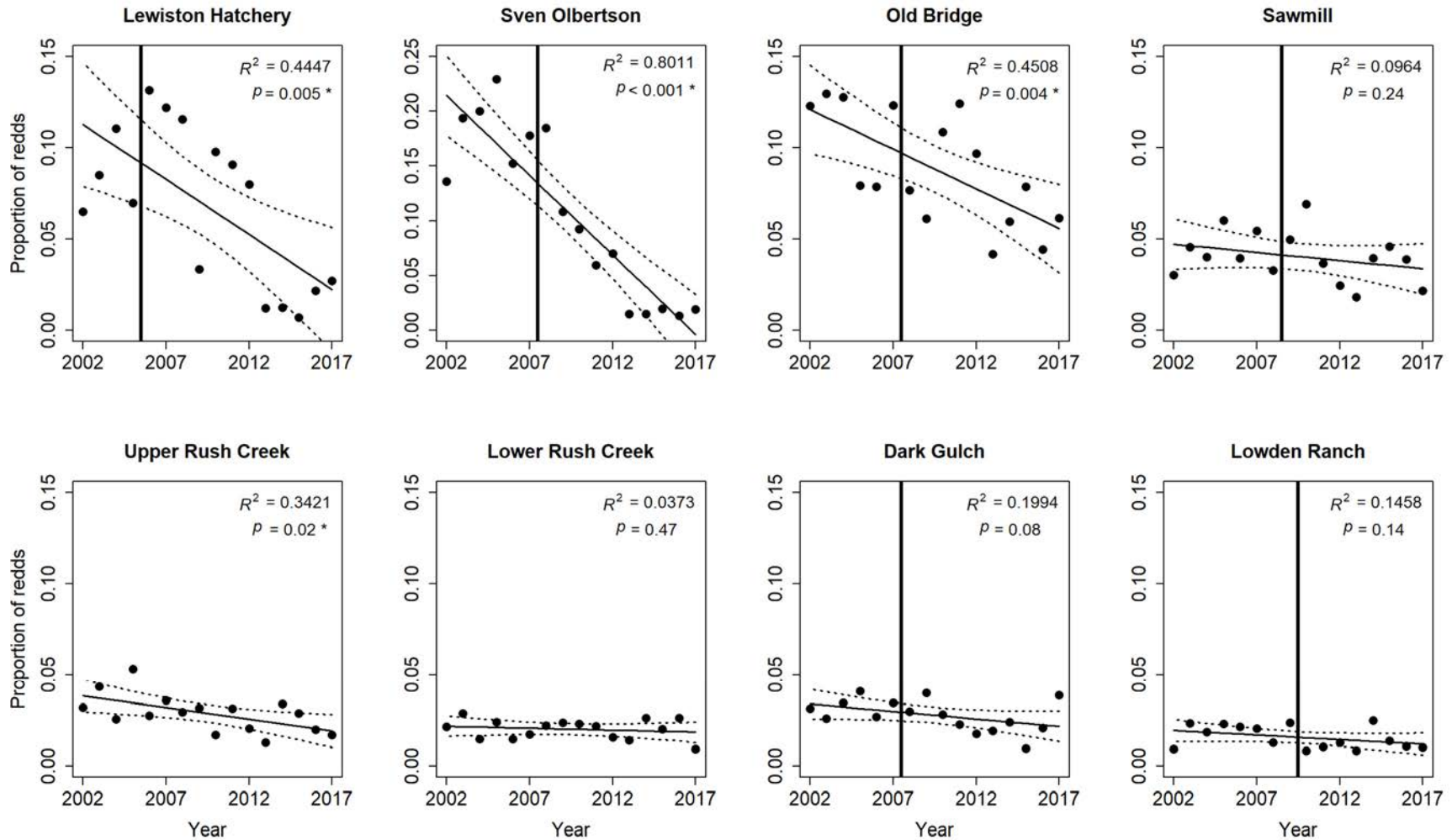


Appendix B. Trinity River mean daily discharge at Lewiston (USGS Gage 11525500) and Hoopa, California (USGS Gage 11530000) during the 2017 survey season.

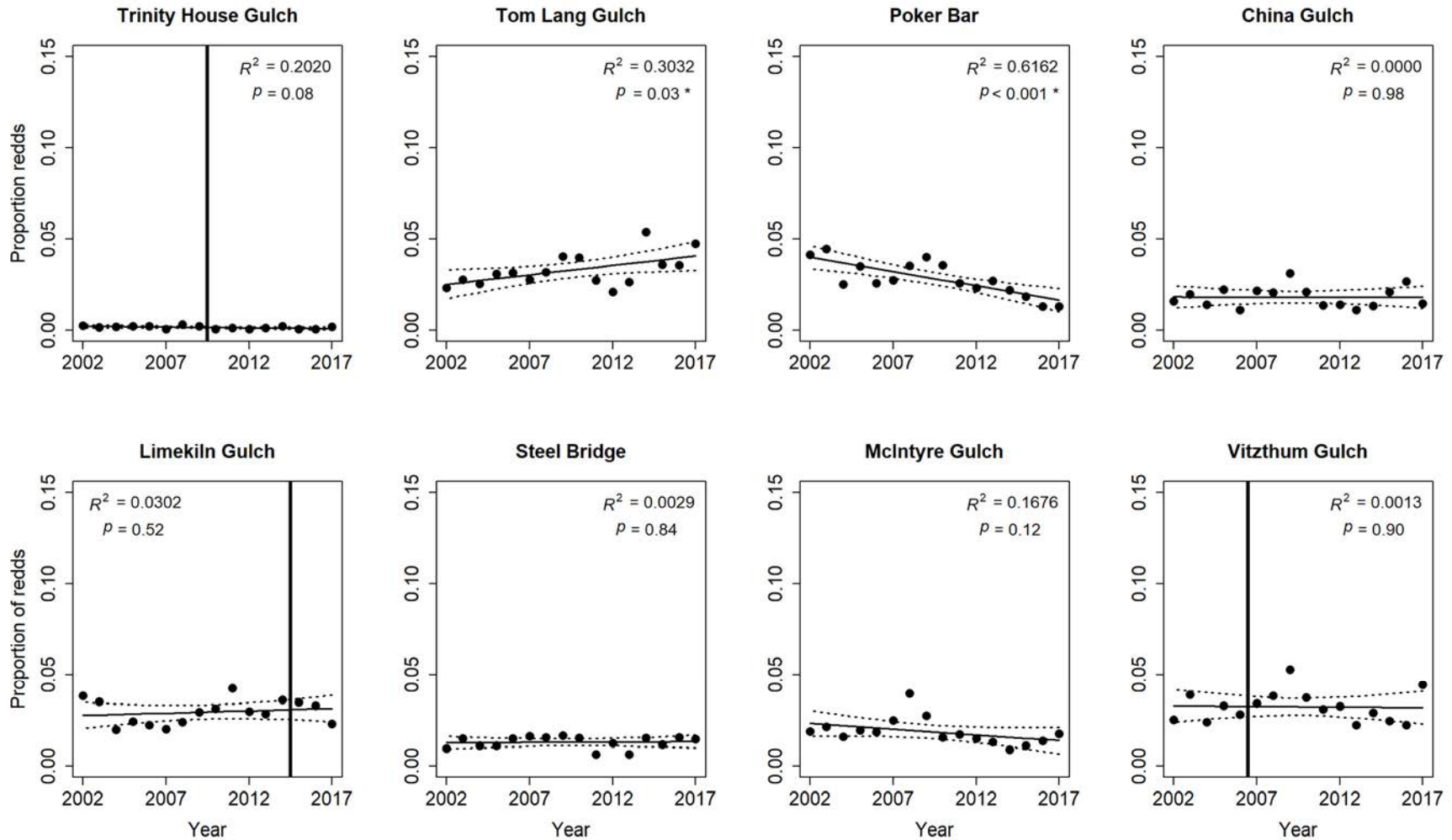
Appendix C. Pre-spawn mortality numbers by week and reach of unmarked and ad-clipped fresh (conditions 1 and 2) female Chinook Salmon carcasses, mainstem Trinity River surveys 2017. Also included are weekly pre-spawn mortality proportions among like mark-type carcasses. Ad-clipped carcass numbers were not expanded by CWT-specific production multipliers and are therefore about 25% of hatchery-origin carcass numbers. Likewise, unmarked carcass numbers include hatchery-origin carcasses that were not ad-clipped. ‘NS’ = no survey and dashes (-) represent a sample size of zero.

Unmarked																
Calendar		Reach												All reaches		
week	Dates	1	2	3	4	5	6	7	9	10	12	13	14	n	Pct.	
35	Aug. 27 - Sep. 2	-	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	-	
36	Sep. 3 - 9	-	-	-	-	-	-	NS	NS	NS	NS	NS	NS	-	-	
37	Sep. 10 - 16	-	-	-	-	-	-	-	-	-	NS	NS	NS	-	-	
38	Sep. 17 - 23	1	0	-	-	1	-	-	NS	NS	NS	NS	NS	2	40.0%	
39	Sep. 24 - 30	-	0	-	-	-	-	NS	-	-	NS	NS	NS	0	0.0%	
40	Oct. 1 - 7	0	0	0	0	-	0	NS	NS	NS	-	-	-	0	0.0%	
41	Oct. 8 - 14	0	0	0	0	0	1	0	-	0	NS	NS	NS	1	4.2%	
42	Oct. 15 - 21	0	0	0	0	0	0	0	NS	NS	-	-	NS	0	0.0%	
43	Oct. 22 - 28	0	0	0	0	0	1	0	0	0	NS	NS	NS	1	1.9%	
44	Oct. 29 - Nov. 4	0	0	0	0	0	0	0	NS	NS	-	0	-	0	0.0%	
45	Nov. 5 - 11	0	0	0	0	0	0	0	0	0	NS	NS	NS	0	0.0%	
46	Nov. 12 - 18	0	0	0	0	-	-	-	NS	NS	NS	NS	NS	0	0.0%	
47	Nov. 19 - 25	1	0	0	NS	NS	0	NS	NS	NS	NS	NS	NS	1	3.7%	
48	Nov. 26 - Dec. 2	1	0	0	0	-	0	-	-	0	NS	NS	NS	1	3.2%	
49	Dec. 3 - 9	0	0	0	-	-	-	-	NS	NS	-	NS	NS	0	0.0%	
50	Dec. 10 - 16	0	0	-	-	-	-	NS	-	-	NS	-	-	0	0.0%	
51	Dec. 17 - 23	-	0	-	-	-	NS	NS	-	-	-	-	-	0	0.0%	
All weeks		3	0	0	0	1	2	0	0	0	-	-	-	6	2.0%	

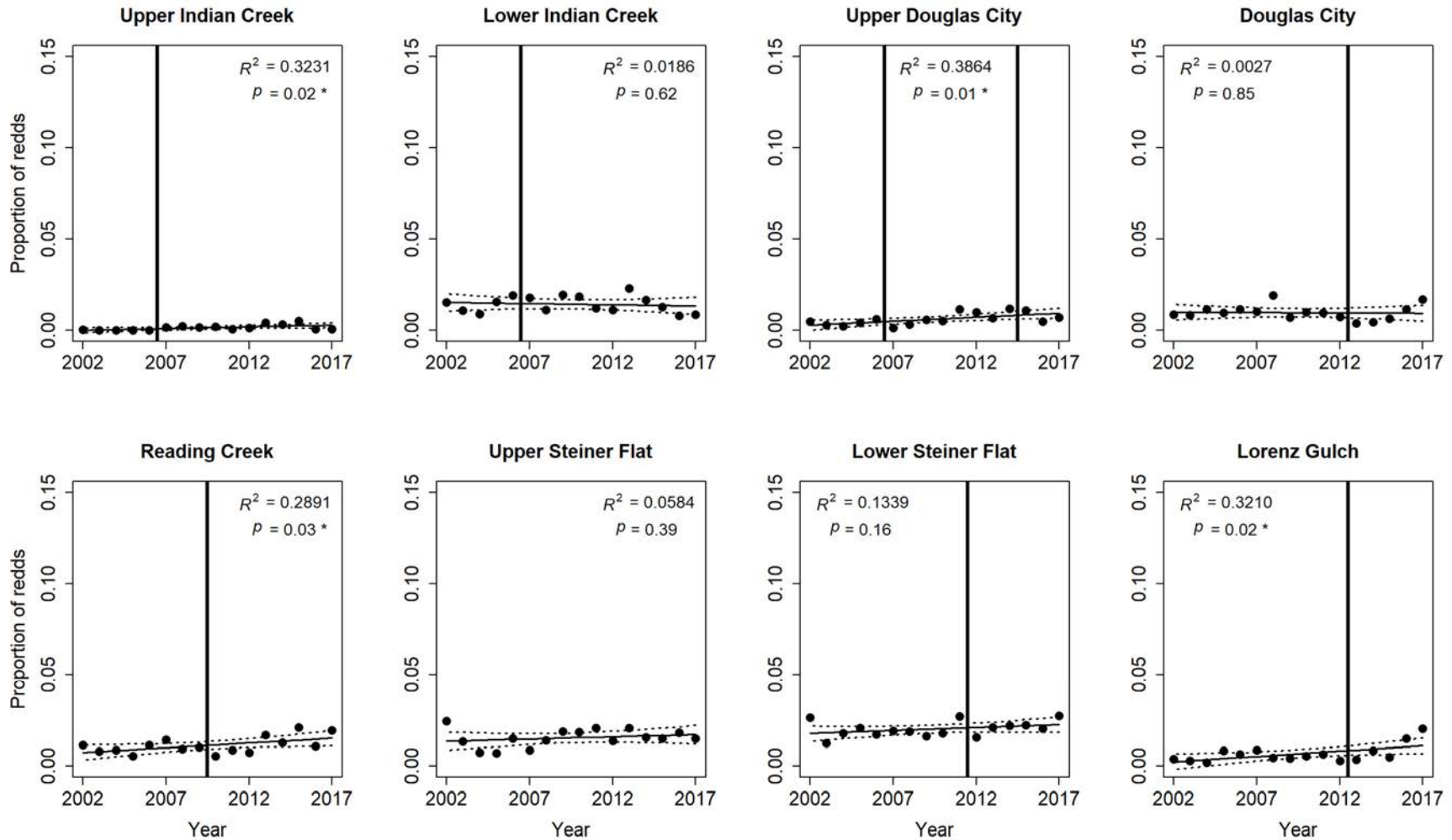
Ad-clipped																
Calendar		Reach												All reaches		
week	Dates	1	2	3	4	5	6	7	9	10	12	13	14	n	Pct.	
35	Aug. 27 - Sep. 2	-	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	-	
36	Sep. 3 - 9	-	-	-	-	-	-	NS	NS	NS	NS	NS	NS	-	-	
37	Sep. 10 - 16	-	-	-	-	-	-	-	-	-	NS	NS	NS	-	-	
38	Sep. 17 - 23	-	-	-	-	-	-	-	NS	NS	NS	NS	NS	-	-	
39	Sep. 24 - 30	-	-	-	-	-	0	NS	-	-	NS	NS	NS	0	0.0%	
40	Oct. 1 - 7	-	0	0	-	-	-	NS	NS	NS	-	-	-	0	0.0%	
41	Oct. 8 - 14	0	-	-	-	0	-	-	-	-	NS	NS	NS	0	0.0%	
42	Oct. 15 - 21	-	0	-	-	-	-	-	NS	NS	-	-	NS	0	0.0%	
43	Oct. 22 - 28	0	-	-	-	-	-	-	-	-	NS	NS	NS	0	0.0%	
44	Oct. 29 - Nov. 4	0	0	-	-	0	-	-	NS	NS	-	-	-	0	0.0%	
45	Nov. 5 - 11	-	-	-	-	-	-	-	-	-	NS	NS	NS	-	-	
46	Nov. 12 - 18	0	-	-	-	-	-	-	NS	NS	NS	NS	NS	0	0.0%	
47	Nov. 19 - 25	0	0	-	NS	NS	-	NS	NS	NS	NS	NS	NS	0	0.0%	
48	Nov. 26 - Dec. 2	0	0	-	-	-	-	-	-	-	NS	NS	NS	0	0.0%	
49	Dec. 3 - 9	0	-	-	-	-	-	-	NS	NS	-	NS	NS	0	0.0%	
50	Dec. 10 - 16	-	-	-	-	-	-	NS	-	-	NS	-	-	-	-	
51	Dec. 17 - 23	-	-	-	-	-	NS	NS	-	-	-	-	-	-	-	
All weeks		0	0	0	-	0	0	-	-	-	-	-	-	0	0.0%	



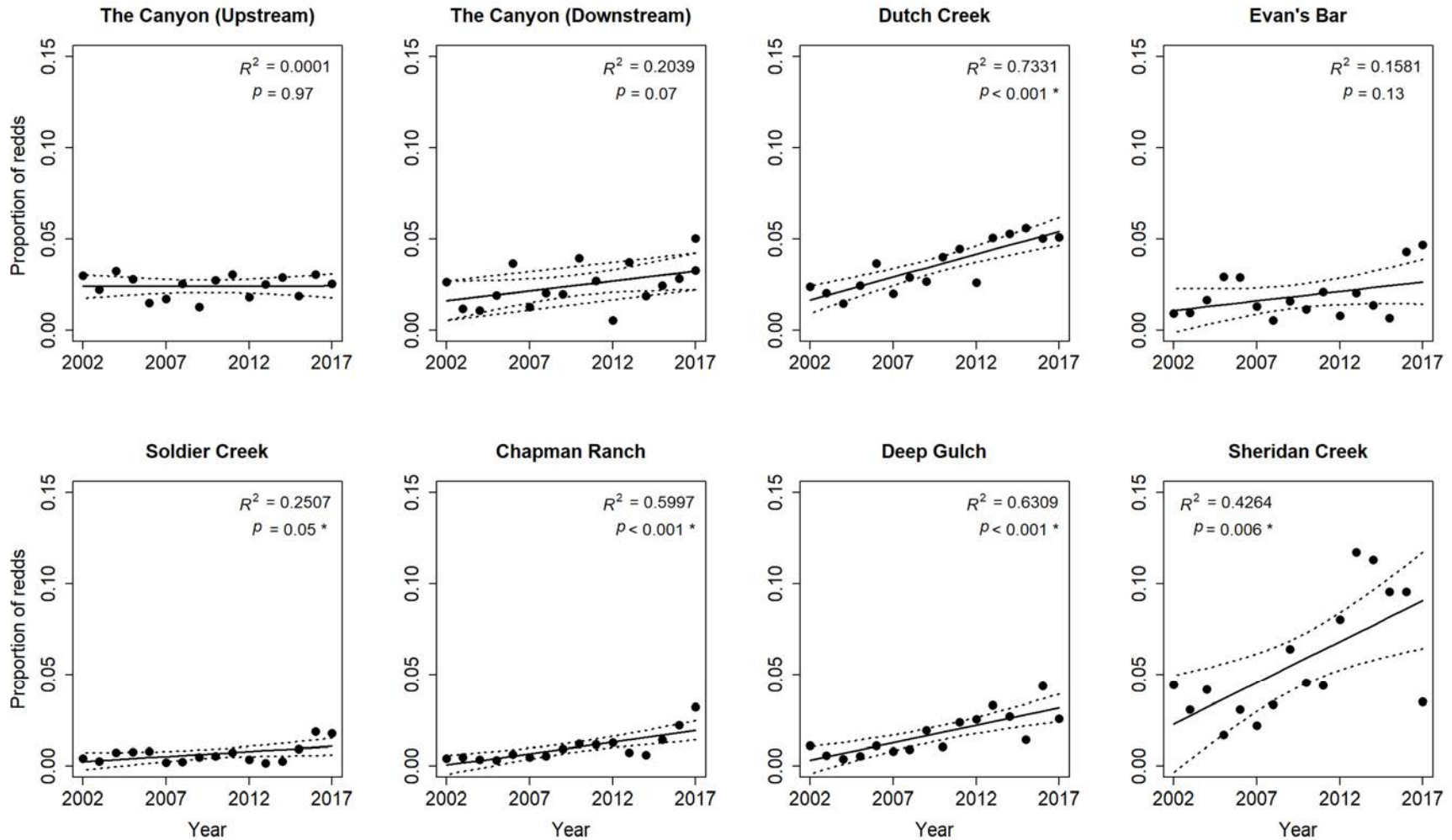
Appendix D. Proportion of TRRP restoration reach natural-origin Chinook Salmon redds within site-scale sections, 2002–2017. Each plot includes a linear model with the R^2 value, p -value (noted with an '*' if <0.05), and 95% confidence limits (dotted lines). The time mechanical channel rehabilitation was initiated is shown as black vertical bars. Note the change in y-axis scale in the Sven Olbertson site.



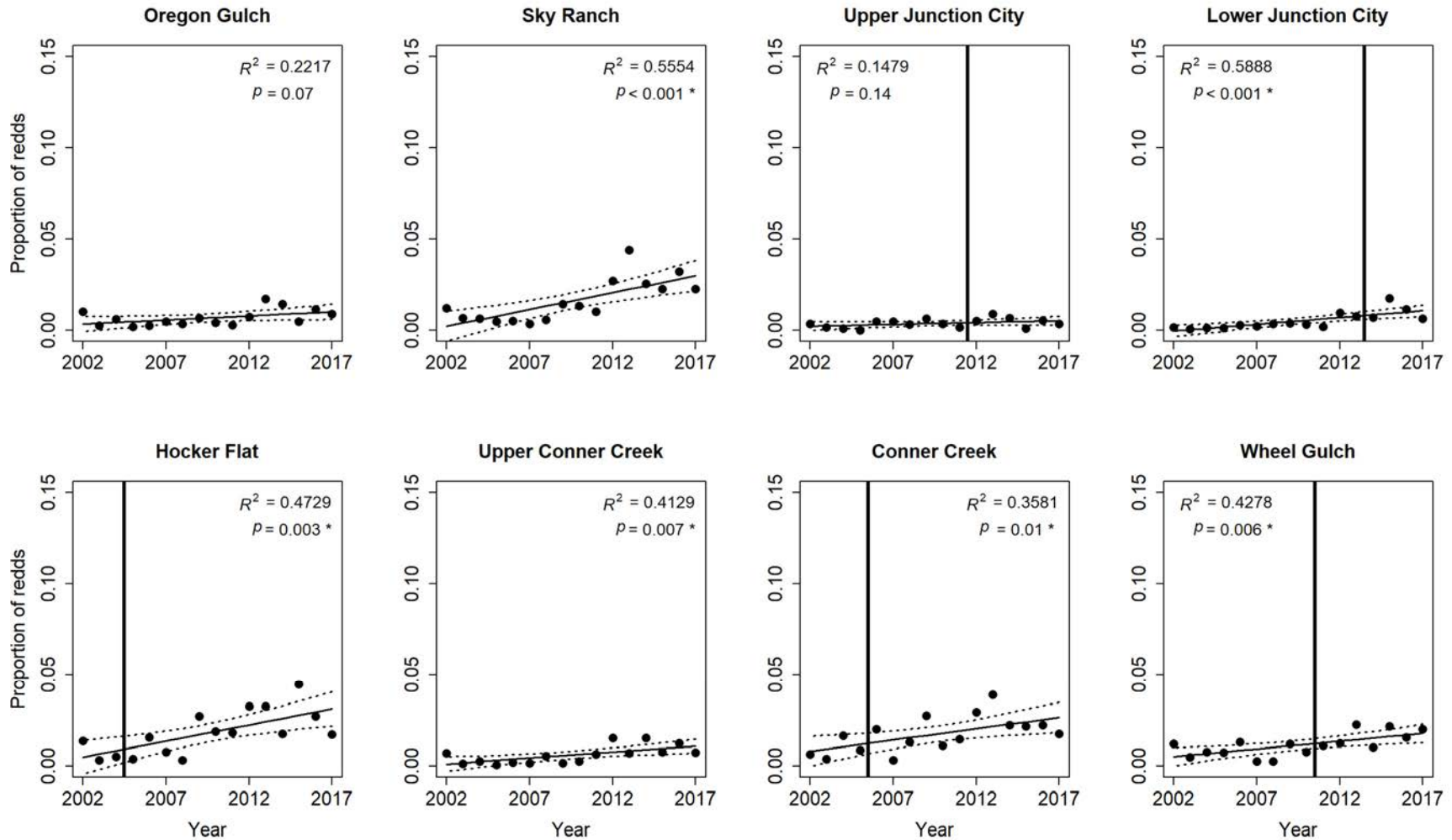
Appendix D (continued). Proportion of restoration reach natural-origin Chinook Salmon redds within site-scale sections, 2002–2017. Each plot includes a linear model with the R^2 value, p -value (noted with an ‘*’ if <0.05), and 95% confidence limits (dotted lines). The time mechanical channel rehabilitation was initiated is shown as black vertical bars.



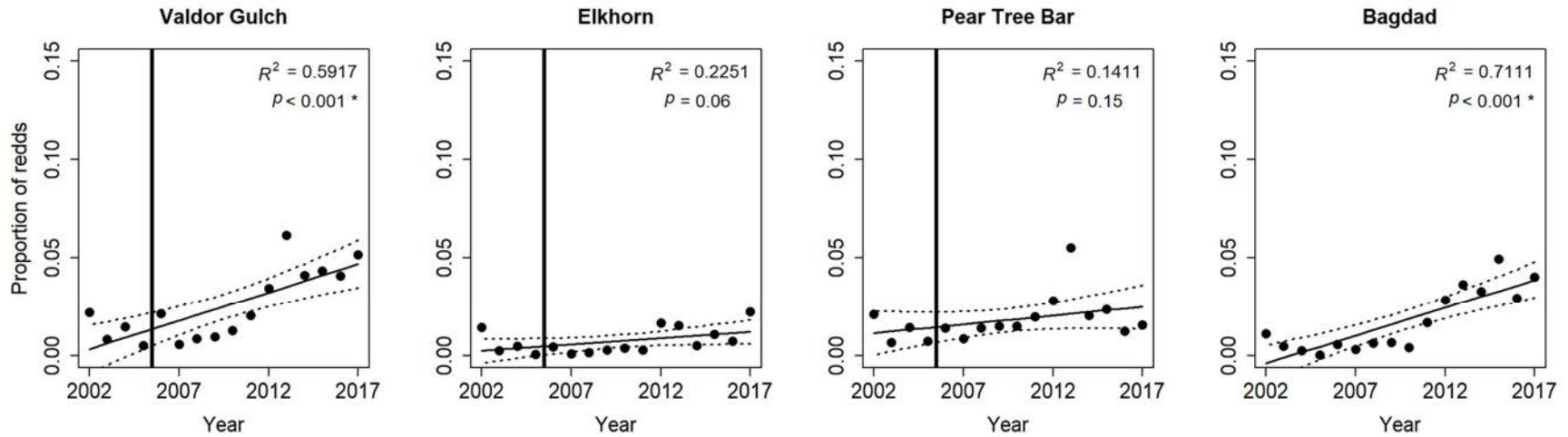
Appendix D (continued). Proportion of restoration reach natural-origin Chinook Salmon redds within site-scale sections, 2002–2017. Each plot includes a linear model with the R^2 value, p -value (noted with an '*' if <0.05), and 95% confidence limits (dotted lines). The time mechanical channel rehabilitation was initiated is shown as black vertical bars.



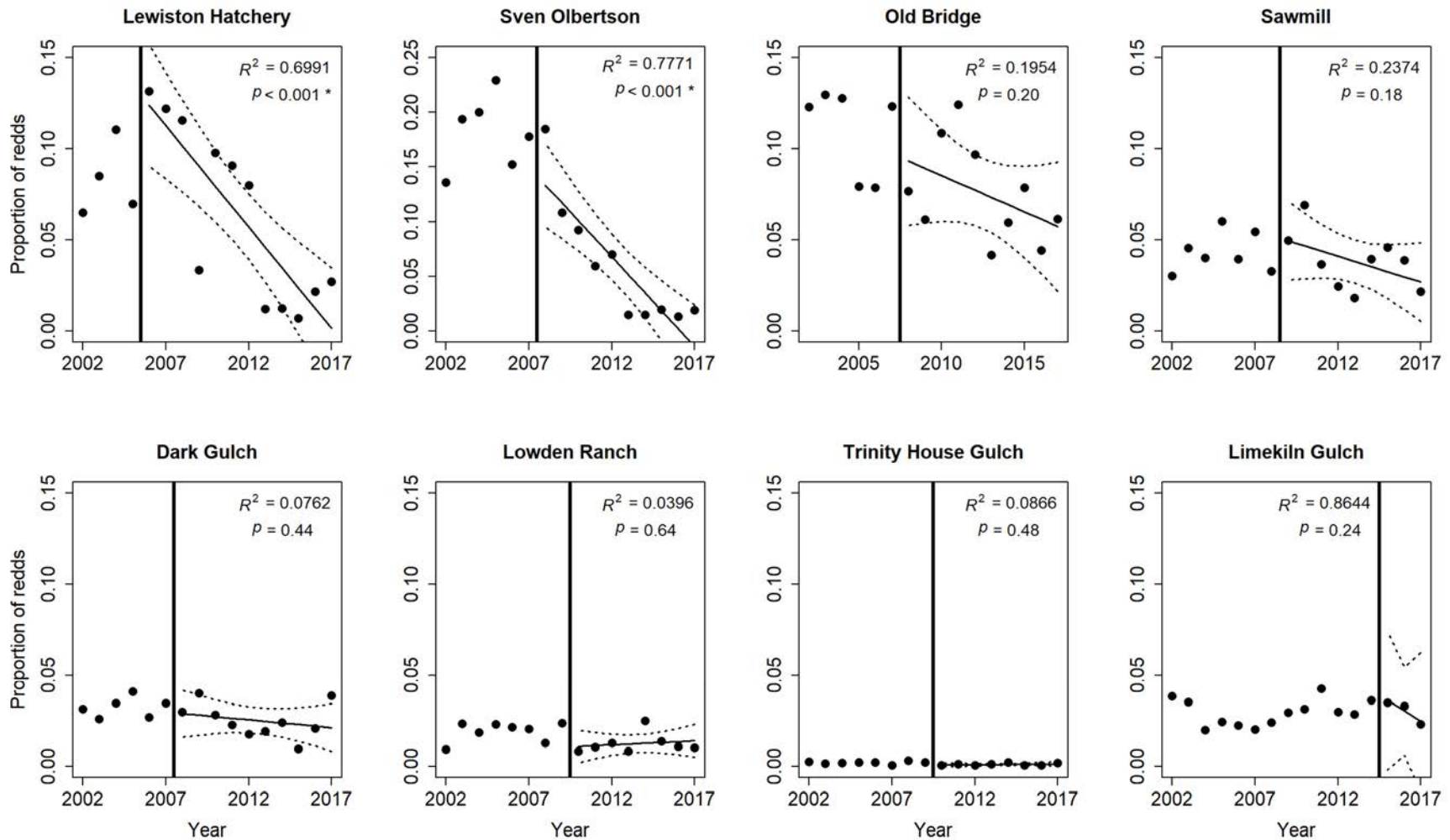
Appendix D (continued). Proportion of restoration reach natural-origin Chinook Salmon redds within site-scale sections, 2002–2017. Each plot includes a linear model with the R^2 value, p -value (noted with an ‘*’ if < 0.05), and 95% confidence limits (dotted lines).



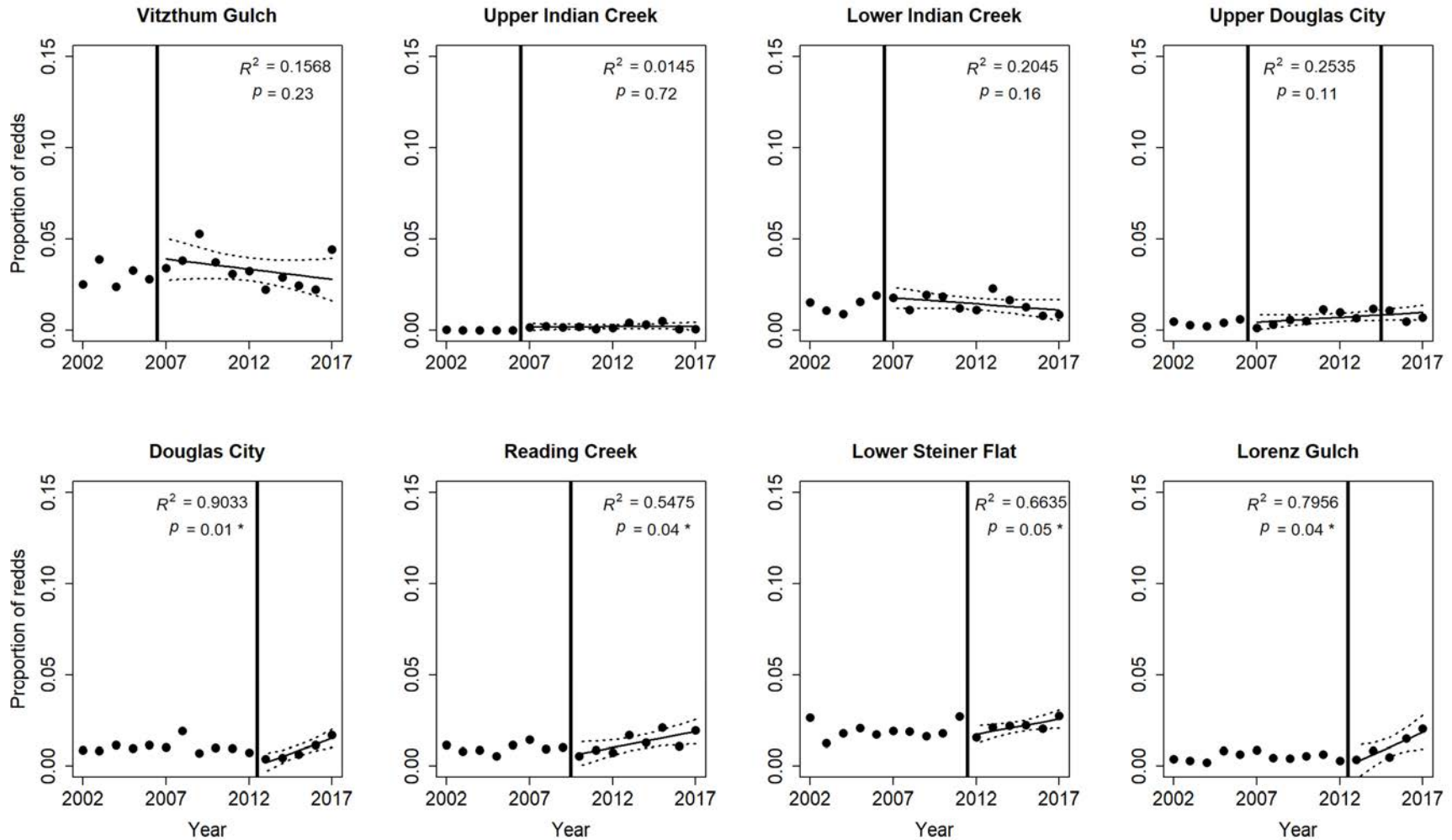
Appendix D (continued). Proportion of restoration reach natural-origin Chinook Salmon redds within site-scale sections, 2002–2017. Each plot includes a linear model with the R^2 value, p -value (noted with an ‘*’ if < 0.05), and 95% confidence limits (dotted lines). The time mechanical channel rehabilitation was initiated is shown as black vertical bars.



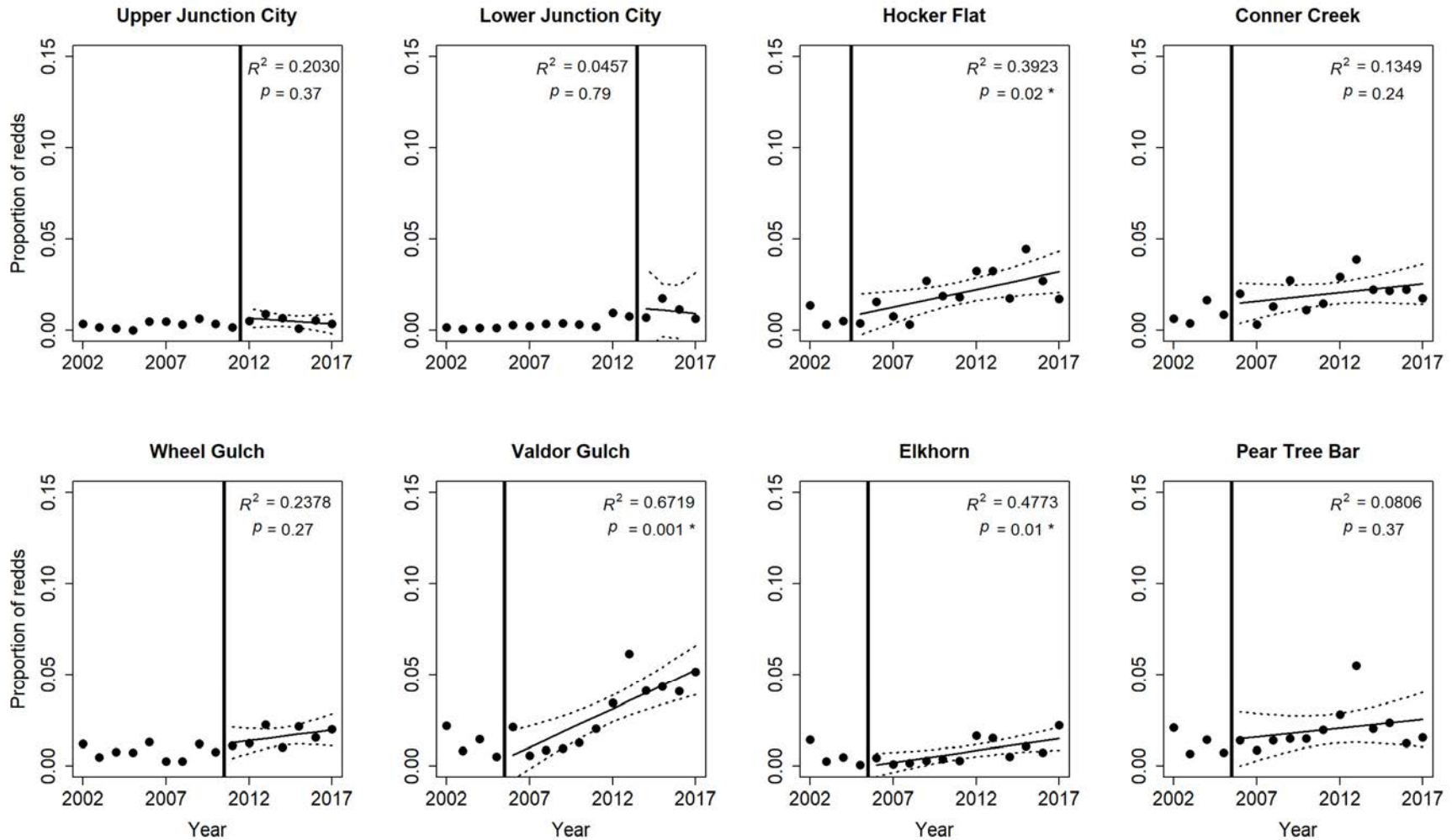
Appendix D (continued). Proportion of restoration reach natural-origin Chinook Salmon redds within site-scale sections, 2002–2017. Each plot includes a linear model with the R^2 value, p -value (noted with an ‘*’ if <0.05), and 95% confidence limits (dotted lines). The time mechanical channel rehabilitation was initiated is shown as black vertical bars.



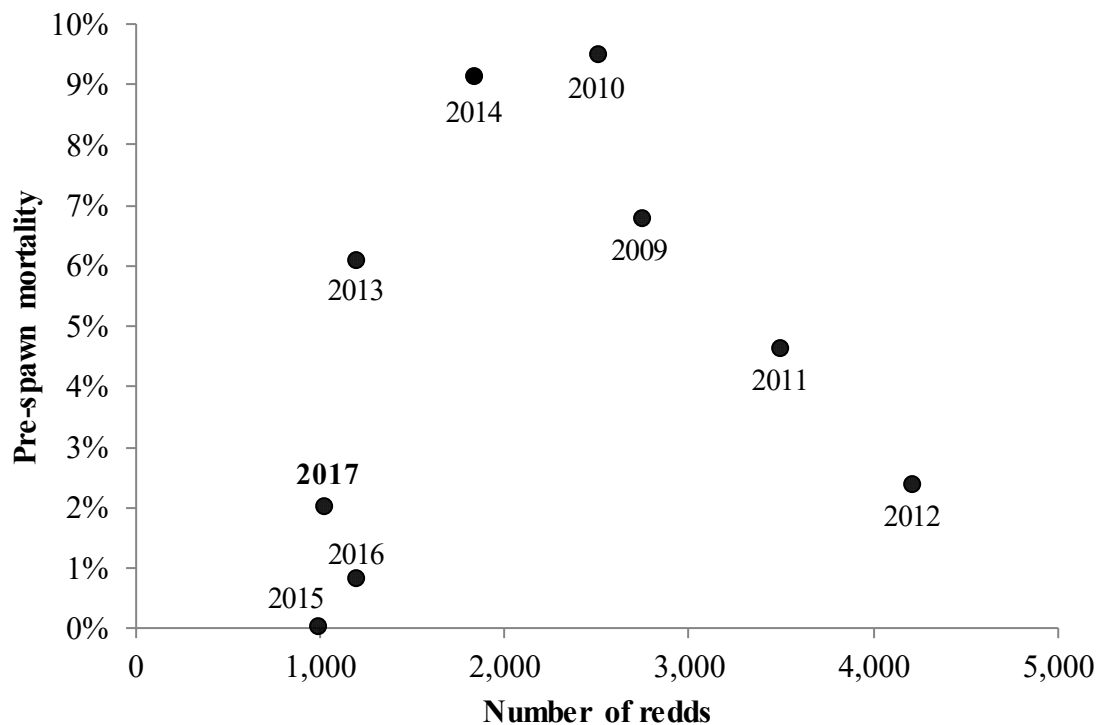
Appendix E. Proportion of natural-origin Chinook Salmon redds within site-scale sections in the TRRP restoration reach that encompass mechanical channel rehabilitation locations, 2002–2017. Each plot includes a post-construction linear model with the R^2 value, p-value (noted with an ‘*’ if < 0.05), and 95% confidence limits (dotted lines). The time mechanical channel rehabilitation was initiated is shown as black vertical bars.



Appendix E (continued). Proportion of natural-origin Chinook Salmon redds within site-scale sections in the TRRP restoration reach that encompass mechanical channel rehabilitation locations, 2002–2017. Each plot includes a post-construction linear model with the R^2 value, p-value (noted with an '*' if < 0.05), and 95% confidence limits (dotted lines). The time mechanical channel rehabilitation was initiated is shown as black vertical bars.



Appendix E (continued). Proportion of natural-origin Chinook Salmon redds within site-scale sections in the TRRP restoration reach that encompass mechanical channel rehabilitation locations, 2002–2017. Each plot includes a post-construction linear model with the R^2 value, p-value (noted with an '*' if <0.05), and 95% confidence limits (dotted lines). The time mechanical channel rehabilitation was initiated is shown as black vertical bars.



Appendix F. Natural-origin Chinook Salmon redd counts versus estimates of pre-spawn mortality from Lewiston Dam to the North Fork confluence, Trinity River surveys, 2009–2017.

PREDATION BY HATCHERY STEELHEAD ON NATURAL SALMON FRY IN THE
UPPER-TRINITY RIVER, CALIFORNIA

by

Seth W. Naman

A Thesis

Presented to

The Faculty of Humboldt State University

In Partial Fullfillment

Of the Requirements for the Degree

Masters of Science

In Natural Resources: Fisheries

December, 2008

PREDATION BY HATCHERY STEELHEAD ON NATURAL SALMON FRY IN THE
UPPER-TRINITY RIVER, CALIFORNIA

by

Seth W. Naman

Approved by Master' Thesis Committee:

Margaret A. Wilzbach, Major Professor

David G. Hankin, Committee Member

Bret C. Harvey, Committee Member

Gary L. Hendrickson, Natural Resources Program Coordinator

Natural Resources Program Number

Chris A. Hopper, Interim Dean for Research and Graduate Studies

ABSTRACT

Predation by Hatchery Steelhead on Natural Salmonid Fry in the Upper-Trinity River, California

Seth W. Naman

Hatchery fish have been implicated in the decline of stocks of naturally produced anadromous salmonids in the Pacific Northwest. I investigated the extent of predation by hatchery steelhead on naturally produced salmonid fry in the upper-Trinity River, California. During spring of 2007, 315 residualized hatchery steelhead and 1,636 juvenile hatchery steelhead were captured and examined for the presence of salmonid fry in the gut. Residualized steelhead consumed 435 salmonid fry and 2,685 salmonid eggs. Juvenile hatchery steelhead consumed 882 salmonid fry. Predation by juvenile hatchery steelhead was significantly greater near a side channel where a high percentage of adult salmonids were known to spawn. I used mark-recapture techniques to estimate the population of residualized hatchery steelhead and PIT tag recoveries to estimate the population of juvenile hatchery steelhead. Using the population estimates and predation rates, I estimated that 24,194 [95% CI = 21,066-27,323] salmonid fry and 171,018 [95% CI = 155,272-186,764] salmonid eggs were consumed by 2,302 residualized hatchery steelhead in 21 days from 10 February to 2 March 2007. Excluding the results from the side channel, I estimate that 437,697 juvenile hatchery steelhead consumed 61,214 [95% CI = 43,813-78,615] salmonid fry in 30 days from 28 March to 26 April 2007. Assuming

a constant population of 1,500 juvenile hatchery steelhead in the side channel during the 30 day period, an additional 49,445 salmonid fry were consumed. Managers should carefully consider all of the risks to naturally produced fish populations from hatchery fish in order to determine if the effects of hatchery releases are consistent with management goals.

ACKNOWLEDGMENTS

Numerous friends, colleagues, and professors provided much needed help and support in the last three years. Dr. Margaret A. Wilzbach willingly accepted me as a graduate student and provided advice and support. Dr. Walter Duffy and the USGS California Cooperative Fish and Wildlife Research Unit provided financial assistance for coursework. Kay Brisby was always willing to help with problems and administrative questions. Dr. Bret Harvey provided useful insight and advice throughout the planning and development of this research. My friends and colleagues of the Yurok Tribal Fisheries Program supported this research with their help, funding, and advice. Jeremy Alameda and Henry C. Alameda Jr. provided excellent assistance with field work and data collection. Drs. D. G. Hankin, R. W. Van Kirk, and H. B Stauffer were essential for their input regarding mathematics and statistics. I would also like to thank my father, who always had time to take me fishing, and my mother who encouraged me to follow my dreams.

TABLE OF CONTENTS

LIST OF TABLES	vii
LIST OF FIGURES	viii
INTRODUCTION	1
STUDY SITE.....	5
METHODS	9
General Field Methods.....	9
Residualized hatchery steelhead population estimation	13
Juvenile steelhead population estimation.....	14
Predation Estimates.....	18
RESULTS	25
Residualized Hatchery Steelhead.....	25
Juvenile Hatchery Steelhead	29
PIT-tag antenna performance and juvenile hatchery steelhead population estimation.....	33
Fry consumption	37
DISCUSSION	44
REFERENCES	58

LIST OF TABLES

Table		Page
1	Review of hatchery steelhead predation studies.	2
2	Age composition for 98 residualized hatchery steelhead from the upper-Trinity River, California.	26
3	Sampling locations, method of capture, and sample size of juvenile hatchery steelhead captured at each location in the upper Trinity River, California, in March of 2007.....	30
4	Fork length, weight, and fry consumption of non-smolting, transitional, and smolting juvenile hatchery steelhead captured in the upper-Trinity River, California 2007, using hook and line, seine, and electroshocker.....	31

LIST OF FIGURES

Figure	Page
1	Map of the study location, and river kilometers (in white) on the upper-Trinity River, California. River kilometers increase in an upstream direction and begin at zero at the confluence of the Trinity and Klamath rivers near the town of Weitchpec, California. 6
2	Images of hatchery steelhead scales from the upper-Trinity River, California, 2007. From left to right: 1) a residualized hatchery steelhead >3 years old (468 mm in length) showing wide spacing of first 30-35 circuli from 1 year of robust hatchery growth (a), followed by tightly spaced and uniform circuli from several years of river growth (b) and; 2) an anadromous hatchery steelhead (635 mm in length) showing several signs of anadromy including ocean growth (c) with wider spacing of circuli than that of the first 30-35 circuli of hatchery growth, as well as ocean entry/exit markings. 28
3	The number of unique detections (first date a tag was detected) of PIT-tagged juvenile steelhead by day, for an array of 2 antennas located in Trinity River Hatchery Juvenile steelhead were forced from the hatchery on 26 and 27 March 2007 following an 11 day volitional emigration period..... 34
4	The number of unique detections (first date a tag was detected) of an array of 2 antennas located 3.2 km downstream in the Trinity River (right). Juvenile steelhead were forced from the hatchery on 26 and 27 March 2007 following an 11 day volitional emigration period. 35
5	The number of unique detections (first date a tag was detected) of PIT-tagged juvenile steelhead, by day, for an array of 2 antennas located in the Trinity River, California, 2007, 3.2 km downstream from the release site, and a regression of the data with a power function. The data were fit to a power function as $y = 73.44x^{0.923}$, $R^2 = 0.89$ 38
6	The proportion of piscivores (piscivores/ number of fish examined) \pm 95% CI and the mean rate of predation (number of salmonid fry/piscivore) \pm 95% CI for residualized hatchery steelhead captured from the upper Trinity River, California, 2007..... 40
7	The proportion of piscivores (piscivores/ number of fish examined) \pm 95% CI and the mean rate of predation (number of salmonid fry/piscivore) \pm 95% CI for juvenile hatchery steelhead captured from the upper-Trinity River, California, 2007. The juvenile data excludes those fish captured at Bear Island. 41

INTRODUCTION

Although several researchers have concluded that predation can influence the population dynamics of anadromous salmonids (Mather 1998), little is known about the extent to which hatchery salmonids prey upon naturally produced salmonids. Nonetheless, millions of hatchery salmonids are released into rivers throughout the western United States annually (Levin et al. 2001). Several researchers have studied competition between hatchery and naturally produced salmonids (e.g. Pollard and Bjornn 1973, McMichael et al. 1997, Fleming et al. 2000, Kostow and Zhou 2006), but predation by hatchery salmonids on naturally produced salmonids remains virtually undocumented in the peer-reviewed literature. Several studies have examined predation by naturally produced salmonids on naturally produced salmonids (e.g. Ruggerone and Rogers 1992, Beauchamp 1995), and others have investigated smallmouth bass predation on salmonids (e.g. Fritts and Pearsons 2004, Naughton et al. 2004), but none specifically address predation by hatchery salmonids on naturally produced salmonids. However, there are a variety of contract reports and technical memoranda on the subject (Table 1). Most of these studies documented low rates of predation, and those that have attempted to estimate the total number of fry consumed have reported relatively low numbers (e.g. Cannamela 1993).

Each year, Trinity River Hatchery releases roughly 800,000 steelhead smolts and 500,000 coho salmon smolts at the base of the Lewiston Dam, directly into an important

Table 1. Review of hatchery steelhead predation studies.

Citation	River System	State	Methods	Sample size	Fry ingested (n)	Fry/Stomach
Beauchamp 1995	Cedar	Washington	Electrofishing	18	0	0.00
Canamella 1993	Upper Salmon	Idaho	Hook and line/electrofishing	6,762	10	0.00
Hawkins and Tipping 1999	Lewis	Washington	Seine	74	1	0.01
Hawkins and Tipping 1999	Lewis	Washington	Seine	110	2	0.02
Hawkins and Tipping 1999	Lewis	Washington	Seine	48	52	1.08
Jonasson et al. 1994	Imnaha/Grande Rhonde basins	Oregon	Hook and line/electrofishing	358	1	0.00
Jonasson et al. 1995	Imnaha/Grande Rhonde basins	Oregon	Electrofishing	175	2	0.01
Martin et al. 1993	Lower Snake (Tucannon)	Washington	Hook and line	1,713	3	0.00
Whitesel et al. 1993	Imnaha/Grande Rhonde basins	Oregon	Screw trap/electrofishing	611	8	0.01

spawning region. The release occurs at a time when many naturally spawned fry and juveniles are emerging from spawning gravels or rearing. Because of the size differential between predator and prey (Pearsons and Fritts 1999) and the spatial and temporal overlap of predator and prey (Mather 1998; Hatchery Scientific Review Group 2004) there is strong potential for predation by hatchery-reared steelhead to significantly impact the abundance of natural salmonid fry.

The upper Trinity River is relatively clear, often averaging less than 2 nephelometric turbidity units (NTU) and sometimes less than 1 NTU during the Chinook salmon and coho salmon fry emergence period. Studies have shown that low turbidity promotes high foraging efficiency by piscivorous fishes (Gregory and Levings 1998; Robertis et al. 2003). However, no estimates of the amount of naturally produced salmonid fry consumed by hatchery salmonids in the Trinity River are available.

There is currently no information available on the extent to which hatchery steelhead residualize in the Trinity River. Hatchery reared steelhead are known to residualize in river systems throughout the western United States (Beauchamp 1995; Viola and Schuck 1995, McMichael and Pearsons 2001). They residualize in greatest numbers near the site of release, decreasing in number as the distance from the point of release increases (Viola and Schuck 1995, McMichael and Pearsons 2001). Negative impacts from predation (Hatchery Scientific Review Group 2004), competition (McMichael et al. 1997), or genetic interactions (Reisenbichler and Rubin 1999), may affect naturally spawned salmonids resulting from the presence of residualized hatchery steelhead. Hatchery reared steelhead have also been shown to be more aggressive than

wild steelhead (Berejikian et al. 1996, McMichael et al. 1999, McMichael and Pearsons 2001), which may exacerbate the effects of competition between hatchery and wild fish. In the uppermost 3.2 km of Trinity River, residualized hatchery steelhead cannot be legally removed by fishermen, as fishing regulations specify that the area is “fly only” and “catch and release only.”

The objectives of this study are to 1) estimate the proportion of piscivores in the residualized hatchery steelhead population and juvenile hatchery steelhead population of the upper Trinity River; 2) estimate the rate (fry/piscivore) at which piscivores in the residualized hatchery steelhead population and juvenile hatchery steelhead population prey upon naturally produced salmonid fry; 3) estimate the population sizes of residualized hatchery steelhead and juvenile hatchery steelhead; and 4) estimate the number of naturally produced salmonid fry consumed by residualized hatchery steelhead and juvenile hatchery steelhead on the upper Trinity River, in the study reach, during the period of study. This information could be used to help guide hatchery policies and is critical to understanding one of the impacts that Trinity River Hatchery may have on natural populations of salmonids.

STUDY SITE

The study area extended from Lewiston Dam, downstream 3.2 km to Old Lewiston Bridge (Figure 1). Trinity River Hatchery is located at the base of the dam, which is the terminus of anadromous fish migration in the Trinity River. This study reach is characterized by a largely confined channel and an alternating series of runs, pools, glides and riffles. Mean channel width is 30.2 m with a mean channel slope of 0.3% (Trinity River Flow Evaluation 1999). Throughout much of fall and winter, discharge from Lewiston Dam is at a base flow of approximately $8.5 \text{ m}^3\text{s}^{-1}$, and water from Trinity and Lewiston reservoirs keeps daily maximum river temperature, even in the heat of the summer, at approximately 12°C (Trinity River Flow Evaluation 1999). Beginning in the end of April, discharge from Lewiston Dam increases in accordance with the Trinity River Flow Evaluation (Trinity River Flow Evaluation 1999) to serve a variety of fisheries and geomorphological functions. Discharge then decreases, generally in the end of July, to $12.7 \text{ m}^3\text{s}^{-1}$, and remains at this level through the summer and fall until the beginning of October when it returns to a base flow of $8.5 \text{ m}^3\text{s}^{-1}$ (Trinity River Flow Evaluation 1999).

Elevation of the study reach is roughly 549 m. Summers are hot and dry followed by a mixture of rain and snow in the winters, typical of northern-California mid-elevation regions that are on the cusp of coastal and arid climates. Average annual precipitation for Weaverville, California, located approximately ten miles northeast of the study area, is 92.8 cm of rain and 45.2 cm of snowfall (National Weather Service 2008).

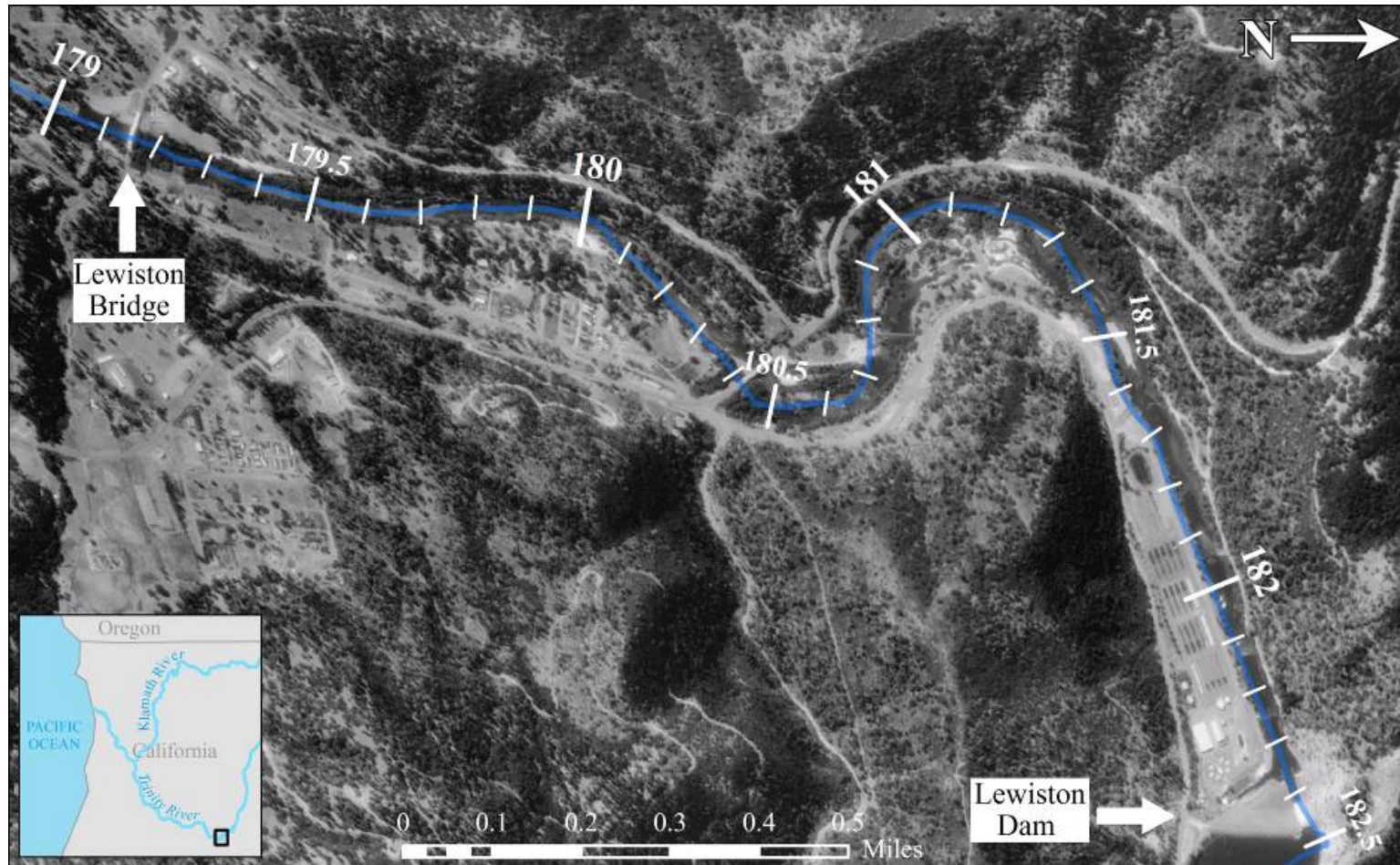


Figure 1. Map of the study location, and river kilometers (in white) on the upper-Trinity River, California. River kilometers increase in an upstream direction and begin at zero at the confluence of the Trinity and Klamath rivers near the town of Weitchpec, California.

The study reach is inhabited by spring- and fall-run Chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*O. kisutch*), steelhead (*O. mykiss*), Pacific lamprey (*Lamptera tridentata*), and brown trout (*Salmo trutta*). Coho salmon are listed under both the federal Endangered Species Act (Good et al. 2005), and the California Endangered Species Act (California Department of Fish and Game 2002).

The upper river provides spawning grounds for anadromous species which are harvested by tribal, recreational and sport fishermen. In the uppermost 3.2 km of the Trinity River, the terminus of anadromous fish migration, estimated redd totals for 2006 were 2,302 redds for Chinook salmon and coho salmon combined. This represents 53% of all redds that were counted from the dam to the North Fork Trinity River, 63.4 km downstream. This high concentration of redds in this section of river is typical for any given year (United States Fish and Wildlife Service 2007). While no data are recorded on the number or distribution of steelhead redds, it appeared to me that a similarly high percentage of the total number of redds were concentrated in the uppermost 3.2 km of river (personal observation).

According to data collected by the California Department of Fish and Game (CDFG) at weirs operated on the Trinity River, the majority of anadromous spawners are of hatchery origin. Returns of hatchery coho salmon have been relatively robust in recent years, but the proportion of natural coho salmon returning to the Trinity River has remained around 10% for many years (Trinity River Flow Evaluation 1999; California Department of Fish and Game 2005). There have been relatively strong runs of hatchery steelhead in the recent past, but the proportion of natural fall-run steelhead returning to

the Trinity River has remained around 20% of the total for many years (Trinity River Flow Evaluation 1999; California Department of Fish and Game 2005). The majority of both spring- and fall-run chinook salmon adults are also of hatchery origin, with natural Chinook salmon making up roughly 25% of the total (Trinity River Flow Evaluation 1999; California Department of Fish and Game 2005).

METHODS

General Field Methods

Prior to release, all hatchery steelhead are marked by adipose fin excision at Trinity River Hatchery, making the distinction between naturally produced steelhead, few of which were captured, and hatchery steelhead, straightforward. Prior to 15 March, any fin-clipped steelhead present in the study reach, excluding anadromous steelhead, were characterized as a residualized hatchery steelhead. Residualized hatchery steelhead were sampled from 6 February to 28 February 2007 and juvenile hatchery steelhead from 27 March to 26 April 2007. Sampling by the Yurok Tribal Fisheries Program in 2005 indicated that the maximum size of residualized hatchery steelhead was roughly 500 mm (Yurok Tribal Fisheries Program 2008). In addition to this size threshold, behavioral and morphological traits were used to distinguish between residualized and anadromous hatchery steelhead. After 15 March, hatchery steelhead that were 250-500 mm in fork length, excluding anadromous steelhead, were considered to be residualized. I used a cut off of 250 mm because only 3 out of 316 residualized hatchery steelhead captured prior to the release of juveniles on 15 March were less than 250 mm. Scale samples were collected from 99 residualized hatchery steelhead to determine age classes and to verify that none of the steelhead identified as residuals showed signs of ocean entry or ocean growth in scale patterns (Holtby et al. 1990). No attempt was made to determine the age of residualized hatchery steelhead considered to be older than age 3.

Three sites were sampled on a weekly basis throughout the duration of the study: Old Lewiston Bridge (rkm 179), Old Weir Hole (rkm 180.7) and the hatchery area (rkm 182.0, Figure 1). River kilometers begin at zero at the confluence of the Trinity and Klamath rivers near the town of Weitchpec, California and increase in an upstream direction. These sites were roughly located at the downstream end, middle, and upstream end of the study zone. Additionally, one or more of the following sites were sampled on a weekly basis: River Oaks Resort (rkm 180.0), New Lewiston Bridge (rkm 180.4), riffles between Old Weir Hole and New Lewiston Bridge (180.6) and Bear Island Area (rkm 181.5). Within the study reach this regime gave equitable spatial distribution to sampling locations.

Steelhead were captured using hook and line with wet or dry flies. Fish were almost exclusively taken using flies (either dry or wet invertebrate patterns). Using lures might have biased the data because fish that strike lures may have a greater propensity toward piscivory than the population as a whole. It should be noted that great care was taken in selecting small flies (\leq size 16 hooks) so that small fish could be caught as effectively as larger ones. The use of hook and line made it possible to collect fish from a wide range of locations and habitat types that would be inaccessible using other methods such as seining or electrofishing.

On four occasions, the sampling crew captured juvenile hatchery steelhead with hook and line, and then captured juvenile hatchery steelhead with a seine net or backpack electrofishers, generally in the same locale on the same day. This was done in order to

compare the rate of predation between fish that were captured using hook and line and other methods, to check for bias resulting from capturing fish with hook and line.

When sampling fish with electrofishers, a single pass was utilized, with personnel moving upstream expeditiously because the electrical current can disable fry and make them easy targets for hatchery steelhead in the area. If temporarily disabled fry float downstream during the electrofishing process and are consumed by hatchery steelhead downstream, and those steelhead are captured and examined within the next 25-30 hours, one might overestimate the number of fry consumed.

In addition to the comparisons of sampling methods, I checked for differences in size between fish that were captured in the river and that of the hatchery population as a whole. Size difference could bias the estimate of total number of fry consumed. On 14 March 2007, one day prior to the release of juvenile hatchery steelhead from Trinity River Hatchery, 50 fish were weighed and measured from each of ten raceways for comparison with the size of individuals captured by hook and line during the first week of study. Testing was constrained to the first week of study because growth, high mortality of small fish, emigration of larger fish, high mortality of sick or weak fish, etc., might change the population characteristics over the course of the study from the original characteristics of the hatchery population.

Captured fish were placed in five gallon buckets before being transferred to a live well that was placed directly in the river. They were examined within 2 hours of being captured. Fish were measured to fork length, visually examined for body morphology, spotting, coloration and skin silvering, then given a smoltification rating of not smolting,

transitional, or smolting (Viola and Schuck 1995). Both body morphology (Beeman et al. 1995) and skin reflectance (Haner et al. 1995, Ando et al. 2005) have been successfully used to discriminate between fish that are smolting, and those that are not. I compared condition of juvenile hatchery steelhead among the smolting categories using Fulton's K (Cone 1989). Prior to analysis and testing, each group was tested for isometric growth by regressing the natural log of fork length on the natural log of weight to determine if the slope differed significantly from three (Cone 1989). Additionally, I tested if the regressions of K on fork length were significantly different than zero, in order to check for dependence of condition on fish length (Cone 1989).

A 7.6 L hand pump garden sprayer was used to perform pulsed gastric lavage (Light et al. 1983). Stomach contents were flushed onto a white dish, examined for the presence of fish or fish parts, and recorded as empty, or containing one or more of the following: inorganic or organic material, invertebrates, salmonids, and (or) other fish species. After examination, captured steelhead were revived and released except for approximately 20 samples that were sacrificed to check the effectiveness of the lavage technique. All salmonid fry detected in samples of stomach contents were enumerated.

I did not attempt to identify consumed salmonid fry to species. Both Chinook salmon fry and coho salmon fry were prevalent in the study reach during this study, with steelhead fry beginning to emerge from the spawning gravel towards the end of the study period.

Consumed fry were known to be of natural origin for several reasons. Chinook salmon are not released from the hatchery until June on the Trinity River, whereas this

study was conducted from February to May. Hatchery Chinook salmon are also released at a size that is typically larger (roughly 80 mm) than the size of consumed salmonids, which were generally less than 50 mm. Additionally, 100% of coho salmon and steelhead are marked before being released from Trinity River Hatchery, making it easy to distinguish between these hatchery “smolts” and naturally produced eggs, alevin, and fry.

Residualized hatchery steelhead population estimation

Upon examination, all residualized hatchery steelhead were marked with a fluorescent yellow 16 mm Petersen Disc™ applied below the dorsal fin, except for those considered to be smolting or injured. This allowed for re-sighting of marked fish, making a mark-recapture population estimate possible. I used a modified Petersen estimator (Seber 1982) to estimate the number of residualized hatchery steelhead that were present in the reach during the study period. The marking of fish began on 12 February. After the completion of gastric sampling on 1 March, fish were re-sighted using four divers swimming abreast of each other. I assumed no mortality or immigration or emigration of residualized hatchery steelhead during this 17 day period. Nominal mortality of residualized hatchery steelhead (naturally caused or otherwise) would have little bearing on results of this study. It is unlikely that there were large scale movements into or out of the study reach during the period of study by these non-migratory fish. For example, river discharge and temperature, which might influence movement of residuals, were generally constant during the period of study.

Juvenile steelhead population estimation

At Trinity River Hatchery, steelhead eggs are taken in winter and spring. Progeny are raised for approximately one year before being released the following spring. The release strategy is volitional, beginning on 15 March each year and continuing for 10-14 days, at which time hatchery personnel force the remaining fish from the hatchery. This makes the estimation of the number of juvenile steelhead in the study reach at any given time inherently difficult as the proportion that exits the hatchery volitionally, and the proportion that is forced out, are not known.

In order to estimate the population of juvenile hatchery steelhead in the study reach on a daily basis, 991 steelhead were implanted with 23 mm half duplex Passive Integrated Transponder (PIT) tags (Zydlewski et al. 2006). This tagging occurred on 5 February and 6 February 2007, approximately 6 weeks prior to the beginning of volitional release from the hatchery. Juvenile hatchery steelhead in 9 of 10 raceways received approximately 110 PIT tags. The other raceway contained fish that were too small (≤ 100 mm) at the time to implant with the 23 mm PIT tags. The number of hatchery steelhead in each raceway at the time of tagging is known as they are hand counted and marked with an adipose fin clip by hatchery personnel and staff from Hoopa Valley Tribal Fisheries.

To gain an understanding of the proportions and timing of juvenile hatchery steelhead that entered and exited the study reach, two antennas were placed in the hatchery flume (hatchery antennas) and 2 antennas spanning the river were placed near the end of the study reach (river antennas). Sampling of juvenile hatchery steelhead

began on 27 March 2007, the day that personnel at Trinity River Hatchery forced steelhead out of the hatchery that remained in raceways after the two week volitional release period.

The two antennas that made up the hatchery array were constructed of wood frames and measured approximately 0.9 m by 1.3 m. Each antenna was wrapped in three loops of eight gauge speaker wire which fit into channels that were routed into the wood frames. Antennas slid neatly into pre-existing slots contained within the walls of the flume, and spanned both the width and depth of the flume.

The first river antenna was installed on 19 March, the second on 21 March. This array consisted of two antennas that were 15 m apart, one measuring 13.6 m and the other 18.2 m wide. The distance between the upper and lower loops of the antennas was approximately 0.45 m. The top portion of the antenna loop remained below the water surface to avoid ensnaring boaters. The antennas were formed from a single loop of 8 gauge speaker wire enclosed in standard garden hose that was attached to steel cable affixed to trees on each stream bank. Rock walls were constructed on the edges of each antenna where they met the stream bank to keep hatchery steelhead from migrating around the side of the antennas. This made the path efficiency (Zydlewski et al. 2006), the probability that a fish swimming downstream will pass through the antenna, approximately 100%. Antenna efficiency at both the hatchery and river arrays was tested weekly, sometimes bi-weekly, with test tags placed in oranges, neutrally buoyant pieces of wood, and on the end of an eight foot pole.

Using data from the hatchery antennas, I determined the proportion of PIT-tagged fish that were forced out of the hatchery. I then multiplied this proportion by the number of hatchery steelhead that were in the 9 raceways which received tags such that

$$\hat{S}_1 = \hat{P}_f \times 729,760, \quad (1)$$

where \hat{P}_f is the proportion of PIT-tagged fish that were forced out of the hatchery, 729,760 is the total number of fish in each of the 9 raceways that contained marked fish and \hat{S}_1 is the number of steelhead that entered the study reach from the hatchery on the day that sampling of juvenile hatchery steelhead began, 27 March 2007.

I used data from the two river antennas to estimate the proportion of juvenile hatchery steelhead that both emigrated volitionally and exited the study reach prior to the end of the volitional emigration period. I then subtracted this proportion from 1 and multiplied the result by the number of hatchery steelhead that emigrated volitionally- which I obtained by subtracting the number of juvenile hatchery steelhead that emigrated volitionally from the total number released from the 9 raceways as:

$$\hat{S}_2 = (1 - \hat{P}_e) \times (729,760 - \hat{S}_1), \quad (2)$$

where \hat{P}_e is the proportion of juvenile hatchery steelhead that both emigrated volitionally and exited the study reach prior to the end of the volitional emigration period, and \hat{S}_2 is the number of hatchery steelhead that were already present in the study reach on the day sampling of juvenile hatchery steelhead began, 27 March 2007.

I estimated the total number of juvenile hatchery steelhead in the study reach on the day sampling began, defined as:

$$\hat{S}_0 = \hat{S}_1 + \hat{S}_2, \quad (3)$$

where \hat{S}_0 is the total number of juvenile hatchery steelhead in the study reach on the day sampling began, \hat{S}_1 is the number of hatchery steelhead that entered the study reach from the hatchery on the day that sampling began and \hat{S}_2 is the number of hatchery steelhead that were already present in the study reach on the day sampling of juvenile hatchery steelhead began.

To estimate the number of juvenile hatchery steelhead in the study reach on each day of the study, I regressed the number of unique PIT tag detections (y) against the day of study (x). Visual inspection of a plot of the data, and trials with various model types, indicated that a power function of the form

$$y = b_0 x^{b_1} \quad (4)$$

best fit the data. I substituted the y-intercept (b_0) in this equation with \hat{S}_0 , the total number of juvenile hatchery steelhead in the study reach on the day sampling began (obtained from equation 3), with x as the day of study. To obtain the variance for this function in the original units, both the x and y values were \log_{10} transformed. I fit a linear regression of $\log_{10} x$ versus $\log_{10} y$, to obtain the variance of the regression line. The square root of this variance was exponentiated with a base of 10 and squared to get the variance in original units.

Predation Estimates

I selected an equation developed by He and Wurtsbaugh (1993) that describes the gastric evacuation rate of brown trout that were fed salmonid fry. This equation resulted in a slower rate of gastric evacuation than the equation developed by Elliott (1991), thereby helping to err on the side of underestimating the total number of fry consumed. The equation is given as:

$$\theta_1 \cdot e^{(-\theta_2 \cdot T)}, \quad (5)$$

where θ_1 is 56.2 hours, θ_2 is -0.073, and T is water temperature in degrees Celsius. The equation had an R^2 of 0.98.

To calculate a daily fry consumption rate, the amount of hours in a day (24) must be divided by the gastric evacuation rate. To be conservative in the estimate of the total number of fry consumed, I used the number of daylight hours for each day (H_j), which was based on nautical twilight (United States Naval Observatory 2007), instead of 24 hours, because it was not known if piscivorous hatchery steelhead of the Trinity River feed continuously throughout the night. While some salmonids are known to feed continuously throughout the 24 hour period, such as piscivorous coho salmon (Ruggerone 1989), other piscivorous salmonids have been shown to have a diel feeding pattern that is not continuous throughout the 24 hour period (Beauchamp 1990).

Estimates of the proportion of fish that were piscivorous, mean rate of predation by piscivores, and total consumption of salmonid fry were made separately for residualized hatchery steelhead and juvenile hatchery steelhead. The proportion of

piscivorous fish in any given week (\hat{P}_w) was estimated by dividing the number of hatchery steelhead that consumed one or more fry in week w by the total number of steelhead examined in week w . To estimate the total proportion of piscivorous fish throughout the study period, the weekly total numbers of hatchery steelhead that consumed one or more fry were divided by the total number of juvenile steelhead examined. A 95% confidence interval of the proportion (Agresti and Coull 1998, Thompson 2002) of piscivorous fish in any given week was approximated with

$$\hat{P}_w \pm t \sqrt{\frac{\hat{P}_w(1 - \hat{P}_w)}{m_w - 1}}, \quad (6)$$

where \hat{P}_w is the estimated proportion of hatchery steelhead that are piscivores from the hatchery steelhead population as a whole during week w of the study period, m_w is the total number of steelhead examined during week w , and t is the upper $\alpha / 2$ point of the t -distribution with $m_w - 1$ degrees of freedom.

For steelhead identified as piscivores, the weekly predation rate (\bar{y}_w) was given by

$$\bar{y}_w = \frac{\sum_{i=1}^{n_w} y_{iw}}{n_w}, \quad (7)$$

where y_{iw} is the number of fry observed in the stomach of fish i in week w , and n_w is the number of piscivores observed in week w , yielding salmonid prey per piscivore. A 95% confidence interval (Thompson 2002) of the mean predation rate was estimated as

$$\bar{y}_w \pm t \sqrt{\frac{\sum_{i=1}^{n_w} (y_{iw} - \bar{y}_w)^2 / (n_w - 1)}{n_w}}, \quad (8)$$

where y_{iw} is the number of fry observed in the stomach of fish i in week w , and n_w is the number of piscivores observed in week w and t is the upper $\alpha / 2$ point of the t -distribution with $n_w - 1$ degrees of freedom.

The total number of salmonid fry consumed during the period of study, in the study reach was estimated as:

$$\hat{F} = \sum_{j=1}^{30} \hat{S}_0 \cdot j^{\hat{b}_1} \cdot \frac{H_j}{\theta_1 \cdot e^{(-\theta_2 \cdot T_j)}} \cdot \hat{P}_j \cdot \bar{y}_j, \quad (9)$$

where \hat{F} is the estimated total fry consumption in the study reach during the study period, \hat{S}_0 is the total number of juvenile hatchery steelhead in the study reach on the day sampling began, j is the day of study, H_j is the number of daylight hours on the j th day (based on nautical twilight), θ_1 is 56.2 hours and θ_2 is -0.073 (see equation 5), T_j is water temperature in degrees Celsius on day j , b_1 is the coefficient for the rate of decay of the power function described in equation 4, \hat{P}_j is the estimated proportion of hatchery steelhead that are piscivores from the hatchery steelhead population on day j , and \bar{y}_j is the predation rate for steelhead identified as piscivores on day j . For the residualized

hatchery steelhead, the same formula was utilized, except the summation was over 21 days.

For \hat{P}_j and \bar{y}_j , the weekly values of the piscivore proportion, \hat{P}_w , and predation rate, \bar{y}_w , were utilized. For example, for any given day in week two of the study, the estimated piscivore proportion and estimated predation rate for week two were used for calculating equation 9. It was assumed that the daily proportion of piscivorous fish and predation rate did not vary within any given week.

Over the five week period during which juvenile hatchery steelhead were studied, 5 days were included in week 1 of the study, 4 days were included in week 5 of study, and 7 days were included in weeks 2-4 yielding 30 days. The timing of the release of hatchery steelhead at the beginning of the study, as well as the timing of water releases from Lewiston Dam at the end of the study, prevented the inclusion of a full 7 days in weeks 1 and 5. Prey consumption of juvenile hatchery steelhead was estimated over a 30 d period and prey consumption of residualized hatchery steelhead was estimated over a 21 d period.

To estimate the number of fry consumed by residualized hatchery steelhead, equation 9 was used, except that $\hat{S}_0 \cdot j^{\hat{b}_1}$ was substituted with the population estimate resulting from the modified Petersen estimator. This population level was held constant for the 21 day residualized hatchery steelhead period of study, assuming no immigration or emigration, and no mortality, natural or otherwise.

To estimate variance of the number of fry consumed by residualized hatchery steelhead and juvenile hatchery steelhead, Gray's (1999) estimator for the variance of a two factor product,

$$\hat{V}(xy) = \bar{x}^2 \hat{V}(y) + \hat{V}(x) \bar{y}^2 - \hat{V}(x) \hat{V}(y), \quad (10)$$

was modified to accommodate constants and a three factor product following Gray (1999). Variance of the total number of fry consumed was estimated assuming daylight hours, temperature, gastric evacuation rate, and survival rate were measured without error. Variances in the proportion of piscivorous fish, predation rate (salmonid fry per piscivore), and population were incorporated into the three factor variance estimator to develop a 95% confidence interval for the number of fry consumed by residualized hatchery steelhead and juvenile hatchery steelhead. Separate estimates of the 95% confidence interval of the number of fry consumed were made for residualized hatchery steelhead and juvenile hatchery steelhead as follows:

$$1.96 \sqrt{\sum_{j=1}^{30} \left(\frac{H_j}{\theta_1 \cdot e^{(-\theta_2 \cdot T_j)}} \right)^2 \left(\begin{aligned} &[\hat{P}_j \bar{y}_j]^2 \hat{V}(\hat{S}_j) + \hat{P}_j^2 \hat{V}(\bar{y}_j) \hat{S}_j^2 \\ &+ \hat{V}(\hat{P}_j) \bar{y}_j^2 \hat{S}_j^2 - \hat{V}(\hat{P}_j) \hat{V}(\bar{y}_j) \hat{S}_j^2 \\ &- \hat{P}_j^2 \hat{V}(\bar{y}_j) \hat{V}(\hat{S}_j) - \hat{V}(\hat{P}_j) \bar{y}_j^2 \hat{V}(\hat{S}_j) \\ &+ \hat{V}(\hat{P}_j) \hat{V}(\bar{y}_j) \hat{V}(\hat{S}_j) \end{aligned} \right)} \quad (11)$$

where H_j is the number of daylight hours on the j th day, T_j is the temperature on the j th

day, $\frac{H_j}{\theta_1 \cdot e^{(-\theta_2 \cdot T_j)}}$ is the temperature based gastric evacuation rate described in

equation 9, \hat{P}_j is the estimated mean proportion of predators on day j , $\hat{V}(\hat{P}_j)$ is the estimated variance of proportion of predators on day j , \bar{y}_j is the estimated mean predation rate of piscivores, $\hat{V}(\bar{y}_j)$ is the estimated variance of predation rate of piscivores, \hat{S}_j is the estimated mean of either the residualized hatchery steelhead population or the juvenile hatchery steelhead population, and $\hat{V}(\hat{S}_j)$ is the estimated variance of either the residualized hatchery steelhead population or the juvenile hatchery steelhead population.

As in equation 9, for \hat{P}_j and \bar{y}_j , the weekly values of the piscivore proportion, \hat{P}_w , and predation rate, \bar{y}_w , were utilized. I assumed that the daily piscivore proportion and predation rate did not vary within any given week.

For estimation of the number of eggs consumed by residualized hatchery steelhead, I employed the same process used to estimate the number of salmonid fry. I assumed that salmonid fry and salmonid eggs were evacuated from the stomach of piscivorous salmonids at the same rate, although I am not aware of any study that has evaluated the evacuation rate of salmonid eggs from stomachs of salmonids that consume eggs.

Use of equation 11 to estimate the confidence intervals should be regarded as an approximation of confidence intervals. Because PIT tag recovery data collected over the

study period were used to fit a model that was then used to estimate \hat{S}_0 , \hat{S}_0 for the different days are not statistically independent of one another. The expression for estimating variance over time (summations over $j = 1$ to 30) are likely incorrect because they do not account for covariance among successive estimated values of \hat{S}_0 . The use of literature based gastric evacuation rates, amount of daylight hours, and water temperature, as constants measured without error, also likely introduces some additional estimate error, but the amount is unknown.

RESULTS

During the course of this study, 315 residualized hatchery steelhead and 1,636 juvenile hatchery steelhead were captured and examined. Of these, 20 (0.95 %) did not have adipose fin clips. One brown trout was also captured during the 3 month duration of study.

Residualized Hatchery Steelhead

A total of 285 residualized steelhead were marked during the period 12 February to 28 February. Snorkelers counted 313 residuals during the resight event on 1 March, of which 38 were marked. Based on these data, I estimate the population of residualized hatchery steelhead in the study reach to be 2,302 (95% CI = 1,681-2,922).

When snorkelers surveyed the reach on 5 February 2007, prior to capture or examination of individual fish, 280 (86%) residualized hatchery steelhead were counted above the large cascade rapid at the Old Weir (rkm 180.7) that lies half way through the study section (Figure 1), while 46 were counted below. On the same date, snorkelers surveyed 3.0 km of the Trinity River downstream of the end of the study area, and counted seven residualized hatchery steelhead.

The 315 residualized hatchery steelhead examined during this study averaged 331 mm in length (SD = 51 mm; range = 243-494 mm), and 408.4 g in weight (SD = 215.2 g; range = 148.7-1415.8 g) (Table 2). Of the residuals examined, 90 % were smaller than 420 mm, which is the cut-off in fork length below which steelhead are considered to

Table 2. Age composition for 98 residualized hatchery steelhead from the upper-Trinity River, California.

	Age		
	2	3	>3
Sample size	54	33	11
Mean fork length (mm)	310	383	459
Mean weight (g)	328.5	614.0	1001.3

exhibit a half-pounder life-history by CDFG (California Department of Fish and Game 2005). There were 29 fish (9%) that were considered to be transitional or smolting. Mean fork length was greater for non-smolting individuals (mean = 333 mm) than for transitional or smolting individuals (mean = 306 mm) (t -test, $t = 4.38$; $df = 48$; $P < 0.001$).

Scale samples of residualized steelhead were collected to evaluate the duration of residualism in the upper Trinity River, and to inspect for evidence of anadromy. Of 99 samples collected, one came from an individual that was 427 mm in length and showed signs of ocean entry and ocean growth. Of the remaining scales, 54 were collected from individuals that were 2 years old, 33 were from individuals aged at 3 years old, and 11 were from fish older than 3 years of age (Table 2). Mean fork length was larger for individuals that were aged (mean = 351 mm) than for individuals that were not aged (mean = 320) (t -test, $t = 4.82$; $df = 139$; $P < 0.001$). This suggests that residualized steelhead that were aged may not be entirely representative of the population as a whole. Ocean growth was clearly evident in the anadromous hatchery steelhead scales. In the residualized hatchery steelhead scales, the spacing of circuli was much tighter and more consistent than that of anadromous hatchery steelhead (Figure 2). Growth in the hatchery was also evident in most residualized steelhead samples, with circuli in the first year of life spaced noticeably greater than in successive years (Figure 2).

Hatchery steelhead residuals were generally smaller than their anadromous counterparts and typically more football shaped than the streamlined anadromous hatchery steelhead. Body morphology, in combination with more colorful fins, a more

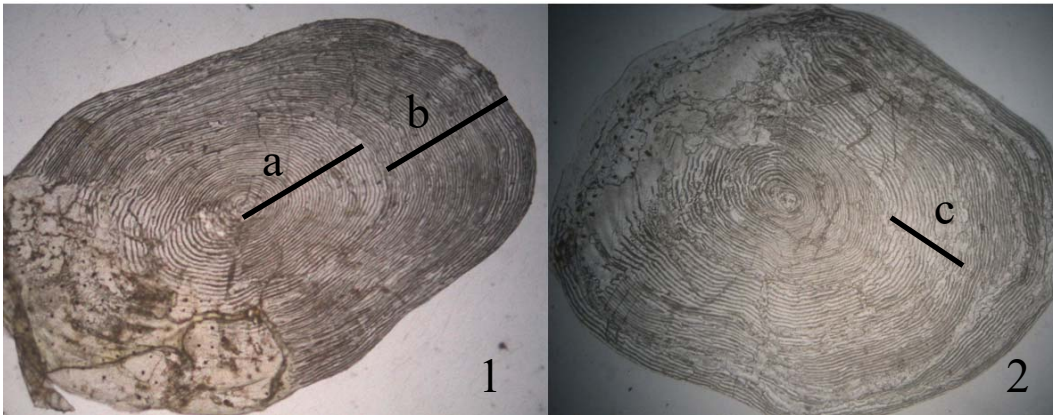


Figure 2. Images of hatchery steelhead scales from the upper-Trinity River, California, 2007. From left to right: 1) a residualized hatchery steelhead >3 years old (468 mm in length) showing wide spacing of first 30-35 circuli from 1 year of robust hatchery growth (a), followed by tightly spaced and uniform circuli from several years of river growth (b) and; 2) an anadromous hatchery steelhead (635 mm in length) showing several signs of anadromy including ocean growth (c) with wider spacing of circuli than that of the first 30-35 circuli of hatchery growth, as well as ocean entry/exit markings.

vibrant pink stripe on the body, and spotting dissimilar to anadromous steelhead, gave the residuals a “troutlike” appearance. Many residuals, including some as small as 285 mm, were observed to be in full spawning colors. Several were ripe males that excreted milt upon examination. I often observed residuals positioned behind spawning anadromous steelhead.

Juvenile Hatchery Steelhead

Of the 1,636 juvenile hatchery steelhead captured during this study, 771 were captured below the Old Weir Hole, located half way through the study reach, while 865 were captured above it (Table 3). Average fork length and weight for juvenile hatchery steelhead was 167 mm (SD = 29 mm; range = 84-249 mm) and 54.6 g (SD = 30.6 g; range = 6.8-217 g), respectively (Table 4). The fork length of juvenile hatchery steelhead differed among smolting categories (not-smolting, transitional, and smolting) (ANOVA; $F = 107.12$; $df = 1,554$; $P < 0.001$). Multiple comparisons showed each group was significantly different from the other (Tukey's 95% Simultaneous Confidence Intervals = 98.06%). Individuals that were not smolting (mean fork length = 159 mm; SD = 31 mm; range = 84-249 mm) were the smallest group, followed by transitional fish (176 mm; SD = 20 mm; range = 125-240 mm), with smolting fish having the largest average fork length (186 mm, SD = 17 mm, range = 154-240 mm). Condition factors also differed among groups (ANOVA; $F = 113.5$; $df = 1,554$; $P < 0.001$). Multiple comparisons showed each group was significantly different from the other

Table 3. Sampling locations, method of capture, and sample size of juvenile hatchery steelhead captured at each location in the upper Trinity River, California, in March of 2007.

Location	rkm	Electrofishing	Hook and line	Seine	Total
Old bridge	179.2	0	272	163	435
Cableway	179.5	0	44	0	44
New bridge	180.4	0	169	0	169
Corner	180.5	0	123	0	123
Weir	180.7	0	256	0	256
Sven Oldertson	181.1	58	0	0	58
Bear Island	181.4	151	247	0	398
Three pipes	181.9	0	72	0	72
First Riffle	182.2	0	81	0	81

Table 4. Fork length, weight, and fry consumption of non-smolting, transitional, and smolting juvenile hatchery steelhead captured in the upper-Trinity River, California 2007, using hook and line, seine, and electroshocker.

Variable	Areas other than Bear Island				Bear Island only ^a				Grand total or mean
	Juvenile category			Sub-total or mean	Juvenile category			Sub-total or mean	
	Non-smolting	Transitional	Smolting		Non-smolting	Transitional	Smolting		
Sample size	696	419	123	1,238	295	92	11	398	1,636
Mean fork length (mm)	156	175	186	166	169	184	199	173	167
Mean weight (g)	43.8	57.6	66.0	50.9	63.5	67.8	83.8	65.0	54.6
Piscivores (<i>n</i>)	45	28	9	82	120	17	2	139	221
Piscivore proportion	0.06	0.07	0.07	0.07	0.41	0.18	0.18	0.35	0.14
Fry consumed	65	32	12	109	715	53	5	773	882
Fry per piscivore	1.4	1.1	1.3	1.3	6.0	3.1	2.5	5.6	4.0

^a The data are given for one location called Bear Island and the rest of the river separately, due to the high rate of salmonid fry consumption by juvenile hatchery steelhead at the Bear Island site.

(Tukey's 95% Simultaneous Confidence Intervals = 98.06%). Mean condition factor of individuals that were not smolting was the highest (1.11) followed by fish that were transitional (1.05), with smolting individuals having the lowest condition factor (1.01).

Mean fork length and weight for 500 (50 from each of 10 raceways) juvenile hatchery steelhead examined in the hatchery on 14 March 2007, one day prior to the beginning of the volitional release period, were 178 mm (SD = 34 mm; range = 62-246 mm) and 76.2 g (SD = 34.4 g; range = 2.1-188.1 g), respectively. Overall, the difference in fork length between 108 juvenile hatchery steelhead captured by hook and line during the first week of study (mean = 182 mm; SD = 27 mm; range = 121-242 mm) and that of the 500 juvenile hatchery steelhead examined one day prior to the beginning of the volitional release period was not significant (t -test; $t = 1.29$, $df = 184$, $P = 0.198$).

Mean fork length and weight of juvenile hatchery steelhead captured by seining and electrofishing in the river ($n = 371$) were 162 mm (SD = 31 mm, range = 95-248 mm) and 52.2 g (SD = 34.0 g, range = 10.4-217.5 g), respectively. For juvenile hatchery steelhead captured by hook and line on the same dates and locations as those captured by seining and electrofishing ($n = 317$), mean fork length and weight were 166 mm (SD = 27 mm, range = 100-249 mm) and 52.9 g (SD = 29.3 g, range = 13.4-198.0 g), respectively. Fork length of juvenile hatchery steelhead captured within the river differed between capture methods (t -test, $t = 2.18$, $df = 685$, $P = 0.030$). However, it is unknown if these differences, which appear to be small, are biologically meaningful.

PIT-tag antenna performance and juvenile hatchery
steelhead population estimation

The read range and efficiency of PIT-tag antennas was greater in the hatchery than in the river. Hatchery antennas had a read range of approximately 102 cm, and tests indicated an efficiency close to 100% with that read range. Of 991 PIT tags that were implanted in the juvenile hatchery steelhead 6 weeks prior to the beginning of the volitional release period, 877 (88%) were subsequently detected by the hatchery array (Figure 3). Of these, 859 (98%) were detected on both hatchery antennas. Given the high detection efficiency, undetected tags likely reflected either rejection by the fish, or fish mortality prior to release.

Read range of the river antennas was roughly 25 cm, and their efficiency ranged between 65% and 80% throughout the study. Measuring efficiency of the river antennas accurately was difficult with test tags because the orientation of the test tags could not always be controlled, which can greatly affect antenna performance (Zydlewski et al. 2006). Of 877 tagged juvenile steelhead that were detected leaving the hatchery, 663 were detected with the river array, with an overall efficiency of at least 76% (Figure 4). Some of the tagged fish that were detected in the hatchery may have residualized upstream of the river array, or died before reaching it.

The river array was not operational until 19 March, 4 days after the volitional release period began. During this four day period, 33 PIT-tagged steelhead exited the hatchery, 9 of which were eventually detected at the river array.

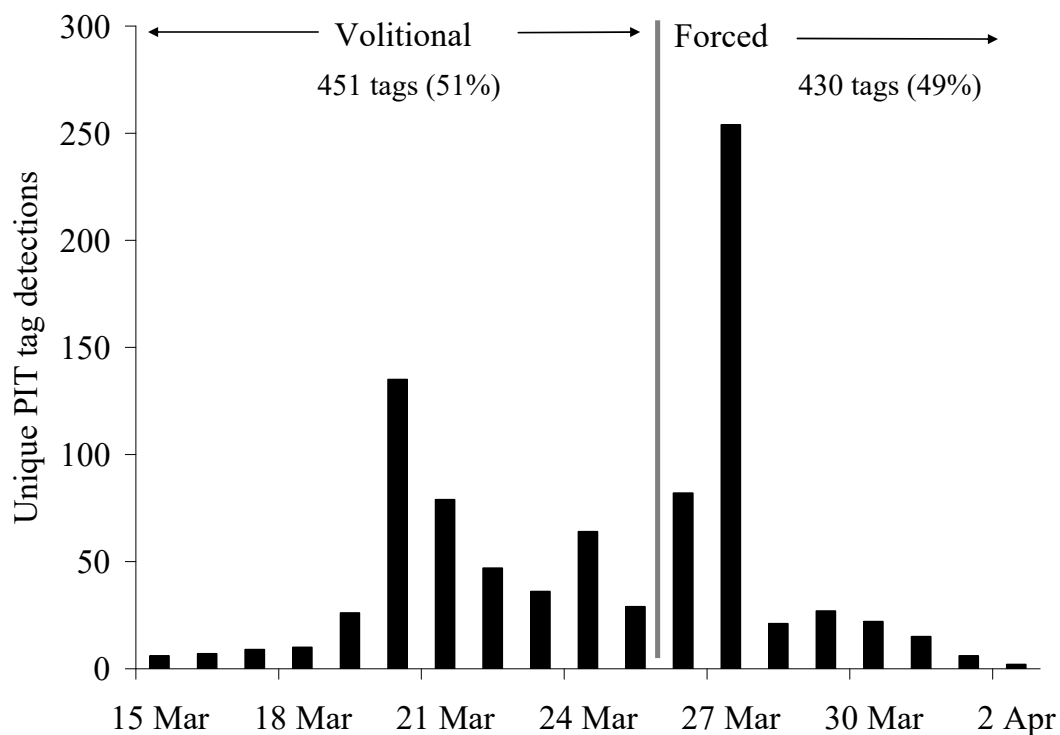


Figure 3. The number of unique detections (first date a tag was detected) of PIT-tagged juvenile steelhead by day, for an array of 2 antennas located in Trinity River Hatchery. Juvenile steelhead were forced from the hatchery on 26 and 27 March 2007 following an 11 day volitional emigration period.

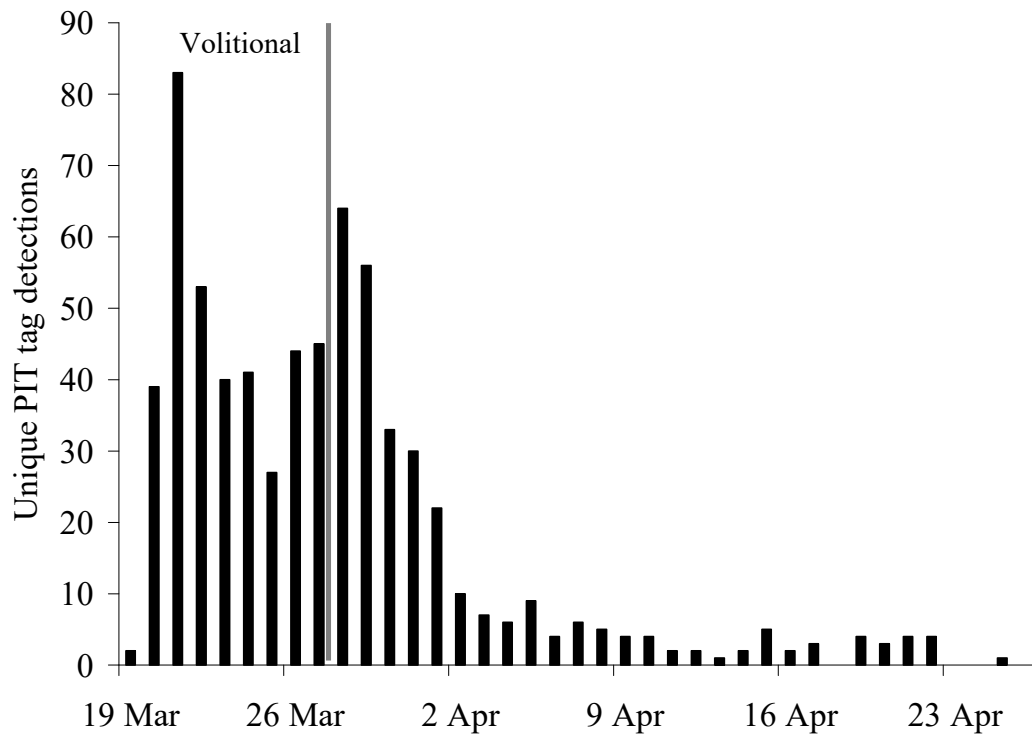


Figure 4. The number of unique detections (first date a tag was detected) of an array of 2 antennas located 3.2 km downstream in the Trinity River (right). Juvenile steelhead were forced from the hatchery on 26 and 27 March 2007 following an 11 day volitional emigration period.

The supporting cable of the downstream river antenna broke on 11 April and was not repaired. During the time that two antennas were in operation, 564 tagged fish were detected. Of these, 276 (49%) were detected at both antennas, while 288 (51%) were detected at only one of the two antennas. Downstream and upstream river antennas appeared to perform similarly. Of the 288 tags detected on one of two antennas, 156 were detected on the upstream antenna and 132 were detected on the downstream antenna.

An estimated 356,975 juvenile hatchery steelhead failed to migrate volitionally from the hatchery. These fish entered the river at the end of the volitional release period, at which time sampling of juvenile steelhead in the river began. A total of 823,210 juvenile hatchery steelhead were released from Trinity River Hatchery between 15 to 27 March 2007. The number of juvenile hatchery steelhead released from 9 raceways that contained PIT-tagged fish was 729,760. Fifty-one percent ($n = 448$) of tagged fish exited the hatchery volitionally (Figure 3). Remaining fish ($P_f = 0.49$) were forced from the hatchery by dewatering of raceways by hatchery personnel.

Prior to 27 March 2007, the end of the volitional release period, 326 of 448 juvenile steelhead that were detected leaving the hatchery were also detected by the river array (Figure 4). This suggests that at least 73 % (P_e) of volitional migrants exited the study reach prior to collection of stomach contents of juvenile steelhead. Multiplying the number of juvenile hatchery steelhead that migrated volitionally by 0.27 ($1 - 0.73$) yielded a product of 100,488 fish (\hat{S}_2). The number of juvenile hatchery steelhead that failed to migrate volitionally and entered the river on the day sampling commenced was estimated

to be 357,582 (\hat{S}_1). The total number of juvenile hatchery steelhead present in the study reach on 27 March (\hat{S}_0) was estimated as the sum of \hat{S}_1 and \hat{S}_2 . An estimated 458,070 (\hat{S}_0) juvenile hatchery steelhead were present in the study reach on 27 March 2007.

To estimate the number of juvenile hatchery steelhead present in the study reach during each day of the study, the number of unique tag detections (first date and time a particular tag was detected) from the river array was regressed over time. Examination of a plot of the data, and trials with various model types, indicated that a power function of the form $y = b_0 x^{b_1}$ provided the best fit ($r^2 = 0.89$). The equation was:

$$y = 73.44 j^{-0.92}, \quad (12)$$

where j is the number of days beyond 27 March 2007. The value for b_0 was substituted with 438,304, the number of hatchery steelhead that were estimated to be in the study reach on 27 March. Model results suggest that the hatchery steelhead population decreased sharply in the beginning of the study, losing roughly half of the total population within the first 24 hours (Figure 5).

Fry consumption

Consumption of salmonid fry varied among juvenile hatchery steelhead. The smallest piscivorous hatchery steelhead had a fork length of 108 mm, and it consumed 2 salmonid fry. A juvenile hatchery steelhead that was 200 mm in length consumed 52 salmonid fry, which was the maximum amount of salmonid fry consumed by any

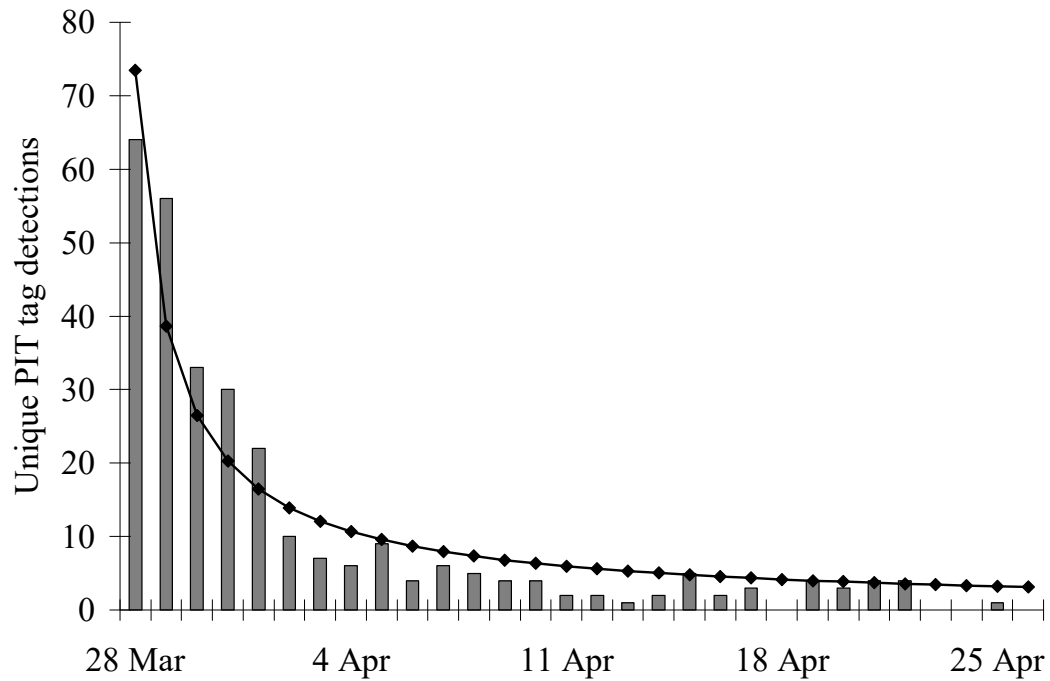


Figure 5. The number of unique detections (first date a tag was detected) of PIT-tagged juvenile steelhead, by day, for an array of 2 antennas located in the Trinity River, California, 2007, 3.2 km downstream from the release site, and a regression of the data with a power function. The data were fit to a power function as $y = 73.44x^{-0.923}$, $R^2 = 0.89$.

hatchery steelhead during this study. Eighty-one of 316 residualized hatchery steelhead (26%) consumed a total of 435 salmonid fry. Additionally, 97 residualized steelhead consumed a total of 2,685 salmonid eggs. The maximum number of salmonid fry consumed by any residualized steelhead was 35, while the maximum number of eggs consumed by any one residualized steelhead was 162. The proportion of piscivores in the residualized steelhead population ranged between 0.20 and just over 0.30 (Figure 6). The number of fry consumed per piscivore decreased from a high of around eight in the first week of study, to roughly 4 in the last week of the study (Figure 6). The average fork length of residualized hatchery steelhead piscivores (363 mm; SD = 61 mm) was greater than that of non-piscivores (319 mm; SD = 41 mm) (*t*-test, $t = 6.08$, $df = 104$, $P < 0.001$).

Of 1,636 juveniles examined, 221 piscivores (13.5 %) consumed 882 salmonid fry (Table 4). The proportion of piscivores in the juvenile steelhead population increased from about 0.02 in the beginning of the study to about 0.1, before falling back down to around 0.04 by the end of the study (Figure 7). Excluding those hatchery steelhead captured at Bear Island, the amount of fry consumed per piscivore remained consistent between weeks, slightly greater than 1.0 (Figure 7). The average fork length of juvenile hatchery steelhead piscivores (173 mm, SD = 28 mm) was greater than that of non-piscivores (168 mm, SD = 29 mm) (*t*-test, $t = 2.85$, $df = 295$, $P = 0.005$). The differences between the proportion of piscivores and the number of fry consumed per piscivore for the three smoltification groups were small (Table 4).

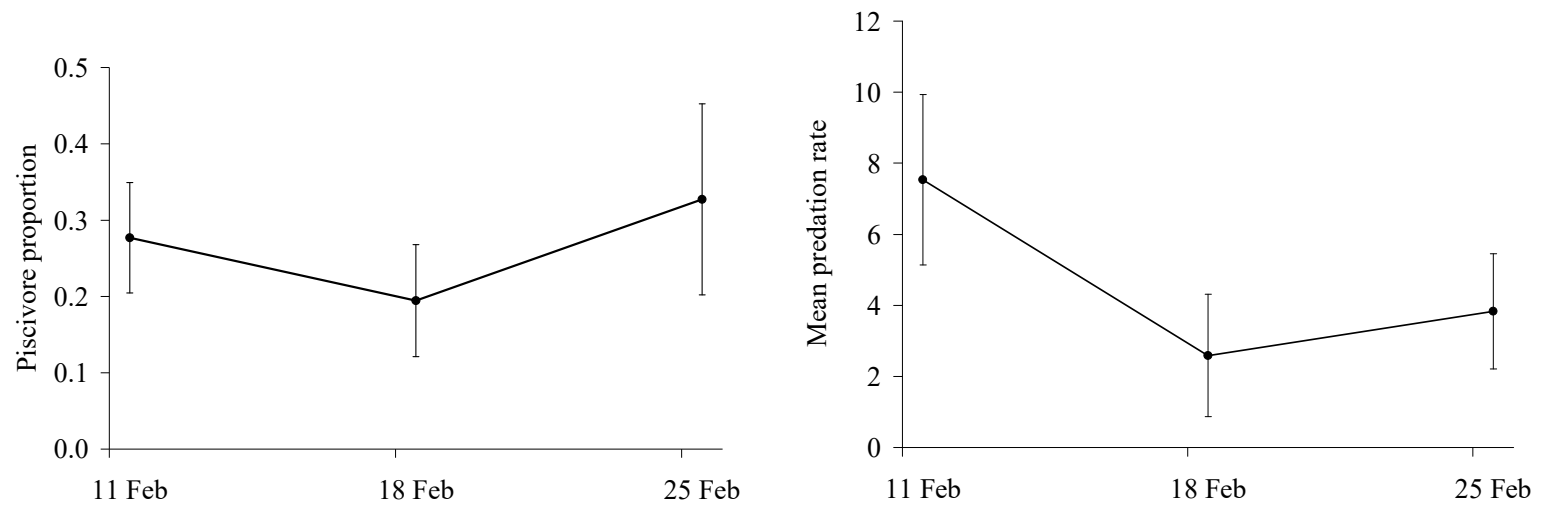


Figure 6. The proportion of piscivores (piscivores/ number of fish examined) \pm 95% CI and the mean rate of predation (number of salmonid fry/piscivore) \pm 95% CI for residualized hatchery steelhead captured from the upper Trinity River, California, 2007.

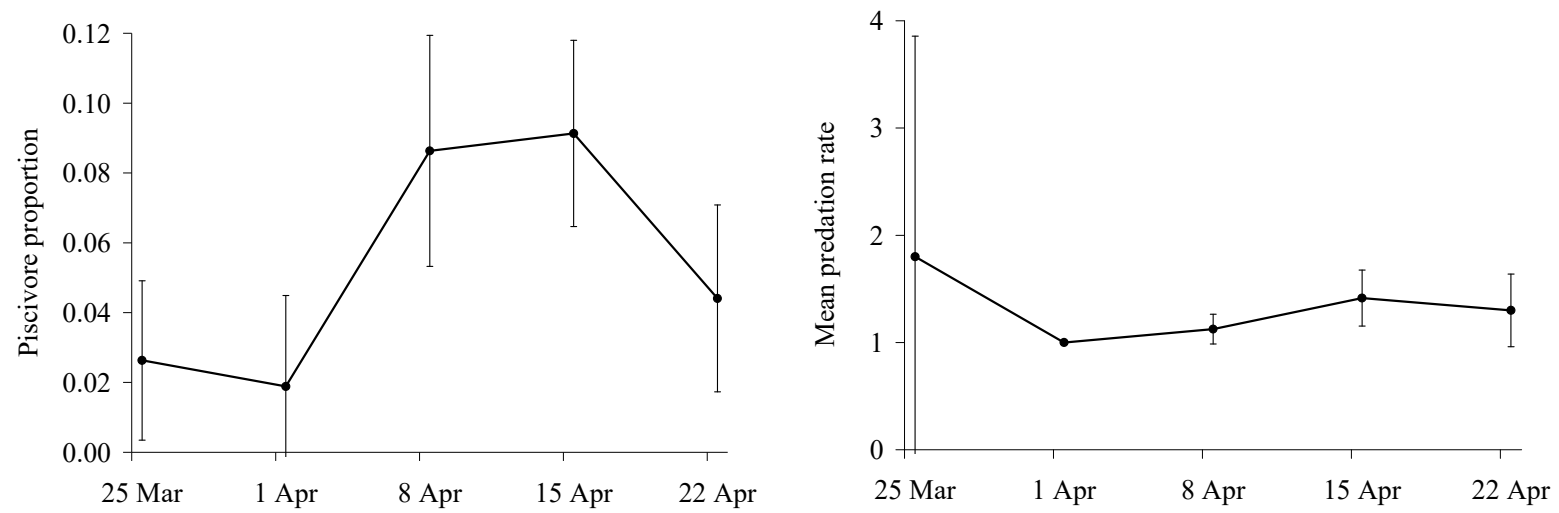


Figure 7. The proportion of piscivores (piscivores/ number of fish examined) \pm 95% CI and the mean rate of predation (number of salmonid fry/piscivore) \pm 95% CI for juvenile hatchery steelhead captured from the upper-Trinity River, California, 2007. The juvenile data excludes those fish captured at Bear Island.

Two years earlier, 2,479 juvenile salmonids consumed 135 salmonid fry in the same study reach (Yurok Tribal Fisheries Program 2008). Differences in fry consumption between the two years likely arises from a single sampling location, a side channel at Bear Island (rkm 180.4), which was sampled in 2007, but not 2005.

The observed count of piscivores between the juveniles captured at Bear Island and those not captured at Bear Island (Table 4) differed from the expected count ($\chi^2 = 140.897$, $P < 0.001$). Likewise the amount of fry consumed per piscivore between the two groups differed from the expected count ($\chi^2 = 75.581$, $P < 0.001$). Prior to this study, the initial investigation of predation rates by hatchery steelhead had not uncovered the high rate of predation that was recorded at Bear Island.

Samples obtained by seining and electrofishing were compared with samples obtained by hook and line on the same dates and in the same locations (4 different occasions in total). Of 372 juvenile hatchery steelhead captured by seine and electrofishing, 100 piscivores consumed a total of 635 salmonid fry. Of 317 juvenile hatchery steelhead captured by hook and line, 62 fish consumed 159 salmonid fry. Fish sampled by seining and electrofishing consumed 6.4 salmonid fry per piscivore, while fish sampled by hook and line consumed 2.6 fry per piscivore. The proportion of piscivorous hatchery steelhead did not differ with capture technique (seining/electrofishing versus hook and line) ($\chi^2 = 3.179$, $P = 0.075$), but the number of fry consumed per piscivore did ($\chi^2 = 25.204$, $P < 0.001$).

I estimate that 24,194 [21,066-27,323] salmonid fry were consumed by 2,302 residualized hatchery steelhead in 21 days from 10 February to 2 March 2007.

Additionally, I estimate that the residualized hatchery steelhead consumed 171,018 [155,272-186,764] salmonid eggs during the same period. Assuming an egg-to-fry survival rate of 0.25, the 171,018 eggs consumed by the residualized hatchery steelhead would equate to 42,755 salmonid fry.

Excluding results from the Bear Island side channel, I estimate that 437,697 juvenile hatchery steelhead consumed 61,214 [43,813-78,615] salmonid fry in 30 days from 28 March to 26 April 2007. Assuming a constant population of 1,500 juvenile hatchery steelhead in the Bear Island side channel in the 30 day period, an additional 49,445 salmonid fry were consumed.

DISCUSSION

This study documents the highest rate of predation by hatchery salmonids on naturally produced salmonids that has been reported (Table 1). Some attributes of the upper Trinity River setting contribute to high predation risk for naturally produced salmonid fry. These include spatial and temporal overlap of predator and prey (Hatchery Scientific Review Group 2004), size differential of predator and prey (Pearsons and Fritts 1999), high concentrations of predators (Mather 1998), as well as abiotic factors including low, regulated flow (8.5 ms^{-1}) and high water clarity ($< 2 \text{ NTU}$; Gregory and Levings 1998, Robertis et al. 2003). Because salmonids are visual predators, another factor controlling the encounter rate of prey is prey density (Beauchamp et al. 1999). The study area is heavily used by spawning adult salmonids, resulting in high concentrations of prey, relative to other parts of the river with lower redd densities.

The release of large numbers of hatchery steelhead can lead to substantial numbers of fry being consumed, even with relatively low predation rates. For example, if 500,000 hatchery steelhead are released, and 5% of these hatchery steelhead consume 1 fry per day, then 25,000 fry can be consumed in one day. The amount of fry consumed is additive, with hatchery steelhead continuing to consume fry each successive day.

The majority of salmonid spawning in the uppermost 40 km of the Trinity River (California Department of Fish and Game 2005) takes place within 3.2 km of the release location of hatchery juvenile salmonids, so that both predator and prey exist in close

proximity to each other. In 2006, there were an estimated 2,302 redds for Chinook salmon and coho salmon combined, although some coho salmon and Chinook salmon may have spawned after redd surveys were terminated on 16 December 2006. Assuming 3,000 eggs per redd and an egg-to-fry survival rate of 0.25, approximately 1,726,500 salmon fry were produced in the study reach. Assuming all fry consumed by hatchery steelhead were Chinook salmon or coho salmon fry, half of the eggs consumed by residualized steelhead were Chinook salmon or coho salmon (the other half being steelhead), and an egg-to-fry survival rate of 0.25, then I estimate that 156,231 Chinook salmon and coho salmon fry were consumed over the 21 d residualized hatchery steelhead study period and the 30 d juvenile hatchery steelhead study period. This represents 9.0 % of Chinook salmon and coho salmon fry that were produced.

For several reasons, the estimate above is not a complete estimate of the number of fry consumed by hatchery steelhead in 2007. The estimate covers only the 21 d and the 30 d periods of study for residualized hatchery steelhead and juvenile hatchery steelhead, respectively. Additionally, almost half of the juvenile hatchery steelhead produced at Trinity River Hatchery in 2007 were not included in this study. The study reach was only a 3.2 km long, the fly only hook and line method utilized may lead to underestimation of fry consumption, and the study only covered a relatively short portion of the entire year. Also, dividing the number of daylight hours by the temperature-based gastric evacuation rate of steelhead resulted in a “correction” of the fry consumption data by approximately one-half throughout the study. Trinity River Hatchery also releases roughly 500,000 coho salmon annually that were not included in this study. Coho salmon

have also been documented to consume salmonid fry (Ruggerone and Rogers 1992, McConnaughey 1999).

I found that the average fork length of juvenile hatchery steelhead piscivores was greater than that of non-piscivores. However the difference was five mm, which, while statistically significant, may not be biologically significant. Because the difference between these two groups was relatively small, and the fact that a wide range of juvenile steelhead size classes consumed salmonid fry, it is unlikely that there is a size at which juvenile hatchery steelhead can be released that would reduce the probability that they would consume salmonid fry. The differences between the proportion of piscivores and the number of fry consumed per piscivore for the three smoltification groups were small (Table 4). This indicates that hatchery rearing strategies aimed at increasing the number of steelhead that are ready to smolt upon release may not affect the number of fry consumed by hatchery steelhead. However, because non-smolting hatchery steelhead are more likely to residualize, non-smolting hatchery steelhead may consume more salmonid fry simply because they spend more time in the river than those that are capable of smolting when released.

Both juvenile hatchery steelhead and juvenile coho salmon are released on 15 March of each year. March is a time of year when many fry are either newly emerged, or just emerging from the gravel (Trinity River Flow Evaluation 1999), making the fry susceptible to predation. Residualized hatchery steelhead are present throughout the months that all salmonids spawn and rear. This study has shown that residualized steelhead take advantage of both fry and eggs in the drift, as well as actively pursuing

rearing fry. For instance, I saw hundreds of adult steelhead spawning in February in areas where Chinook salmon and coho salmon had already spawned (redd superimposition). Spawning adult hatchery steelhead, upon creating their own nests, would excavate the yolk sac fry and eyed eggs of salmon, sending them into the water column, making for a readily available food resource for residualized hatchery steelhead.

Data from a comparison of fish samples collected by hook and line and those captured by other means suggests that hook and line may underestimate the number of salmonid fry consumed. This indicates that by relying on invertebrate fly patterns to attract juvenile hatchery steelhead, I may have failed to capture those juveniles that specialize in piscivory. For instance, if one casts a floating insect to a group of juvenile hatchery steelhead, an individual that typically focuses on pursuing salmonid fry may be less likely to be the first to look up and strike the dry fly than an individual that focuses on preying upon insects. I often witnessed juvenile hatchery steelhead pursuing salmonid fry in the shallows along the stream banks. It became clear after spending hours watching individual steelhead rush into groups of fry, that some hatchery steelhead tend to specialize in the pursuit of fry, while others do not. This has implication for the results of this research because the majority of the samples (77%) were captured using hook and line with invertebrate fly patterns, possibly underestimating the number of fry consumed.

Undoubtedly, several of the juvenile hatchery steelhead in raceway F, the only raceway that was not included in this study or in the calculations of fry consumption, were larger in size than the smallest piscivore that was recorded during this investigation, and therefore capable of consuming salmonid fry. This means that it is possible that

some juvenile hatchery steelhead from raceway F, which on average contained the smallest steelhead released from Trinity River Hatchery, also consumed salmonid fry, thereby underestimating of the total number of fry consumed during the period of study in the study reach. In total, 384,906 juvenile hatchery steelhead were not included in the calculation of the number of fry consumed.

The relatively high rate of predation by juvenile hatchery steelhead on naturally produced fry at the Bear Island side channel was surprising. The number of fry per piscivore at Bear Island was roughly four times that of the rest of the study site (Table 4). Previous sampling by the Yurok Tribal Fisheries Program did not reveal large variation in predation rates at various locations throughout the study reach, but their survey did not sample juvenile hatchery steelhead at the Bear Island site. High predation may reflect a higher concentration of fry per unit of volume than in other areas of the river, and (or) it could reflect learned behavior by hatchery fish. Several juvenile hatchery steelhead had both feed pellets and invertebrates in their stomachs on the first day of our study, indicating that they quickly begin feeding on insects and other food particles in the drift.

Length of juvenile hatchery steelhead in my study was considerably smaller than in the survey conducted by the Yurok Tribal Fisheries Program in 2005 (Yurok Tribal Fisheries Program 2008). Average length differed by 30% (214 mm versus 167 mm) between the two studies. The study by the Yurok Tribal Fisheries Program (2008) found that 78% of juvenile hatchery steelhead examined were transitional or smolting. In this study, only 39% of juvenile hatchery steelhead were transitional or smolting. This is evidence that the average difference of 47 mm in fork length between juvenile steelhead

captured in 2005, and those captured in 2007, is not only statistically significant, it is also biologically meaningful. Variability in release size affects inferences regarding survival and adult returns because both survival (Tipping 1997, Miyakoshi et al. 2001, Jokikokko et al. 2006) and smoltification, to a point (Chrisp and Bjornn 1978, Tipping et al. 1995), are positively correlated with juvenile size. Annual variability in release size of juvenile steelhead from Trinity River Hatchery may reflect variability in air temperature, weather, and water temperature, as fish are reared in outdoor raceways.

Chrisp and Bjornn (1978) determined that steelhead parr must reach a minimum total length of 140-160 mm before they have the capability to become smolts and migrate to the sea. Those that were greater than 170 mm in length had more pronounced changes associated with smoltification, and migrated in larger numbers, than smaller juveniles. Rhine et al. (2002) found that steelhead classified as smolts were significantly longer, heavier, and had lower mean condition factor than steelhead classified as transitional or not molting. This agrees with my findings. Additionally, larger smolt size has been linked with increased rates of survival (Ward and Slaney 1988, Henderson and Cass 1991, Tipping 1997, Miyakoshi et al. 2001, Jokikokko et al. 2006), especially in years with poor ocean conditions (Saloniemia et al. 2004). However, the positive correlation between steelhead smolt size and percentage migrating (Chrisp and Bjornn 1978, Tipping et al. 1995) and survival (Tipping 1997) tends to disappear at roughly 190-210 mm, after which point residualism and precocialism begin to increase (Schmidt and House 1979, Partridge 1986, Viola and Schuck 1995, Newman 2002, Rhine et al. 2002). Tipping et al. (1995) reported that for optimum emigration rates, steelhead smolt lengths should be at

least 190 mm and that Fulton's K values should be 0.90-0.99. Excessively large smolts conferred no clear emigration advantage, and were costlier to produce. However, average fork length should exceed 190 mm, in order to account for the normal distribution of a population (Tipping et al. 1995, Tipping 1997).

Because they are not, on average, physiologically capable of smolting, the 175,210 juvenile hatchery steelhead in raceways F (mean fork length = 125 mm) and N (mean fork length = 128 mm) of Trinity River Hatchery were forced into one of two probable pathways which are both undesirable from a management perspective: death or residualism. As mentioned above, mortality tends to be highest for smaller steelhead smolts (Seelbach 1987, Ward and Slaney 1988). Those that do survive compete with naturally produced salmonids for food and habitat (McMichael et al. 1997), exhibit aggression toward other salmonids (Berejikian et al. 1996, McMichael et al. 1999), and consume other salmonids (this study).

Although estimates of the number of residualized steelhead that exist in the upper Trinity River during summer months are not available, tens of thousands may persist throughout the summer (in any given year). Researchers have estimated residualism rates of 10-17% on other river systems (Viola and Schuck 1995, Rhine et al. 2002, Bumgarner et al. 2002). Snorkel surveys in June from previous years have documented tens of thousands of juvenile hatchery steelhead in the upper Trinity River (personal communication, P. Garrison, 2007 California Department of Fish and Game, P.O. Box 1185, Weaverville, CA 96093). For example, Bumgarner (2002) estimated that the number of residualized steelhead present in the Touchet River on 27 May 1999 was

18,411, or 14.7% of the 125,000 released. Assuming a minimum of 10% of steelhead from Trinity River Hatchery fail to migrate by 1 June, roughly 80,000 hatchery steelhead could be present in the Trinity River, most likely in the uppermost reaches.

In two separate years (2005 and 2007) only a few thousand fish were estimated to persist into March from releases of roughly 800,000 the previous year (Yurok Tribal Fisheries Program 2008, this study). The fate of the large number of steelhead that likely remain in the Trinity River between the time of release and the spring of the following year is not known. Most of the fish probably perish, as non-migratory juvenile steelhead tend to have high rates of mortality in freshwater (Chrisp and Bjornn 1978, Seelbach 1987), although some probably continue to smolt throughout the summer months. For example, Chrisp and Bjornn (1978) found that for yearlings planted in the spring, high mortalities (70%) occurred the following summer. It is not advantageous, from a management perspective, for juvenile hatchery steelhead to remain in the river for one year after release, and then migrate to the ocean, because they interact with naturally produced salmonids in the river (McMichael et al. 1997, McMichael et al. 1999, Kostow et al. 2003) and they have low survival rates (Chrisp and Bjornn 1978, Seelbach 1987).

Overall mean fork length for juvenile hatchery steelhead that were captured during the first week of this study was not significantly different from the mean for the 500 juvenile hatchery steelhead that were measured one day prior to release from the hatchery. This indicates that the hook and line method provided a reasonable means to sample fish without bias in relation to fish size. Because longer steelhead, up to roughly 200 mm, smolt at a greater frequency than smaller steelhead (Chrisp and Bjornn 1978,

Rhine et al. 2002), it is possible that longer fish continually exited the study reach throughout the course of the investigation, making the mean fork length decrease over time. For instance, the mean length of fish captured during the first week of the study was 182 mm, while the overall mean for the duration of the study was 167 mm.

Even though Trinity River Hatchery serves as one of the large mitigation hatcheries in California, fishing regulations on the uppermost 3.2 km of the Trinity River are “fly only” and “catch and release only”. These regulations have no apparent biological justification. Fish and game agencies in some western states rely on angler harvest to eliminate residualized hatchery steelhead (Partridge 1985). Without this tool, river managers have few available means to eradicate non-anadromous steelhead from the river. Catch and release regulations that are, in this case, closely associated with a large hatchery, may obscure the overall purpose and ethic of catch and release angling from the fishing public, which is meant to preserve wild fish. The California Fish and Game Commission Policy (2004) states that

“Resident fish will not be planted or resident fisheries developed in drainages of salmon [or steelhead] waters, where, in the opinion of the Department, such planting or development will interfere with salmon [or steelhead] populations. Exceptions to this policy may be authorized by the Commission (a) where the stream is no longer adaptable to anadromous runs, or (b) during the mid-summer period in those individual streams considered on a water-by-water

basis where there is a high demand for angling recreation and such planting or development has been determined by the Department not to be detrimental to salmon [or steelhead].”

A fishery for non-anadromous hatchery steelhead now exists on the Trinity River. These residualized fish cannot legally be removed by anglers; however, they are targeted by fly fishermen. To date, the California Department of Fish and Game has not examined whether or not this resident fishery is detrimental to salmon or steelhead. Without this information, it is not possible to determine if the fishery is in conflict with the stated policies of the California Fish and Game Commission. Additionally, in some years, tens of thousands of adult hatchery salmonids, in excess of hatchery egg take goals, are returned to the river after entering the hatchery, and they cannot be harvested.

During the course of this study, I learned that virtually 100% of the steelhead broodstock at Trinity River Hatchery is of hatchery origin (personal communication, L. Marshall, 2007, California Department of Fish and Game, 1000 Hatchery Rd., Lewiston, CA 96052). Hatchery-reared, adipose fin clipped anadromous steelhead have been bred at Trinity River Hatchery for decades, with little, if any, genetic input from naturally produced steelhead. In order for the selection regimes in the natural environment to dominate the mean fitness of the hatchery and naturally produced population as a whole, it is recommended that the proportion of hatchery broodstock composed of naturally produced fish must exceed the proportion of hatchery fish spawning in the river (Hatchery Scientific Review Group 2004). For example, if the hatchery uses 10%

naturally produced steelhead for broodstock, then only 10% of steelhead that spawn naturally should be of hatchery origin so that the hatchery does not produce deleterious changes in the hatchery and naturally produced populations. Since Trinity River Hatchery uses virtually 100% hatchery steelhead broodstock, and the percentage of naturally spawning adults in any given year is roughly 75% (Trinity River Flow Evaluation 1999, California Department of Fish and Game 2005), the hatchery, and not the Trinity River, may be driving the natural selection process. This means that steelhead in the upper Trinity River mainstem might be better adapted to reproduction in the hatchery than in the Trinity River. This has bearing on this study and on the restoration of naturally produced fish in the Trinity River. This is because hatchery programs have the potential to significantly alter the genetic composition (Crozier 1998, Lynch and O'Hely 2001, Saisa et al. 2003), phenotypic traits (Einum and Flemming 1997, Hard et al 2000, Kostow 2004, Wessel et al. 2006), behavior (Mesa 1991, Berejikian et al. 1996, Fleming et al. 1996, Jonsson 1997), survival (Jonnnson et al. 2003, McGinnity et al. 2003, Kostow 2004) and ultimately the reproductive success (Reisenbichler and Rubin 1999, Fleming et al. 2000, Mclean et al 2003, Araki et al. 2007) of anadromous salmonids, potentially in a matter of a few generations (Araki et al. 2007). Egg transfers from Iron Gate Hatchery to Trinity River Hatchery were routine until at least 1994, and hatchery steelhead of the Trinity River are more genetically similar to Klamath River steelhead than they are to wild steelhead from Horse Linto Creek, a tributary to the Trinity River (Pearse et al. 2007).

While I did not study the effects of competition between hatchery and naturally produced salmonids in the river, others have reported negative impacts on naturally produced salmonids (Kennedy and Strange 1986, McMichael et al. 1997, McMichael et al. 1999), even to the point of measurably impacting the population of natural salmonids (Kostow et al. 2003, Kostow and Zhou 2006). Competition between hatchery and naturally produced salmonids may be more harmful than predation by hatchery salmonids on naturally produced salmonids, but its effects can be less visible. The end result of the competition may be dead naturally produced fish, which cannot be held in hand and counted as in this study.

Interactions in the freshwater environment between hatchery and naturally produced salmonids are likely to disproportionately affect those species which spend the most rearing time in the river. Naturally produced steelhead, spring Chinook salmon, and coho salmon juveniles typically spend at least one year in freshwater (Healey 1991, Sandercock 1991, Moyle 2002). Fall Chinook salmon, however, are unambiguously ocean-type (Moyle 2002). Fall Chinook salmon juveniles emerge from the gravel in late winter or early spring, and within a matter of months, migrate downstream to the estuary and the ocean (Moyle 2002, Quinn 2005). Therefore, naturally produced steelhead, spring Chinook salmon, and coho salmon juveniles are more likely than fall Chinook salmon to experience competition for food and resources in the river, triggering mechanisms such as density dependent mortality (Kostow et al. 2003, Kostow and Zhou 2006), that may ultimately impact the populations of those species. It then follows that in the upper Trinity River, the stocks which have the lowest proportion of naturally

produced individuals returning to the upper Trinity River are coho salmon (~10%) and steelhead (~25%), while fall Chinook salmon have the highest proportion of naturally produced individuals (~40%) (Trinity River Flow Evaluation 1999, California Department of Fish and Game 2005). It should be noted that naturally produced salmonids have also been affected by reductions in available fry rearing habitat of the Trinity River in previous decades resulting from the erection of dams (Trinity River Flow Evaluation 1999, Record of Decision 2000).

Quantifying impacts on naturally produced salmon from predation by hatchery reared fish is one of the steps that can help inform decision makers. For example, one might estimate the number of fry that survive to reach smoltification as a result of a habitat improvement project that would not have survived to smoltification otherwise. This benefit to natural production as a result of a project like habitat enhancement could then be compared with the detriment to natural production caused by predation. This would let managers gauge, with a cost-benefit type analysis, the potential for conflict between the operational regime of a hatchery and river restoration projects. For instance, of 44 different river restoration sites aimed at improving the survival rate of naturally produced fry in the Trinity River, 4 are located in the study reach for this project. Benefits to natural production resulting from these habitat enhancement projects could be compared to the results of this study.

Northern-California Native American Tribes, the State of California, and the U.S. Government have agreed that restoring naturally produced salmonids to “pre-dam levels” is a priority, collectively creating and operating the Trinity Management Council, and the

Trinity River Restoration Program (Trinity River Flow Evaluation 1999, Record of Decision 2000). When ecological and genetic interactions between hatchery and natural salmonids are placed in the greater context of Trinity River restoration, the interactions between these fish has the potential to become problematic, as the goals of Trinity River Restoration Program may be in conflict with the current management regime of hatchery fish. Whether or not the extent of the conflict warrants action by river and hatchery managers is a decision that should be carefully considered.

Other river systems that might be at risk for predation by hatchery salmonids on naturally produced salmonids are those which have similar conditions as that on the Trinity River. Those conditions are relatively low flows, low turbidity, and release location near areas in which spawning adults congregate to build redds.

REFERENCES

- Agresti, A., and B Coull. 1998. Approximate is better than 'exact' for interval estimation of binomial proportions. *The American Statistician* 52: 119-126.
- Ando, D., T. Kitamura, and S. Mizuno. 2005. Quantitative analysis of body silvering during smoltification. *North American Journal of Aquaculture* 67:160–166.
- Araki, H., B. Cooper, and M. S. Blouin. 2007. Genetic effects of captive breeding cause a rapid, cumulative fitness decline in the wild. *Science* 318:100–103.
- Beauchamp, D. A. 1990 Seasonal and diel food habits of rainbow trout stocked as juveniles in Lake Washington. *Transactions of the American Fisheries Society* 119: 475–482.
- Beauchamp, D. A. 1995. Riverine predation on sockeye salmon fry migrating to Lake Washington. *North American Journal of Fisheries Management* 15:358-365.
- Beauchamp, D. A., M. G. LaRiviere, and G. L. Thomas. 1999. Evaluation of competition and predation as limits to juvenile kokanee and sockeye salmon production in Lake Ozette, Washington. *North American Journal of Fisheries Management* 15:193-207.
- Beeman, J. W., D. W. Rondorf, M. E. Tilson, and D. A. Venditti. 1995. A nonlethal measure of smolt status of juvenile steelhead based on body morphology. *Transactions of the American Fisheries Society* 124:764-769.
- Berejikian, B. A., S. B. Mathews and T. P. Quinn. 1996. Effects of hatchery and wild ancestry and rearing environments on the development of agonistic behavior in steelhead trout (*Oncorhynchus mykiss*) fry. *Canadian Journal of Fisheries and Aquatic Sciences* 53: 2004-2014.
- Bumgarner, J., M Schuck, S. Martin, J. Dedloff, and L. Ross. Lyons Ferry Complex Hatchery Evaluation: Summer steelhead and trout report 1998, 1999, and 2000 run years. United States Fish and Wildlife Service Lower Snake River Compensation Plan Office, Boise, Idaho. Cooperative Agreements 1411-98-J057, 14110-99-J070, 14110-0-J049. Washington Department of Fish and Wildlife report FPA02-09.

- California Department of Fish and Game. 2002. Status review of California coho salmon north of San Francisco. Report to The California Fish and Game Commission. Candidate Species Status Review Report 2002-3, 336 pp.
- California Department of Fish and Game. 2005. Trinity River Basin salmon and steelhead monitoring project 2003-2004 season. Northern California-North Coast Region. Redding, CA. 142 pp.
- Cannamela, D.A. 1993. Hatchery steelhead smolt predation of wild and natural juvenile Chinook salmon fry in the upper-Salmon River, Idaho. Idaho Department of Fish and Game. Boise, Idaho.
- Chrisp, E. Y. and T. C. Bjornn. 1978. Parr-smolt transformation and seaward migration of wild and hatchery steelhead trout in Idaho. Forest, Wildlife, and Range Experiment Station. Project F-49-12, Salmon and Steelhead Investigation. Final Report. Moscow, Idaho.
- Cone, R. S. 1989. The need to reconsider the use of condition indices in fishery science. Transactions of the American Fisheries Society 118:510-514.
- Crozier, W. W. 1998. Genetic implications of hatchery rearing in Atlantic Salmon: effects of rearing environment on genetic composition. Journal of Fish Biology 52: 1014-1025.
- Einum, S. and I. A. Fleming. 1997. Genetic divergence and interactions in the wild among native, farmed and hybrid Atlantic salmon. Journal of Fish Biology 50: 634-651.
- Elliott, J. M. 1991. Rates of gastric evacuation in piscivorous brown trout, *Salmo trutta*. Freshwater Biology 25: 297-305.
- Fleming, I. A., K. Hindar, I. B. Mjölneröd, B. Jonsson, T. Balstad and A. Lamberg. 2000. Lifetime success and interactions of farm salmon invading a native population. Proceedings of the Royal Society of London B 267: 1517-1523.
- Fleming, I. A., B. Jonsson, M. R. Gross, and A. Lamberg. 1996. An experimental study of the reproductive behavior and success of farmed and wild Atlantic Salmon (*Salmo salar*). Journal of Applied Ecology 33:893-905.
- Fritts, A. L. and T. N. Pearsons. 2004. Smallmouth bass predation on hatchery and wild salmonids in the Yakima River, Washington. Transactions of the American Fisheries Society 133(4):880-895.

- Good, T.P., R.S. Waples, and P. Adams (editors). 2005. Updated status of federally listed ESUs of West Coast salmon and steelhead. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-NWFSC-66, 598 pp.
- Gregory, R. S. and C. D. Levings. 1998. Turbidity reduces predation on migrating juvenile pacific salmon. Transactions of the American Fisheries Society 127: 275-285.
- Grey, G. 1999. Covariances in multiplicative estimates. Transactions of the American Fisheries Society 128:475-482.
- Haner, P. V., J. C. Faler, R. M. Schrock, D. W. Rondorf, and A. G. Maule. 1995. Skin reflectance as a nonlethal measurer of smoltification for juvenile salmonids. North American Journal of Fisheries Management 15:814-822.
- Hard, J. J., B. A. Berejikian, E. P. Tezak, S. L. Schroder, C. M. Knudsen and L. T. Parker. 2000. Evidence for morphometric differentiation of wild and captively reared adult coho salmon: a geometric analysis. Environmental Biology of Fishes 58:61-73.
- Hatchery Scientific Review Group. 2004. Hatchery reform: principles and recommendations of the hatchery scientific review group. Long Live the Kings, 1305 Fourth Avenue, Suite 810, Seattle, WA 98101. Available at: www.hatcheryreform.org. Contacted on March 2008.
- Hawkins, S. W., and J. M. Tipping. 1999. Predation by juvenile hatchery salmonids on wild fall chinook salmon fry in the Lewis River, Washington. California Fish and Game 85:124-129
- He, E. and W. A. Wurtsbaugh. 1993. An empirical model of gastric evacuation rates for fish and an analysis of digestion in piscivorous brown trout. Transactions of the American Fisheries Society 122: 717-730.
- Healey, M.C. 1991. Life history of coho salmon (*Oncorhynchus tshawytscha*). Pages 313-393 in C. Groot and L. Margolis, editors Pacific salmon life histories. University of British Columbia Press, Vancouver, British Columbia, Canada.
- Henderson, M. A., and A. J. Cass. 1991. Effect of smolt size on smolt-to-adult survival for Chilko Lake sockeye salmon (*Oncorhynchus nerka*). Canadian Journal of Fisheries and Aquatic Sciences. 48:988-994.
- Holtby, L. B., B. C. Andersen, and R. K. Kadowaki. 1990. Importance of smolt size and early ocean growth to interannual variability in marine survival of coho salmon (*Oncorhynchus kisutch*). Canadian Journal of Fisheries and Aquatic Sciences. 47: 2181-2194

- Jokikokko, E., I. Kallio-Nyberg, I. Saloniemi and E. Jutila. 2006. The survival of semi-wild, wild and hatchery-reared Atlantic salmon smolts of the Simojoki River in the Baltic Sea. *Journal of Fish Biology* 68: 430-442.
- Jonasson B.C., R.W. Charmichael and T.A. Whitesel. 1994. Residual hatchery steelhead: Characteristics and potential interactions with spring Chinook salmon in northeast Oregon. Oregon Department of Fish and Wildlife. Salem, Oregon.
- Jonasson B.C., R.W. Charmichael and T.A. Whitesel. 1995. Residual hatchery steelhead: Characteristics and potential interactions with spring Chinook salmon in northeast Oregon. Oregon Department of Fish and Wildlife. Salem, Oregon.
- Jonsson, B. 1997. A review of ecological and behavioural interactions between cultured and wild Atlantic salmon. *ICES Journal of Marine Science* 54: 1031-1039.
- Jonsson, N., B. Jonsson and L. P. Hansen. 2003. The marine survival and growth of wild and hatchery-reared Atlantic salmon. *Journal of Applied Ecology* 40: 900-911.
- Kennedy, G. J. A. and C. D. Strange. 1986. The effects of intra- and inter-specific competition on the survival and growth of stocked juvenile Atlantic salmon, *Salmo salar* L., and resident trout, *Salmo trutta* L., in an upland stream. *Journal of Fish Biology* 28: 479-489
- Kostow, K. E. 2004. Differences in juvenile phenotypes and survival between hatchery stocks and a natural population provide evidence for modified selection due to captive breeding. *Canadian Journal of Fisheries and Aquatic Sciences* 61: 577-589.
- Kostow, K. E., A. R. Marshall and S. R. Phelps. 2003. Naturally spawning hatchery steelhead contribute to smolt production but experience low reproductive success. *Transactions of the American Fisheries Society* 132:780-790.
- Kostow, K. E. and S. Zhou. 2006. The Effect of an introduced summer steelhead hatchery stock on the productivity of a wild winter steelhead population. *Transactions of the American Fisheries Society* 135: 825-841.
- Levin, P. S., R. W. Zabel and J. G. Williams. 2001. The road to extinction is paved with good intentions: negative association of fish hatcheries with threatened salmon. *Proceedings of the Royal Society of London B* 268: 1153-1158.
- Light, R.W., P.H. Alder, and D.E. Arnold. 1983. Evaluation of gastric lavage for stomach analyses. *North American Journal of Fisheries Management* 3:81-85.
- Lynch, M. and M. O'Hely. 2001. Captive breeding and the genetic fitness of natural populations. *Conservation Genetics* 2: 363-378.

- Martin, S. W., A. E. Viola, and M.L. Schuck. 1993. Investigations of the interactions among hatchery reared summer steelhead, rainbow trout, and wild spring Chinook salmon in southeast Washington. Washington Department of Fish and Wildlife. Olympia, Washington. Report # 93-4.
- Mather, M.E. 1998. The role of context-specific predation in understanding patterns exhibited by anadromous salmon. *Canadian Journal of Fisheries and Aquatic Sciences* 55 (Suppl. 1): 232-246.
- McConnaughey, J. 1999. Predation by coho salmon smolts (*Oncorhynchus kisutch*) in the Yakima and Klickitat Rivers. Report by the Yakima Indian Nation Fisheries Program, Yakima, Washington.
- McGinnity, P., P.Prodo, A. Ferguson, R. Hynes, N. O' Maoile'idigh, N. Baker, D. Cotter, B. O'Heal, D. Cooke, G. Rogan, J. Taggart and T. Cross. 2003. Fitness reduction and potential extinction of wild populations of Atlantic salmon, *Salmo salar*, as a result of interactions with escaped farm salmon. *Proceedings of the Royal Society of London B* 270: 2443–2450.
- McLean, J. E., P. Bentzen and T. P. Quinn. 2003. Differential reproductive success of sympatric, naturally spawning hatchery and wild steelhead trout, (*Oncorhynchus mykiss*) through the adult stage. *Canadian Journal of Fisheries and Aquatic Sciences* 66: 443-440.
- McMichael, G.A. and T.N. Pearsons. 2001. Upstream movement of residual hatchery steelhead into areas containing bull trout and cutthroat trout. *North American Journal of Fisheries Management* 21: 943-946.
- McMichael, G.A., T.N. Pearsons, and S.A. Leider. 1999. Behavioral interactions among hatchery-reared steelhead smolts and wild *Oncorhynchus mykiss* in natural streams. *North American Journal of Fisheries Management* 19: 948-956.
- McMichael, G.A., C. S. Sharpe and T.N. Pearsons. 1997. Effects of residual hatchery-reared steelhead on growth of wild rainbow trout and spring chinook salmon. *Transactions of the American Fisheries Society* 126: 230–239.
- Mesa, M. G. 1991. Variation in feeding, aggression, and position choice between hatchery and wild cutthroat trout in an artificial stream. *Transactions of the American Fisheries Society* 120: 723 727.
- Miyakoshi, Y., M. Nagata, and S. Kitada. 2001. Effect of smolt size on post release survival of hatchery-reared masou salmon *Oncorhynchus masou*. *Fisheries Science* 67:134-137

- Moyle, P. B. 2002. Inland fishes of California. University of California Press. Berkeley, California.
- Naughton, G. P. D. H. Bennett, and K. B. Newman. 2004. Predation on juvenile salmonids by smallmouth bass in the Lower Granite Reservoir System, Snake River. *North American Journal of Fisheries Management* 24: 534–544.
- Newman, R. L. 2002. Steelhead volitional release experiment Squaw Creek Pond, Idaho. Report to United States Fish and Wildlife Service, Lower Snake River Compensation Plan Office, Boise Idaho. Agreement 14110-9J007. Idaho Fish and Game Report Number 02-49.
- National Weather Service. 2008. Local climate records. National Weather Service, Eureka, California. Available at www.wrh.noaa.gov/eka/climate. Contacted on March 2008.
- Partridge, F. E. 1985. Effect of steelhead smolt size on residualism and adult return rates. Report by Idaho Department of Fish and Game to the U.S. Department of the Interior, Lower Snake River Fish and Wildlife Compensation Plan. Contract 14-16-001-83605 (1983 segment).
- Partridge, F. E. 1986. Effect of steelhead smolt size on residualism and adult return rates. Report by Idaho Department of Fish and Game to the U.S. Department of the Interior, Lower Snake River Fish and Wildlife Compensation Plan. Contract 14-16-001-83605 (1984 segment).
- Pearse, P.E., C. J. Donohoe, and J. C. Garza. 2007. Population genetics of steelhead (*Oncorhynchus mykiss*) in the Klamath River. *Environmental Biology of Fish* 80:377–387.
- Pearsons, T. N. and A. L. Fritts. 1999. Maximum size of Chinook salmon consumed by juvenile coho salmon. *North American Journal of Fisheries Management* 19:165–170.
- Pollard, H. A. II and T. C. Bjornn. 1973. The effects of angling and hatchery trout on the abundance of juvenile steelhead trout. *Transactions of the American Fisheries Society* 102: 745–752.
- Quinn, T.P. 2005. The behavior and ecology of Pacific salmon and trout. University of Washington Press, Seattle, WA.
- Record of Decision. 2000. U.S. Department of the Interior Record of Decision Trinity River Mainstem Fishery Restoration Final Environmental Impact Statement/Environmental Impact Report. Available at www.trrp.net/documents/ROD.pdf. Accessed January 2008.

- Reisenbichler, R. R. and J. D. McIntyre. 1977. Genetic differences in growth and survival of juvenile hatchery and wild steelhead trout, *Salmo gairdneri*. Journal of Fisheries Research Board of Canada 34: 123-128.
- Reisenbichler, R. R. and S. P. Rubin. 1999. Genetic changes from artificial propagation of Pacific salmon affect the productivity and viability of supplemented populations. ICES Journal of Marine Science 56: 459-466.
- Rhine, T. D., J. L. Anderson, and R. S. Osborne. 2002. Sawtooth fish hatchery volitional release experiment: A stocking method to reduce residual steelhead in the upper Salmon River, Idaho. Report to the U.S. Fish and Wildlife Service, Lower Snake River Compensation Plan Office, Boise, Idaho. Idaho Fish and Game Report Number 02-55.
- Robertis, A. D., C. H. Ryer, A. Veloza, and R. D. Brodeur. 2003. Differential effects of turbidity on prey consumption of piscivorous and planktivorous fish. Canadian Journal of Fisheries and Aquatic Sciences 60:1517-1526.
- Ruggerone, G. T. (1989) Gastric evacuation rates and daily ration of piscivorous coho salmon, *Oncorhynchus kisutch* Walbaum. Journal of Fish Biology 34, 451-463.
- Ruggerone, G. T. and D. E. Rogers. 1992. Predation on sockeye salmon fry by juvenile coho salmon in the Chignik Lakes, Alaska: Implications for salmon management. North American Journal of Fisheries Management 12: 87-102.
- Saisa, M., M. Koljonen and Jaana Tahtinen. 2003. Genetic changes in Atlantic salmon stocks since historical times and the effective population size of a long-term captive breeding programme. Conservation Genetics 4: 613-627.
- Saloniemi, I., E. Jokikokko, I. Kallio-Nyberg, E. Jutila and P. Pasanen. 2004. Survival of reared and wild Atlantic salmon smolts: size matters more in bad years. ICES Journal of Marine Science 61:782-787
- Sandercock, F.K. 1991. Life history of coho salmon (*Oncorhynchus kisutch*). Pages 397-445 in C. Groot and L. Margolis, editors Pacific Salmon Life Histories. University of British Columbia Press, Vancouver, British Columbia, Canada.
- Schmidt, S. P. and E. W. House. 1979. Precocious sexual development in hatchery-reared and laboratory maintained male steelhead trout (*Salmo gairdneri*). Journal of the Fisheries Research Board of Canada. 36:90-93.
- Seber, G.A.F. 1982. The estimation of animal abundance and related parameters. 2nd edition. Griffin, London. Chapters 3-5.

- Seelbach, P. W. 1987. Smolting success of hatchery-raised steelhead planted in a Michigan tributary of Lake Michigan. *North American Journal of Fisheries Management* 7:223-231.
- Thompson, S. K. 2002. Sampling. Wiley Series in Probability and Statistics, New York, NY.
- Tipping, J. M., R. V. Cooper, J. B. Byrne, and T. H. Johnson. 1995. Length and condition factor of migrating and nonmigrating hatchery-reared winter steelhead smolts. *The Progressive Fish-Culturist* 57:120-123.
- Tipping, J. M. 1997. Effect of smolt length at release on adult returns of hatchery-reared winter steelhead. *The Progressive Fish-Culturist* 59:310-311.
- Trinity River Flow Evaluation 1999. Report by the U.S. Fish and Wildlife Service and Hoopa Valley Tribe to the Secretary, U.S. Department of Interior, Washington, D.C. Available at <http://www.fws.gov/arcata/fisheries/reportsDisplay.html>. Contacted on November 2007.
- United States Fish and Wildlife Service. 2007. Trinity River redd survey update. Progress Report. United States Fish and Wildlife Service. Arcata Fish and Wildlife Office, Arcata, California.
- United States Naval Observatory. 2007. United States Naval Observatory sun or moon rise/set table for one year. Available at http://aa.usno.navy.mil/data/docs/RS_OneYear.php. Contaced on November 2007.
- Viola, A.E. and Schuck, M.L. 1995. A method to reduce the abundance of residual hatchery steelhead in rivers. *North American Journal of Fisheries Management* 15: 488-493.
- Ward, B.R. and P.A. Slaney. 1988. Life history and smolt-to-adult survival of Keogh River steelhead Trout (*Salmo gairdneri*) and the relationship to smolt size. *Canadian Journal of Fisheries and Aquatic Sciences* 45: 1110-1122
- Wessel, M. L., W. W. Smoker and J. E. Joyce. 2006. Variation of morphology among juvenile Chinook salmon of hatchery, hybrid, and wild origin. *Transaction of the American Fisheries Society* 135: 333-340.
- Whitesel, T.A., B.C. Jonasson and R.W. Charmichael. 1993. Residual hatchery steelhead: Characteristics and potential interactions with spring Chinook salmon in northeast Oregon. Oregon Department of Fish and Wildlife. Salem, Oregon.

- Yurok Tribal Fisheries Program. 2008. Predation by hatchery steelhead on natural salmonid fry in the upper-Trinity River, California, 2005. Yurok Tribal Fisheries Program, Weitchpec, CA.
- Zydlewski G. B., G. H., T. Dubreuil, B. Letcher, S. Casey, and J. Zydlewski. 2006. Remote monitoring of fish in small streams. *Fisheries* 31:492–502.



Tracking Number: (2020-005 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: James Stone, Northern California Guides and Sportsmen's Association

Address: PO Box 111, Sutter CA 95982

Telephone number: 530-923-9440

Email address: jstone@ncgasa.org

2. Rulemaking Authority (Required) - Reference to the statutory or constitutional authority of the Commission to take the action requested: Title 14, Section 5.75, 202, 205, 265 and 270, Fish and Game Code

3. Overview (Required) - Summarize the proposed changes to regulations: NCGASA is proposing a slot limit on striped bass from 20-30 inches. This would increase, from 18 inches to 20 inches, the size of a fish that may be harvested, and further restrict the harvest of any mature fish in the system above 30 inches.

4. Rationale (Required) - Describe the problem and the reason for the proposed change: Generally, the purpose behind the implementation of slot limits is to improve opportunities for targeted species in a particular body or bodies of water. In addition to improving natural reproduction success the slot limit can also serve to improve the average catchable size of a targeted species.

Currently, anglers are allowed to harvest 2 striped bass, per person, per day, above 18 inches in total length (tip to tail). This practice has resulted in removal of fish as early as the 2nd year class, and severely impacts the largest and most sexually mature fisheries above 30 inches. As a result, natural reproduction in the system is artificially constrained by the regulatory framework currently in place.



Striped bass are declining in the system on a similar track to other anadromous fisheries, including salmon. Recent changes by the Commission to the 1996 Striped Bass Policy have removed programs that were initially conceived to improve abundance and angler opportunity. Limitations on CDFW funding have also prevented the Department from focusing on bass species as other higher priority actions must be directed to listed and endangered fisheries.

NCGASA, our members, and our partners believe that it is in the best long-term interest of this important recreational fishery to adopt a slot limit for the long term success of the fishery. |

SECTION II: Optional Information

5. **Date of Petition:** | April 3, 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: | Proposed beginning in the 2021. |
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: | Unknown, presumed 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: | 4/9/2020 |



FGC staff action:

- ☐ Accept - complete
- ☐ Reject - incomplete
- ☐ Reject - outside scope of FGC authority

Tracking Number

Date petitioner was notified of receipt of petition and pending action: _____

Meeting date for FGC consideration: _____

FGC action:

- ☐ Denied by FGC
- ☐ Denied - same as petition _____
- ☐ Granted for consideration of regulation change

Tracking Number

From: Walter Lamb <landtrust@ballona.org>
Sent: Wednesday, June 10, 2020 12:07 PM
To: Cornman, Ari@FGC <Ari.Cornman@FGC.ca.gov>
Cc: FGC <FGC@fgc.ca.gov>
Subject: Comment deadlines

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

Hi Ari,

I hope that you are continuing to do well. I wanted to reiterate some comments prior to tomorrow's regular comment deadline. Once a staff report is published, I may provide additional comments in response. Our organization has submitted many factual records over the course of our ongoing efforts to address these leases, so I won't weigh this communication down by rehashing those factual points. Instead, I am hoping that the following high level points will be factored into the staff recommendation.

- Section 630(a) states that "all ecological reserves are maintained for the primary purpose of developing a statewide program for protection of rare, threatened, or endangered native plants, wildlife, aquatic organisms, and specialized terrestrial or aquatic habitat types. Visitor uses are dependent upon the provisions of applicable laws and upon **a determination by the commission** that opening an area to such visitor use is compatible with the purposes of the property." (emphasis added) The staff report should include not just a recommendation to grant or deny the petition, but a supporting determination for the Commission to adopt, that is based on the factual record, showing that the leases are for uses that are compatible with the property.

- Section 630(a) also states that "**unless the department determines that restoration or other uses in the following areas is more appropriate**, existing recreational uses may be allowed under license agreement with Playa Vista Little League in that portion of Area C identified in the license agreement and existing parking areas may be allowed under leases to the County of Los Angeles." (emphasis added) This language was clearly not intended to allow the Department to indefinitely avoid making such a determination. Fifteen years after the adoption of this language, the Department should provide the public with a clear determination regarding the appropriateness of various potential uses of the land in question. If the Department is unable or unwilling to do that, then this regulatory exception should be discontinued.

- At the 2005 FGC hearing at which this language was adopted, the Department employee who made the presentation assured the Commissioners that while the leases were "not typical", that they would be "analyzed in our restoration plan as to their compatibility." ([link](#) to relevant section of presentation) At the time of this hearing, the restoration analysis was expected to be completed within two or three years. However, 15 years later, neither the draft EIR or final EIR included any such analysis. The relevance of these facts are that the Commission cannot simply rely on a 2005 determination of compatibility, to the extent such a determination can even be implied from the 2005 decision, because any such implied determination was clearly intended to be temporary and contingent on a timely future

analysis that has never materialized. Thus, the Commission is required to make a current determination regarding compatibility of these uses to support its decision.

- Our position is that a Commission decision without a supporting determination, based on the factual record, would constitute arbitrary and capricious decision-making by the Commission which would thus be vulnerable to a challenge. If the Commission makes a clear determination of compatibility that is reasonably supported by the facts, we would not have grounds to challenge the Commission's decision, even if we disagree with the decision.

Feel free to give me a call if you want to discuss any of these points. Otherwise, I'll look for the staff report and make additional comments as necessary.

Thanks,

Walter

Walter Lamb
Ballona Wetlands Land Trust
310-384-1042
[Facebook](#)

From: Kathy Knight [REDACTED]
Sent: Thursday, June 11, 2020 04:27 PM
To: FGC <FGC@fgc.ca.gov>
Subject: Petition 2020-003

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

To California Fish & Game Commission:

Regarding the petition of Walter Lamb of the Ballona Wetlands Land Trust, I support that half of the parking area on the north side of Area A of the Ballona Wetlands Ecological Reserve be removed and returned to habitat for the wildlife of Ballona.

I also support never again thinking about putting any high rise parking in this area.
The workers at the Fisherman's Village across the street should have their own parking at the large parking lot for Fisherman's Village.

Thank you for supporting taking care of the precious wildlife at the Ballona Wetlands Ecological Reserve. It is such a rare opportunity on our coast to save this area forever for them to survive and for the migratory birds and insects to use.

Sincerely,

Kathy Knight
Volunteer for 27 years to save
the Ballona Wetlands

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

CALIFORNIA FISH AND GAME COMMISSION - NONREGULATORY REQUESTS - ACTIVE

Revised 06/12/2020

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
4/16/2020	Spraying at Ballona	Observed two California employees using sprays to remove iceplant at Ballona Wetlands State Ecological Reserve, thinks that it was a violation of the Coastal Act because they appeared to be using Roundup (glyphosate).	Robert van de Hoek, Ballona Institute	Wildlife	Glyphosate is authorized for use within the coastal zone. No action recommended.
4/16/2020	Catalina Island deer	Wants to see deer taken off Catalina island and causing damage, wants them brought back to reserves in the mainland.	Robert van de Hoek, Ballona Institute	Wildlife	DFW is working with island authorities on this issue. FGC has no day-to-day management authority over deer. No action recommended.

California Fish and Game Commission

Potential Agenda Items for August 2020 Commission Meeting

The next Commission meeting is scheduled for August 19-20, 2020 in Fortuna; however, due to ongoing health concerns related to COVID-19 and state travel restrictions, this meeting will be held by webinar/teleconference. This document identifies potential agenda items for this meeting, including items to be received from Commission staff and the California Department of Fish and Wildlife (Department).

Wednesday, August 19: Marine-related and administrative items

1. General public comment for items not on the agenda (Day 1)
2. Tribal Committee
3. Annual Tribal Planning meeting
4. Marine Resources Committee
5. Executive director's report
6. Extend emergency regulation for take of purple sea urchin in Casper Cove, Mendocino County, by 90 days (if approved by the Commission under item 33B)
7. Notice: sunset date in recreational take of red abalone regulations
8. Discuss: recreational and commercial groundfish regulations
9. Notice: recreational Dungeness crab marine life protection measures regulations *(if the Commission approves continuing the notice to August 2020 under agenda item 13(B))*
10. Determine whether the petitioned action to list Pacific leatherback sea turtle as a threatened or endangered species under the California Endangered Species Act (CESA) may be warranted
11. Receive white seabass fishery management plan annual review
12. Marine items of interest from previous meetings
13. Action on marine petitions for regulation change
14. Action on marine non-regulatory requests from previous meetings
15. Receive Department informational items (marine)
16. Executive (closed) session

Thursday, August 20: Wildlife- and inland fisheries-related and administrative items

17. General public comment for items not on the agenda (Day 2)
18. Wildlife Resources Committee
19. Discuss: simplification of statewide inland fishing regulations
20. Receive the Department's request for a 30-day extension to develop 90-day evaluation report for the petition to list Agassiz's desert tortoise as a threatened or endangered species under CESA
21. Determine whether the petitioned action to list Western Joshua tree as a threatened or endangered species under CESA may be warranted *(if approved by the Commission under agenda item 27)*

22. Discuss and consider adopting proposed meeting dates for Commission meetings for January through December 2021
23. Wildlife and inland fisheries items of interest from previous meetings
24. Action on wildlife and inland fisheries petitions for regulation change
25. Action on wildlife and inland fisheries non-regulatory requests from previous meetings
26. Receive Department informational items (wildlife and inland fisheries)
27. Administrative items (next meeting agenda, rulemaking timetable, new business)

Memorandum

Date: June 10, 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 changes to the Fish and Game Commission's (Commission's) 2020 regulatory timetable:

- Add a rulemaking to amend sections 27.30, 27.35, 27.40, 27.45, 27.50, 28.27, 28.28, 28.54, 28.55, and 150.16, Title 14, CCR, for state recreational and commercial fishing regulations for groundfish and associated species. In June 2020, the Pacific Fishery Management Council will conclude a biennial review of the status of west coast groundfish populations, and will recommend groundfish fishery harvest limits and regulations. It is important to have consistent State and federal regulations establishing harvest limits, season dates, depth constraints and other management measures, and is also important that State and federal regulations be effective concurrently. This rulemaking proposes to make State regulations consistent with PFMC recommendations and thus federal regulations for groundfish and associated species.
 - The proposed schedule is notice by memo at the June 2020 meeting, discussion at the August 2020 meeting, and adoption at the October 2020 meeting.
- Add a rulemaking to amend section 29.15, Title 14, CCR regarding recreational take of red abalone. A moratorium has been placed on the recreational take of red abalone since December of 2017 in response to adverse ocean conditions and significant population decline. The moratorium is currently set to expire on April 1, 2021. However, ocean conditions and stock status for the species have remained very poor. As such the sunset date on the moratorium should be removed so that the harvest of red abalone would not commence before the stock is ready. The proposed timeline is notice at the August meeting, discussion at the October meeting, and adoption at the December meeting.
- 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 PSU 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 urchin and red abalone.

- Delay the rulemaking to amend sections 165 Harvesting of Kelp and Other Aquatic Plants, 165.5 Lease of Kelp Beds for Exclusive Harvest of *Macrocystis* and *Nereocystis*, and 705 Commercial Fishing Applications, Permits, Tags and Fees, currently scheduled for notice at the August meeting, discussion at the October meeting, and adoption at the December meeting. In discussion with FGC staff, we support the recommendation to postpone the Kelp/Algae rulemaking to a later date.

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.

cc: Stafford Lehr, Deputy Director
Wildlife and Fisheries Division
Stafford.Lehr@wildlife.ca.gov

David Bess, Chief
Law Enforcement Division
David.Bess@wildlife.ca.gov

Craig Shuman, D. Env., Manager
Marine Region
Craig.Shuman@wildlife.ca.gov

Michelle Selmon, Program Manager
Regulations Unit
Wildlife and Fisheries Division
Michelle.Selmon@wildlife.ca.gov

Fish and Game Commission:

David Thesell, Program Manager
Fish and Game Commission
David.Thesell@fgc.ca.gov

California Fish and Game Commission: Perpetual Timetable for Anticipated Regulatory Actions

Updated June 11, 2020

Items proposed for change are shown in blue underlined font

Regulatory Change Category	Title 14 Section(s)	FGC Santa Ana Jun 24, 2020	FGC Santa Ana Jun 25, 2020	MRC San Clemente Jul 29, 2020	TC Fortuna Aug 18, 2020	FGC Fortuna Aug 19, 2020	FGC Fortuna Aug 20, 2020	WRC Sacramento Sep 17, 2020	FGC Oakland Oct 14, 2020	FGC Oakland Oct 15, 2020	TC Monterey Area Nov 9, 2020	MRC Monterey Area Nov 10, 2020	FGC San Diego 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
Upper Klamath-Trinity spring Chinook salmon sport fishing emergency regulations (2nd 90-day extension)	7.50(b)(91.2)	EE 6/23																					
Upper Klamath-Trinity spring Chinook salmon sport fishing (certificate of compliance)	7.50(b)(91.2)	E 6/22																					
Public use of Department of Fish and Wildlife lands ¹	550, 550.5, 551, 552, 630, 702			E 7/1																			
Mammal Hunting	360, 361, 362, 363, 364, 364.1			E 7/1									N				D			A			
Waterfowl (Annual)	502, 507			E 7/1									N				D			A			
Central Valley Sport Fishing (Annual)	2.35, 7.00, 7.50(b)(5), (68), (124), (156.5)			E 7/16									N				D			A			
Klamath River Basin Sport Fishing (Annual) ²	5.87(f), 7.50(b)(91.1)				E 8/15								N				D			A			
Purple Sea Urchin emergency regulations (180 days)	29.06							EE 9/16															
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	D/A							E 10/1														
<u>Groundfish</u>	<u>27.30, 27.35, 27.40, 27.45, 27.50, 28.27, 28.28, 28.54, 28.55, 150.16</u>	N				D			A						E 1/1								
Recreational Dungeness Crab Marine Life Protection Measures	29.80, 29.85 701	N				D			A						E 1/1								
Commercial Kelp and Algae Harvest Management	165, 165.5, 705					N			D/A						6-44								
Simplification of Statewide Inland Fishing Regulations ³	5.00, 7.00, 7.50, 8.10		N				D			A									E 3/1				
<u>Recreational Take of Red Abalone</u>	<u>29.15</u>					N			D				A						E 3/1				

Rulemaking Schedule to be Determined	Title 14 Section(s)	FGC Santa Ana Jun 24, 2020	FGC Santa Ana Jun 25, 2020	MRC San Clemente Jul 29, 2020	TC Fortuna Aug 18, 2020	FGC Fortuna Aug 19, 2020	FGC Fortuna Aug 20, 2020	WRC Sacramento Sep 17, 2020	FGC Oakland Oct 14, 2020	FGC Oakland Oct 15, 2020	TC Monterey Area Nov 9, 2020	MRC Monterey Area Nov 10, 2020	FGC San Diego 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
<u>Commercial Kelp and Algae Harvest Management</u>	<u>165, 165.5, 705</u>																						
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

BEFORE THE FISH AND GAME COMMISSION
STATE OF CALIFORNIA

In the Matter of the Appeal by:

Case No. 19ALJ14-FGC

Michael Anderson

Appellant.

Decision

Pursuant to the authority provided in Fish and Game Code Section 7852.2, subdivision (d), and Government Code section 11445.20, the Fish and Game Commission hereby orders that:

1. The Commission hereby grants reinstatement of the salmon vessel permit (#SA0724) (Permit) previously issued to Mr. Anderson by the Department of Fish and Wildlife (Department).
2. The Appellant must pay the Department all license, permit, and late fees owed pursuant to Section 7852.2, subdivision (a) and the fees owed for the 2019-2020 permit year, within 60 days of this Decision, which total **\$ 1,764.98**.
3. The Department shall issue Appellant the Permit if the fees are paid consistent with this Decision.

This decision shall become effective the 25th day of February 2020.

IT IS SO ORDERED this 21st day of February 2020.



Eric Sklar, President

From: Mike Anderson [REDACTED]
Sent: Tuesday, April 21, 2020 10:07 AM
To: Yaun, Michael@FGC <Michael.Yaun@fgc.ca.gov>
Subject: Re: Agency case no. 19ALJ14-FGC, Anderson Appeal - final decision

Me. Yuan,

I am entering week five of no employment due the the Coronavirus virus pandemic. Federal and state assistance has not arrived in a timely fashion. Who must I petition for an extension for the pending fees to reinstate my CA salmon license?

Thank you

Sent from my iPhone

BEFORE THE FISH AND GAME COMMISSION
STATE OF CALIFORNIA

In the Matter of the Appeal by:

Case No. 19ALJ14-FGC

Michael Anderson

Appellant.

Revised Decision

Pursuant to the authority provided in Fish and Game Code Section 7852.2, subdivision (d), and Government Code section 11445.20, the Fish and Game Commission hereby orders that:

1. The Commission hereby grants reinstatement of the salmon vessel permit (#SA0724) (Permit) previously issued to Mr. Anderson by the California Department of Fish and Wildlife (Department).
2. The Appellant must pay the Department all license, permit, and late fees owed pursuant to Section 7852.2, subdivision (a), and the fees owed for the 2019-2020 permit year, which total **\$ 1,764.98**.
3. The Department shall issue Appellant the Permit if the fees are paid consistent with this Decision and any required fees for future fishing years not subject to this order.

This decision shall become effective the ____ day of June 2020.

IT IS SO ORDERED this ____ day of June 2020.

Eric Sklar, President



State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
License and Revenue Branch
1740 N. Market Blvd.
Sacramento, CA 95834-1997
www.wildlife.ca.gov

GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director



CERTIFIED MAIL

May 5, 2020

Mr. Christian W. Buschmann


**SUBJECT: NOTICE OF DENIAL FOR REINSTATEMENT OF A TRANSFERABLE
MARKET SQUID VESSEL PERMIT, PERMIT NUMBER SVT027**

Dear Mr. Buschmann:

This letter is in response to your request to reinstate your Transferable Market Squid Vessel Permit (TMSVP) for the F/V *St. Teresa* (FG38647).

Authority-Market Squid Vessel Permit

Pursuant to California Code of Regulations (CCR), Title 14, Section 149.1(g), all application and permit fees specified in CCR, Title 14, Section 705, for renewal of Market Squid Vessel Permits, Market Squid Brail Permits, and Market Squid Light Boat Permits, must be received by the California Department of Fish and Wildlife (Department) at the address specified on the application, or, if mailed, postmarked on or before April 30 of each permit year. Late fees, late fee deadlines, and late renewal appeal provisions are specified in Fish and Game Code (FGC) Section 7852.2.

Authority-Late Renewal Applications

FGC Section 7852.2(a) establishes a graduated late fee for any renewal application that is received after the deadline.

FGC Section 7852.2(b) states the Department shall not waive the applicable late fee. Additionally, FGC Section 7852.2(c) requires the Department to deny any application for renewal received after March 31 of the permit year following the year in which the applicant last held a valid permit for that fishery.

Reason for Appeal to the Department

In your email dated April 23, 2020, you requested that TMSVP, permit number SVT027, for the F/V *St. Teresa* (FG38647) be reinstated.

Department Findings

Department license records show that the F/V *St. Teresa* last held a valid TMSVP in 2018-2019, which made you eligible to renew the permit for the 2019-2020 permit year.

Mr. Christian W. Buschmann

May 5, 2020

Page 2

Department Determination

Your request to reinstate your TMSVP for the F/V *St. Teresa* is denied because the F/V *St. Teresa* last held a valid TMSVP in the 2018-2019 permit year. The Department received your request for reinstatement on April 23, 2020. FGC Section 7852.2(c) requires the Department to deny any application for renewal received after March 31 of the permit year following the year in which the applicant last held a valid permit for that fishery.

Deadline to File an Appeal to the Fish and Game Commission

If you wish to appeal the Department's decision, you must submit a written appeal to the Fish and Game Commission (Commission) either by mail at P.O. Box 944209, Sacramento, CA 94244-2090, or by email at fgc@fgc.ca.gov. Pursuant to FGC Section 7852.2(d), your written appeal must be received within 60 days of the date of this letter. The Commission, upon consideration of the appeal, may grant the renewal of the TMSVP. If the Commission grants the renewal, it shall assess the applicable late fees, which amount to **\$7,688.25**. A fee schedule is enclosed.

If you have any questions or require further assistance, please contact Ms. Genalyn Lobel at (916) 928-5816 or Genalyn.Lobel@wildlife.ca.gov.

Sincerely,



Joshua Morgan, Chief
License and Revenue Branch

cc: Ms. Melissa Miller-Henson
Fish and Game Commission
Sacramento, CA

Ms. Genalyn Lobel
California Department of Fish and Wildlife
Sacramento, CA



State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
License and Revenue Branch
1740 N. Market Blvd.
Sacramento, CA 95834-1997
www.wildlife.ca.gov

GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director



May 5, 2020

Mr. Christian W. Buschmann (L91206)
Fees Required for Reinstatement of a
Transferable Market Squid Vessel Permit (TMSVP)
Permit Number SVT027
F/V St. Teresa (FG38647)

Prior Year Fees		Permit Fees
2019-2020	Nonresident Commercial Boat Registration	\$1,122.00
	TMSVP	\$2,937.00
	Late Fee (61 days to March 31, 2019)	<u>\$627.50</u>
Prior Year Fees Due		\$4,686.50
Prior Year permit fees must be paid before a 2020-2021 TMSVP can be issued.		
Current Year Fees		
2020-2021	TMSVP	<u>\$3,001.75</u>
Total Current Fees		\$3,001.75
Total Fees Due		\$7,688.25

If the Fish and Game Commission grants the renewal of the permit, payment of \$7,688.25 would be due.

Chris Buschmann



California Fish and Game Commission
P.O. Box 944209
Sacramento, CA 94244-2090

June 3, 2020

Sent via email

Re: Appeal of Market Squid Vessel Permit Denial (SVT027)

Dear Commissioners,

I am writing to respectfully request that you reinstate my market squid vessel permit for my fishing vessel, the St. Teresa (SVT027). On May 5, 2020, the Department of Fish and Wildlife (DFW) denied my application to renew my permit because my application was submitted after the March 31, 2020 deadline. As described below, a variety of circumstances contributed to my oversight in failing to timely renew my permit. While this mistake was certainly my fault, I took all possible steps to renew my permit upon becoming aware of the oversight. This permit is absolutely critical to my livelihood, particularly during these trying times, as I struggle to keep afloat and provide for my family. If renewed, I will make sure that I do not repeat this mistake again.

I grew up in a fishing family and have been a fisherman since I purchased my first boat when I was 19 years old. Over the years, I have regularly maintained my fishing licenses in Alaska, Washington, Oregon, and California. Once I was able to purchase the St. Teresa, a 58-foot purse seine vessel, I was excited to obtain a California market squid vessel permit in 2018. I could not wait to participate in a fishery I enjoy for the benefit of my family and become a member of the California squid fishing community.

It appears that DFW sent a notice to my Alaska business address in December 2019, stating that I needed to renew my permit. I was not in Alaska at the time and did not see any written notification regarding my permit renewal until I tried to renew my permit in April and learned that I had missed the deadline. During this time, I was consistently engaged in both the crab fishery in Oregon and Washington and the squid fishery in Oregon. In March, I was extremely busy trying to do everything possible to land whatever product I could, given the very uncertain times during the coronavirus pandemic. This contributed to my oversight in missing the permit renewal deadline. In previous years, I have made sure to stay on top of these deadlines and file on time. Regardless, it was my mistake that I did not renew on time.

In April, I discovered this oversight when I tried to renew my permit at the same time as my other state permits and licenses. I found my California permit was unavailable to renew because I had inadvertently missed the deadline for doing so. After learning I needed to renew my permit, I

immediately tried to do so but communications with DFW were difficult given that DFW's offices were shut down due to COVID-19. I tried nine different numbers within DFW in an effort to discuss with staff.

This permit is essential to my business, particularly given the economic downturn. I am missing critical fishing time right now and my small fishing operation may not survive if I am not able to fish for squid this year. I humbly ask that you allow me to renew my permit, with the appropriate late fees and any other fees required for reinstatement.

I realize this is a failure on my part and I will not let it happen again. I have already taken steps to ensure better tracking of California permit and license renewals so that this does not fall through the cracks in the future. I will prioritize this renewal every year and I promise we will not have this issue again. Please let me fish!

Thank you for your time and consideration.

Chris Buschmann



State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Office of the General Counsel
P.O. Box 944209
Sacramento, CA 94244-2090
www.wildlife.ca.gov

GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director



June 10, 2020

California Fish and Game Commission
P.O. Box 944209
Sacramento, CA 94244-2090

Re: *In the Matter of Christian Buschmann*

Dear Commissioners:

This letter is in response to Christian Buschmann's appeal of the Department of Fish and Wildlife's ("Department") denial of his request to renew his Transferable Market Squid Vessel Permit, #SVT027 ("Permit"). The Permit was last valid during the 2018-19 fishing year. Mr. Buschmann submitted his appeal to the Commission on June 3, 2020. The Department will not be participating in this appeal and accordingly, does not oppose the renewal of the Permit for the 2020-2021 fishing year provided that he pays all applicable fees.

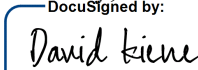
The fees that Mr. Buschmann must pay to renew the Permit are described in Fish and Game Code, section 7852.2 ("Section 7852.2"), subdivision (a). Section 7852.2, subdivision (a) states:

- (a) In addition to the base fee for the license, stamp, permit, or other entitlement, the department shall assess a late fee for any renewal the application for which is received after the deadline, according to the following schedule:
- (1) One to 30 days after the deadline, a fee of one hundred twenty-five dollars (\$125).
 - (2) Thirty-one to 60 days after the deadline, a fee of two hundred fifty dollars (\$250).
 - (3) Sixty-one days or more after the deadline, a fee of five hundred dollars (\$500).

To emphasize that these fees must be paid, Section 7852.2, subdivision (b) states that "The department shall not waive the applicable late fee," while subdivision (d) states "If the commission grants renewal, it shall assess the applicable late fee pursuant to subdivision (a)." The fees total **\$7,688.25** and are described in the attached fee statement.

If you have any questions please contact me at the address above or by telephone number (916) 651-7646, or e-mail at David.Kiene@wildlife.ca.gov.

Sincerely,
DocuSigned by:


DAVID KIENE

0251C8A9A1D45E
Senior Staff Counsel

Cc: Robert Smith
Attorney for Christian Buschmann



State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
License and Revenue Branch
1740 N. Market Blvd.
Sacramento, CA 95834-1997
www.wildlife.ca.gov

GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director



May 5, 2020

Mr. Christian W. Buschmann (L91206)
Fees Required for Reinstatement of a
Transferable Market Squid Vessel Permit (TMSVP)
Permit Number SVT027
F/V *St. Teresa* (FG38647)

Prior Year Fees		Permit Fees
2019-2020	Nonresident Commercial Boat Registration	\$1,122.00
	TMSVP	\$2,937.00
	Late Fee (61 days to March 31, 2019)	<u>\$627.50</u>
Prior Year Fees Due		\$4,686.50
Prior Year permit fees must be paid before a 2020-2021 TMSVP can be issued.		
Current Year Fees		
2020-2021	TMSVP	<u>\$3,001.75</u>
Total Current Fees		\$3,001.75
Total Fees Due		\$7,688.25

If the Fish and Game Commission grants the renewal of the permit, payment of \$7,688.25 would be due.