STAFF SUMMARY FOR JUNE 12 - 13, 2019

15. WILDLIFE AND INLAND FISHERIES PETITIONS FOR REGULATION CHANGE

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

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

(A) Action on petitions for regulation change received at the Apr 2019 meeting

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

Summary of Previous/Future Actions

(A)

- Receipt of new petitions — Apr 17, 2019; Sacramento
- **Today's discussion and possible action — Jun 12-13, 2019; Sacramento**

(B)

- Petition #2019-001 referred to DFW — Apr 17, 2019; Sacramento
- **Today's discussion and possible action — Jun 12-13, 2019; Sacramento**

Background

As of Oct 1, 2015, 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" (Section 662, Title 14). Petitions received at an FGC meeting are scheduled for consideration at the next business meeting, 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.

(A) ***Petitions for regulation change.*** Five petitions from Apr 2019 are scheduled for action:

I. *Petition #2019-006 AM1: Use of bait for taking bear* (Exhibit A2)

II. *Petition #2019-008 AM2: Firing range at Ballona Wetlands Ecological Reserve* (Exhibit A3)

III. *Petition #2019-009: Trinity River fishing regulations* (Exhibit A4)

IV. *Petition #2019-010: Use of airguns for taking game* (Exhibit A5)

V. *Petition #2019-011: Bag and possession limits for brown trout in the Klamath River Basin* (Exhibit A6)

Staff recommendations and rationales are provided in Exhibit A1.

(B) ***Pending regulation petitions.*** This is an opportunity for staff to provide a recommendation on petitions previously referred by FGC to staff, DFW, or committee for review. DFW has completed its review and prepared recommendations for two petitions previously referred (see "Recommendation" section below):

I. *Petition #2019-001: Commercial parking at Ballona Wetlands Ecological Reserve* (exhibit B1). At the Feb 2019 FGC meeting, this item was referred to DFW for review.

II. *Petition #2018-018 AM1: Crow hunting at Hollenbeck Canyon Wildlife Area* (Exhibit B6). At the Apr 2019 FGC meeting, this item was referred to DFW for review.

Recommendation

(A) ***FGC staff:*** Adopt staff recommendations as reflected in Exhibit A1.

(B) ***FGC staff:*** Adopt DFW's recommendations.

DFW*:* Petition #2018-018 AM1: Grant for consideration in the next DFW-managed lands rulemaking. Petition #2019-001: Deny for the reasons set forth in Exhibit B2.

Significant Public Comments

1. The Hoopa Valley Tribe, Yurok Tribe, National Marine Fisheries Service (NMFS), U.S. Bureau of Reclamation (USBR), and the U.S. Forest Service (USFS), related to Petition #2019-011, support unlimited bag and possession limits for recreational brown trout fishing, ask for captured brown trout to be euthanized in their studies on the Trinity River, request permission to electrofish, request a bounty for brown trout, and express the desire to work together on a brown trout management plan (Exhibit A5).
2. One commenter writes in support of brown trout and striped bass as valuable for recreational angling, and questions Petition #2019-011 (Exhibit A6).
3. The petitioner who submitted Petition #2019-010 offers assistance with testing big bore air rifles (Exhibit A8).
4. Senator Ben Allen, in response to Petition #2019-001, asks for additional time for commercial businesses to use the parking at the Ballona Wetlands Ecological Reserve so they can make alternative arrangements (Exhibit B3).
5. The Marina Del Rey Lessees Association, writing in reference to Petition #2019-001, supports the continued use of the parking lot at the Ballona Wetlands Ecological Reserve for visitors to the nearby marina. They urge FGC to seek reversal of DFW's decision to no longer allow non-county employee parking (Exhibit B4).
6. The County of Los Angeles Small Craft Harbor Commission, writing in reference to Petition #2019-001, expresses the importance of the parking lot at the Ballona Wetlands Ecological Reserve for visitors and employees at Fisherman's Village and for public coastal access. The commission requests that FGC defer the newly-imposed lease restriction on use of the overflow lot for at least 90 days (Exhibit B5).

Exhibits

A1. Table of petitions and staff recommendations received at Apr 2019 FGC meeting, revised Jun 5, 2019

A2. Petition #2019-006 AM1: Use of bait for taking bear, received Mar 20, 2019

A3. Petition #2019-008 AM2: Firing range at Ballona Wetlands Ecological Reserve, received Apr 8, 2019

A4. Petition #2019-009: Trinity River fishing regulations, received Mar 26, 2019
A5. Letter from the Hoopa Valley Tribe, Yurok Tribe, NMFS, USBR, and USFS, received Apr 26, 2019
A6. Letter from Herb Burton, received May 10, 2019
A7. Petition #2019-010: Use of airguns for taking game, received Apr 30, 2019
A8. Email from Robert Larkins, received May 4, 2019
A9. Petition #2019-011: Bag and possession limits for brown trout in the Klamath River Basin, received Apr 12, 2019
B1. Petition #2019-001: Commercial parking at Ballona Wetlands Ecological Reserve, received Jan 7, 2019
B2. DFW memo recommending denial of Petition #2019-001, received Jun 5, 2019
B3. Letter from Senator Ben Allen, received May 24, 2019
B4. Letter from Marina Del Rey Lessees Association, received Apr 15, 2019
B5. Letter from the County of Los Angeles Small Craft Harbor Commission, received Apr 22, 2019
B6. Petition #2018-018 AM1: Crow hunting at Hollenbeck Canyon Wildlife Area, received Dec 6, 2018

Motion/Direction

Moved by ____________ and seconded by ____________ that the Commission adopts the staff recommendations as reflected in Exhibit A1, denies Petition #2019-001, and grants Petition #2018-018 .

OR

Moved by ____________ and seconded by ____________ that the Commission adopts the staff recommendations as reflected in Exhibit A1, except for Petition #________ for which the action is ______________________, and adopts the following actions for petitions:

#2019-001: ____________ and #2018-018: ____________.

CALIFORNIA FISH AND GAME COMMISSION PETITIONS FOR REGULATION CHANGE - ACTION

Revised 6/5/2019

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

General Petition Information					FGC Action			Additional Information
Tracking No.	Date Received	Name of Petitioner	Subject of Request	Short Description	FGC Receipt Scheduled	FGC Action Scheduled	Staff Recommendation	Marine or Wildlife?
2018-018 AM 1	12/6/2018	Gary F. Brennan	Crow hunting at Hollenbeck Canyon Wildlife Area	Extend the hunting season for American crow in Hollenbeck Canyon to coincide with the statewide American crow hunting season.	2/6/2019	4/17/2019: Referred to DFW -------------------- 6/12-13/2019	GRANT for consideration in the DFW-managed lands rulemaking.	Wildlife
2019-001	1/7/2019	Walter Lamb	Commercial parking at Ballona Wetlands Ecological Reserve	Amend Section 630 of the Code of California Regulations, Title 14 to eliminate commercial parking use in the Ballona Wetlands Ecological Reserve.	2/6/2019	4/17/2019: Referred to DFW -------------------- 6/12-13/2019	DENY: FGC regulates visitor uses but not day-to-day administration of ecological reserves. (See DFW memo received 6/5/2019.) DFW has taken action to address the issue, and no further action is needed.	Wildlife
2019-006 AM 1	3/20/2019	Jesse Harris	Use of bait for taking bear	Allow bait as a method of take for bear.	4/17/2019	6/12-13/2019	DENY: Use of bear bait is inconsistent with fair chase principles taught in California basic hunter education classes and ongoing efforts to reduce habituation of bears. In addition, supplemental feeding can alter basic wildlife behaviors and adaptations.	Wildlife
2019-008 AM 2	4/8/2019	Patricia McPherson	Firing range at Ballona Wetlands Ecological Reserve (BWER)	Change regulations for the parking lot lease at BWER for the Sheriff's Department to disallow its firing range onsite.	4/17/2019	6/12-13/2019	DENY: FGC regulates visitor uses but not day-to-day administration of ecological reserves. DFW has taken action to address the issue, and no further action is needed.	Wildlife
2019-009	3/26/2019	Herb Burton	Trinity River salmon fishing regulations	Revise open season: January 1 through September 15 with "no fishing from boat" restriction, limited to shore and wade fishing only.	4/17/2019	6/12-13/2019	DENY: The petition lacks a biological reason for restricting fishing. Regulations currently provide anglers different options and opportunities to fish in the Trinity River, and the proposal would eliminate opportunity.	Wildlife
2019-010 AM 2	4/30/2019	Robert Larkins	Authorize airguns for take of game	To allow airguns for hunting game in California.	4/17/2019	6/12-13/2019	Refer to DFW for review and recommendation.	Wildlife
2019-011	4/12/2019	Justin Alvarez	Bag and possession limits for brown trout in the Klamath River Basin	Within the Klamath Trinity River Basin, allow bag limit and possession limit for recreational Brown Trout to be raised to unlimited.	4/17/2019	6/12-13/2019	Refer to DFW for review and recommendation.	Wildlife

Tracking Number: (2019-006 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, 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: Jesse Harris
Address:
Telephone number:
Email address:

2. **Rulemaking Authority (Required) -** Reference to the statutory or constitutional authority of the Commission to take the action requested: California Department of Wildlife Title 14: 365(e)

3. **Overview (Required) -** Summarize the proposed changes to regulations: Current law states that hunting bear over bait is illegal. I propose that we lift the ban on bait and allow bait as a method of take for bear.

4. **Rationale (Required) -** Describe the problem and the reason for the proposed change: Since the banning of hounds for bear hunting there has not been a full bear quota taken. This is causing an increase in bear population and increasing bear/ human interaction. Legislation has taken a very valuable management tool from us by banning hounds for bear hunting. It is up to us to come up with new ways to manage our wildlife. By allowing baiting, a hunter can set up a determined location where they can plan their shooting distance. This will help create more humane kill shots due to the hunter not simply spotting a bear and taking a shot. The hunter can set their distance to where when a bear comes into bait, the hunter knows exactly how far their shot is, and can wait until the bear is in a position where a humane kill can be made. By using bait, it also allows a hunter to take the time to see if a bear is a sow with cubs. The hunter can also choose to pass on a smaller bear. By using bait, the hunter can be selective in which bear he takes. This is not always possible in spot and stalk situations, where you may see a bear, but not see its cubs just over the ridge, or in the brush. Baiting is a humane and effective management tool that can be used to manage bear populations statewide. Again, while the Commission cannot override State legislation, it is up to the Commission, and us as hunters to come up with other solutions.

SECTION II: Optional Information

5. Date of Petition: 03/07/2019

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):
☐ Add New Title 14 Section(s):
☒ Repeal Title 14 Section(s): 365(e)

8. If the proposal is related to a previously submitted petition that was rejected, specify the tracking number of the previously submitted petition
Or ☒ Not applicable.

9. Effective date: If applicable, identify the desired effective date of the regulation. If the proposed change requires immediate implementation, explain the nature of the emergency: June 31st, 2019

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

11. Economic or Fiscal Impacts: Identify any known impacts of the proposed regulation change on revenues to the California Department of Fish and Wildlife, individuals, businesses, jobs, other state agencies, local agencies, schools, or housing: Potential of increased bear tag sales

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

SECTION 3: FGC Staff Only

Date received: Received by email on Friday, March 8, 2019 at 7:39 AM.

FGC staff action:

☑ Accept - complete
☐ Reject - incomplete
☐ Reject - outside scope of FGC authority

Tracking Number 2019-006

Date petitioner was notified of receipt of petition and pending action: April 17, 2019

Meeting date for FGC consideration: June 12-13, 2019

FGC action:

- ☐ Denied by FGC
- ☐ Denied - same as petition ____________________
  Tracking Number
- ☐ Granted for consideration of regulation change

Kinchak, Sergey@FGC

From: Cornman, Ari@FGC
Sent: Friday, April 5, 2019 11:19 AM
To: Castleton, Craig@FGC; Kinchak, Sergey@FGC
Subject: FW: Updates to 3 proposed rule changes for the Commission

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From: Cornman, Ari@FGC
Sent: Thursday, March 21, 2019 7:58 AM
To: Harold(David) Thesell (Harold.Thesell@FGC.ca.gov) <Harold.Thesell@FGC.ca.gov>
Cc: Castleton, Craig@FGC <Craig.Castleton@FGC.ca.gov>
Subject: FW: Updates to 3 proposed rule changes for the Commission

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From: FGC
Sent: Thursday, March 21, 2019 6:20 AM
To: Kinchak, Sergey@FGC <Sergey.Kinchak@FGC.ca.gov>; Cornman, Ari@FGC <Ari.Cornman@FGC.ca.gov>
Subject: Fw: Updates to 3 proposed rule changes for the Commission

Forwarding an update to three pending petitions.

Jon

From: Jess Harris
Sent: Wednesday, March 20, 2019 05:57 PM
To: FGC
Subject: Updates to 3 proposed rule changes for the Commission

I would like to update my proposals.

For the proposal to add fox to the electric calls list, I need to update the authority. Here is the cited authority: Note: Authority cited: Sections 200, 202, 203, 355, 3003.1, 3800 and 4150, Fish and Game Code. Reference: Sections 200, 202, 203, 203.1, 207, 355, 356, 2055, 3003.1, 3004.5, 3800 and 4150, Fish and Game Code.

For the bear baiting proposal, here is the cited authority: Note: Authority cited: Sections 86, 200, 202 and 203, Fish and Game Code. Reference: Sections 200, 202, 203, 203.1 and 207, Fish and Game Code

I would also like to withdraw my proposal for night hunting lights.

I also would like to waive my 10 day period to receive a letter regarding my proposals.

Thank you very much for your time,
Jesse Harris

Tracking Number: (2019-008 AM 2)

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: Grassroots Coalition, Patricia McPherson
   Address:
   Telephone number:
   Email address:

2. **Rulemaking Authority (Required) -** Reference to the statutory or constitutional authority of the Commission to take the action requested: AmendTitle 14 , Section(s): 630. Sections 1765 and 10504, Fish and Game Code.

3. **Overview (Required) -** Summarize the proposed changes to regulations: Los Angeles County Parking Lot exemption at Ballona Wetlands Ecological Reserve (BWER) in Los Angeles. The parking lot lease for the Sheriff's Department , located within BWER needs to be rejected and/or changed to disallow its FIRING RANGE onsite. Recent events demonstrate the facility to be hazardous to both the wildlife, private users of the parking lot and their vehicles, and the public.

4. **Rationale (Required) -** Describe the problem and the reason for the proposed change: On March 9, 2019, an out of control fire swept through the facility. Video documentation demonstrates fire spewing out through an opened doorway while shots of multiple rounds of ammunition explode into the facility and throughout the area outside of the facility. There is no immediate horizon for release of the DEIR for BWER. The DEIR may not be released for years to come due to numerous corrections that need to be made both at the state level and in particular, federal level that is ongoing. If the DEIR is released in its current form, it will be legally challenged due to its failure to include a restoration of its nature as a predominantly freshwater, seasonal wetland. Therefore, Staff recommendation of 4/27/17, 'not recommending making any land use changes until after the environmental impact report is complete' is unreasonable and potentially hazardous to the health and well- being of the environment, the wildlife, the public and private persons.

SECTION II: Optional Information

5. Date of Petition: Petition – 3/10/19

6. Category of Proposed Change

☐ Sport Fishing
☐ Commercial Fishing
☐ Hunting
☒ Other, please specify: LA County Parking Exemption within Ballona Wetlands Ecological Reserve.

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(h)(3), T14
☐ 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 Same parking lot , different Petition, 2017-003.
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: Requires immediate attention as the portable (destroyed) FIRING RANGE facility may be taken out and simply replaced with another portable FIRING RANGE thereby creating another hazardous situation..

10. Supporting documentation: Identify and attach to the petition any information supporting the proposal including data, reports and other documents: VIDEO DOCUMENTATION OF THE INCIDENT on 3/9/19, documented by Rick Pine.

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: no known impacts

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

None known applicable

SECTION 3: FGC Staff Only

Date received: Received by email on Monday, March 11, 2019 at 7:27 AM.

FGC staff action:

☑ Accept - complete
☐ Reject - incomplete
☐ Reject - outside scope of FGC authority

Tracking Number 2018-008

Date petitioner was notified of receipt of petition and pending action: April 17, 2019

Meeting date for FGC consideration: June 12-13, 2019

FGC action:

☐ Denied by FGC

☐ Denied - same as petition ____________________
Tracking Number

☐ Granted for consideration of regulation change

Cornman, Ari@FGC

From: FGC
Sent: Thursday, March 28, 2019 2:23 PM
To: Cornman, Ari@FGC
Cc: Kinchak, Sergey@FGC
Subject: Fw: AMENDMENT TO --FCG Petition BY GRASSROOTS COALITION sent 3/10/19 Ballona Wetlands Ecological Reserve-LA COUNTY PARKING LOT HAZARDOUS CONDITIONS
Attachments: FGC1.pdf; IMG_3762.MOV

From: patricia mc pherson
Sent: Thursday, March 28, 2019 11:04 AM
To: FGC
Subject: AMENDMENT TO --FCG Petition BY GRASSROOTS COALITION sent 3/10/19 Ballona Wetlands Ecological Reserve-LA COUNTY PARKING LOT HAZARDOUS CONDITIONS

Attention to FGC-

Grassroots Coalition wishes to amend its Petition of March 10, 2019—below, to include all aspects of Title 14, Section 630 that may be applicable to the current Petition of Grassroots Coalition.
The following link provides Title 14, Section 630, to which the Petition utilizes any and all portions of Section 630 for the Petition. The link provides Title 14, Section 630 of an Ecological Reserve including Ballona Wetlands Ecological Reserve.

Grassroots Coalition also wishes to waive any 10 response period per this amendment to its current Petition.

LINK for Title 14, Section 630-

https://govt.westlaw.com/calregs/Document/IFBA6186B2BAF46948C0E12549289136F?originationContext=Search+Result&listSource=Search&viewType=FullText&navigationPath=Search%2fv3%2fsearch%2fresults%2fnavigation%2fi0ad720f200000169c53d53c28a24496f%3fstartIndex%3d1%26Nav%3dREGULATION_PUBLICVIEW%26contextData%3d(sc.Default)&rank=1&list=REGULATION_PUBLICVIEW&transitionType=SearchItem&contextData=(sc.Search)&t_T1=14&t_T2=630&t_S1=CA+ADC+s

Thank you for your attention to these matters and
please let GC know if there is any need for further clarification.

Patricia McPherson, Grassroots Coalition

Begin forwarded message:

From: patricia mc pherson
Subject: FCG Petition BY GRASSROOTS COALITION sent 3/10/19 Ballona Wetlands Ecological Reserve-LA COUNTY PARKING LOT HAZARDOUS CONDITIONS
Date: March 10, 2019 at 11:35:43 AM PDT
To: FGC <fgc@fgc.ca.gov>
Cc: Jeanette Vosburg <saveballona@hotmail.com>, Walter Lamb <landtrust@ballona.org>, Rick P >, "Todd T. Cardiff, Esq." <todd@tcardifflaw.com>

GRASSROOTS COALITION
ENVIRONMENTAL INTEGRITY & PUBLIC POLICY

Hello California Fish & Game Commission,

Please accept and review the Petition below as soon as possible,
Thank you,
Patricia McPherson, Grassroots Coalition

ATTACHMENTS:

Additional Comments:

Unexplained Reasons and Missing Information-

For, allowing a Sheriff's Department's Portable FIRING RANGE within Ballona Wetlands Ecological Reserve; in an area currently allowed by FGC for parking by persons affiliated with private businesses at Fisherman's Village (Fisherman's Village already has ample parking and is underused with numerous, daily vacant areas of the Fisherman's Village lot.)

The public, the Reserve, wildlife and the persons and vehicles using the current parking lot of BWER are at risk from potentially hazardous conditions arising again as occurred with the fire and subsequent bullet explosions and releases that occurred on 3/9/19.

There is already ample parking for Sheriff's Department Personnel's vehicular parking needs within the Fisherman's Village parking lot.

Outline the purposes of Proposition 50 and Proposition 12 bond funds used to acquire the Ballona Wetlands for approximately $140 million, and explain how the FIRING RANGE and Sheriff's Dept. personnel parking serves those goals.

Elaborate on CDFW Director claims that parking is a current problem at the ecological reserve, given that the reserve is closed to the public, and that there is ample parking at various parking lots adjacent to BWER and ride share/ transport available throughout the Marina del Rey.

Action Requested-

-Immediately eliminate private, non-reserve related parking on the state-owned ecological reserve including the FIRING RANGE operated by the Sheriff's Department.

-Calendar a near-by and ASAP substantive discussion and vote on the use of the BWER lot by the Sheriff's Department and other County personnel and private parties (non -public) needs and risks at the lot. Additionally, provide for a substantive discussion regarding the environmental, wildlife and public risks.

The Firing Range Trailer(s) is located in the BALLONA WETLANDS ECOLOGICAL RESERVE (parking lot shown in top picture below. Fisherman's Village parking lot is shown below the BWER lot)

Ample parking in county lot

Lot is NOT for public access to coast

Screen shot only below. See video at top of Petition.

Rick

patricia mc pherson

Cornman, Ari@FGC

From: FGC
Sent: Tuesday, April 9, 2019 8:45 AM
To: Cornman, Ari@FGC
Subject: Fw: AMENDMENT TO --FCG Petition BY GRASSROOTS COALITION sent 3/10/19 Ballona Wetlands Ecological Reserve-LA COUNTY PARKING LOT HAZARDOUS CONDITIONS

From: patricia mc pherson
Sent: Monday, April 8, 2019 06:10 PM
To: FGC
Subject: Re: AMENDMENT TO --FCG Petition BY GRASSROOTS COALITION sent 3/10/19 Ballona Wetlands Ecological Reserve-LA COUNTY PARKING LOT HAZARDOUS CONDITIONS

Attention to FGC per Grassroots (GC) Petition of March 10, 2019

For clarification purposes please AMEND the Petition request to read that GC requesting REGULATION CHANGES to the parking lot lease agreement.
GC continues to utilize any/all portion of Title 14, Section 630 applicability for the Petition to be heard, including but not limited to Section 30 (h)(3).

Thank you for your attention to this matter and please let GC know if any further clarification(s) is needed to address the Firing Range issue of use.

Patricia McPherson, Grassroots Coalition

> On Mar 28, 2019, at 11:04 AM, patricia mc pherson wrote:
>
> Attention to FGC-
>
> Grassroots Coalition wishes to amend its Petition of March 10, 2019—below, to include all aspects of Title 14, Section 630 that may be applicable to the current Petition of Grassroots Coalition.
> The following link provides Title 14, Section 630, to which the Petition utilizes any and all portions of Section 630 for the Petition. The link provides Title 14, Section 630 of an Ecological Reserve including Ballona Wetlands Ecological Reserve.
>
> Grassroots Coalition also wishes to waive any 10 response period per this amendment to its current Petition.

LINK for Title 14, Section 630-

https://govt.westlaw.com/calregs/Document/IFBA6186B2BAF46948C0E12549289136F?originationContext=Search+Result&listSource=Search&viewType=FullText&navigationPath=Search%2fv3%2fsearch%2fresults%2fnavigation%2fi0ad720f200000169c53d53c28a24496f%3fstartIndex%3d1%26Nav%3dREGULATION_PUBLICVIEW%26contextData%3d(sc.Default)&rank=1&list=REGULATION_PUBLICVIEW&transitionType=SearchItem&contextData=(sc.Search)&t_T1=14&t_T2=630&t_S1=CA+ADC+s

Thank you for your attention to these matters and
please let GC know if there is any need for further clarification.

Patricia McPherson, Grassroots Coalition

Begin forwarded message:

From: patricia mc pherson
Subject: FCG Petition BY GRASSROOTS COALITION sent 3/10/19 Ballona Wetlands Ecological Reserve-LA COUNTY PARKING LOT HAZARDOUS CONDITIONS
Date: March 10, 2019 at 11:35:43 AM PDT
To: FGC <fgc@fgc.ca.gov>
Cc: Jeanette Vosburg <saveballona@hotmail.com>, Walter Lamb <landtrust@ballona.org>, Rick P , "Todd T. Cardiff, Esq." <todd@tcardifflaw.com>

<Screen Shot 2017-04-22 at 8.55.19 AM.png>

Hello California Fish & Game Commission,

Please accept and review the Petition below as soon as possible,
Thank you,
Patricia McPherson, Grassroots Coalition

<FGC1.pdf>

ATTACHMENTS:

<IMG_3762.MOV>

Additional Comments:

<Screen Shot 2019-03-10 at 10.51.25 AM.png>

The Firing Range Trailer(s) is located in the BALLONA WETLANDS ECOLOGICAL RESERVE (parking lot shown in top picture below. Fisherman's Village parking lot is shown below the BWER lot)

<Screen Shot 2019-03-10 at 10.22.07 AM.png>
<Screen Shot 2019-03-10 at 11.27.41 AM.png>
<Screen Shot 2019-03-10 at 11.28.44 AM.png>
<Screen Shot 2019-03-10 at 11.29.39 AM.png>

Screen shot only below. See video at top of Petition.

<Screen Shot 2019-03-10 at 8.09.25 AM.png>

patricia mc pherson

patricia mc pherson

March 25, 2019

Attention: California Fish and Game Commission
1416 Ninth Street Suite 1320
Sacramento, CA 95814

Attached, enclosed is a petition (and attachments A & B) agenda item for the upcoming April 17, 2019 CFGC meeting in Santa Monica. Should you have any further questions feel free to contact me at any time.

Respectfully;

Herb Burton

Tracking Number: (2019-009)

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).

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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: Herb Burton, Trinity County Board of Supervisors
   Address:
   Telephone number:
   Email address:

2. **Rulemaking Authority (Required)** - Reference to the statutory or constitutional authority of the Commission to take the action requested: REFERENCE: 200,205,265,270 AUTHORITY: 200,205,265,270.

3. **Overview (Required)** - Summarize the proposed changes to regulations: (State Special Regulation 14CCR 7.50 Trinity River mainstream 250ft. downstream of Lewiston Dam to Old Lewiston Bridge; Open Season April 1 through September 15). PROPOSAL: Revise Open Season: January 1 through September 15 with no fishing from a boat restriction, limited to shore and wade fishing only. Refer Attachment A.

4. **Rationale (Required)** - Describe the problem and the reason for the proposed change: Increase Trinity County fishing opportunities minimize impacts to spring Chinook salmon and promote off season (winter) tourism and economic opportunities that would benefit Trinity County's struggling economy. Refer Attachment A

SECTION II: Optional Information

5. **Date of Petition: March 25, 2019**

6. **Category of Proposed Change**
   ☒ Sport Fishing

☐ Commercial Fishing
☐ Hunting
☐ Other, please specify: Click here to enter text.

7. **The proposal is to:** (*To determine section number(s), see current year regulation booklet or https://govt.westlaw.com/calregs*)
☒ Amend Title 14 Section(s): Click here to enter text.
☐ Add New Title 14 Section(s): Click here to enter text.
☐ Repeal Title 14 Section(s): Click here to enter text.

8. **If the proposal is related to a previously submitted petition that was rejected, specify the tracking number of the previously submitted petition** 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: January 1, 2020

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

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: Minimal-cost printing and posting updated CF&W regulation signage.

12. **Forms:** If applicable, list any forms to be created, amended or repealed:
Not applicable

SECTION 3: FGC Staff Only

Date received: Click here to enter text.

RECEIVED
CALIFORNIA
FISH AND GAME
COMMISSION
2019 MAR 26 PM 12: 3

FGC staff action:
☒ Accept - complete
☐ Reject - incomplete
☐ Reject - outside scope of FGC authority
Tracking Number 2019-009

Date petitioner was notified of receipt of petition and pending action: APRIL 17, 2019

Meeting date for FGC consideration: JUNE 12-13, 2019

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

Attachment A

MEMORANDUM

Date: March 25, 2019

TO: California Fish and Game Commission
1416 Ninth Street, Suite 1320
Sacramento, CA 95814

FROM: Herb Burton, Trinity County Board of Supervisors

SUBJECT: **Agenda item for State Fish and Game Commission meeting (April) Trinity River Sport Fishing Regulation revision.** State Special Regulation (14CCR 7.50) Trinity River mainstream from 250 ft. downstream of Lewiston Dam to Old Lewiston Bridge, Open Season-April 1 through September 15.

PROPOSAL: Revise open season: **January 1 through September 15** with **no fishing from a boat restriction, limited to shore and wade fishing only (250 ft. downstream of Lewiston Dam to Old Lewiston Bridge).** Extended season will provide additional three months fly fishing for winter trout and steelhead. No fishing from a boat restriction will help to minimize potential impacts to fish stocks and ensure quality angling experiences.

PURPOSE: ***increase Trinity County fishing opportunities**
***minimize impacts to spring chinook salmon**
***promote off season (winter) tourism and economic opportunity while having minimal biological impact.**

HISTORY: Since the completion of Trinity and Lewiston Dams (1964), over half a century the Trinity River, 250 ft. below Lewiston Dam downstream to the Old Lewiston Bridge, has been managed Fly Fishing only. These waters represent one of the *two* designated Fly Fishing only waters in California. The two mile reach is managed for Trinity River anadromous hatchery salmon and steelhead mitigation. Special season and regulations (gear restrictions, reduced daily bag limit, and greater angling majority exercise CATCH & RELEASE) help to protect and provide anglers the opportunity to fly fish for trout and steelhead with minimal impacts to fish stocks and Lewiston hatchery operations. Hatchery Chinook and Coho spawning production is completed December. Hatchery steelhead spawning production ends March. Past several years Lewiston hatchery steelhead mitigation goals have been achieved. Historically, late 60's thru 80's the TR Fly Fishing only water open season was Memorial weekend through September 15...Since the 2000 TR Record of Decision open season was revised April 1 through September 15, providing additional angling opportunities, before restoration (high volume) flushing flows released. Neighboring Klamath River below Iron Gate Dam and hatchery is currently managed with a January 1 open season.

RECOMMENDATION: Sport fishing provides a major economic boost to Trinity County's economy. Unfortunately 2018- 2019 presented some major economic challenges. DFW is in the process of listing spring Chinook salmon threatened or endangered and has closed all spring Chinook salmon fishing in the Klamath and Trinity Rivers. The Carr fire impacted a number of major headwater and mainstream tributaries that are purging undesirable sediments loads. The proposal is even more important after the fires due to Deadwood Creek turbidity and that at times it could be the only opportunity on the mainstream Trinity River. The Trinity River Fly Fishing only water represents one of the oldest and most popular special managed fisheries in California. Endorsing (14CCR 7.50) proposed extended open season: **January 1 through September 15 and no fishing from a boat restriction, limited to shore and wade fishing only (250 ft. below Lewiston Dam down to the Old Single Lane Bridge)** would provide additional three months (winter) angling opportunities that would benefit Trinity County businesses and struggling economy while having minimal biological impact.

Attachment B

TRINITY COUNTY

Board of Supervisors

P.O. BOX 1613, WEAVERVILLE, CALIFORNIA 96093-1613

PHONE (530) 623-1217 FAX (530) 623-8365

March 19, 2019

California Fish and Game Commission
PO Box 944209
Sacramento, CA 94244-2090

To whom it concerns:

Re: Expanding open season to January 1 through September 15

The Trinity County Board of Supervisors is in full support of this proposed action. This action would expand the open season to January 1 through September 15, on the section of Trinity River that is 250 feet downstream of Lewiston Dam to the Old Lewiston Bridge. This action would keep the no fishing from boat restriction and limit angling to shore and wade fishing only. We feel this would benefit angling opportunities in the county which in turn would benefit off-season tourism and expand economic opportunity on the river. This reach is managed for hatchery salmon and steelhead thus there would be minimal biological impacts on the river.

Thank you for your consideration.

Sincerely,

Judy Morris, Chairman
Trinity County Board of Supervisors

April 8, 2019

California Fish and Game Commission
1416 Ninth Street
Room 1320
Sacramento, CA 95814

Re: Trinity River Brown Trout Management Plan

Dear Commissioners:

On April 26th, 2018 a workshop was held to discuss the issue of Brown Trout management on the Trinity River. The workshop invited staff from all the resource management agencies: United States Fish and Wildlife Service (USFWS) California Department Fish & Wildlife (CDFW), Yurok Tribe, United States Forest Service (USFS), and National Marine Fisheries Service (NMFS), some invited stakeholder groups, and university staff. In the end, no stakeholder groups were able to attend, but all other parties were present. The outcome of this workshop was a list of management actions to recommend to the California State Fish and Game Commission

The purpose of this letter is to make recommendations on behalf of the Hoopa Valley Tribe (HVT), Yurok Tribe, USFWS, NMFS, USFS, and the USBR regarding management of Brown Trout within the Trinity River. Introduced Brown Trout pose an impediment to the recovery of the native fishes such as Chinook and Coho salmon, steelhead trout, and pacific lamprey. These native species support both tribal and non-Indian fisheries. A recent predation study conducted by the HVT and Humboldt State University found Brown Trout have the potential to consume large portions of the natural and hatchery production of anadromous salmonids. The NMFS specifically listed Trinity River Brown Trout as an impediment to recovery in its Southern Oregon Northern California Coastal Evolutionary Significant Unit (ESU) Coho recovery plan.
The state of California increased the bag limit to 5 fish per day in 2007 because of predation concerns, and lists the following actions to deal with invasive species in their Coho Salmon recovery plan.

- Develop a rapid-response eradication plan for invasive, non-native fish species that negatively affect Coho salmon.
- Develop management guidelines to mitigate the impacts of non-native fish species on Coho salmon.
- Remove non-native fish species from stock ponds where these fish pose a threat to Coho salmon.

In 2015, Brown Trout were estimated to have consumed 7% of the hatchery production and 20% of the natural production for that year. Given the large scale efforts on the Trinity River to restore the native fishes we request the following actions be taken to ameliorate the negative impacts to the native fishes.

We request that the bag limit and possession limit for recreational Brown Trout be raised to unlimited. This action would be unlikely to eliminate the population but would facilitate some suppression and would help raise awareness of the fact that Brown Trout are an invasive species.

We request that, as a condition of permitting studies on the Trinity River, all captured Brown Trout be removed from the water and euthanized. We are amenable to having these individuals donated to a food bank to eliminate wastage.

We request permission to conduct periodic electrofishing, targeting deep water areas in March to remove Brown Trout. The timing and location would minimize effects on other species and would be the most effective means of population suppression.

We request permission to pursue a bounty for Brown Trout to help suppression and as a way to garner buy in from fishing guides and the public.

In summary, we hope to work together to address this issue and develop a management plan for Brown Trout in the Trinity River. We believe that Brown Trout suppression is a positive step to improving the health of native fish populations as we continue to work toward delisting and preventing future listing of Klamath-Trinity River origin salmon, steelhead, and lamprey.

If you have questions or want to discuss further please feel free to contact Justin Alvarez of the Hoopa Tribal Fisheries Department at (530-625-4267 x 1020) or PO Box 417, Hoopa, CA 95546. He can answer or direct questions to any of the resource agencies as needed.

Sincerely,

Ryan Jackson,
Hoopa Valley Tribal Chairman

Joe James,
Yurok Tribal Chairman

Justin Ly,
North Coast Branch Supervisor
National Marine Fisheries Service

Mike Dixon, Ph.D.
Trinity River Restoration Program
U.S. Bureau of Reclamation

Scott Russell
Shasta Trinity Forest Supervisor
U.S. Forest Service

Date: May 6, 2019

TO: California Fish and Game Commission
P.O. BOX 944209
Sacramento, CA 94244-2090

FROM: Herb Burton

SUBJECT: **Agenda item State Fish and Game Commission meeting (June). Petition 2019-011 (Justin Alveraz)-Trinity River Brown Trout Management plan.**

REQUEST: **Public Comment regarding petition 2019-9011 (See attached).**

Attachment A

Public Comment regarding:
(petition- 2019-011 Alveraz)- Trinity River Brown Trout Management Plan

Over two decades, multi millions have been invested in years of experimental mechanical Trinity River restoration projects, unfortunately resulting in fish declines and failure to achieve restoration goals. Trinity River brown trout are now the latest restoration target. Why now? When fish numbers decline it is easy to point fingers. The fact Trinity River brown trout are nonnative and a predator makes them a potential threat and prime candidate for a proposed eradication management plan (Petition 2019-011 Alveraz).

To many, sport fisherman, guides and fishing outfitters, Trinity River brown trout are a rare quality sport fish that are highly praised, ultimate challenge and attract a variety of anglers willing to travel great distances and invest substantially (hotels, restaurants, guide services, misc. local businesses); annually contributing to Trinity County's struggling economy.

Declining salmon-steelhead populations in Central Valley watersheds prompted a very similar case, STRIPED BASS VS. SALMON. 2015-2016 a proposal to eradicate striped bass, a nonnative predatory fish well distributed in the greater majority of CV rivers (Sacramento, American, Feather, Yuba, Mokelumne) and delta, generated major controversy and debate between irrigators and fisherman that persisted for years. However, California researchers, including Peter Moyle, a professor emeritus at UC Davis, determined striped bass have lived alongside salmon for the past 100 plus years, long enough time for them to adapt to living together. Also indicated, "get rid of striped bass and another predator will move in and take its place---it's the law of unexpected consequences." Ultimately, California Fish and Game Commission denied the proposal and let striped bass off the hook. (https://www.mercurynews.com/2016/05/29/california-researchers-let-striped-bass-off-the-...)

If nonnative predators, such as striped bass, are able to adapt and coexist with salmon-steelhead isn't it possible small fluctuating brown trout populations, living alongside Trinity River salmon- steelhead for over a century, could also adapt and coexist? If proposed brown trout management (petition 2019-011 Alveraz) is approved, would unlimited bag/daily possession limits increase fish culling and place additional undue fishing pressure on "native" fish stocks. Will another predator move in and take the place of brown trout and would Trinity River salmon-steelhead populations be impacted by "the law of unexpected consequences?" Scant data is not enough to support brown trout eradication; especially when it has been identified there are much more serious challenges (historic five yr. drought, poor- ocean conditions-inland water qualities, habitats, hatchery stocks, overharvesting, hatchery coho salmon ranching) impacting Trinity River salmon-steelhead populations.

Attached are copies of likely the most comprehensive Trinity River brown trout scientific paper written, a must read. **Annual and seasonal variation, relative abundance, and effects of managed flows on the timing of migration in Brown Trout (*Salmo Trutta)* in the upper Trinity River (Robert M. Sullivan and John P. Hileman)** Providing accurate accounting of brown trout in the TR:

A-History
B-Population estimates
C-Migrations
D-TR (ROD) Flow impacts
E-Economic benefits
F-Vital data and Trinity River brown trout management recommendations

I strongly recommend California Fish and Game Commissioners review the scientific paper and consider researchers have revealed both resident and nonnative predatory fish have adapted and coexist with salmon-steelhead. Is a brown trout eradication plan (petition 2019-011 Alveraz) the best, most effective, fisheries management for the Trinity River and its diverse fish stocks?

Respectfully Yours;

Herb Burton

California Fish and Game 104(3): 99-128; 2018

Annual and seasonal variation, relative abundance, and effects of managed flows on timing of migration in Brown Trout (*Salmo trutta*) in the upper Trinity River

ROBERT M. SULLIVAN* AND JOHN P. HILEMAN

California Department of Fish and Wildlife, Region 1, Wildlife/Lands Program, P.O. Box 1185 Weaverville, California 96093

California Department of Fish and Wildlife, Region 1, Fisheries Program, Trinity River Project, P.O. Box 1185, Weaverville, California 96093

**Correspondent: Robert.Sullivan@Wildlife.ca.gov*

We evaluated annual and seasonal patterns of relative abundance and timing of migration from historic trapping data in non-anadromous Brown Trout (*Salmo trutta*) inhabiting the upper Trinity River, California. Results of our analysis failed to support the hypothesis that the population of Brown Trout in the upper Trinity River has increased and continues to proliferate since 2000. Instead, we hypothesize that the peak in Brown Trout catch per unit effort (CPUE) in 2004, was not an indication of an increase in population size, but rather a secondary potamodromous behavioral response by Brown Trout already in the upper Trinity River system, in response to variation in managed flows and altered environmental conditions that ensued. We also tested the hypothesis of no significant difference in timing of migration in response to annually managed flow regimes. Managed hydrographs associated with the Trinity River Restoration Program (TRRP) and United States Bureau of Reclamation (USBR) were categorized into three flow types: 1) baseline Pre-ROD flows (1982-2002); 2) Record of Decision (ROD) flows (2005-2011, 2017); and 3) pulsed augmentation (Pulse) flows (2003, 2004, 2012-2016). Annual variation in CPUE showed cyclic fluctuations approximately every four to eight years and there was a significant positive relationship between CPUE and year (1982-2017). However, for the sampling period 2003 to 2017, the relationship between CPUE and year was significant and negative, indicating that Brown Trout have declined dramatically in relative abundance since peaking in 2004, especially after 2014. This sequence of dates coincides with establishment of the Trinity River Restoration Program in 2002, and subsequent Record of Decision "ROD flows" and periodic augmentation flows ("Pulse flows") beginning in 2003. Additionally, our results failed to support the hypothesis of no significant difference in timing of migration among different flow types. Instead, annually managed flow regimes appear to have significantly affected timing of migration in Brown Trout. Deviation away from the baseline Pre-ROD flow pattern of seasonal migration occurred through reduction in counts of fish early to mid-season beginning in late May (Julian week 21), followed by an increase in counts late in the season (mid-December, Julian week 49); thus displacing the baseline Pre-ROD flow timing of migration to later in the season. Results of our analysis, together with a review of pertinent literature and available data do not support the suggestion that Brown Trout be actively removed from the upper Trinity River, because of increased population growth since 2000, competitive lifestyle, or negative impact to native juvenile anadromous salmonids, relative to other co-occurring adult piscivorous salmonids and fish-eating terrestrial vertebrates. We make several recommendations for future management actions to help resolve issues related to Brown Trout and other salmonids in the Trinity River.

Key words: annual and seasonal variation, Brown Trout, managed flow regimes, migration, piscivorous lifestyle, potamodromous, suppression of population, Trinity River

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Brown Trout (*Salmo trutta*) are a non-native species of salmonid found in the Trinity River, Klamath Basin of northwestern California. Although capable of developing an anadromous life history form in response to localized food limitation as a population expands (O'Neal and Stanford 2011), there are no definitive tagging studies to suggest that the current population of Brown Trout in the upper Trinity River is anadromous (M. Currier, California Department of Fish and Wildlife [CDFW] Reservoir Biologist, personal communication 2017). This species has coexisted with native anadromous salmonids in the Trinity River for over a century. Brown Trout are territorial, predatory, and potentially compete with co-occurring native anadromous salmonids for food, space, and cover (Glova and Field-Dodgson 1995, L'Abee-Lund et al. 2002). Large adult Brown Trout may predominate in areas of suitable habitat within the mainstem Trinity River. Preliminary analysis of count data suggested that the population of Brown Trout in the upper Trinity River has increased and continues to proliferate since 2000 (CDFW 2014, USBR 2014). This hypothesis, in conjunction with the view that Brown Trout adversely affect populations of juvenile Chinook Salmon (*Oncorhynchus tshawytscha*), steelhead (*Oncorhynchus mykiss*), Klamath River Lamprey (*Entosphenus similus*), and potentially impede recovery of listed Coho Salmon (*Oncorhynchus kisutch*) (NOAA Fisheries 2014), resulted in recommendations to specifically and systematically remove Brown Trout in the upper Trinity River (Alvarez 2017).

At issue is whether: 1) "continued proliferation" of Brown Trout undermines efforts to restore native anadromous fish in the upper Trinity River; 2) release of Brown Trout captured during salmonid monitoring is a breach of Tribal Trust Responsibilities (DOI 1993, TRFES 1999) constituting "take" of listed Coho Salmon; and 3) presence of Brown Trout significantly reduces commercial and sport fishing opportunities for native salmonids. However, the same piscivorous lifestyle is also true for resident steelhead, and Coho Salmon in other river systems (Ruggergone 1989, Ruggergone and Rogers 1992, McConnaughey 1999, TRFES 1999, Naman 2008, YTFP 2008). Moreover, numerous other aquatic and terrestrial piscivorous predators also inhabit the upper Trinity River (TRFES 1999). Further, comprehensive comparative studies that document: 1) competition among anadromous salmonids, and 2) the relative impact and importance of predation on juvenile salmonids by any of a suite of anadromous, aquatic, or terrestrial piscivorous taxa inhabiting the upper Trinity

River are lacking. As such, the long-term benefit to populations of juvenile salmonids, by systematically eliminating adult Brown Trout from the upper Trinity River, is lacking critical information and remains entirely unknown, as is the relative impact to the local economy in the context of both current and future opportunities for recreational angling.

Complicating this issue further is a lack of understanding of the potential effects of variable and intensely managed annual flow regimes, which characterizes the upper Trinity River, on the relative abundance estimates and timing of migration in several species of adult salmonids. For example, effects of seasonal variability in relative abundance of salmonid populations associated with annually managed flow regimes and restoration programs can be considerable (Platts and Nelson 1988, Holtby and Scrivener 1989, Bradford et al. 1997, Ham and Pearsons 2000, Bayley 2002, Hasler et al. 2014, Peterson et al. 2017). Such variability may severely constrain estimates of population size and trends, and interpretations of the effects of variable managed flow and temperature regimes on seasonal patterns of migration, local movements, habitat use, and rates of survival in resident non-anadromous and anadromous fish (Crisp 1993, Clark and Rose 1997, Cunjak et al. 1998).

Because Brown Trout in the Trinity River are non-anadromous and do not rely on ocean conditions for their life history requirements, their annual abundance and seasonal migratory responses to changes in flow patterns affected by managed flow regimes are independent of any oceanic influence, unlike anadromous species. As such, we view Brown Trout as an excellent "control" species for evaluating potential effects of managed hydrological variation within the upper Trinity River, compared to anadromous salmonids.

Our specific objectives were fourfold. First, we re-evaluate relative abundance, annual distribution, timing of seasonal migration, and potential impact of Klamath River Lamprey (*Entosphenus similus*) parasitism on Brown Trout, relative to other sympatric salmonids. Second, we test the hypothesis that the population of Brown Trout in the upper Trinity River has increased since 2000. Third, we test the hypothesis of no significant difference in pattern of timing of migration in relation to annually managed flow regimes (hydrographs). Forth, we use results of our analyses to address: 1) competition among sympatric salmonids inhabiting the upper Trinity River, 2) the potential impact to commercial and sport fishing opportunities, and 3) management recommendations advocating systematic removal of Brown Trout from the Trinity River because of its competitive and piscivorous lifestyle.

Background on history of introduction.—The United States Commission of Fish and Fisheries in the late 1800s imported both "Von Behr" trout from the Black Forest of Germany (stream type *S. trutta*), and "Loch Leven" trout from Scotland (lake type *S. trutta*). Von Behr trout eggs were brought to the New York State Hatchery at Cold Springs Harbor and the United States Fish Commission hatchery at Northville, Michigan in 1882. Loch Leven trout eggs were brought to Cold Springs Harbor Hatchery in 1884 (Dill and Cordone 1997). Although Brown Trout are frequently referred to as "German Brown Trout", Von Behr trout were eventually outcrossed with Loch Leven fish.

The US Fish Commission hatchery at Northville Michigan delivered Loch Leven, Von Behr, and hybrid Brown Trout eggs to Fort Gaston in Hoopa and Sisson Hatchery in Mt. Shasta, California (Adkins 2007). There were two introductions from these hatcheries into the Trinity River, one near the mouth at Fort Gaston and a separate effort closer to the headwaters in Stewart's Fork and the upper Trinity River near Lewiston, California (Adkins 2007). The U.S. Fish Commission conducted the first documented introduction of Brown Trout into the Trinity River in July 1883 (USCFF 1895). To promote recreational angling, 24,856 yearling Brown Trout were released into the tributaries in the lower Trinity River from fish reared at Fort Gaston in Hoopa Valley (Dill and Cordone 1997). Re-introductions (stocking) of Brown Trout to the Trinity River and tributaries occurred annually from 1911 to 1932, peaking at 180,000 Brown Trout stocked in 1925 (Wertz 1979). From 1964 to 1976, California Department of Fish and Game (CDFG) implemented a Brown Trout maintenance program at Trinity River Hatchery (TRH) and propagated Brown Trout from adult returns to TRH. Managers stocked Brown Trout from this maintenance program on a near annual basis at various locations in the Trinity River and below Lewiston Dam. There is a series of annual hatchery reports documenting TRH Brown Trout production and stocking from 1961 to 1968 by Murray (1968) and from 1970 to 1977 by Bedell (1977 and 1979), including references therein. We summarize data from these reports in Appendix I.

In 1969, CDFG released TRH-produced yearling Brown Trout into the lower Klamath River at the township of Klamath Glen. This practice ended in 1976, when 12,600 yearling Brown Trout were released into the Trinity River at TRH. In that same year, 29,500 two-year old Brown Trout (2nd brood year 1975 fish) were released into Trinity Lake (Bedell 1977). However, CDFG discontinued the Brown Trout maintenance program because of low returns, small size, and lack of development and retention of anadromous characteristics in the Trinity River population (Bedell 1979).

In 2001, CDFG began stocking reproductively viable Brown Trout into Trinity Lake but this practice stopped in 2008 (M. Currier, personal communication 2017). Also in 2008, CDFG marked (adipose fin clip) and released 64,750 Brown Trout into Trinity Lake to determine if a portion of these fish survive migration through the turbines at Trinity Dam, immigrate into Lewiston Lake, and escape into the upper Trinity River through Lewiston Dam. Such movement could potentially have provided a continuous source of Brown Trout into the Trinity River, particularly during periods of low water levels in Trinity Lake, in combination with pulsed augmentation flows into the Trinity River. However, although this management action potentially could have artificially augmented annual counts of Brown Trout at Junction City Weir (JCW) between 2001 and 2008, no marked Brown Trout have been recorded in the Trinity River (M. Currier, personal communication 2017).

At the terminal end of anadromy in the upper Trinity River at Lewiston Dam, only three "wild" Brown Trout (all unmarked and not weir-tagged) have been recorded captured in annual TRH adult Salmonid returns since 1978 (one each in 1998, 2005, and 2014). Moreover, information on Brown Trout in the Klamath River appears to be extremely uncommon. For example, historically (1997-2017) there have been no Brown Trout verified by creel censuses conducted by CDFW from the mouth of the Klamath River to Weitchpec (S. Borok, Environmental Scientist, CDFW personal communication 2017). Additionally, 1,618 trap-days resulted in only 39 Brown Trout counted from 1989 to 2017 at the Willow Creek Weir, lower Trinity River (M. Kier, CDFW Environmental Scientist, personal communication 2017).

Methods and Materials

Study area.—Trinity River is located in northwestern California and is the largest tributary of the Klamath River (Figure 1). Construction of Trinity and Lewiston dams occurred in the early 1960s. Trinity Dam creates Trinity Lake (NAD 83, Zone 10N, UTM 519,964.7 m east and 4,516,719.7 m north), storing up to 2.45 million acre-feet of water (USFWS and HVT 1999). Lewiston Lake, formed by Lewiston Dam, is located 11.8 km downstream of

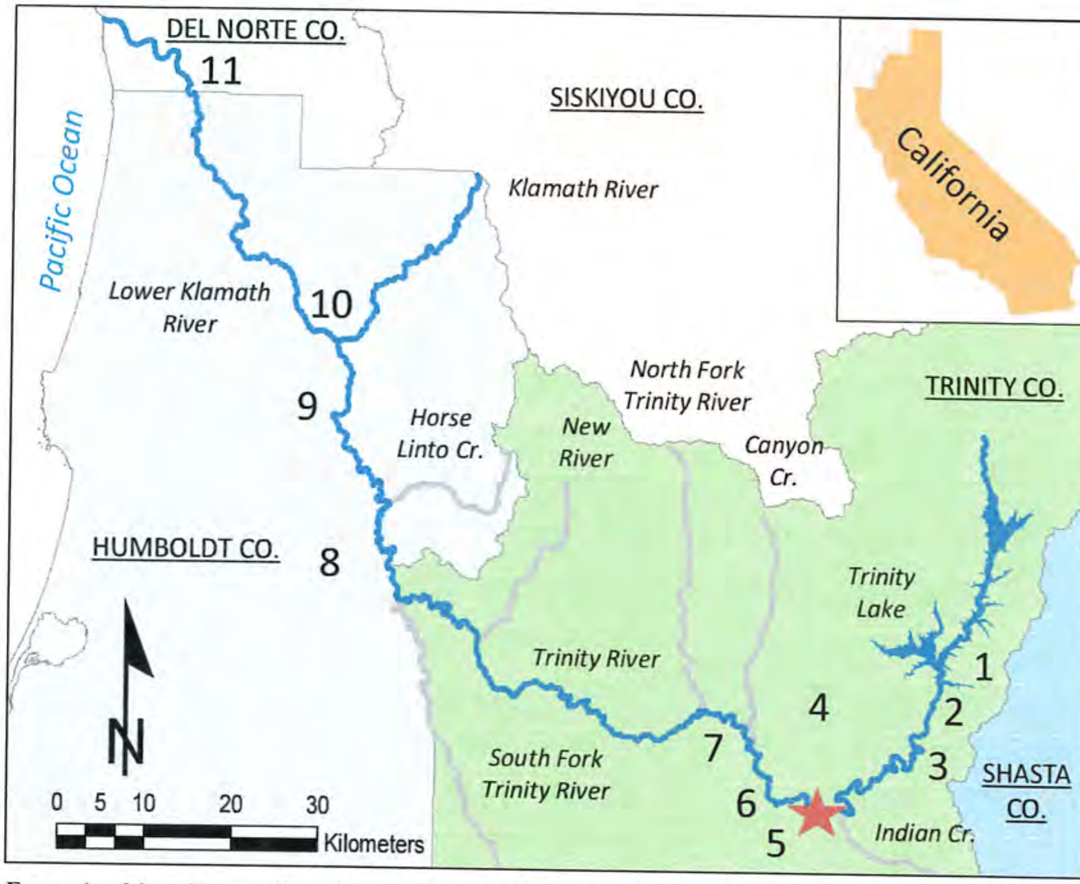

FIGURE 1.—Map of Lower Klamath River, Klamath River, Trinity River, and major tributaries of the upper Trinity River. Also included various other landmarks, including: 1) Trinity Dam, 2) Lewiston Lake, 3) Lewiston Dam and Trinity River Hatchery, 4) Weaverville, 5) Junction City Weir (red star), 6) Junction City, 7) Pear Tree Gulch, 8) Willow Cr., 9) Fort Gaston/Hoopa, 10) Weitchpec, and 11) Klamath Glen.

Trinity Dam (river kilometer [rkm] 180; UTM 517,489.4 m east and 4,508,408.4 m north), which serves as a re-regulating reservoir for flow to the Trinity River and diversion to the Sacramento River Basin, comprising the Trinity River Division of the Central Valley Project. Lewiston Dam is the uppermost limit of anadromous fisheries on the Trinity River. From Lewiston Dam, the Trinity River flows for approximately 180 kilometers before joining the Klamath River at the township of Weitchpec, California (UTM 440,575.2 m east and 4,559,590.2 m north). The Klamath River flows for an additional 70 rkm before entering the Pacific Ocean. The upper Trinity River is the stretch from the confluence of the North Fork Trinity River to 63.1 km upstream to Lewiston Dam. Trinity River Hatchery (TRH) is located immediately below Lewiston Dam.

Weir sampling.—Data presented herein derive from JCW, which is a Bertoni (Alaskan) style fish-tagging weir located 43.7 km downstream of Lewiston Dam. CDFW has operated JCW on an annual basis since 1978 and in cooperation with the Hoopa Valley Tribe since 1996. JCW functions to mark spring-run Chinook Salmon as part of an annual single mark-recapture estimate for the upper Trinity River above the weir. JCW also traps Coho Salmon, steelhead, Brown Trout, and Klamath Smallscale Sucker (*C. rimiculus*), but these species are considered "by-catch" by CDFW, as the primary target species was spring-run Chinook Salmon. Although annual sampling of Brown Trout began in 1982, lack of funding and administration mandate prevented data collection in 1983, 1984, 1992, and 1995. Prior to 1996, installation of JCW occurred when spring flows receded in June or July, and the weir was "fished" through December depending upon flow conditions. However, in 1996 a decision was made to truncate annual trapping efforts at the end of September, a procedure that continues to today. There are no trapping efficiency estimates for Brown Trout. Spring-run Chinook Salmon efficiency estimates at JCW vary from 26.6% of the annual run-size in 1992 (n =5,329) to 0.5% in 2012 (n = 35,326). Long-term average trapping efficiency for spring-run Chinook Salmon at JCW was 7.9% of the annual run size estimate. Same-season marked Brown Trout are not common, indicating that multiple captures of individual fish are rare.

Operation of JCW is a passive process, in which the weir is "fished" five days per week (Sunday evening - Friday afternoon). Trap-days start one half hour before sunset and end mid-day the following day, in order to exploit crepuscular behavior of the target species (spring-run Chinook Salmon), and capture both dusk and dawn migrating fish. JCW is open to both boat traffic and passage of migrating fish on a daily basis from mid-day to early evening, and on weekends. Limitations on scheduling are a function of safety, funding, and staffing. The term "fished" refers to blocking river to passage of adult fish except at a small opening at a pair of fyke panels spaced 11.4 cm apart inside a trap box, where the gap is located. The trap box consists of a cage immediately upstream of the weir, with a "V"-shaped opening (fyke) with wide end facing downstream that narrows towards the upstream interior of the trap box, where the gap is located. Upstream migrating fish swim through an 11.4 cm funneled gap in the fyke panels into the trap box, trapping adult fish. Staff check the trap box twice daily, once in the morning and again in the afternoon each trap-day, before opening the 4.9 m wide panel to recreational boat navigation. Unimpeded passage of fish occurs after the second trap check, and on weekends. Beginning in 2005, captured Brown Trout were measured, tagged (serial numbered T-bar [Floy tag]), and all salmonids evaluated for condition (i.e., evidence of predator wounds, gill net scars, and wounds by Klamath River Lamprey, etc.).

Study design.—The Trinity River Restoration Program (TRRP 2018), created by the Record of Decision (ROD) outlined a plan for restoration of the upper 63.1 km (mainstem) of the Trinity River and its fish and wildlife populations (TRFES 1999). The Trinity River Mainstem Fishery Restoration Environmental Impact Statement/Report was the document upon which the ROD was based (USDI 2000). TRRP restoration strategy included: 1) flow management through manipulation of the annual hydrograph, 2) mechanical channel rehabilitation, 3) sediment management, 4) watershed restoration, 5) infrastructure improvements, 6) adaptive environmental assessment and monitoring, and 7) environmental compliance and mitigation. Timing, extent, and volume of restoration flows appear in Appendix II. Information on the intended benefit of each ROD and Pulse flow hydrograph varies on an annual basis depending upon water availability and the particular restoration objective at the time of implementation (TRRP 2018).

To test the hypothesis of no significant difference in the annual pattern of timing of migration associated with managed hydrographs, we designated three flow year-types (henceforth called flow types): 1) baseline Pre-ROD flow (1982-2002), 2) ROD flow (2005-2011, 2017), and 3) Pulse flow (2003, 2004, 2012-2016). Pulsed augmentation flows were designed to cue migration of Chinook Salmon out of the Lower Klamath River to prevent risk of infection due to the ciliate parasite *Ichthyophthirius multifiliis*. Prior to 2003, there were no annually managed ROD or Pulse flows. Additionally, we note that each Pulse flow event was accompanied by a single ROD flow hydrograph (ROD plus Pulse flows), beginning in 2003. Thus, for each Pulse flow, effects of each pulsed augmentation are not completely separable or independent from effects of its companion ROD flow.

Since 2001, total restoration releases have included flows for: 1) restoration flows, 2) Tribal Ceremonial Boat Dance flows, and 3) pulsed augmentation flows. Ceremonial Tribal Boat Dance flows occur in odd years just prior to any pulsed flow augmentation. However, because they only amount to 0.6% of the total release into the Trinity River (TRRP 2018), we did not include them in our analysis, even though pulse flows occasionally tier off the trailing ends of ceremonial flows. Shapes of the ascending limbs of the hydrographs were mostly rapid (19/22) with few years in which there were benches (7/22), all of which were associated with managed flows. In contrast, shapes of the descending limbs of the hydrographs were all gradual with numerous benches associated with virtually all managed flows (14/22). Benches in hydrographs included stabilization of water release for approximately one or more days. There were two double peaked ROD flows (2016 and 2017). All Pulse flows had rapid ascending hydrographs and at least one bench. Similarly, all descending limbs were rapid with at least one bench. Spring-summer base flows historically equate to 13 m^3/s.

ROD flows occurred annually from late April to August. Conjoining Pulse flows occurred from August to September. Actual magnitude and duration of ROD and Pulse flows varied in hydrologic characteristics, cubic meters per second (m^3/s), shape of the hydrograph, and duration of the hydrograph depending upon the specific management intent. Average duration of ROD flows was about 89.8 days (range 62.0-112.0 days) from mid-April to early August, and averaged 221.9 m^3/s (range 124.9-328.6 m^3/s) of flow at the top end of the hydrograph. Average duration of Pulse flows was about 28.3 days (range 11.0-40.0 days) from mid-August to late September, and averaged 61.1 m^3/s (range 35.3-97.0 m^3/s) of flow at the top end of the hydrograph. For the same general monthly period, average duration of baseline Pre-ROD flows was about 52.4 days (range 28.0-81.0 days) from late April to late July, and averaged 119.6 m^3/s (range 62.3-192.3 m^3/s) of flow at the top of the hydrograph. Water summary data and a typical flow release diagram (hydrograph) tiered to water-year type are available at the TRRP website (TRRP 2018). We obtained digital and printed hydrographic data from the US Bureau of Reclamation (USBR) Lewiston Water Quality Gauge (LWS) in the upper Trinity River (rkm 178.2 at Lewiston Dam) downloaded from the California Department of Water Resources, California Data Exchange Center (DWR 2017).

Statistical analysis.—We used catch per unit effort (CPUE) in units of adult fish trapped (caught) per trap-day (effort) to estimate relative annual abundance and evaluate "population" trends over time. Brown Trout were considered adults if they were at least 32 centimeters in fork length (one-year-old fish). Although CPUE is not a measure of true abundance, it is an established indicator of relative abundance (Bonar et al. 2009). Estimates of CPUE derive from by-catch data collected at JCW for Brown Trout (1982-2017). A test of the hypothesis that the annual distribution of CPUE was derived from a normally distributed population was rejected (Shapiro-Wilk test (W) = 0.88, P <0.01, n = 32; McDonald 2014). Because annual estimates of CPUE were skewed significantly to the right, they were ranked, visually inspected by use of normalized (0.0, 1.0) quantile-quantile (Q-Q) plots (R Core Team 2013), and found to be normally distributed (W = 0.96, P = 0.23, n = 32). Thus, all subsequent statistical analyses of count data used non-parametric methods (McDonald 2014). Because of small annual sample size, we used the Spearman rank correlation (r_s) to assess evidence of trends in parasitism (wounding) by Klamath River Lamprey.

We analyzed trends in seasonal data by use of Julian weeks (JW), defined as one of seven consecutive-day-sets of 52 weekly periods in a calendar year, beginning 01 January of each year. This procedure allowed inter-annual comparisons of identical weekly periods. The extra day in leap years was included in the ninth week. Wilcoxon signed-rank test, computed from an approximate normal variate (Z) using non-zero data, evaluated the hypothesis that the median difference between pairs of JW was zero among different flows (Hasler et al. 2014). To determine if timing of seasonal migration in ROD and Pulse flows deviated from the baseline Pre-ROD flow, we calculated a Percent Deviation Index (PDI) from total trap counts:

PDI ROD flow = %ROD flow count – %Pre-ROD flow count

PDI Pulse flow = %Pulse flow count – %Pre-ROD flow count

To evaluate the specific timing of migration, we tested the hypothesis that counts of Brown Trout captured during individual JW were not significantly different between Pre-ROD, ROD, or Pulse flow types (years 1982-2017, JW21-JW49). We attempted to standardize sampling effort by including in our analysis only those pairwise comparisons that had a sample size ≥ 5 for each flow type. Pairwise comparisons of non-zero counts using JW as attributes were then evaluated using the nonparametric Dwass-Steel-Chritchlow-Fligner (*DSCF*) test (Critchlow and Fligner 1991).

We used Robust Regression (ROBREG) analysis to test the hypothesis that the population of Brown Trout in the upper Trinity River has increased and continues to proliferate since 2000 (SYSTAT 2009 and references therein). We conducted all regressions on ranked counts, used the Least Trimmed Squares (LTS) method and FAST-LTS algorithm and the weighted median to compute estimates of regression coefficients in determining adequacy of the model to generate a robust regression estimator (Rousseeuw and Leroy 1987, Huber and Ronchetti 2009). This method uses ranks of residuals instead of observed residuals, has few distributional assumptions, and is useful in detecting and deleting outliers in both the Y-space and X-space prior to performing ordinary least-squares regression on outlier-free data. Robust regression statistics and plots included the least-squares regression correlation coefficient (R) on outlier-free data, adjusted and robust coefficients of determination (R^2) to assess adequacy of the model (Rousseeuw and Van Driessen 2000, Maronna et al. 2006), and 95% confidence intervals surrounding the regression line. We accepted statistical significance at $P \leq 0.05$ (McDonald 2014).

Results

Annual variation in trap counts.—The relationship between: 1) total days the JCW was in place and 2) total days the weir was fished was positive and highly significant (R = 0.98, Robust R^2 = 0.98, Adj. R^2 = 0.96, F = 752.0, P <0.01, $d.f._{1,30}$; Figure 2A). Whereas, the relationship between year and these two variables was both negative and significant from 1982 to 2017 (Figure 2B and 2C). Average days of operation for this period was 72.5 trap days (range = 15 [2012] - 139 [1991], with the largest number of trap days associated with sampling from 1982 to 1994 (average = 104.3 trap days). In contrast, after truncating sampling at the end of September in 1995, the relationship between year and number of days JCW was fished, although negative, was not significant. Thus, except for 2005 when JCW was fished through October, sampling effort was relatively consistent from 1996 to 2017

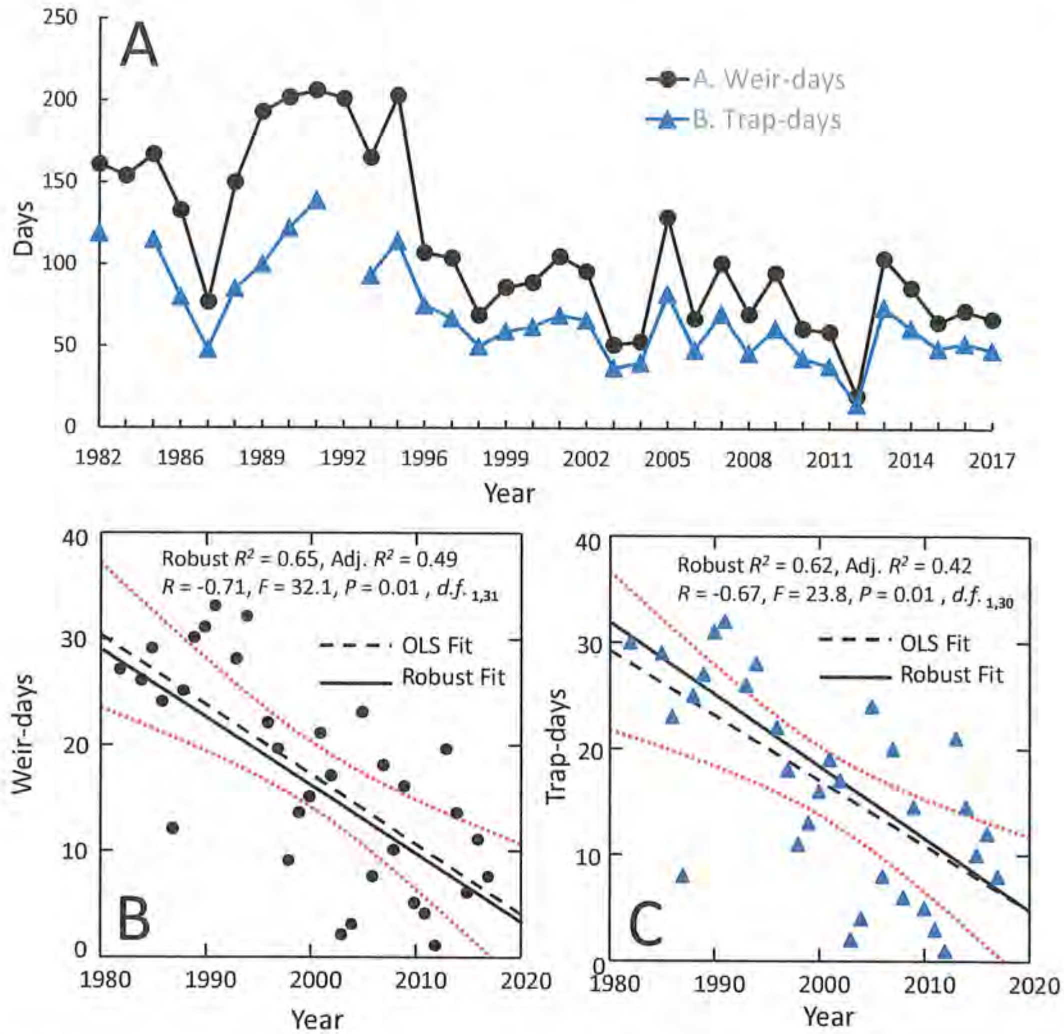

FIGURE 2.—A) Annual variation in total days Junction City Weir was in placed and total days the weir was fished. B) Relationship between total days the weir was in place versus total days weir was fished. OLS Fit = Ordinary Least Squares regression for outlier free data, Robust Fit = Least Trimmed Squares regression, and 95% confidence intervals on regression line.

(average = 55.1 trap days). Beginning in 2003, however, weir operations were temporarily and routinely halted in ROD and Pulse flow years until flows in those years subsided sufficiently to reinstate JCW (average = 50.9 trap days).

Annual variation in CPUE for Brown Trout exhibited cyclic fluctuations approximately every four to six years (Figure 3A, Table 1). These fluctuations were relatively muted between 1982 and 2002, but CPUE increased beginning in 2003, peaked in 2004, and was followed by a sharp decline through 2017. Regression analysis showed a significant and positive relationship between CPUE and year for the sampling period 1982 to 2017 (Figure 3B). However, for the sampling period 2003 to 2017, the relationship between year and CPUE was significantly negative (Figure 3C), indicating that Brown Trout have declined dramatically in relative abundance since 2003.

Effects of in-river parasitism by Klamath River Lamprey.—Combined data for all species analyzed herein, showed that the largest number of annual observations of adult fish

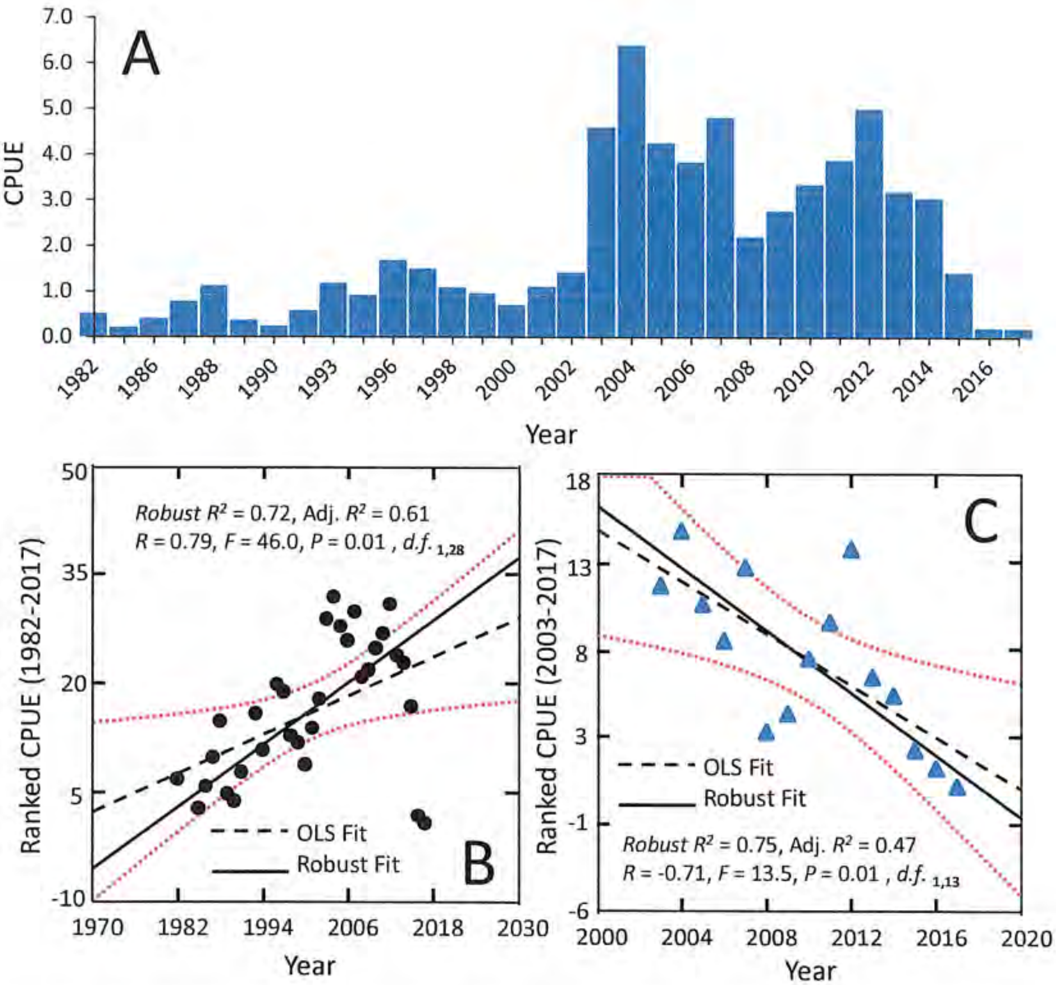

Figure 3.—Annual variation in catch per unit effort (CPUE) of total counts of Brown Trout (n = 3,596) from the Junction City Weir for years: A) 1984 to 2017 and B) 2003 to 2017, which included all ROD and Pulse flows over the last 15 years. OLS Fit = Ordinary Least Squares regression for outlier free data, Robust Fit = Least Trimmed Squares regression, and 95% confidence intervals on regression line.

trapped at JCW with fresh circular Klamath River Lamprey wounds (2.0 - 3.0 cm diameter) on their lateral surfaces occurred in 2015, 2016, and 2017 (Table 2). The percentage of all species of live adult fish with fresh lamprey wounds was significant and positively correlated with year (r_s = 0.67, P <0.05, n = 8). This apparent increased trend of visible lamprey wounds on adult fish was significant for Chinook Salmon (r_s = 0.71, P <0.05, n = 8) and Brown Trout (r_s = 0.69, P <0.05, n = 8), but not for steelhead (r_s = 0.61, P > 0.05, n = 8). For Brown Trout and Chinook Salmon the largest percentage of adult fish with lamprey wounds occurred in 2015, 2016, and 2017, and for adult steelhead the largest percentages occurred in 2012, 2015, and 2016. Additionally, we note that adult Coho Salmon generally occur in the upper Trinity River no earlier than late September after wier operations cease for the season, which precludes observations of lamprey wounds for this taxon.

Further, although the percentage of non-weir tagged mortalities that drifted downriver and impinged upon the panels of weir for all adult species combined showed no significantly correlated with year (r_s = -0.14, P >0.05, n = 8); this relationship was significant and positive

Table 1.—Annual and Julian week sample data for Brown Trout from 1982 to 2017; and a summary of non-weir tagged mortalities that washed onto the weir from up river. Data for 1983, 1984, 1992, and 1995 are missing (na = no data) because of lack of funding for Junction City Weir; including total days the weir was in place (Weir-days) and total days the weir was fished (Trap-days).

Year	Weir-days	Trap-days	Count	Non-weir tagged mortality	Julian week	Count
1982	161	119	61	na	21	3
1984	154	na	na	na	22	8
1985	167	115	24	na	23	19
1986	133	80	32	na	24	104
1987	77	48	37	na	25	249
1988	150	85	95	na	26	280
1989	193	100	37	na	27	303
1990	202	122	28	na	28	360
1991	206	139	79	na	29	265
1992	201	na	na	na	30	480
1993	165	93	109	na	31	481
1994	203	114	105	na	32	368
1996	107	75	126	0	33	135
1997	104	67	100	0	34	71
1998	69	50	54	0	35	22
1999	86	59	56	0	36	36
2000	89	62	43	0	37	35
2001	105	69	76	0	38	63
2002	96	66	93	0	39	118
2003	51	37	170	0	40	62
2004	53	40	256	0	41	29
2005	129	82	349	4	42	41
2006	67	48	184	1	43	30
2007	101	70	337	na	44	9
2008	70	46	101	0	45	15
2009	95	61	169	0	46	4
2010	61	43	144	0	47	1
2011	59	38	147	0	48	1
2012	20	15	75	0	49	4
2013	104	74	236	5		
2014	86	61	185	9		
2015	65	49	69	48		
2016	72	52	10	4		
2017	67	48	9	1		

for Brown Trout (r_s = -0.88, P <0.01, n = 8). However, the historically elevated counts of non-weir tagged mortalities in adult Brown Trout observed in 2015 were coincident with a tagging study initiated in 2013 (Table 1, CDFW 2014, USBR 2014), and included three individual radio tagged and one anchor-style tagged fish (02 July 2015). As such, the relationship between the percentage of non-weir tagged mortality and wounding by lamprey was significant and positive for Brown Trout (r_s = 0.76, P <0.05, n = 8), but not for any other species ($r_s \leq$ -0.50, P >0.05, n = 8).

Seasonal variation in trap counts.—Relative abundance of Brown Trout fluctuated weekly, beginning in late May (JW21), and continued through mid-December (JW49, Figure 4). Brown Trout occurred most frequently in the upper Trinity River from late June (JW25) through mid-August (JW33), with a primary peak in late July (JW30) and early August (JW31), declining abruptly through early September (JW35), with very few fish lingering in the area through mid-December (JW49). The relationship between percent seasonal trap counts of Brown Trout and JW exhibited a significant negative trend (Figure 4), with the percent count decreasing (negative trend) over the total season but increased in the early part of the season, declining late in the season.

Deviation in timing of migration from baseline flow type.—Total counts for each flow type were: 1) baseline Pre-ROD flow = 1,155; 2) ROD flow = 1,001; and 3) Pulse flow = 1,440 from 1982 to 2017 (n = 3,596; Figure 5A and B). A positive or negative PDI (Y-axis) signaled deviation from the baseline Pre-ROD flow pattern in timing of migration, by addition or subtraction of fish along the X-axis (JW) in ROD and Pulse flows (Figure 5C and D). Deviation away from the baseline occurred through: 1) reduction in counts of fish at the ascending limb, and 2) addition of fish along the declining central segment and trailing end of migration. A Wilcoxon signed-ranks test showed a significant overall difference between baseline Pre-ROD and ROD flows (Z = 2.0, P = 0.05, n = 29), ROD and Pulse flows (Z = 2.5, P = 0.01, n = 29), but not baseline Pre-ROD and Pulse flows (Z = 0.37, P = 0.71, n = 29).

Further, of 29 JW sampled, 37.9% (n = 11) had sample sizes $\geq$5 for each flow type (Table 3). Of these, eight showed significant differences among flow groups. For example, 87.5% differed significantly between baseline Pre-ROD and ROD flows; 62.5% differed significantly between baseline Pre-ROD and Pulse flows; but there were no significant differences between ROD and Pulse flows. Total counts of Brown Trout that encompassed all deviations away from the baseline Pre-ROD flow pattern of migration (positive plus negative counts), ranged from 488 fish (ROD flows) to 775 fish (Pulse flows; Table 4). Hence, the combined influence of both ROD and Pulse flow hydrographs post-2003 affected 1,263 Brown Trout relative to the baseline Pre-ROD flow pattern in timing of migration. The relationship between total counts of ROD and Pulse flow-affected fish was both significant and positive (Figure 6). Thus, as the count difference of ROD flows to baseline flows increases so does the count difference of Pulse flows to baseline flows.

Additionally, of all Brown Trout affected by ROD and Pulse flows, 59.1% encompassed JW28 through JW32. As indicated in Appendix II, implementation of ROD flows occurred from early April (JW17) through early August (JW32), whereas Pulse flows occurred from mid-August (JW35) to late September (JW39). Thus, in Brown Trout, alteration in the baseline Pre-ROD flow pattern of migration appeared to be most affected by the descending limbs of ROD flows, especially in wet years with hydrographs that have relatively long descending limbs.

Table 2.—Percent frequency of fish with visible Klamath River Lamprey wounds and number of mortalities counted for Brown Trout and anadromous steelhead and Chinook Salmon, co-occurring in the Trinity River, and trapped at Junction City Weir.

Year	All species (%)			Chinook Salmon (%)			Steelhead (%)			Brown Trout (%)		
	n	Wounds	Mortality	*n*	Wounds	Mortality	*n*	Wounds	Mortality	*n*	Wounds	Mortality
2010	387	14.2	2.1	222	10.8	3.6	21	0.0	0.0	144	21.5	0.0
2011	449	4.9	5.6	247	2.8	9.7	55	0.0	1.8	147	10.2	0.0
2012	274	11.7	1.8	189	4.8	2.6	10	20.0	0.0	75	28.0	0.0
2013	1155	8.0	1.1	835	4.4	1.0	84	3.6	0.0	236	22.0	2.1
2014	1246	9.0	1.6	1028	7.1	1.1	33	9.1	0.0	185	19.5	4.9
2015	468	35.8	13.9	343	28.9	5.0	56	25.0	0.0	69	78.3	69.6
2016	227	42.9	3.1	154	50.6	1.9	63	19.0	0.0	10	70.0	40.0
2017	269	41.3	1.5	208	48.6	1.4	52	9.6	0.0	9	55.6	11.0

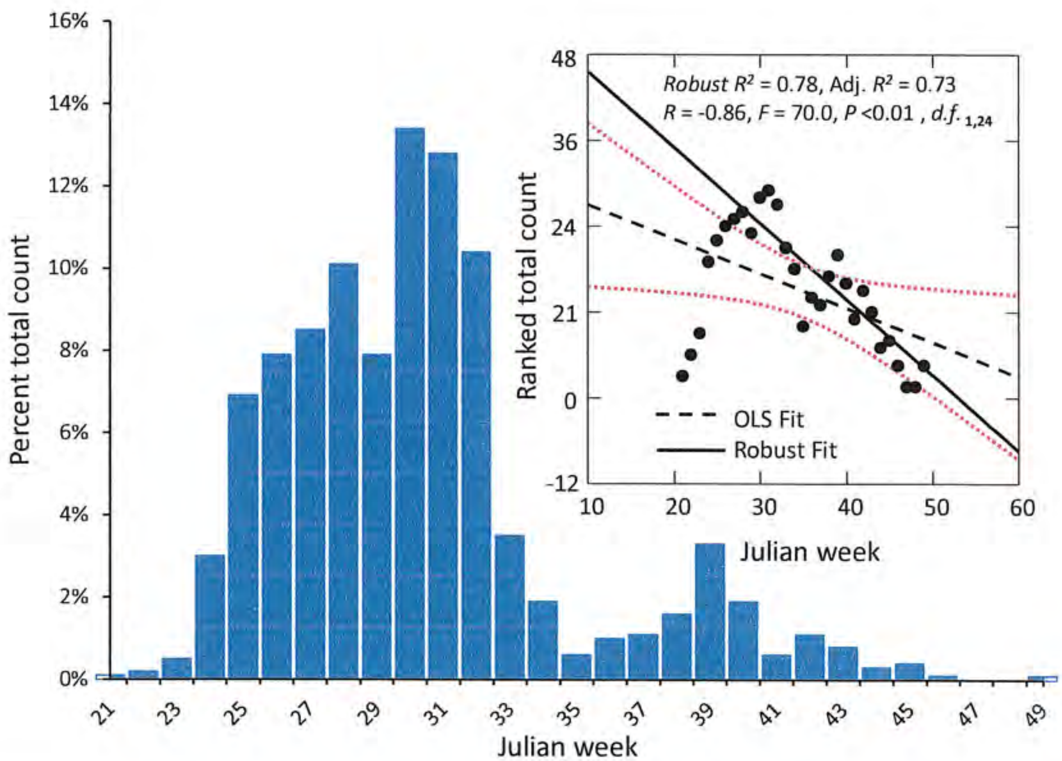

Figure 4.—Seasonal variation in percent total counts ($n = 3{,}596$) by Julian week (JW) of Brown Trout from Junction City Weir (years 1982-2017 and JW21-JW49). OLS Fit = Ordinary Least Squares regression for outlier free data, Robust Fit = Least Trimmed Squares regression, and 95% confidence intervals on regression line.

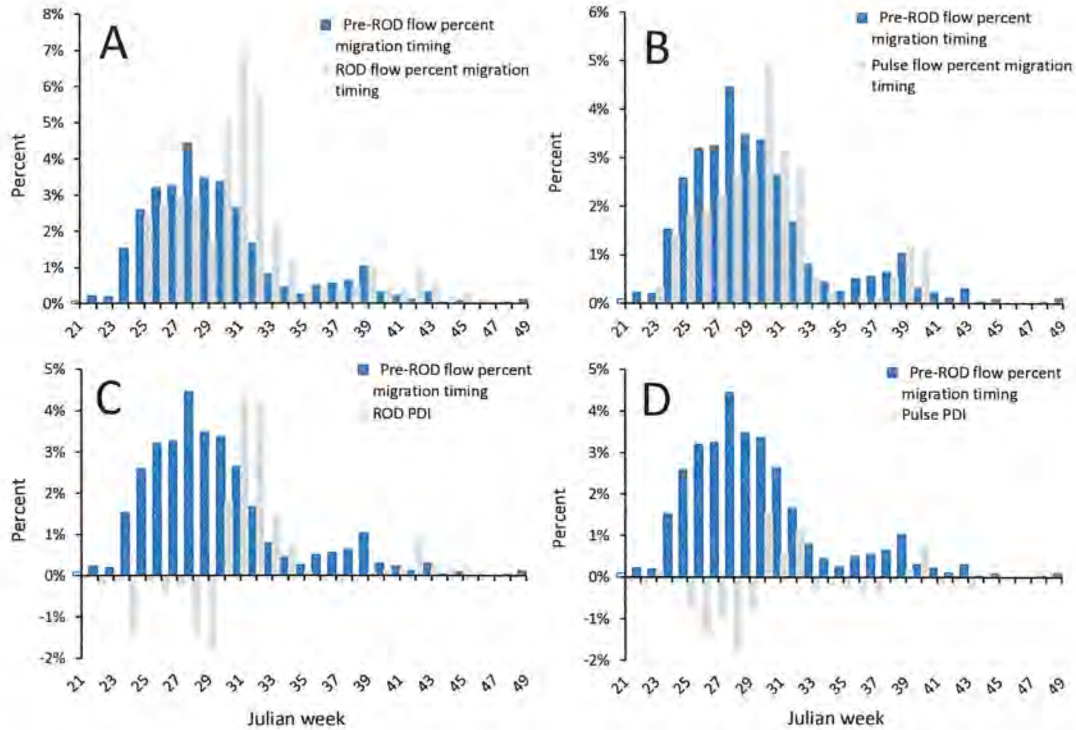

FIGURE 5.—Percent total count by Julian week (JW) of Brown Trout for baseline Pre-ROD flow (n = 1,155) in relation to: A) ROD flow (n = 1,001) and B) Pulse flow (n = 1,440; years 1982-2017 and JW21-JW49). Percent total count by JW of Brown Trout baseline Pre-ROD flow relative to the Percent Deviation Index (PDI) for: C) ROD and D) Pulse flows.

DISCUSSION

Annual and seasonal variation in estimates of relative abundance.—Although the overall pattern of annual variation in Brown Trout CPUE showed a significant increase in relative abundance from 1982 to 2017, we show that counts of Brown Trout have decreased significantly from 2003 to 2017. These results deviate dramatically from the hypothesis that the population of Brown Trout in the Trinity River has increased in number and continues to proliferate since 2000. This sequence of dates coincides with establishment of the Trinity River Restoration Program in 2002, and subsequent "ROD flows" in combination with periodic Pulse Flows beginning in 2003. As such, we do not interpret any increased "trend" as a reflection of an increase in relative abundance (population size) of Brown Trout in the upper Trinity River in recent times. Not only did the increase in Brown Trout actually start in 2003, but the magnitude of change in CPUE from 1.4 (2002) to 6.4 (2004) is explained more parsimoniously as an extreme migratory response by Brown Trout already in the Trinity River system coincident with managed flow regimes initiated in 2003 by the USBR and TRRP. It is not possible to attribute an increase in "size" of the Brown Trout population based on reproductive output, relative to the baseline Pre-ROD Flow trap count, given the timeline and extent of sampling that occurred between 2002 and 2004. This means that the peak in Brown Trout CPUE at JCW beginning in 2003 was not an indication of an increase in population size, but rather an indication of a secondary behavioral response to managed flows and the altered environmental conditions that ensued.

TABLE 3.—Dwass-Steel-Chritchlow-Fligner (*DSCF*) statistical tests for pairwise comparisons of ranked non-zero total counts of Brown Trout by Julian week. Only those non-zero pairwise comparisons that had a sample size ≥5 for each flow type were included in our analysis; and only comparisons that were significant ($P \leq 0.05$) were included in the table.

Julian week	Flow group(*i*)	*n*	Flow group(*j*)	*n*	*DSCF* statistic	*P*-value
29	Pre-ROD	15	ROD	5	11.8	0.00
	Pre-ROD	15	Pulse	5	12.6	0.00
30	Pre-ROD	15	ROD	7	6.2	0.00
	Pre-ROD	15	Pulse	6	7.2	0.00
31	Pre-ROD	13	Pulse	9	6.6	0.00
	Pre-ROD	13	Pulse	6	8.3	0.00
32	Pre-ROD	12	Pulse	6	9.1	0.00
	Pre-ROD	12	Pulse	6	12	0.00
33	Pre-ROD	8	Pulse	5	3.3	0.05
34	Pre-ROD	7	ROD	5	5.8	0.00
35	Pre-ROD	9	ROD	7	5.9	0.01
39	Pre-ROD	11	ROD	8	8.1	0.00

Although we focused specifically on the potential effects on a river system subjected to highly managed flow regimes and geomorphological restoration of the mainstem, other covariates besides hydrology and geomorphology affect annual and seasonal patterns of relative abundance and timing of migration in salmonids. For example, factors responsible for decreasing stocks of anadromous salmonids in both Trinity and Klamath rivers reference recent ocean conditions and drought (Dettinger and Cayan 2014, Diffenbaugh et al. 2015, and Mann and Gleick 2015). Since 2001, 38.9% of regional water-years had "dry" or "critically dry" designations, including two periods of three consecutive dry water-years (2007-2009 and 2013-2015.

Moreover, CPUE estimates of Brown Trout relative abundance in 2015, 2016, and 2017 are consistent with estimates of abundance observed pre-2003. This decrease post-2003 also likely reflects in part, the historically unprecedented level of non-weir tagged Brown Trout mortalities observed in 2015 that drifted downriver and impinged upon weir panels beginning in 2015 relative to any other previous year (see Table 1). In our analysis, a potential complicating factor in determining population trends of Brown Trout included documentation of non-weir tagged mortalities, which may be associated with in-river wounding by Klamath River Lamprey that parasitize adult salmonids. Brown Trout in the upper Trinity River spend their entire life cycle in the river, which likely subjects them to a higher risk of in-river Klamath River Lamprey parasitism compared to other sympatric salmonids. Although wounds from Klamath River Lamprey parasitism may contribute to a decline in Brown Trout abundance in the upper Trinity River (Alvarez 2017), we found no evidence to suggest a strong relationship between wounding by Klamath River Lamprey and high

Table 4.—Total counts (positive and negative) and total cumulative counts (positive plus negative) by Julian week of Brown Trout affected by ROD and Pulse flows, relative to the pattern in timing of migration representative of the baseline Pre-ROD flow (1982-2017 and JW21-JW49).

				1st Release group			2nd Release group		
Brood year	Adults	Females spawned	Eggs taken	Date	Number released	Location	Date	Released	Location
1963	34	22	58,100	23-Apr-65	28,500 (UM)	Trinity River Hatchery			
1964	145	64	163,600	18-Apr-66	28,900 (AD)	Trinity River Hatchery			
1965	100	39	109,900	1-Nov-67	35,200 (LV)	Hawkin's Bar			
1966	152	62	75,600	1-Oct-68	41,514 (UM)	Hawkin's Bar			
1967	231	62	158,700	na	na	na			
1968	170	32	76,644	Oct-70/Nov-70	18,967 (RV, LV)	China Slide (LV)	Nov-70	10841 (RV)	Klamath Glen
1969	70	26	53,000	29-Mar-71	23,370 (UM)	Lime Point	Nov-72	2321 (UM)	Trinity River Hatchery
1970	23	2	na	na	na	Trinity River Hatchery			
1971	7	34	140793	17-Apr-73	30,220 (UM)	Trinity River Hatchery			
1972	111	43	73,000	8-Aug-74	23,030 (UM)	Old Lewiston Bridge			
1973	39	26	55,227	14-Apr-75	17,820 (UM)	Old Weir Site			
1974	32	7	13,200	23-Apr-76	73,60 (UM)	Trinity River Hatchery			
1975	24	9	17,272	1-Apr-77	12,600 (AD)	Trinity River Hatchery			
1976	49	28	52,000	5-May-77	29,500 (UM)	Trinity Lake			

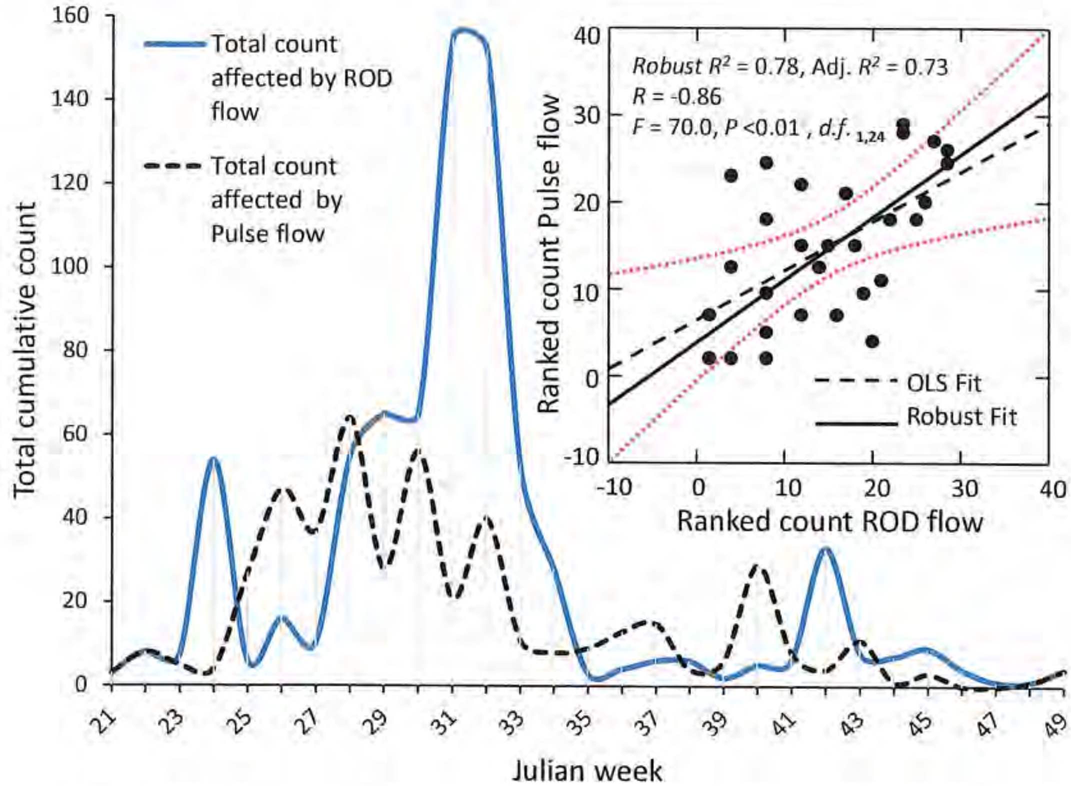

FIGURE 6.—Total cumulative count (positive plus negative) and Robust Regression of Brown Trout affected by both ROD and Pulse flows relative to baseline Pre-ROD flow (years 1982-2017 and JW21-JW49). OLS Fit = Ordinary Least Squares regression for outlier free data, Robust Fit = Least Trimmed Squares regression, and 95% confidence intervals on regression line.

levels of mortality in Brown Trout, relative to co-occurring anadromous salmonids. Instead, our data showed that although all three sympatric species of salmonids may exhibit elevated levels of lamprey wounds, mortalities in these species did not increase proportionately. Without additional information demonstrating a significant relationship between wounding by Klamath River Lamprey and subsequent mortality, we are unable to determine if parasitism by Klamath River Lamprey is a major factor contributing to fluctuations in populations of non-anadromous or anadromous species of fish in the upper Trinity River.

Potamodromous migration in Brown Trout.—Anadromy is a life history strategy in which adult fish migrate from saltwater to an upstream body of flowing fresh water (river or stream) to spawn (Moyle 2004). In contrast, a potamodromous life history refers to fish whose migrations occur wholly within fresh water (Maki-Petays et al. 1997). There have been no comprehensive tagging studies of Brown Trout in the Trinity River to suggest that Brown Trout are not anadromous. However, our analysis suggests that Brown Trout in the upper Trinity River are best described as a potamodromous population, born in upstream freshwater habitats, migrating downstream as juveniles (but still in freshwater), and growing into adults before migrating back upstream to spawn. Meyers et al. (1992) found that seasonal movements in Brown Trout may range from 7.2 to 20.1 km during spring and fall, but were relatively sedentary at other times (Burrell et al. 2000). Rapidly fluctuating flow conditions are critical factors with which spawning Brown Trout below peaking hydroelectric dams must contend. Indeed, Heggenes et al. (2007) found that Brown Trout appeared to move more when high flows continued for longer durations.

From 2012 to 2017, there were five consecutive ROD and Pulse flows in the upper Trinity River. Other studies have hypothesized that varying water flow may induce longer movements when Brown Trout are predisposed to move (e.g. spawning movements). Ovidio et al. (1998) and Young et al. (2010) reported that varying flow, in conjunction with varying temperature, triggered movements to the spawning areas for Brown Trout. Both Clapp and Clark (1990) and Brown et al. (2001) found a correlation between water flow and longer movements in relatively large Brown Trout. In contrast, Bunt et al. (1999) reported no effects of pulsed flows on Brown Trout movements within their study site; however, pulsed flows were regular on a diurnal basis, which may have allowed fish to adapt or acclimate behaviorally to recurrent pulsed flow augmentation.

Our hypothesis that Brown Trout populations are responding behaviorally to managed flow regimes is consistent with the recent suggestion that the magnitude and duration of flows are more important than quality of additional pulsed cold water intended to stimulate fish to move for prevention of disease (Strange 2010, USBR 2016). For example, we show that timing of migration in the baseline Pre-ROD Flow of Brown Trout from 1994 to 2017 has changed in response to both ROD and Pulse flows, both separately and in combination, since 2003. If variation in Brown Trout CPUE is a behavioral response to ROD and Pulse flows, this likely implies that these flows enable Brown Trout to occupy downriver habitats for a longer period relative to baseline conditions. Potentially well beyond the duration that juvenile salmon and steelhead out-migrate. Salmon fry typically emerge from the gravel around mid-February and out-migrate from March through June.

Additionally, ROD flows in conjunction with Pulse flows may facilitate prolonged opportunities for feeding on out-migrating juvenile salmonids. This condition would constitute "prey switching" by Brown Trout as a function of frequency-dependent predation associated with release of approximately 3- to 5-million fingerlings annually by the TRH (Larry Glenn, CDFW TRH Manager, personal communication 2016). Further, anecdotal information from local anglers suggest that Brown Trout follow spawning Klamath Smallscale Suckers to feed on sucker roe during the early summer in the upper Trinity River. Empirical evidence does suggest that Klamath Smallscale Suckers do spawn in the early summer in the upper Trinity River as exemplified by capture of gravid female suckers on June 30, 2009 (JW26) at JCW.

Seasonal variation in migration in relation to flow type.—Seasonal variation in trap counts of Brown Trout showed significant differences in the timing of migration between baseline Pre-ROD, ROD, and Pulse flows. There also was a significant difference between ROD and Pulse flows, suggesting that pulsed augmentation flows may represent an important additional and independent factor affecting the timing of migration, relative to a ROD Flow hydrograph. Deviation away from the baseline Pre-ROD migration pattern occurred through reduction in counts of fish early to mid-season and an increase in counts late in the season, which displaced the actual timing of migration in post-2003 flows to later in the season. That both ROD and Pulse flows have altered the timing of migration, relative to the baseline Pre-ROD condition, fails to support the hypothesis of no significant difference in the timing of migration of Brown Trout in relation to annually managed flow regimes.

Peterson et al. (2017) used a variety of environmental attributes to assess the relative influence of managed pulse flows to explain the magnitude of daily counts and proportions of fall-run Chinook Salmon observed at a weir on the Stanislaus River, California. They concluded that, although managed pulse flows resulted in immediate increases in daily passages, the measured response was brief, representing only a small portion of the total run relative to a stronger response between migratory activity and discharge levels. As relates to the upper Trinity River, we interpret these observations to be more reflective of the effects of implementing annual ROD flow hydrographs as opposed to short-term pulsed flow augmentations. The effects of managed flow on the timing of adult migration clearly needs further investigation in relation to the potential measured impacts of flow management, as well as other physical and biological covariates, prior to implementing any actions that actively suppress adult Brown Trout in the upper Trinity River.

Although we show that Brown Trout responded behaviorally on an annual and seasonal basis to flow augmentation, we lack reproductive data for Brown Trout to test an additional hypothesis that managed flow regimes likely affect multiple brood-year cycles post-2003 if ROD and Pulse flows continue. Flow-related impacts to multiple brood-year cycles likely have even greater implications for co-occurring anadromous species of salmonids inhabiting the Trinity River, particularly those that overlap in the pattern of run-timing, most notably spring-run and fall-run Chinook Salmon. Currently these issues have not been part of the long-term effects analysis to protect adult anadromous salmon in the Lower Klamath River, even though flows designed to facilitate such protection originate in the upper Trinity River (USBR 2016). As of 25 July 2016, there was no plan to address these issues for any salmonid in the upper Trinity River or as part of any proposed environmental impact assessment (Mary Paasch, USBR, personal communication 25 July 2016).

How viable is the competition scenario?—Brown Trout predation on native populations of salmonids and use of suitable habitat within the upper Trinity River, has resulted in criticism that there is significant competition between Brown Trout and native anadromous salmonids for limited food, space, and cover (McHugh and Budy 2006, Naman 2008, Waters 1983, Wang and White 1994, Alvarez 2017). However, documenting interspecific competition in nature is equivocal at best and only potentially possible where the combined demand for a resource is in excess of the supply (Larson and Moore 1985, Fausch 1988, Lohr and West 1992, Brewer 1994, Meffe and Carroll 1994, Blanchet et al. 2007). Additionally, documenting competition is particularly problematic in a large riverine system continuously subjected to variation in hydrology, temperature of water, and in-river restoration associated with floodplain reconstruction.

Several studies show that adult steelhead and Coho Salmon consume hatchery and naturally produced salmonid fry or smolts (Ruggergone 1989, Ruggergone and Rogers 1992, McConnaughey 1999, Pearsons and Fritts 1999, Naman and Sharpe 2012). Naman (2008) stated that release of large numbers of hatchery steelhead from the TRH could result in substantial counts of Chinook Salmon and Coho Salmon fry being consumed even with relatively low predation rates (i.e., 25,000 fry per day equating to approximately 9.0% of all Chinook Salmon and Coho Salmon fry produced). Studies in other river systems concluded that Brown Trout were superior competitors to sympatric Brook Trout (*Salvelinus fontinalis*, Fausch and White 1981, Blanchet et al. 2007, Korsu et al. 2010). Whereas, several investigations suggest that co-occurring piscivorous species were a superior pairwise competitor relative to Brown Trout (Fausch and White 1986, Magoulick and Wilzbach 1998, Strange and Habera 1998). Additionally, McKenna et al. (2013) found evidence for a decline of Brook Trout in the presence of Brown Trout across many watersheds. Yet a model of the relationship between Brook Trout and Brown Trout abundance explained less than 1% of the variation documented; and ordination showed extensive overlap in habitat used by these two taxa, with only small components of the "hypervolume" (multidimensional space) being distinctive (McKenna et al. 2013).

The relative importance of competition and predation also changes with life stage and seasonal availability of different prey items (Jonsson et al. 1999, L'abee-Lund et al. 2002, Browne and Rasmussen 2009). In controlled laboratory stream experiments, Coho Salmon dominated Brook Trout and Brown Trout of equal size, and Brook Trout dominated equal-size Brown Trout. However, when released from competition, subordinate species shifted to positions that were more resource profitable (Fausch and White 1986). Further, laboratory growth rates of Coho Salmon equaled rates measured in tributaries, whereas both Brook Trout and Brown Trout grew more slowly in the laboratory than in the field as a result of intraspecific competition due to lack of cover affording visual isolation (Fausch and White 1986). These results suggest that larger size and competitive superiority of Coho Salmon give them an advantage over juvenile Brook Trout and Brown Trout in tributaries when resources are limiting.

Based on recent dietary and bioenergetics analyses, Alvarez (2017) concluded that predation by Brown Trout poses a potential impediment to recovery of native salmonids in the Trinity River. However, the comparative impact of predation by co-occurring anadromous salmonids, as well as terrestrial *piscivorous* predators, on juvenile salmonids in the Trinity River is unknown relative to Brown Trout. Without comparative and simultaneous equal sampling effort, co-occurring species of adult salmonids, individually or in combination, could be a far bigger problem that Brown Trout, in relation to the overall impacts to survival of juvenile fish. Therefore, we maintain that, without such comparative information on both aquatic and terrestrial fish predators, it is premature to advocate or implement any comprehensive management strategy that would systematically remove Brown Trout from the Trinity River.

Economic impact of the Trinity River Brown Trout sport fishery.—Flow regimes managed annually in combination with massive programs of habitat restoration in the upper Trinity River have contributed to a substantial recreational fishery for Brown Trout, particularly among fly anglers. This industry brings intrinsic value and economic stimulus to the local community. The Trinity River Brown Trout fishery is unique in that, unlike fisheries in other regions of California, and on the West Coast, the Trinity River offers an opportunity to catch both trophy steelhead and Brown Trout. Commercial sport fishing guides operate under special recreation permits issued by the US Bureau of Land Management, which issue 100 guide permits for the Trinity River on a first-come, first-serve basis. Commercial fishing guides charge upward of $450 per day to fish steelhead and Brown Trout on the upper Trinity River. They typically book clients 4 days per week for 15 weeks (October-January), yielding an estimated $27,000 generated per guide annually (Bill Dickens, former President of the Trinity River Guides Association, personal communication 2017). If half of the commercial fly-fishing guides book clients at this rate, the conservative estimated income generated from commercial guide fees is approximately $1,350,000 annually, which does not include revenues benefitting local hotels, restaurants, businesses, and the community as a whole through tax-generated revenues. In theory, any financial loss from a managed fishery that seeks to remove Brown Trout could potentially benefit by economic opportunities derived from increased numbers of native salmonids. However, the validity of this premise remains untested in practice for the upper Trinity River.

Management recommendations.—Several factors are important in determining whether programmatic removal of Brown Trout from the Trinity River is necessary and has the potential to be successful. First, is the consideration of whether removal of Brown Trout is required for enhancing populations of target species. Fetherman et al. (2015) found that Brown Trout removal did not dramatically affect survival or emigration from the study site of sympatric salmonids. Second, it is important to consider whether removal will be successful after one removal effort, or are multiple removal efforts needed to overcome biotic resistance. A single removal of 66% of the Brown Trout population in the Au Sable River in Michigan did not result in population or size at age increases within sympatric Brook Trout populations (Shetter and Alexander 1970). Third, focus should be placed on whether environmental resistance factors, such as temperature, flow, and abiotic resources, may prevent successful removal (Moyle and Light 1996). Williams et al. (2009) showed that lower flows resulted in higher summer water temperatures and lower dissolved oxygen levels; both variables directly affect salmonid survival (Hicks et al. 1991, Fetherman et al. 2015). Fourth, the logistical and economic constraints of conducting large-scale removals in large river systems are substantially unattractive as a viable management option.

For example, although nearly $4.4 million was spent to remove 1.5 million nonnative predatory fish from the Colorado River, 86% of published reports (as of 2005) suggested that native species do not benefit from removal efforts (Mueller 2005). Fetherman et al. (2015) also found that Brown Trout removal had only a short-term positive benefit on Rainbow Trout (*O. mykiss*). However, the overall benefit of removal was equivocal, which led these authors to conclude that removal of adult Brown Trout was not a viable management option to pursue in future conservation efforts of Rainbow Trout, and certainly not in perpetuity. As such, resource managers and policy makers must weigh the logistical constraints, economic costs, and achievable measures of success associated with removal efforts against benefit(s) of the action. This is the only approach by which a resource agency responsible for the stewardship of fish and wildlife, can reasonably determine whether removal of adult Brown Trout from a large hydrologically influenced, temperature and water variable, and habitat managed riverine system is a viable long-term management option, pursuant to future species, conservation, and economic needs.

Facilitating completion of the adaptive management loop is often disconnected from reality by the politics of resource management (Murphy and Weiland 2014). Attributes of effective and comprehensive species-focused management for the upper Trinity River must rely upon implementation of the best available science, which includes relevant aspects of species life history requirements (TRFES 1999, Sullivan et al. 2006). CDFW does not currently have a management policy that mandates systematic removal of Brown Trout captured through any sampling effort or caught by anglers. We believe that advocating destruction of captured Brown Trout and development of recommendations for suppression to population levels that do not "significantly" impede the Endangered Species Act (ESA), Tribal-trust species recovery goals and objectives (Alvarez 2017), or programmatic restoration efforts within the upper Trinity River are premature, and the possible outcomes of such actions are likely not knowable. Our view is particularly relevant given the lack of: 1) information on comparative predatory impacts of other fish and terrestrial species on juvenile salmonid survival, 2) a thorough economic analysis of the long-term consequences of any proposed management actions, and 3) an analysis of the relative impact to the local commercial sport fishing industry focused on the upper Trinity River.

Instead, we maintain that progressive actions derive from *a priori* assessment of the: 1) comparative impacts of managed flow regimes on timing of migration in adult Brown Trout, as well as anadromous salmonids (Peterson et al. 2017); 2) population size and age structure of sympatric co-occurring salmonids; and, 3) metric-driven prey-base and dietary requirements of co-occurring riverine salmonid communities. We also suggest that studies be implemented that focus on age-specific habitat use within both aquatic and terrestrial piscivorous communities inhabiting the upper Trinity River, in conjunction with experimental and in-river studies focused on specific species; including non-salmonid fish taxa. Such actions would allow a better understanding of the potential for managed flows in facilitating conservation in all connected co-varying segments of this highly regulated river system (Hasler et al. 2014, Peterson et al. 2017), which constitute essential and integral elements of any coordinated science-based adaptive management program.

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Associate Editor was J. Weaver

Appendix I.—History of annual Trinity River Hatchery spawning and juvenile release dates for Brown Trout in the upper Trinity River; na = no data, blank = not applicable, UM = unmarked release, AD = adipose fin clipped release, LV = left ventral fin clipped release, RV= right ventral fin clipped release.

				1st Release group			2nd Release group		
Brood year	Adults	Females spawned	Eggs taken	Date	Number released	Location	Date	Released	Location
1963	34	22	58,100	23-Apr-65	28,500 (UM)	Trinity River Hatchery			
1964	145	64	163,600	18-Apr-66	28,900 (AD)	Trinity River Hatchery			
1965	100	39	109,900	1-Nov-67	35,200 (LV)	Hawkin's Bar			
1966	152	62	75,600	1-Oct-68	41,514 (UM)	Hawkin's Bar			
1967	231	62	158,700	na	na	na			
1968	170	32	76,644	Oct-70/Nov-70	18,967 (RV, LV)	China Slide (LV)	Nov-70	10841 (RV)	Klamath Glen
1969	70	26	53,000	29-Mar-71	23,370 (UM)	Lime Point	Nov-72	2321 (UM)	Trinity River Hatchery
1970	23	2	na	na	na	Trinity River Hatchery			
1971	7	34	140793	17-Apr-73	30,220 (UM)	Trinity River Hatchery			
1972	111	43	73,000	8-Aug-74	23,030 (UM)	Old Lewiston Bridge			
1973	39	26	55,227	14-Apr-75	17,820 (UM)	Old Weir Site			
1974	32	7	13,200	23-Apr-76	73,60 (UM)	Trinity River Hatchery			
1975	24	9	17,272	1-Apr-77	12,600 (AD)	Trinity River Hatchery			
1976	49	28	52,000	5-May-77	29,500 (UM)	Trinity Lake			

Appendix II.—Annual attributes of ascending and descending limbs of hydrographs that characterized baseline Pre-ROD, ROD, and Pulse flows for the years (1995-2000 and 2002-2017). Rate of flow measured in cubic meters per second (m^3/s) and flow release in hector meters. For each hydrograph, a bench indicated a temporary holding steady of flow release volume and flattening of the hydrograph. Rapidness indicated a steep and immediate increase or decrease in rate of flow, relative to a more prolonged or gradual increase or decrease in rate of flow. Abbreviations: na = no data, R = rapid, G = gradual, B = number of benches, and 2P = double peak. Digital data to verify online printed hydrographs for 1994 and 2001 were not available through California Department of Water Resources, California Data Exchange Center website for the time-period encompassing all 3-flow types.

			Ascending and descending limbs of hydrograph								Pulse flow ascending-descending limbs of hydrograph							
Year	Water Year	Flow	Low release magnitude (m^3/s)	Shape ascending	Peak release magnitude (m^3/s)	Restoration release (hector m)	Shape descending	Low release magnitude (m^3/s)	Date and duration flow to base-flow	Total days	Low (m^3/s)	Shape ascending	Peak release magnitude (m^3/s)	Pulse restoration release (hector m)	Shape descending	Low release magnitude (m^3/s)	Date and duration flow to base-flow	Total days
1995	na	Pre-ROD	14	R	131	na	G	27	25 Apr-22 May	28								
1996	na	Pre-ROD	9	R	144	na	G, 1B	14	10 May-9 Jun	31								
1997	na	Pre-ROD	10	R	62	na	G, 3B	13	2 May-2 Jul	62								
1998	na	Pre-ROD	47	R	192	na	G	13	24 May-27 Jul	65								
1999	na	Pre-ROD	15	G	71	na	G	13	8 May-18 Jul	72								
2000	na	Pre-ROD	9	R	66	na	G	13	8 May-27 Jul	81								
2002	normal	Pre-ROD	9	R	171	59,540	G	13	27 Apr-25 Jun	28								
2003	wet	Pulse	9	R	74	55,272	G, 2B	12	29 Apr-22 Jul	85	13	R	51	4,194	G	12	23 Aug-18 Sep	27
2004	wet	Pulse	9	R	176	80,300	G, 4B	12	4 May-22 Jul	80	16	R	48	4,465	G	14	21 Aug-14 Sep	25
2005	wet	ROD	8	R, 2 B	197	79,880	G, 1B	13	27 Apr-22 Jul	87								
2006	extra wet	ROD	8	G, 5B	286	99,900	G, 2B	13	16 Apr-22 Jul	98								
2007	dry	ROD	8	R	135	55,963	G	13	25 Apr-25 Jun	62								
2008	dry	ROD	9	R, 1B	183	80,016	G, 3B	20	22 Apr-15 Jul	85								
2009	dry	ROD	8	R	125	54,952	G, 4B	12	24 Apr-6 Jul	74								
2010	wet	ROD	9	R	194	81,003	G, 3B	12	22 Apr-2 Aug	102								
2011	wet	ROD	7	R, 2B	329	89,033	G, 2B	13	26 Apr-1 Aug	98								
2012	normal	Pulse	9	R, 2B	172	79,819	G, 4B	13	4 Apr-26 Jul	114	13	R, 1B	39	4,811	R, 1B	13	12 Aug-20 Sep	40
2013	dry	Pulse	8	R, 1B	125	55,741	G, 2B	13	13 Apr-25 Jun	74	13	R	74	2,294	R, 1B	13	24 Aug-20 Sep	28
2014	critically dry	Pulse	9	R, 1B	97	45,701	G, 1B	13	21 Apr-26 Jun	67	12	R, 1B	97	7,993	R, 1B	13	15-25 Sep	11
2015	dry	Pulse	9	R	241	55,593	G, 3B	13	21 Apr-1 Jul	72	19	R, 1B	83	5,908	R, 1B	13	20 Aug-21 Sep	31
2016	wet	Pulse	9	R, 2P	283	87,429	G	13	20 Apr-2 Aug	105	14	R, 1B	35	4,835	R, 2B	13	24 Aug-28 Sep	36
2017	extra wet	ROD	9	R, 2P	326	101,536	G	13	22 Apr-11 Aug	112								

Tracking Number: (2019-010)

To request a change to regulations under the authority of the California Fish and Game Commission (Commission), you are required to submit this completed form to: California Fish and Game Commission, 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: Robert Larkins
   Address:
   Telephone number:
   Email address:

2. **Rulemaking Authority (Required) -** Reference to the statutory or constitutional authority of the Commission to take the action requested: To amend the type of equipment that may be utilized to hunt game in California.

3. **Overview (Required) -** Summarize the proposed changes to regulations: I would like to propose that big bore air rifles, typically .30 caliber up to .50 caliber be legalized for taking medium and large game mammals in California. Several states including Arizona and Texas have now legalized big bore air rifles for hunting small, medium and big game. Big bore air rifles have been proven more than capable of humanely taking the animals mentioned, in fact African Elands weighing up to 2200 pounds and water buffalos have been successfully taken with a .45 caliber air rifle, with one shot. Air rifles are normally safer than traditional firearms because they do not have the range of a firearm, they are quieter and normally hold only one round, similar to a black powder rifle and need to be recharged with compressed air typically after 2-5 shots. With the move right now for gun control, the air rifle gives hunters' an alternative to a traditional firearm. It is true that the air rifle will never replace the firearm but it does offer a safe and sensible alternative.

4. **Rationale (Required) -** Describe the problem and the reason for the proposed change: To offer an alternative to the type of equipment that may be used to hunt game. This gives hunters and those that are reluctant to use a firearm an alternative and safer method of humanely taking medium and larger game.

SECTION II: Optional Information

5. **Date of Petition: April 9, 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):
☐ 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
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:

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

11. Economic or Fiscal Impacts: Identify any known impacts of the proposed regulation change on revenues to the California Department of Fish and Wildlife, individuals, businesses, jobs, other state agencies, local agencies, schools, or housing:

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

SECTION 3: FGC Staff Only

Date received: Received by email on Monday, April 10, 2019 at 8:14 AM.

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

Tracking Number 2019-010

Date petitioner was notified of receipt of petition and pending action: ______________

Meeting date for FGC consideration: ___________________________

FGC action:
☐ Denied by FGC

☐ Denied - same as petition ____________________
Tracking Number

☐ Granted for consideration of regulation change

From: Bob Larkins
Sent: Saturday, May 4, 2019 6:17 PM
To: FGC
Subject: Re: FGC - Petition 2019-011 AM 2

Thank you for your consideration. If you need big bore air rifles for testing I have them in .25, .30, .35, .45 & .50 rifles.
Anything I can do to assist I'd be happy to offer my assistance.
Robert Larkins

Sent from my iPad

On 3 May 2019, at 16:38, FGC <FGC@fgc.ca.gov> wrote:

> Good afternoon Mr. Larkins:
>
> Please see attachment per Acting Executive Director Melissa Miller-Henson.
>
> Sincerely,
>
> **Sergey Kinchak | Staff Services Analyst**
> **California Fish and Game Commission**
> 1416 Ninth Street, Room 1320
> Sacramento, CA 95814
> Phone: 916.657.2342
>
> <LTR_FGC Response_Pet 2019_010 AM 2_Accept_050319_Signed.pdf>

Tracking Number: (2019-011)

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: Justin Alvarez
   Address:
   Telephone number:
   Email address:

2. **Rulemaking Authority (Required) -** Reference to the statutory or constitutional authority of the Commission to take the action requested: FGC1.2.1.205(b) & Sections 200, 202, 205, 210, 219 and 220, Fish and Game Code.

3. **Overview (Required) -** Summarize the proposed changes to regulations: We request that, within the Klamath Trinity River Basin, the bag limit and possession limit for recreational Brown Trout be raised to unlimited.

4. **Rationale (Required) -** Describe the problem and the reason for the proposed change: Introduced Brown Trout pose an impediment to the recovery of the native fishes such as Chinook and Coho salmon, steelhead trout, and Pacific lamprey. These native species support both tribal and non-Indian fisheries. A recent predation study conducted by the Hoopa Valley Tribe and Humboldt State University found Brown Trout have the potential to consume large portions of the natural and hatchery production of anadromous salmonids. The NMFS specifically listed Trinity River Brown Trout as an impediment to recovery in its Southern Oregon Northern California Coastal Evolutionary Significant Unit (ESU) Coho recovery plan. The State of California increased the bag limit to 5 fish per day in 2007 because of predation concerns, and lists the following actions to deal with invasive species in their Coho Salmon recovery plan. Develop a rapid-response eradication plan for invasive, non-native fish species that negatively affect Coho Salmon. Develop management guidelines to mitigate the impacts of non-native fish species on Coho Salmon. Remove non-native fish species from stock ponds where these fish pose a threat to Coho salmon. In 2015, Brown Trout were estimated to have consumed 7% of the hatchery production and 20% of the natural production for that year. Given the large scale efforts on the

Trinity River to restore the native fishes we request the above actions be taken to ameliorate the negative impacts to the native fishes.

SECTION II: Optional Information

5. Date of Petition: April 8, 2019

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):7.50(b)(91.1)(C)1a & 7.50(b)(91.1)(E)
☐ Add New Title 14 Section(s): Click here to enter text.
☐ Repeal Title 14 Section(s): Click here to enter text.

8. If the proposal is related to a previously submitted petition that was rejected, specify the tracking number of the previously submitted petition Click here to enter text.
Or ☒ Not applicable.

9. Effective date: If applicable, identify the desired effective date of the regulation. If the proposed change requires immediate implementation, explain the nature of the emergency: Effective with release of 2019 supplemental regulations.

10. Supporting documentation: Identify and attach to the petition any information supporting the proposal including data, reports and other documents: Publication of Brown Trout Predation Study from Ecology of Freshwater Fishes. Letter of support from Six Rivers Forest. Mailed separately: Letter from Hoopa, Yurok, National Marine Fisheries Service, US Bureau of Reclamation, and Shasta Trinity Forest Service requesting action. Letter of Support from Trinity County Supervisors based on recommendation of the Trinity County Fish and Game Commission. Letter of Support from US Fish and Wildlife Service.

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: Benefits of Brown Trout Persisting: 1)provides an additional target species for recreational fishing 2)Potential increase in local revenue from fisherman targeting Brown Trout 3)Potential for increased fishing guide job opportunities Cost of Brown Trout Persisting; 1)Potential decrease in local revenue through negative impacts to the native fishery. 2)Loss of hatchery fish to Brown Trout Predation includes the cost of producing the hatchery fish and also lost fishing opportunities both recreational and commercial 3) Hampering recovery efforts for Chinook salmon and endangered Coho salmon

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

Click here to enter text.

SECTION 3: FGC Staff Only

Date received: Click here to enter text.

RECEIVED CALIFORNIA FISH AND GAME COMMISSION 2019 APR 12 AM 11:58

FGC staff action:

- ☐ Accept - complete
- ☐ Reject - incomplete
- ☐ Reject - outside scope of FGC authority

Tracking Number 2019-011

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

USDA United States Department of Agriculture | Forest Service | Pacific Southwest Region Six Rivers National Forest | 1330 Bayshore Way Eureka, CA 95501 707-442-1721 TDD: 707-442-1721 Fax: 707-442-9242

File Code: 2630
Date: May 11, 2018

To Whom It May Concern,

The Six Rivers National Forest is a strong supporter of our local partners that contribute to our mission to restore and conserve our watersheds and local fisheries. We are concerned about invasive species (non-native species) whose introduction continues to cause economic and environmental harm. Brown trout (*Salmo trutta*) is one of those species that was introduced to the Trinity River in Northern California beginning in the 1890's. After in river planting stopped in 1932, Brown Trout have sustained their population without additional stocking. Today, there are numerous large scale efforts to restore the salmon and steelhead fisheries on the Trinity River and many of the Trinity River managers have been concerned that predation by piscivorous Brown Trout may impede efforts to restore native salmonids, in particular endangered Coho Salmon.

The National Marine Fisheries Service specifically listed Trinity River Brown Trout as an impediment to recovery in the Southern Oregon Northern California Coho recovery plan. The state of California increased the bag limit to 5 fish per day in 2007 because of predation concerns, and lists the following actions to deal with invasive species in their Coho Salmon recovery plan.

- Develop a rapid-response eradication plan for invasive, non-native fish species that negatively affect coho salmon,
- Develop management guidelines to mitigate the impacts of non-native fish species on coho salmon, and
- Remove non-native fish species from stock ponds where these fish pose a threat to coho salmon.

In 2015 and 2016, research studies were conducted by the Hoopa Tribe to quantify predation by Brown Trout on the native fishes of the Trinity River. They concluded a large portion of the hatchery and wild production was being consumed by Brown Trout. Armed with these findings, the Hoopa Tribe brought together managers and stakeholders to draft a Brown Trout Management Plan (2018). Some of the proposed recommendations outlined below are being considered at this time.

- Increase to no limit the Brown Trout Bag and Possession Limits,
- Cull Brown Trout at projects conducted on the Trinity when they are encountered,
- Engage in public outreach to encourage retention,
- Periodic electrofishing targeting Brown Trout, and
- Pursue a bounty for Brown Trout to help suppression and as a way to garner buy in from fishing guides and the public.

It is our responsibility as land stewards to stop the spread of this non-native fish species on public lands. These actions which have been identified prioritize recovery of the salmon and steelhead populations that support tribal, commercial, and recreational fisheries. We look forward to working with our partners on development of this plan and alternatives to remove Brown Trout throughout the Klamath Basin.

Sincerely,

MERV GEORGE JR.
Forest Supervisor

Received: 22 October 2018 | Revised: 8 January 2019 | Accepted: 12 February 2019

DOI: 10.1111/eff.12476

ORIGINAL ARTICLE

WILEY Ecology of FRESHWATER FISH

Predation on wild and hatchery salmon by non-native brown trout (*Salmo trutta*) in the Trinity River, California

Justin S. Alvarez[1] | **Darren M. Ward**[2]

[1]Fisheries Department, Hoopa Valley Tribe, Hoopa, California

[2]Department of Fisheries Biology, Humboldt State University, Arcata, California

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Email: darren.ward@humboldt.edu

Funding information
Hoopa Valley Tribe Fisheries Department; National Oceanic and Atmospheric Administration, Grant/Award Number: CIMEC/Freshwater Fish Ecology RC

Abstract

Non-native predators may interfere with conservation efforts for native species. For example, fisheries managers have recently become concerned that non-native brown trout may impede efforts to restore native salmon and trout in California's Trinity River. However, the extent of brown trout predation on these species is unknown. We quantified brown trout predation on wild and hatchery-produced salmon and trout in the Trinity River in 2015. We first estimated the total biomass of prey consumed annually by brown trout using a bioenergetics model and measurements of brown trout growth and abundance over a 64-km study reach. Then, we used stable isotope analysis and gastric lavage to allocate total consumption to specific prey taxa. Although hatchery-produced fish are primarily released in the spring, hatchery fish accounted for most of the annual consumption by large, piscivorous brown trout (>40 cm long). In all, the 1579 (95% CI 1,279–1,878) brown trout >20 cm long in the study reach ate 5,930 kg (95% CI 3,800–8,805 kg) of hatchery fish in 2015. Brown trout predation on hatchery fish was ca. 7% of the total biomass released from the hatchery. Brown trout only ate 924 kg (95% CI 60–3,526 kg) of wild fish in 2015, but this was potentially a large proportion of wild salmon production because wild fish were relatively small. As large brown trout rely heavily on hatchery-produced fish, modifying hatchery practices to minimise predation may enhance survival of hatchery fish and potentially reduce the abundanc[illegible] ϶tory brown trout.

1 | INTRODUCTION

Brown trout (*Salmo trutta*) have undergone massive range expansion from their native waters in Europe and North Africa to the waters of every continent except Antarctica (Dill & Cordone, 1997; MacCrimmon & Marshall, 1968). This expansion was intentional. European colonists transported and introduced brown trout around the world because they considered them desirable for sport fishing and food (Wilson, 1879). However, introduced brown trout may negatively affect populations of native fishes in areas where they have been introduced (Belk, Billman, Ellsworth, & McMillan, 2016; Hoxmeier & Dieterman, 2016; McHugh & Budy, 2006; Townsend, 1996). In this study, we evaluated predation by introduced brown trout on native salmon and trout species that are the focus of a large-scale, intensive conservation and habitat restoration effort in the Trinity River, a large tributary of the Klamath River in Northern California.

In Northern California, Scottish, German and hybrid brown trout eggs were brought to Fort Gaston (Hoopa, CA) and Sisson hatcheries near Mt. Shasta by train in the 1890s (Adkins, 2007; Thomas, 1981). There were two introductions from those hatcheries to the Trinity River, one near the mouth at Fort Gaston and a separate effort closer to the headwaters in Stewart's Fork and the main stem Trinity River near Lewiston, CA (Adkins, 2007; Thomas, 1981). According to a Trinity Journal newspaper article (1911), the motivation behind the upstream introduction was the California Fish and Game Commission's plan to replace native rainbow trout (*Oncorhynchus mykiss*) with the "more desirable brown trout" throughout the state.

The downstream introduction was implemented to supplement the dwindling salmon fishery that the local Hoopa Tribe relies on for sustenance (Adkins, 2007). In the early years of brown trout introduction to the Trinity River, fisheries managers raised concerns that the brown trout predation was impacting abundance of native salmon species through predation (Thomas, 1981). This lead to a moratorium on brown trout releases in the Trinity River during the 1920s, but the moratorium was short lived and brown trout stocking was gradually phased back in and continued until 1932 (Thomas, 1981).

Prior to and during the time period when brown trout were introduced, native fishes of the Trinity River experienced steep declines in abundance (Adkins, 2007). Native and tribally-important species such as Chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*Oncorhynchus kisutch*), steelhead trout (*O. mykiss*) and Pacific lamprey (*Entosphenus tridentatus*) were affected by large-scale habitat loss from intensive mining and logging throughout the watershed. A pair of dams completed in the early 1960s exacerbated these effects, cutting off access to the entire upper watershed for migratory fish and diverting a substantial fraction of the Trinity River's water to California's Central Valley for irrigation. The Trinity River hatchery was completed in 1958 to partially mitigate the effects of habitat loss on salmon production. The hatchery currently releases more than 2 million juvenile salmon and steelhead per year into the Trinity River and spawns returning adults to produce the next generation of hatchery fish (California Hatchery Scientific Review Group, 2012). Recent efforts to rehabilitate the native fish populations of the Trinity River also include a massive investment in habitat restoration, including large-scale channel reconfiguration, cover addition, minimum flows, and habitat-forming flow releases from the dams (Beechie et al., 2015). Currently, Trinity River Chinook salmon and steelhead remain well below historic abundance and Trinity River coho salmon are considered threatened under both state and federal laws (National Marine Fisheries Service, 2014).

The potential for brown trout to directly affect native salmon populations by predation depends on brown trout feeding behaviour and abundance. Piscivory by Trinity River brown trout has been documented during field projects focused on other species and by local fisherman, but no formal diet studies of this brown trout population have been conducted. The best historical index for brown trout abundance in the Trinity River is the adult salmon sampling weir in Junction City (river kilometre 136.2). Brown trout catch totals increased at the weir during sampling from 2000 to 2013 to levels 200%–300% higher than those in the 1980s and 1990s, despite reduced sampling effort since 2000 (Borok, Cannata, Hileman, Hill, & Kier, 2014; Borok, Cannata, Hill, Hileman, & Kier, 2014; National Marine Fisheries Service, 2014). Documentation of piscivory combined with the potential increase in brown trout populations inferred from weir catch data suggests that brown trout may be having a substantial impact on native fishes. This threat was identified by the California Department of Fish and Wildlife in 2005 and provided the impetus for changing fishing regulations, adding a bag limit of one brown trout in 2006 and increasing it to five brown trout in 2007 (California Fish & Game Commission, 2007). Trinity River brown trout were also identified as an impediment to species recovery in the recovery plan for Southern Oregon and Northern California coho salmon (National Marine Fisheries Service, 2014).

To assess predation by brown trout on native species, we undertook the first large-scale sampling effort for brown trout in the Trinity River. Sampling included multi-pass electrofishing over a 64-km study reach to estimate abundance, size, growth and age structure of brown trout. We used diet sampling and isotope analysis to characterise brown trout diet composition. Finally, we used the brown trout population and diet data to parameterise a bioenergetics model to estimate brown trout consumption of salmon and other prey in the Trinity River.

2 | METHODS

2.1 | Study area

The Trinity River in Northern California is the largest tributary to the Klamath River, with a main stem length of 274 km and a watershed area of about 7,679 km^2. The Trinity River's headwaters are in the Trinity Alps at an elevation of about 1,850 m, and the confluence with the Klamath River in Weitchpec is 69.5 km from the ocean at an elevation of 56 m. There are two large earthen dams on the Trinity River. Upstream at river kilometre 261.6 is Trinity Dam, which is used for water storage, and downstream at river kilometre 250.3 is Lewiston Dam, which is used to export water to the Sacramento River basin. The Trinity River Fish hatchery is located at Lewiston Dam, and all hatchery-produced fish are released immediately downstream of the dam.

This study is focused on the 64 km of the main stem Trinity River below Lewiston Dam and above the North Fork of the Trinity River (Figure 1). Existing observations indicate that brown trout are widespread through the 178 km of anadromous habitat in the main stem Trinity River as well as major tributaries. However, based on habitat use data collected for other studies (Goodman, Som, Alvarez, & Martin, 2015), brown trout are most abundant in the focal area and it is the area where they likely have the most access to native salmon prey from hatchery releases and natural spawning grounds.

Discharge from Lewiston Dam ranges annually from 8.6 to 311.5 m^3/s. With tributary inputs downstream of the dam, the Trinity River near the North Fork experiences flows between 12 and 850 m^3/s. There is a characteristic seasonal flow pattern: during winter and spring storms and an annual spring dam release, the upper range is approached; by mid-summer and through winter the flows stay closer to the lower range.

The 64 river kilometres in which the study took place were divided into six reaches based on tributary inputs, river access and prior information about brown trout density (Figure 1). The boundaries of each reach occurred at the following locations and creek mouths in downstream order: the concrete weir below Lewiston Dam, Rush Creek, Steel Bridge river access, Indian Creek, Evans Bar river access, Canyon Creek and the North Fork of the Trinity River.

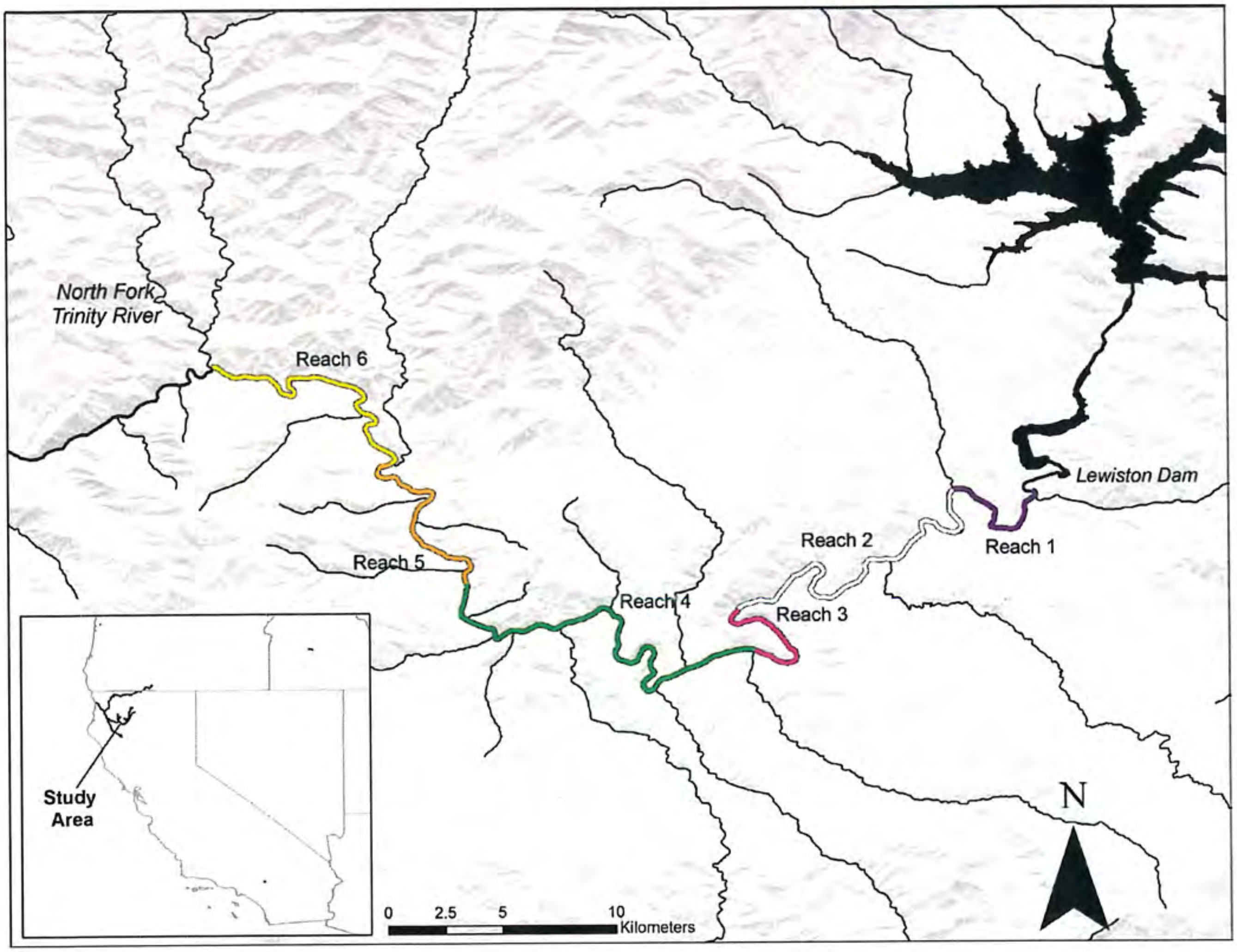

FIGURE 1 Map of the study area with an inset regional map of California. The Trinity River flows from right to left. The study area begins at Lewiston Dam and ends at the confluence of the main stem with the North Fork of the Trinity River. Within the study area, each reach is highlighted with the colour of the Floy T-bar tag that was used to mark fish, matching the temperature profile lines in Figure 2

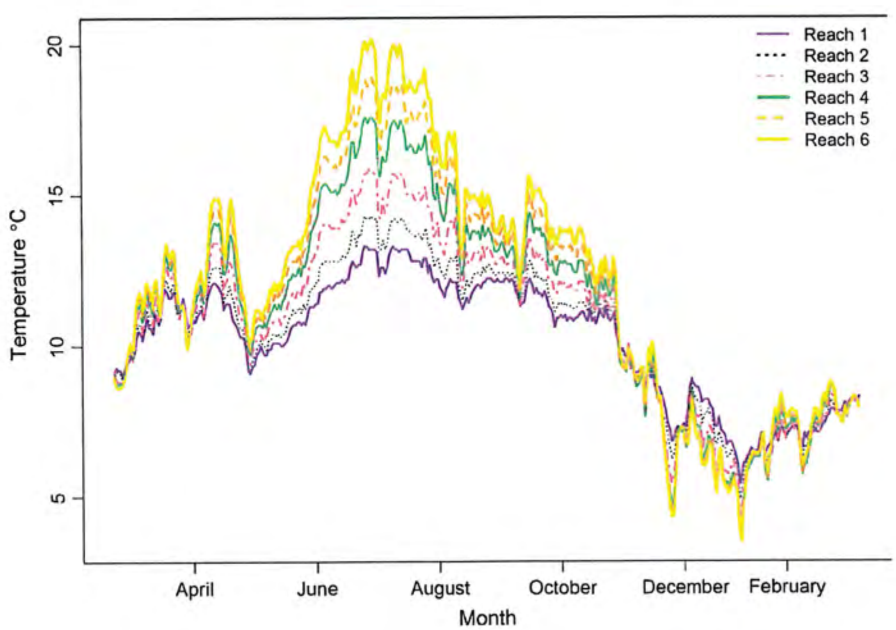

FIGURE 2 Temperature profiles of each reach where Reach 1 is the furthest upstream and Reach 6 is the furthest downstream. The colour of the line matches the colour of the reach in Figure 1

2.2 | Fish sampling

A 4.3-m raft with a Smith-Root 2.5 kW generator powered pulsator electrofisher system (Smith-Root Inc., Vancouver, WA) was used to sample the entire 64 km of river. The control box was set with a DC pulse rate of 30 Hz with voltage between 300 and 400. Sampling focused on the thalweg of the main stem while moving slowly downstream. In March of 2015, the study area was sampled with three passes. Each pass proceeded from upstream to down and took 4 days to complete. A single sampling pass started near Lewiston Dam on Monday and worked down to a river access. Tuesday sampling began where Monday's sampling left off and this pattern continued until the 64 km was completed on Thursday. The following Monday, a new pass would begin starting at Lewiston Dam again. The 7-day interval between samples at a given location allowed brown trout to recover from handling stress and resume normal feeding behaviour before being resampled (Pickering, Pottinger, & Christie, 1982). The three passes bounded the spring release of coho salmon smolts from the hatchery: the first pass was completed before the release, the second immediately following the release, and the third after many of the released smolts had migrated through the study area (Harris, Petros, & Pinnix, 2016). A similar brown trout sampling effort was conducted in the spring of 2016, providing additional diet samples and recaptures for final growth measurements of tagged individuals.

Most brown trout were sampled by electrofishing (859 total), but additional samples were collected opportunistically by other means to provide diet data from outside the spring electrofishing season and to provide additional samples for size and growth analyses. An Alaskan style weir, operated by the California Department of Fish and Wildlife and the Hoopa Tribe, was installed in Junction City California in late June and run through September in 2015 and 2016 to catch migrating adult salmon (Sinnen, Currier, Knechtle, & Borok, 2005). Brown trout captured in the weir in 2015 and 2016 (224 total) were processed as described below. We also processed some additional individuals captured using rod and reel (29 total). All methods produced a similar size range of fish, from 20 cm (minimum size used in the analysis) to at least 60 cm.

2.3 | Processing and handling

Once captured, all brown trout >20 cm long were anaesthetised in water saturated with CO_2 using Alka-Seltzer Gold tablets. Trinity River brown trout are the target of a recreational fishery, so alternative anaesthetics that require a withdrawal period before human consumption were not suitable for this work. Fish <20 cm long were too small for our tagging operation and were less likely to be piscivorous, so we did not include smaller fish in subsequent analysis. Once anaesthetised, the fish were measured (fork length) and the following samples were collected: scales were taken from the left side between the anal and dorsal fin just above the lateral line for age analysis, a 1 cm^2 fin clip was taken from the distal posterior tip of the dorsal fin for stable isotope analysis, and stomach contents were collected using gastric lavage for diet analysis. Fish were weighed following gastric lavage so that stomach contents would not contribute to the mass. Lavage was conducted using a hand-pumped garden sprayer. The spray pipe was placed through the fish's mouth into the stomach and water was sprayed in until the stomach was full. Through continued filling and massaging the belly from the outside, food items were washed and pushed out. A subsample of 30 fish was sacrificed after processing and the stomachs examined to gauge the effectiveness of the gastric lavage. Of these, 28 had completely empty guts, indicating that lavage was generally effective.

After the samples and measurements were taken, the fish were tagged with a uniquely numbered FD94 T-bar tag (Floy Tag & Manufacturing Inc., Seattle, WA) for future identification and then released. The tags were made of a 7.5-cm-long piece of monofilament with polyolefin coloured tubing around it. At the insertion, end was a 1.5-mm-thick, 2-cm-wide "T." The tag was injected using Floy Tag's Mark III pistol grip tagging gun. The needle was inserted below the dorsal fin to allow the T to articulate with the dorsal support skeleton. The colour of the T-bar tag corresponded with a reach (Figure 1) where the fish was collected. These colours allowed a quick visual indication of larger-scale movements while sampling fish in the field and were a check for the closure assumption of the population estimate. Fish captured at the weir received a Floy tag with a distinct tag colour to differentiate them from fish tagged during electrofishing.

2.4 | Analysis

2.4.1 | Population estimate

The electrofishing passes were used to generate the population estimate used in the energetics simulation (described below). The population estimate was calculated using Chapman's estimator (Seber, 1982). This estimator assumes a closed population, with no births, deaths, emigration or immigration. Movement assumptions were tested using the different coloured tags in each reach. During the three-pass sample bout, all but one of the recaptured fish were found in the reach where they were initially tagged. Based on the lack of individual movement and the short timeframe for births and deaths in the 1 week between passes, we considered the closure assumptions met. The first pass was used as the first sampling occasion while the second and third passes were combined into a second sampling occasion.

Not all of the reaches had enough recaptures of tagged fish to calculate a separate population estimate for each reach with reasonable precision, so the whole surveyed section of river was treated as one population for the main estimate. Subsequently, we calculated a population estimate for each reach by dividing the main population estimate among reaches proportionally to the catch in each reach. Using this approach, the overall population estimate used the maximum sample size available.

2.4.2 | Age and growth analysis

Brown trout scales were sorted, mounted and examined following the plastic impression method (Clutter & Whitesel, 1956; Van

Alen, 1982). After discarding unreadable or regenerated scales, each scale was assigned an age and a confidence level (high, medium or low); those scales with a low confidence level were not used in subsequent analyses. To ensure age readings were being performed consistently, scales taken from individual fish that were sampled in multiple years were checked to ensure the increase in age estimates from the scales matched the time that passed between sampling. These checks were conducted blind to the original data by the same reader. All repeat-sampled fish (n = 31) were aged consistently.

The length and age data were fit to a von Bertalanffy growth model assuming additive error with normally distributed residuals using the nonlinear least squares (nls) function in base R (R Development Core Team, 2009). The model is as follows: $L_t = L_\infty\left(1 - e^{-k(t-t_0)}\right) + \varepsilon$ where L_t is fork length at age t, L_∞ is the asymptotic maximum length, k defines the rate at which the asymptote is approached, t_0 is the hypothetical age of the fish at size zero, and ε is error.

We also fit individual length and mass measurements to an allometric curve with multiplicative error in base R (R Development Core Team, 2009) using the nls function. This relationship was used in the bioenergetics model to convert the predicted growth in length from the von Bertalanffy model to growth in mass for the bioenergetics model.

2.4.3 | Annual survival analysis

Age-frequency data can be analysed in multiple ways to estimate survival rates. In simulation studies, the Chapman–Robson survival estimate had less bias and less error than other techniques, especially at small sample sizes (Dunn, Francis, & Doonan, 2002), so that method was applied. The Chapman–Robson estimator is formulated as follows:

$$\hat{S} = \frac{T}{n+T-1}$$

where $T = \sum (x \times N_x)$, where $\hat{S}$ is the annual survival estimate, n is the total number of aged fish from the fully recruited ages, x is the coded age where coded age 0 is the age with the highest number of individuals caught, and N_x is the number of individuals of each age. This approach assumes constant survival throughout the population and constant recruitment across years. We calculated separate survival estimates for the 2015 and 2016 catch and used the average of the two for the consumption model.

2.4.4 | Isotope analysis of diet composition

We measured carbon and nitrogen isotope ratios in 253 brown trout fin clip tissue samples as well as in samples of multiple potential prey items. We selected prey items to analyse for isotopes based on the prey that were most prevalent in the gut samples. Prey items included various mayflies (Ephemeroptera), golden stoneflies (Perlidae) and salmonflies (*Pteronarcys californica*), as well as lamprey ammocoetes, wild steelhead trout fry and hatchery coho salmon smolts. As juvenile salmonids of different species generally have similar diets, we assumed that wild steelhead fry represented the isotope composition of wild salmon and trout (including potential cannibalism on juvenile brown trout). All hatchery fish are fed the same food, based on marine-derived fish meal, so we assumed that the hatchery coho salmon smolts represented the isotope composition of all hatchery species. Nonsalmonid fish species besides lamprey were rare in the diet samples (present in <1% of samples), so they were not assessed as potential prey in the isotope analysis. The prey samples were collected from a rotary screw trap run by the Hoopa Tribal Fisheries programme that is located within the sample area in the downstream reach. Isotope samples were placed on ice immediately after collection and were transferred to a freezer upon return from the field at the end of the day. From the freezer, the samples were transferred to a drying oven set to 65°C and were dried for 36–60 hr. The dried samples were homogenised, and a subsample of 0.5–1.5 mg removed, weighed and placed into a tin capsule. The encapsulated tissue was placed in a plastic tray in one of 96 wells.

The filled trays were sent to UC Davis stable isotope laboratory for analysis of Carbon 13 (δ^{13}C) and Nitrogen 15 (δ^{15}N) using a PDZ Europa ANCA-GSL elemental analyzer interfaced to a PDZ Europa 20-20 isotope ratio mass spectrometer (Sercon Ltd., Cheshire, UK). The δ^{15}N and δ^{13}C values reported were the values of the sample relative to ratios of the international standard for each element, air for nitrogen and Vienna PeeDee Belemnite for carbon.

Isotopic data were used to determine the proportion of each prey type within the diets of the brown trout. Prey were grouped into four categories: ammocoetes, aquatic invertebrates, hatchery salmonids and wild salmonids. Limiting the ratio of prey groupings to isotopes improves model fit (Phillips & Gregg, 2003). As brown trout length was found to be positively correlated with δ^{15}N and δ^{13}C (r^2 of 0.55 and 0.58 respectively), the brown trout isotope data were grouped into five categories based on fork length: <30, 30–40, 40–50, 50–60 and >60 cm. These break points provided adequate samples within each bin to facilitate isotopic analysis and improved resolution within the bioenergetics model when converting food requirements to biomass consumed. The proportions of each prey type consumed by each brown trout group were estimated by fitting the isotope data using a Bayesian framework in the R package MixSIAR (Stock & Semmens, 2013). This package uses a Markov Chain Monte Carlo (MCMC) approach to fitting multi-linear models. Three chains were run with one million iterations each. The burn in length was 500,000, and the thinning rate was 500. The model was run with brown trout size category as a fixed effect and only residual error. Estimated fractionation rates were derived by averaging values from literature sources: 3.74 *SD* 0.477 for δ^{15}N and 1.38 *SD* 0.983 δ^{13}C (Flinders, 2012; McCutchan, Lewis, Kendall, & McGrath, 2003; Minagawa & Wada, 1984; Peterson & Howarth, 1987; Vander Zanden, Cabana, & Rasmussen, 1997; Vander Zanden & Rasmussen, 2001).

2.4.5 | Bioenergetics

A bioenergetics approach was used to estimate total prey consumption by brown trout, with a parametric bootstrap to characterise the variance of the estimate. The bioenergetics simulation represented

TABLE 1 Parameters of the Wisconsin bioenergetics model and the values used to implement it

Parameter	Value	Parameter definition
CTO	17.5	Water temp corresponding to 0.98 of the maximum consumption rate
CTM	17.5	The upper end of the temperature where still at 0.98 of the maximum consumption rate
CQ	3.8	Water temperature at which temperature dependence is a fraction (CK1) of the maximum rate
CA	0.2161	Intercept of mass dependence function for a 1-g fish at optimum water temperature
CB	−0.233	Coefficient of mass dependence for increasing portion of curve
CTL	20.8	Temperature at which consumption is reduced some fraction (CK4) of the maximum rate
CK1	0.23	Specific rate of respiration ($g\ g^{-1}\ d^{-1}$)
CK4	0.1	See CTL
RA	0.0113	Intercept for the allometric mass function for respiration
RB	−0.269	Slope of allometric mass function for respiration
RQ	0.0938	Approximates the rate at which the function increases over relatively low water temperature
RK1	1	Intercept for swimming speed above the cut-off temperature
RK4	0.13	Mass dependent coefficient for swimming speed at all water temperatures
BACT	0.0405	Water temperature dependent coefficient of swimming speed at water temp below RTL
RTO	0.0234	Coefficient for swimming speed dependence on metabolism (s/cm)
RTL	25	Cut-off temperature at which activity relationship changes
ACT	9.7	Intercept of the relationship between swimming speed and mass at a given temperature
LOSS	0.35	Energy lost to faeces and specific dynamic action
EDA	6,582	Intercept for energy density-weight function
EDB	1.1246	Slope of the energy density-weight function

Note. The model equations and parameter meanings are described in Hansen et al. (1997). All parameter values are from Dieterman, Thorn, and Anderson (2004) except LOSS, which is from Burke and Rice (2002).

the growth and consumption of age 2–12 brown trout over 1 year. The model ran on a daily time step where 1 March 2015 was model day one. The base of the simulation was the Wisconsin Bioenergetics model (Hansen, Johnson, Kitchell, & Schindler, 1997) coded into R (code by Andre Buchheister, personal communication, August 2015). Published values for parameters relating to brown trout metabolism, egestion, activity, growth and consumption were used to set a baseline and facilitate comparison to other studies (Table 1). We did not have information about brown trout spawning frequency in the system, so we did not include gamete loss in our model, potentially producing an underestimate of total consumption.

To estimate the maximum amount a brown trout could consume, we used Hansen et al.'s (1997) third consumption equation, as it is designed for cold water fishes such as brown trout. In the model, consumption is dependent on size, water temperature and the amount of food consumed in laboratory experiments during ad libitum feeding at optimal temperatures. To estimate what brown trout actually consume, the modelled maximum consumption is scaled by the proportion of maximum consumption (p). The proportion of maximum consumption was allowed to vary between simulation iterations to achieve the targeted growth of the brown trout of each age. Parameters representing the mass at the start of the year, mass-specific growth rate, population size, survival rate and diet composition were randomly selected for each iteration of the model from a normal distribution, with a mean and standard deviation for each parameter derived from the field data (Table 2).

Additional input data required to estimate consumption included mean daily temperature and prey-specific energy density. The temperature fish experienced was determined using linear interpolation of the mean daily temperature between available U.S Geological Survey gage stations (ID numbers 11525500, 11525655, 11525854 and 11526400). The temperature profiles used in the energetics model were that of the midpoint of each reach from 1 March 2015 through 28 February 2016 (Figure 2). The prey energy densities were literature values: invertebrates 4.07 kJ/g (Groot, Margolis, & Clarke, 1995; Myrvold & Kennedy, 2015), lamprey ammocoetes 3.54 kJ/g (Alvarez, 2017), other fish 5.78 kJ/g (Hansen et al., 1997). Temperature and prey energy density were not randomised as part of the bootstrap.

Each simulation started with a random draw of average starting size for brown trout of each age from 2 to 12 (Table 2). Then, randomly drawn von Bertalanffy parameters were used to calculate average sizes at the end of the year. After converting length to mass, an optimisation function optim in R (R Development Core Team, 2009) was used to find the proportion of maximum consumption required to achieve the selected final mass within each reach for an individual of each age. During that growth interval, daily size and consumption were recorded for each fish. Next, a random draw of population size and survival rate was used to find the number of fish of each age on each day. Finally, the number of fish alive on each day within the appropriate reach and of the appropriate age was used to expand the individual brown trout daily consumption estimates to the reach level. To facilitate allocating total consumption to different prey types, the total biomass consumed each day was aggregated into the five length-based bins used in the stable isotope mixing model. This process was repeated 3,000 times to characterise the variation in consumption

TABLE 2 Brown trout population parameters for the bioenergetics simulation

Parameter	Mean	Standard error
Population size		
Reach 1	111	65.5
Reach 2	300	178.5
Reach 3	95	56.5
Reach 4	553	328.5
Reach 5	284	169
Reach 6	237	141
Annual survival	58.3%	2.4%
Initial size (cm)		
Age 2	20.0	2.4
Age 3	34.0	4.7
Age 4	40.6	4.0
Age 5	47.0	4.5
Age 6	53.2	4.7
Age 7	56.6	5.1
Age 8	62.8	5.2
Age 9	66.0	4.9
Age 10	69.0	4.9
Age 11	72.0	4.6
Age 12	75.0	4.6
Growth rate		
L_∞	90.6	2.9
K	0.14	0.009
t_o	−0.21	0.055

Note. The estimates and variance are derived from field data collected during this study.

given different growth rates, and to account for the error associated with growth, abundance and survival estimates. The error estimate does not include variation associated with process error or bioenergetics parameters taken from the literature. These model runs produce estimates of the total biomass of food with the energy density of brown trout that is consumed for each size class.

Diet proportion, predator and prey energy densities, and the estimate of consumption from the simulation were combined to find the biomass of each prey category consumed by brown trout. For this portion of the analysis, the posterior distribution from the isotopic analysis was treated as a parametric bootstrap which we drew from with a multinomial random draw. A random multinomial draw of consumption by for each size bin was combined with a draw of prey proportion and energy densities in the equation $= \frac{E}{A{\times}E_A+H{\times}E_H+W{\times}E_W+I{\times}E_I}$, where B is the total biomass consumed and E is the total energy required. The symbols A, H, W and I are the proportion ammocoetes, hatchery fish, wild fish and invertebrates contribute to total biomass consumed respectively. E_x is the energy density of the prey category x. The resulting biomass combined with the random draw of proportions provides the biomass of each prey type consumed by the population for a single iteration. This process was repeated 100,000 times to generate a distribution of consumption estimates, ensuring multiple combinations of the consumption and diet composition estimates.

3 | RESULTS

In 2015, we captured 589 brown trout between 20 and 79 cm. Based on recaptures, we estimated the population to be 1580 (95% CI 1,279–1,878). The scale samples collected from these fish revealed

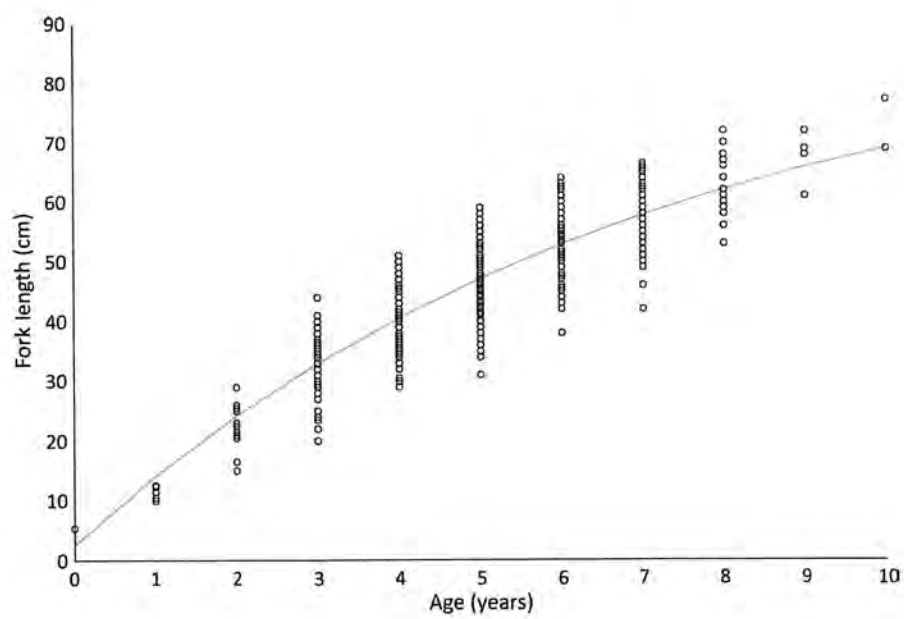

FIGURE 3 Age and size for all individual brown trout and the fitted Von Bertalanffy growth curve. Von Bertalanffy parameter estimates and standard errors are in Table 3

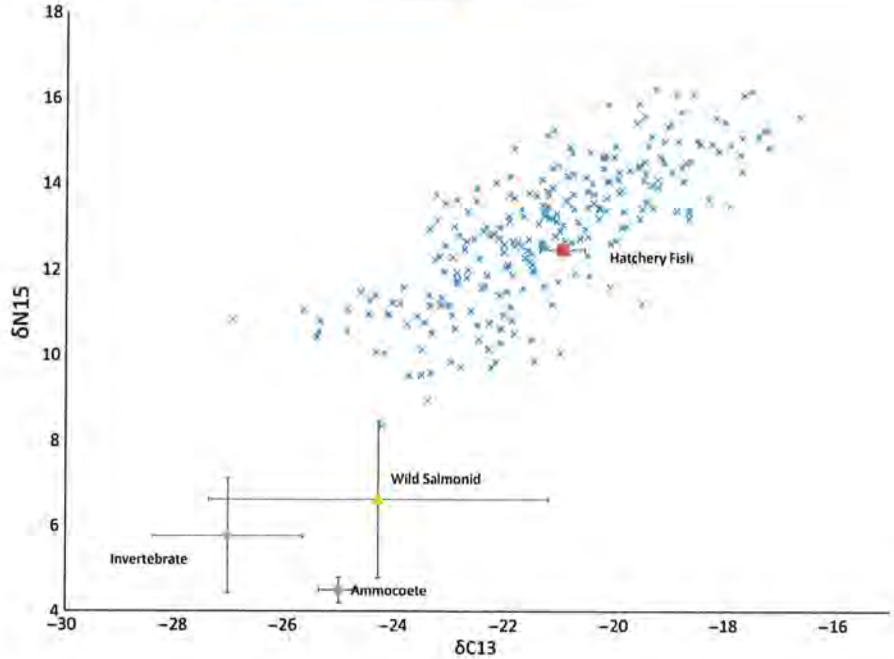

FIGURE 4 Isoplot of brown trout and prey items. Blue x's represent individual brown trout isotope ratios. Prey items are labelled and the location is the mean value for that prey category. The error bars are a single standard deviation

their ages ranged from 2 to 11 years (Figure 3). This sample provided sufficient representation of the population's age and size composition to estimate growth and survival parameters for the bioenergetics model (Table 2).

Wild fish and invertebrate prey had lower $\delta^{15}N$ and $\delta^{13}C$ than hatchery fish. Brown trout isotope values ranged from in between wild prey and hatchery fish values to higher than both (Figure 4). The MixSIAR model MCMC chains converged with all parameters having $\hat{R}$ values of >1.01 $\hat{R}$ < 1.05 is acceptable for inference (Stock & Semmens, 2013). The model results show that the large brown trout consume very a high proportion of fish, especially hatchery fish, and that reliance on fish declines in smaller brown trout (Figure 5). A relatively small proportion of the diet comes from wild fish.

The snapshot of diets from gastric lavage samples shows a similar level of piscivory as the isotope model for larger size classes, but lower than the isotope model for small size classes (Table 3). However, gastric lavage lacks the full temporal scale of the isotope analysis and is not as effective at parsing out wild and hatchery fish. While most fish retrieved during lavage were not identifiable to hatchery or wild origin (based on hatchery marking), the temporal pattern of fish consumption by brown trout was consistent with heavy reliance on hatchery-released fish. The number of fish found in stomachs of brown trout peaked in the sample pass conducted immediately following the release of coho salmon smolts from the hatchery (average: 2.2 fish per stomach; *SD* 2.6; range: 0–11) relative to the sample before the smolts were released (average: 0.3 fish per stomach; *SD* 0.8; range: 0–9) and after most hatchery coho salmon smolts had moved out of the study area (average: 0.3 fish per stomach; *SD* 0.7; range: 0–2). Across all samples, coho salmon were the most common identifiable fish in lavage samples (n = 36), followed by steelhead (n = 16), Chinook salmon (n = 5) and brown trout (n = 5, not counting one individual that apparently consumed four small brown trout in the live well during sampling). Additional fish recovered from lavage samples were not identifiable to a single species, but based on size and time of year we could narrow these fish to the two most likely prey species: larger fish were either yearling coho salmon or steelhead trout (n = 73) and the smaller fish were either Chinook or coho salmon (n = 14).

The energetics simulation predicted that the brown trout population needed to consume 58,382 megajoules (95% CI 39,334–77,432) of energy per year. Variation in growth rate accounted for most of the dispersion around the consumption estimates. The variation around the population size and survival rate estimates added additional variation around the consumption estimate, but this variation was almost inconsequential when compared to differences from growth. When energy was converted into prey biomass by category, the most-consumed prey item was hatchery fish, followed by invertebrates, wild fish and ammocoetes (Figure 6). In 2015, brown trout consumed 5,930 kg (95% CI 3,800–8,805 kg) of hatchery salmonids and 924 kg (95% CI 60–3,526 kg) wild salmonids.

4 | DISCUSSION

Non-native brown trout in the Trinity River are highly piscivorous. We found that large individual brown trout relied heavily on native salmonids as prey. This is a particular concern given the ongoing, intensive recovery efforts for native salmonids in the Trinity River. Here, we consider brown trout predation separately on hatchery and wild-spawned fish. We take this approach for three reasons: First, hatchery fish are isotopically distinct from other prey sources due to the marine fish component of hatchery fish feed, so we had to estimate consumption of hatchery fish separately from wild fish in our isotope analysis. Second, hatchery production and release practices

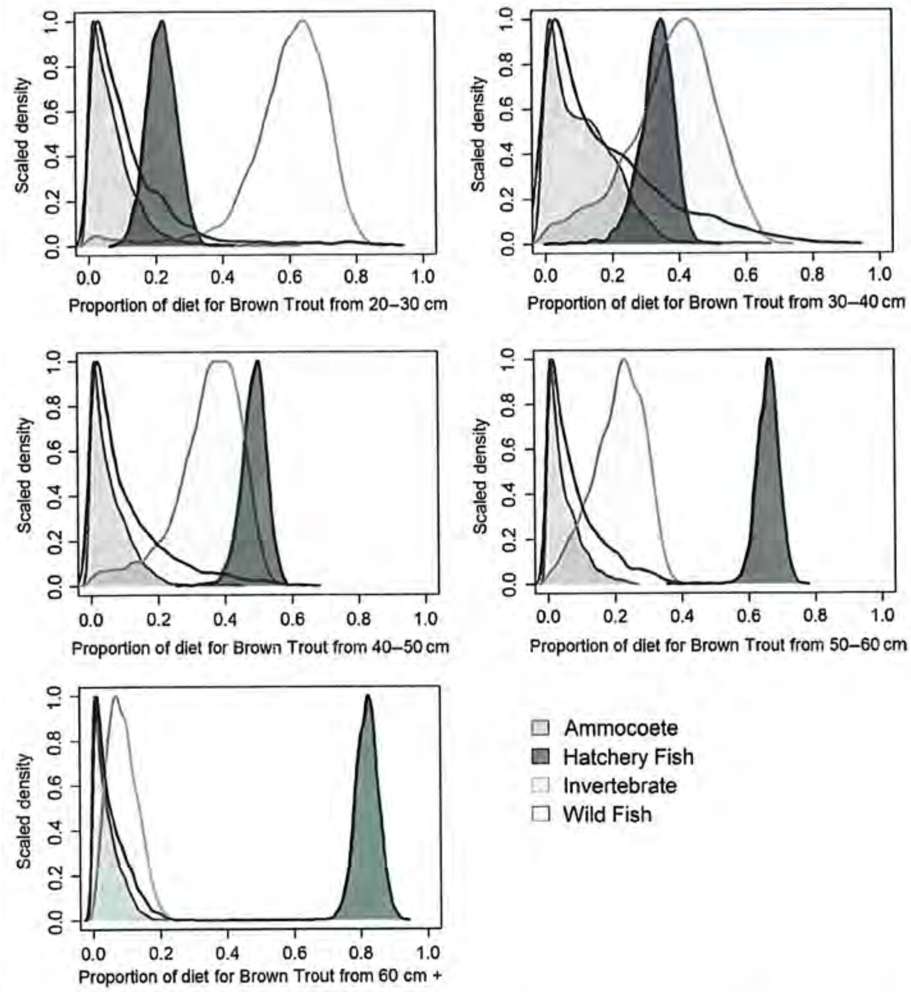

FIGURE 5 Diet proportions of brown trout grouped by fork length. Sample sizes for each size bin were n = 19 for 20–30 cm, n = 60 for 30–40 cm, n = 83 for 40–50 cm, n = 61 for 50–60 cm, and n = 30 for >60 cm

are factors that managers can control to potentially affect predation rate or brown trout abundance, but this is not true of wild-spawned fish. Third, although the Trinity River hatchery and wild runs of salmon and trout are genetically integrated, hatchery and wild-spawned individuals often have different survival and adult return rates (Araki, Berejikian, Ford, & Blouin, 2008) so predation on each type may have different effects on salmon and trout populations.

4.1 | Hatchery-produced fish

Piscivorous brown trout in the Trinity River relied heavily on hatchery-produced fish. Our isotope analysis indicates that most of the biomass of large brown trout in the Trinity River is derived from consumption of hatchery fish. Other studies have found that releases of large numbers of hatchery-produced fish can provide a substantial resource pulse that alters recipient ecosystems (Alexiades, Flecker, & Kraft, 2017; Warren & McClure, 2012). To put the results for predation on hatchery fish in context with regard to salmon production, the mean estimate of hatchery fish biomass consumed by brown trout was about 7% of the total biomass released from Trinity River Hatchery in 2015.

The artificial subsidy provided by juvenile salmon and trout from the hatchery likely allows Trinity River brown trout to maintain elevated population levels and reach larger size than would otherwise exist within the river. Historical records suggest that the Trinity River brown trout population increased substantially after hatchery releases began, (Moffett & Smith, 1950; Rodgers, 1973) giving some credence

TABLE 3 Comparison of diet composition results based on lavage and isotope analysis

Brown trout size interval (cm)	% Fish	
	Lavage (%)	Isotope (%)
20–30	8	38
30–40	26	60
40–50	83	63
50–60	82	78
>60	98	92

Note. The lavage was calculated as the summed mass of content within a category divided by the total mass of stomach contents. All masses are wet masses and do not account for digestive state. Brown trout are grouped by fork length.

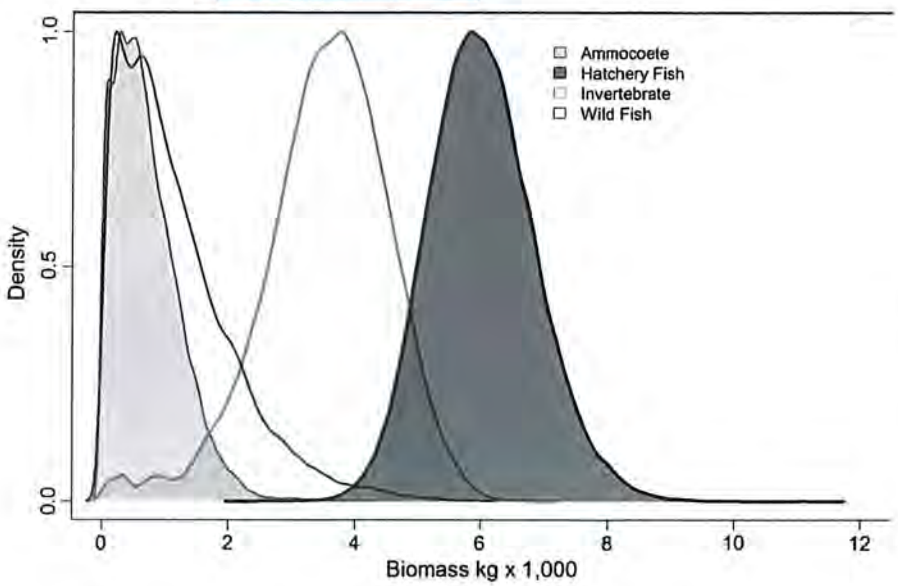

FIGURE 6 Estimated biomass of prey consumed by all brown trout >20 cm long in the Trinity River over the course of a year. Median consumption estimates were 5,930 kg of hatchery fish (95% CI 3,800–8,805 kg) 3,566 kg of invertebrates (95% CI 1,279–5,524 kg), 924 kg (95% CI 60–3,526 kg) of wild fish and 598 kg of lamprey ammocoetes (95% CI 18–2,058 kg)

to the notion that hatchery supplementation increased brown trout population growth, although habitat restoration and changes in flow management probably explain some of the variation in brown trout abundance. Brown trout are currently sustained by hatchery fish even though the availability of hatchery fish is seasonally limited to relatively brief periods after hatchery releases and before the hatchery fish migrate out of the Trinity River heading for the ocean (March for coho salmon, April for steelhead trout, June and October for Chinook salmon). Our bioenergetics model and observations of stomach contents suggest that the large brown trout feed voraciously immediately following hatchery releases and probably do not gain much biomass during the rest of the year. However, brown trout do still eat opportunistically when hatchery fish are not available, including during the vulnerable emergence and early rearing period for wild salmon and trout in the study area (January–February).

There was a clear ontogenetic diet shift for Trinity River brown trout, with increasing reliance on hatchery fish for larger, older individuals. An increase in piscivory with size is a well-documented phenomenon for brown trout (Jensen, Kiljunen, & Amundsen, 2012; L'Abée-Lund, Langeland, & Sægrov, 1992) and is often accompanied by a rapid increase in growth rate and a larger maximum size (Jonsson, Næsje, Jonsson, Saksgård, & Sandlund, 1999). However, recent work suggests that the shift to piscivory is contingent on the presence of a suitable prey species that is vulnerable to brown trout and abundant enough to support a population of predators (Sánchez-Hernández, Eloranta, Finstad, & Amundsen, 2017). Hatchery-released fish may fill this role for brown trout in the Trinity River, supporting a shift to piscivory and sustaining the biomass of large, predatory individuals.

4.2 | Wild-spawned fish

Our estimate of predation on wild-spawned salmon and trout is lower and less precise than the estimate for hatchery-produced fish. The lower precision of this estimate is caused in part by the isotopic similarity of wild salmon and trout to other naturally-occurring prey items in the Trinity River, including insects and lamprey ammocoetes. However, based on observations of fish in brown trout diets before the hatchery releases, we know that brown trout in the Trinity River do actively feed on wild-spawned salmon and trout. Although the total biomass of wild fish that brown trout consume is much lower than for hatchery fish, this predation is still a potential concern for conservation because it occurs over longer time spans, including the early rearing period when the total biomass of wild fish available is much lower than the biomass of hatchery fish available during hatchery releases. However, translating our consumption estimates into mortality rates and estimating the effects of brown trout on wild salmon populations in the Trinity River is not possible with the current data set.

Based on the average estimate of ca. 1,000 kg of wild salmonids consumed by brown trout and a total of ca. 4,000 kg of juvenile salmonids outmigrating from the upper Trinity River (Harris et al., 2016), we could naively say that 20% of wild salmonid production in 2015 was consumed by brown trout. However, this estimate could have a substantial positive or negative bias for a variety of reasons. First, some proportion of the wild salmonids consumed by piscivorous brown trout were juvenile brown trout, which are lumped with other wild-spawned salmon and trout in the isotope analysis (potential positive bias). The lavage data suggest that cannibalism was relatively rare, but our samples from outside of the spring electrofishing sample bouts are limited and cannibalism may have been more common in other seasons. Even if we assume cannibalism was truly rare, the naïve calculation of brown trout imposed mortality is premised on some very unlikely assumptions: that every fish consumed by brown trout was similar in size to outmigrants and that every fish consumed by brown trout would have survived their journey out of the 64 km below the dam if it was not consumed. In reality, brown trout can consume juvenile salmonids during their entire rearing period leading up to outmigration, including at sizes much smaller than outmigrants (potential negative bias). Further, not all of the wild fish consumed by brown trout would have otherwise survived (potential positive bias), some level of compensatory mortality is certain (Ward & Hvidsten, 2010). Finally, any attempt to estimate effects on populations would clearly require estimates of consumption at the species level, not lumped into hatchery and wild categories (unknown bias, possibly different for each prey species).

In addition to predation, brown trout may affect survival and growth of wild-spawned salmon and trout in the Trinity River through competition. Our sampling techniques and analysis focused on large brown trout with diets and microhabitat use that are distinct from native juvenile salmon and trout. However, other studies have found that juvenile brown trout can compete for food and territory space with juveniles of all three salmon and trout species native to the Trinity River (Fausch & White, 1986; Gatz, Sale, & Loar, 1987; Glova & Field-Dodgson, 1995). Competition could exacerbate any negative effects of brown trout on populations of native fish in the Trinity River, as has been suggested for non-native brook trout and native Chinook salmon in the Columbia River system (Levin, Achord, Feist, & Zabel, 2002). Evaluating effects of competition between brown trout and native salmon and trout in the Trinity River will require a new sampling effort.

4.3 | Management options

Historical records are incomplete, but existing information suggests that brown trout abundance in the Trinity River continues to fluctuate. Creel surveys prior to 1970 refer to catches of less than 10 brown trout per angler per year, with fish ranging from 30 to 50 cm (Moffett & Smith, 1950; Rodgers, 1973). Catches in recent years are generally 2–5 brown trout per angler per day with lengths reaching or exceeding 70 cm (J. Alvarez, personal observation). Our sampling in 2015 might represent part of a recent peak in brown trout abundance. As sampling continued into 2016 and 2017, the brown trout population estimates declined and younger year-classes were less common (Alvarez, 2017). Despite this potential recent decrease in brown trout abundance, our results suggest that Trinity River brown trout have the capacity to exist at abundance high enough to consume a substantial proportion of native salmonid production.

The consumption estimates that we produced are contingent on the validity of our bioenergetics model. Bioenergetics models provide a framework for accounting for metabolic costs and other energetic losses when inferring food consumption from observations of growth. The models are based on fundamental relationships between body size, temperature and physiological rates (Hansen et al., 1997). There is a large body of work on the energetics of brown trout growth that describes these relationships (Elliott, 1994), providing the basis for the parameters that we used. However, there are many uncertainties in bioenergetics models that can lead to biased estimates, including uncertainty in the parameter estimates, the functional form of the physiological relationships and how these vary across individuals and populations (Chipps & Wahl, 2008). In our model, we used simulations to incorporate the uncertainty in our field-derived parameter estimates into our estimate of consumption, but there are no estimates of the uncertainty available for most of the basic physiological parameters in the literature. One particular area of concern for our estimate is the highly seasonal pattern of prey availability and consumption, with most of the annual energy intake for large brown trout coming from the consumption of hatchery fish during the spring release. The standard bioenergetics model formulation often underestimates consumption when prey availability is high and overestimates consumption when prey availability is low (Chipps & Wahl, 2008). However, we do not know how these biases play out over time when food availability transitions from very high to low, or how this seasonal variation may affect our isotopic determination of diet composition.

If brown trout are suppressing survival of native salmon and trout, then direct control of brown trout abundance by altering sport harvest regulations, euthanising brown trout captured in the course of other sampling efforts and targeted removal sampling may aid in the recovery of native populations. However, direct control of invasive trout can be very expensive and such efforts have a mixed record of success (Meyer, Lamansky, & Schill, 2006; Syslo et al., 2011). If implemented, any such efforts should include assessment of survival of hatchery-released fish and recruitment success of wild fish to determine whether brown trout control efforts benefit native salmon and trout.

Efforts to manage the brown trout population to reduce impacts on native salmon and trout in the Trinity River are likely to generate some controversy. The authors of previous studies in other regions often comment on the importance of brown trout to the sport fishing community. For example, Belk et al. (2016) investigated the potential for maintaining the fishery for non-native brown trout in the Provo River in Utah while increasing native fish populations through physical habitat restoration. They found that rare species would persist only with low brown trout abundance; negative effects on native species could be ameliorated but not removed while brown trout persisted. Similarly, Townsend (1996) studied streams across New Zealand and found localised extirpations of galaxiid fishes and large-scale changes to entire aquatic communities associated with introduced brown trout. Despite these findings, in his conclusions he questioned the need for and feasibility of any brown trout removal programme. A community of recreational anglers is invested in brown trout in the Trinity River system because resident brown trout support a small recreational fishery, especially when native anadromous species are not available.

As an alternative to direct control efforts, it may be possible to reduce predation on hatchery fish by altering release practices at the hatchery. Reducing brown trout predation on hatchery-released fish has two potential benefits: increased survival of hatchery-released fish, supporting conservation efforts and harvest opportunities, and a reduced subsidy to the brown trout population. The latter could have cascading affects, including reducing the abundance of large, piscivorous brown trout that rely on hatchery-released fish and reducing predation on wild fish. This assumes that brown trout will not be able to sustain their high biomass by switching to an alternative prey, but we argue that this is a reasonable assumption given that large brown trout do not currently consume much biomass of other prey during the portion of the year when hatchery salmon are not available. Approaches that might reduce brown trout predation on hatchery fish include synchronising the releases of multiple species from the hatchery, so that large numbers of prey swamp the brown trout for a lower overall predation rate (Ward & Hvidsten, 2010), and minimising the time that hatchery fish remain in the system by delaying releases until fish are large and set to migrate rapidly to sea.

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Tracking Number: (2019-001)

To request a change to regulations under the authority of the California Fish and Game Commission (Commission), you are required to submit this completed form to: California Fish and Game Commission, 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:
Telephone number:
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 eliminate commercial parking use in the Ballona Wetlands Ecological Reserve, by changing the language in paragraph (h)(3) from "existing parking areas may be allowed under leases to the County of Los Angeles" to "existing parking areas may be allowed under leases to the County of Los Angeles provided such leases are limited to parking uses by public agencies that perform services for the Ballona Wetlands Ecological Reserve and that such leases prohibit parking for commercial use." The purpose of this proposed change is to convert a substantial portion of approximately 72,600 square feet of paved parking lot, used primarily by employees a private shopping plaza, and to a lesser extent by agencies of Los Angeles County, to a use more compatible with a public ecological reserve.

4. **Rationale (Required) -** Describe the problem and the reason for the proposed change: California taxpayers spent $139 million 15 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 commercial parking space to local businesses. Yet, approximately 72,600 square feet of land currently leased to Los Angeles County, Department of Beaches and Harbors ("Beaches and Harbors"), includes parking for employees of the businesses in

Fisherman's Village, across Fiji Way from the ecological reserve. The current parking exception was adopted by the Commission at its August 19, 2005 meeting.

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. Only a small portion of this lot is used by the Department of Fish and Wildlife for its vehicles and an office trailer.

Section 630 currently provides the Department with sole discretion as to whether a more appropriate use of this parcel should take precedence over the existing parking use. There is no question that this parcel of land can and would be more appropriately used if the Department exercised that discretion, but the Department has not done so. Therefore the only available remedy short of litigation available to stakeholders of the ecological reserve is to request this regulatory change.

The existing commercial parking use violates the public bond fund measures used to acquire the land, violates the temporary Coastal Development Permit issued in 1988 and intended to be in effect for approximately five years, 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:

When a resubmitted version of this petition was denied in December of 2017, the Commissioners expressed a consensus that the petition was not necessarily without merit, but that they felt it was premature since comments were still being received in response to publication of the draft Environmental Impact Report for the restoration of the Ballona Wetlands. The Land Trust disagreed with that assessment, because the Commission's duties to maintain appropriate regulations is independent from the Department's duties pursuant to the California Environmental Quality Act (CEQA). Nonetheless, the public comment period was closed on February 5, 2018 and the Department has had almost a year to respond to the public comments received. The Department has made statements at subsequent FGC meetings with regard to the parking lots indicating changes to usage of the parking areas in question, but those changes appear not to have been implemented.

Additionally, new documents have been obtained by the Land Trust (some pursuant to litigation settlement with Los Angeles County) that further reinforce the commercial use aspect of the parking area in question. These documents clearly show collaboration between the County and local businesses to influence land use decisions in a manner that would favor their business interests over the public's interest in restoring the Ballona Wetlands as native wildlife habitat.

Finally, this petition is significantly different that the previous petition in that it seeks only the prohibition of parking for commercial purposes, not the prohibition of parking by public agencies.

For these reasons, we are confident that this petition merits consideration at the April 2019 meeting of the California Fish and Game Commission.

SECTION II: Optional Information

5. Date of Petition: January 03, 2019

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):
☐ 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 2017-002
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: Please see attached documents relating to the existing parking use and proposed parking structure, including new information that the Land Trust obtained after the June 21 hearing on our original petition

The Ballona Wetlands Draft EIR is 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 would result in the loss of $1,608 in annual lease payments, which is substantially below market value. The land Trust hat offered to more than offset that amount if the paved lots can be converted to more appropriate use.

Additionally, due to lease payments that are clearly well below market value, and because parking for a shopping plaza and an unrelated County agency do not further the public purpose of the ecological reserve and the Department of Fish and Wildlife generally, the state could be in violation of the constitutional provision against gifts of public funds between agencies, as noted above.

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

SECTION 3: FGC Staff Only

Date received:

FGC staff action:

☐ Accept - complete
☐ Reject - incomplete
☐ Reject - outside scope of FGC authority

Tracking Number

Date petitioner was notified of receipt of petition and pending action: _______________

Meeting date for FGC consideration: ___________________________

FGC action:

☐ Denied by FGC
☐ Denied - same as petition _____________________
Tracking Number
☐ Granted for consideration of regulation change

State of California
Department of Fish and Wildlife

Memorandum

Date: June 5, 2019

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

From: Kari Lewis
Chief
Wildlife Branch

Subject: **RESPONSE TO PETITION TO ELIMINATE COMMERCIAL PARKING AT BALLONA WETLANDS ECOLOGICAL RESERVE**

In February 2019, the California Fish and Game Commission (Commission) received a petition (Petition # 2019-001) for regulation change from Mr. Walter Lamb to amend existing regulations to prohibit commercial parking use at the Ballona Wetlands Ecological Reserve by limiting County of Los Angeles leases to parking uses by public agencies that perform services for the reserve. In April 2019, the Commission referred the petition to the California Department of Fish and Wildlife (Department) for review and recommendation. The Department has reviewed Petition # 2019-001 and has determined the regulation change is unnecessary for the following reasons:

- Sections 550, 550.5 and 630, Title 14, California Code of Regulations regulate visitor uses (e.g. wildlife watching, fishing, and hunting) on designated ecological reserves, but not the Department's day-to-day management of those reserves. Subsection 630(h)(3) allows for the use of the existing parking areas at Ballona Wetlands Ecological Reserve under leases to the County of Los Angeles. In its management role, the Department is working with the County of Los Angeles to amend an existing lease. Amendments to the lease terms and conditions should remain under the Department's authority. Changes to regulations governing public use activities are not necessary for the Department to manage leases.
- At the Commission's April 2019 meeting, Director Bonham stated the Department is currently reevaluating the terms of the lease, including the commercial parking conditions.

Based on the above reasons and in order to avoid an unnecessary rulemaking package, the Department recommends denying the petition. If you have any questions or need additional information, please feel free to contact me at (916) 445-3789 or Kari.Lewis@wildilfe.ca.gov.

cc: Stafford Lehr, Deputy Director
Wildlife and Fisheries Division

Ed Pert, Regional Manager
South Coast Region

CAPITOL OFFICE
STATE CAPITOL, ROOM 4076
SACRAMENTO, CA 95814
TEL (916) 651-4026
FAX (916) 651-4926

DISTRICT OFFICE
2512 ARTESIA BLVD., SUITE 320
REDONDO BEACH, CA 90278
TEL (310) 318-6994
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WWW.SENATE.CA.GOV/ALLEN
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California State Senate

SENATOR
BEN ALLEN
TWENTY-SIXTH SENATE DISTRICT

COMMITTEES
ENVIRONMENTAL QUALITY, CHAIR
GOVERNMENTAL ORGANIZATION
JUDICIARY
NATURAL RESOURCES & WATER

JEWISH CAUCUS, CHAIR
ENVIRONMENTAL CAUCUS, CO-CHAIR

Received May 24, 2019

May 15, 2019

Eric Sklar
President, California Fish and Game Commssion
P.O. Box 944209
Sacramento, CA 94244

RE: Limit Use of Leased Parking Sites in Ballona Wetlands Ecological Reserve Parking Lot

Dear President Sklar,

Currently, the Ballona Wetlands Ecological Reserve parking lot on Fiji Way is utilized by the County of Los Angeles, Marina Del Rey Sheriff Station, and commercial tourism businesses located at Fisherman's Village and along Fiji Way. Allowing the employees of these businesses to park here has enabled the parking lots at Fisherman's Village and Dock 52 to be reserved for the public. Evicting the commercial businesses from the Ballona Wetlands parking lot will eliminate over two hundred parking spaces and force the businesses' employees to use the lot at Fisherman's Village and Dock 52, severely minimizing the parking spaces available to the public.

I urge the Fish and Game Commission to provide the commercial businesses being evicted from the Ballona Wetlands parking lot additional time to make necessary arrangements for their employees. Due to limited parking spaces in the area, additional time to coordinate alternative parking is essential. I ask the Commission to extend the notice to vacate the parking lot to ninety days instead of the proposed thirty days.

If employees and tourists are forced to park in the same lot, it will severely hinder people's ability to enjoy our coast.

Sincerely,

Ben Allen

Ben Allen
Senator, 26th Senate District

Marina del Rey
Lessees Association

C/o Mr. Timothy C. Riley, Executive Director
8537 Wakefield Avenue
Panorama City, CA 91402
Telephone: 818-891-0495; FAX: 818-891-1056

April 11, 2019

California Fish and Game Commission
P. O. Box 944209
Sacramento, CA 94244-2090
email: fgc@fgc.ca.gov

RE: Item #21 (A) III, April 17, 2019, Meeting Agenda
Limit Use of Leased Parking Sites in Ballona Wetlands Ecological Reserve Parking Lot

Dear Members of the Commission:

The Marina del Rey Lessees Association represents the leaseholders of anchorages, residential, commercial, marine and visitor-serving properties in unincorporated Marina del Rey. The lessees take great pride in providing a balance of public and private uses in Marina del Rey that allow the residents and visitors alike to enjoy the Marina's attractions.

In concert with the goals and policies of the California Coastal Commission and the County of Los Angeles, the Association strongly supports maximizing visitor-serving uses and public access to the water in Marina del Rey which are facilitated by augmenting parking for the general public.

To that end, we support the continued use of that portion of the Ballona Wetlands Ecological Reserve for parking by employees of the County and the local businesses so that public parking remains available at the Fisherman's Village lot for visitors to enjoy the Marina's many visitor-serving uses, including access to the water afforded by viewing areas along the promenade and harbor cruises.

In recognition of the importance of sufficient parking for the public to enjoy Marina del Rey's public and private amenities, the Association urges the Fish and Game Commission to seek reversal of the Department of Fish and Wildlife's decision to no longer allow the non-County employee parking on the Ballona Wetlands Ecological Reserve parking lot.

The County's use of the parking lot adjacent to the Ballona Wetlands should continue as a vital service that advances the public interest of providing access to the shoreline and visitor-serving uses at Fisherman's Village and other nearby venues for the enjoyment of visitors and residents of the County of Los Angeles.

The original letter submitted on September 26, 2017 by the Association in support of the current use of the parking lot is attached in this communication. The planning process undertaken by the state of California should be allowed to proceed without disruption of the status quo at this time.

Thank you for your consideration of our support for the continued use of this much-needed parking.

Sincerely,

David O. Levine /m

David O. Levine
President

Marina del Rey Lessees Association

C/o Mr. Timothy C. Riley, Executive Director
8537 Wakefield Avenue
Panorama City, CA 91402
Telephone: 818-891-0495; FAX: 818-891-1056

September 26, 2017

California Fish and Game Commission
1416 Ninth Street, Suite 1320
Sacramento, CA 95814

RE: Item #11 (A), October 11, 2017, Meeting Agenda
County Parking Leases at the Ballona Wetlands Ecological Preserve

Dear Members of the Commission:

The Marina del Rey Lessees Association represents the leaseholders of anchorages, residential, commercial, marine and visitor-serving properties in unincorporated Marina del Rey. The members of the Association operate their businesses under long-term leases with the County of Los Angeles. Our businesses also function under the County's goal of providing a balance of public and private uses in Marina del Rey, and as a result, we find ourselves as supportive stewards of the vision of the County of Los Angeles and the California Coastal Commission to maximize visitor-serving uses and public access to the water. To this end, we espouse sensible policies to afford greater public access to public attractions in Marina del Rey, and achieving this laudable goal is obtained by the County's continued use of a portion of the Ballona Wetlands Ecological Preserve in Area A that has been leased for a parking area since August of 2005.

Development of private leaseholds as well as public improvements and facilities in Marina del Rey are guided by the requirements of the Marina del Rey Local Coastal Program (LCP), which was certified by the California Coastal Commission on February 8, 2012. The Coastal Commission assigns high priority to public access to the shoreline and the coast. Shoreline access in the Marina is obtained from public and private parcels that front on the numerous basins of the Marina del Rey Harbor. The Commission also sets a high priority for visitor-serving uses in the Marina. Both shoreline access and visitor-serving uses are provided by the Fisherman's Village commercial and recreational development that occupies Parcel 56 on Fiji Way, across from the Ballona Wetlands parking area leased to the County.

The County's Department of Beaches and Harbors and the Marina del Rey Sheriff's Station share portions of the paved parking spaces on the leased land of the Ballona Wetlands in order to accommodate parking for vital law enforcement and government services, thereby freeing up parking spaces in the public lot of Parcel W adjacent to Fisherman's Village for the purpose of accommodating public needs to access the shoreline and visitor-serving uses. The Marina del Rey LCP in Chapter 2, entitled "Recreation and Visitor-Serving Facilities," observes as an identified issue that "public parking in the Marina is very important because of the County's policy of maximizing recreational use of the area. However, the locations and size of parking lots may not be sufficient to handle peak periods."

Due to the numerous restaurants, retail shops, harbor cruises, equipment rentals, sightseeing opportunities and fishing along the docks at the Fisherman's Village parcel, the adjacent parking lot is well-utilized and often reaches capacity during peak periods. Therefore, if the Fish and Game Commission were to deny the County the continued use of the parking area at Ballona Wetlands, given the approximately 250 spaces currently used by the County and employees, the inevitable relocation of such parking to Parcel W adjacent to Fisherman's Village would seriously displace parking availability for the public that the Coastal Commission has deemed critical for access to the shoreline and visitor-serving uses.

Additionally, the Marina del Rey LCP recognizes the importance of maximum access to the coast in several respects. Chapter 1, entitled "Shoreline Access," notes in reference to Coastal Act Policy 30212 that "public access from the nearest public roadway to the shoreline and along the coast shall be provided in new development," with some exceptions. The "Shoreline Access" chapter observes that "to invite maximum use by the public, access to the shoreline requires: 1) public awareness, 2) physical presence, and 3) legal access." Physical access and legal access to the shoreline are "available and consistent throughout most of the Marina." However, public awareness of shoreline access varies. The LCP observes that "maximum awareness" is found in "shoreline adjacent to public attractions such as Fisherman's Village, the Marina Beach and Burton Chace Park." All three of these sites, of which only Fisherman's Village is developed as a private leasehold, are known public venues for access to the water.

The important point is that the parking lot at Ballona Wetlands serves to provide access to the Fisherman's Village development that the California Coastal Commission has deemed to be a significant access to the shoreline. This point is conceded by the opponents of the County's continued use of the parking lot insofar as their arguments are that the parking serves "patrons of a private shopping plaza" and provides "parking for the employees of private entities." While the majority of the parking serves the needs of law enforcement and the government agencies, the ability to accommodate some parking for employees of private businesses quite obviously allows for more parking at Parcel W to be used by the public visiting the Marina to enjoy recreational and visitor-serving opportunities that are promulgated by the Coastal Act policies embodied in the Marina del Rey LCP.

The Association believes that any action to eliminate the parking use exemption for the County of Los Angeles at the Ballona Wetlands Ecological Preserve would not only harm public access as discussed above, but would result in a decision that is premature at this time considering that the California Department of Fish and Wildlife has released for public review on September 25, 2017 the Draft EIS/EIR for the Ballona Wetlands Restoration Project for a comment period that extends to November 24, 2017. Sufficient time is required by the stakeholders in Marina del Rey to review and comment on the proposed three-story parking structure within the existing parking footprint in Area A and whether this proposal would enhance to an even greater degree public access to the shoreline and the visitor-serving uses at Fisherman's Village and other proximate commercial and recreational opportunities.

In addition to fostering more visitor-serving and recreational uses in the Marina, the Association has worked closely with the Department of Beaches and Harbors and the Sheriff's Department on initiatives to address homeless encampments in the Ballona Wetlands that have unfortunately degraded the site's ecological resources. We are aware that the County and the Sheriff have committed significant financial resources and law enforcement activity to assist with the preservation of the Ballona Wetlands. Moreover, the County at its own expense maintains and conducts enforcement of the parking area to keep it clean and secure.

For the reasons stated above, the Marina del Rey Lessees Association strongly urges the Fish and Game Commission to allow the County's use of the parking lots adjacent to the Ballona Wetlands to continue as a vital public service that enhances public safety as well as advances the public interest of providing access to the shoreline and visitor-serving uses at Fisherman's Village and other nearby venues for the enjoyment of visitors and the residents of Los Angeles County.

Thank you for your consideration of our support for the County of Los Angeles to maintain its parking exemption at the Ballona Wetlands Ecological Preserve and our request to allow ample opportunities for stakeholders in Marina del Rey to review and comment on the Draft EIS/EIR for the Ballona Wetlands Restoration Project prior to the adoption of any permanent parking solution for the use of Area A. .

Sincerely,

David O. Levine /m

David O. Levine
President

County of Los Angeles
Small Craft Harbor Commission
13837 Fiji Way, Marina del Rey, CA 90292
Web Page: http://beaches.lacounty.gov

April 15, 2019

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

Re: Item #21 (A) III (Petition #2019-001: Limit Use of leased parking sites in Ballona Wetlands Ecological Reserve parking lot), April 17, 2019 Meeting Agenda

Dear Commissioners:

The Marina del Rey Small Craft Harbor Commission (SCHC) is made up of five members appointed by each member of the County of Los Angeles Board of Supervisors and represents the beneficial interest of Marina del Rey. At its April 10, 2019 meeting, the SCHC voted to send this correspondence to make you aware of our Commission's position on the recent restrictions added by the Department of Fish and Wildlife to the lease for the Fisherman's Village Overflow Lot (Overflow Lot) located at 13716 Fiji Way, Marina del Rey, 90292, to cease all non-County employee parking at the Overflow Lot.

The Overflow Lot is a visitor-serving benefit to Marina del Rey and primarily used by Fisherman's Village employees, who would otherwise occupy already scarce public parking at Fisherman's Village. Also, the Overflow Lot provides additional public parking during busy special event days. Without the use of the Overflow Lot, visitors will lose parking spaces that allow them to visit the Ballona Wetlands, take a harbor cruise, or visit Fisherman's Village. The new restrictions will also create a hardship and a potential safety issue for employees of the surrounding businesses, who will be forced to find other parking some distance away from their jobsite.

Development in Marina del Rey is governed by the Marina del Rey Local Coastal Program (LCP), which was certified by the California Coastal Commission (CCC) on February 8, 2012. The LCP assigns high priority to public coastal access. Fisherman's Village and other waterfront improvements along Fiji Way provide great benefit to the public through their visitor-serving uses and convenient access to Marina del Rey waters. The Overflow Lot serves a critical role in support of such public benefits that both the County and CCC regard as highly important. Accordingly, we believe changing the current use of the Overflow Lot is against the well-established public policy of promoting public access to the coast. Continuing the current use of the Overflow Lot will serve critical public purposes, assure its timely maintenance, and avoid the waste of government resources.

I therefore, on behalf of the Small Craft Harbor Commission, respectfully request that you defer the newly-imposed lease restriction on use of the Overflow Lot for at least 90 days so that current users of the lot may make alternate parking arrangements.

Respectfully,

David Lumian
Chair, Small Craft Harbor Commission

c: Richard Burg
Small Craft Harbor Commissioners
Gary Jones

Tracking Number: 2018-018 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, 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: Gary F. Brennan
   Address:
   Telephone number:
   Email address:

2. **Rulemaking Authority (Required) -** Reference to the statutory or constitutional authority of the Commission to take the action requested: Sections 200, 203, 205, 265, 355, 710, 710.5, 710.7, 1050, 1530, 1583, 1745, 1764, 1765 and 10504, Fish and Game Code. Reference: Sections 355, 711, 713, 1050, 1055.3, 1301, 1526, 1528, 1530, 1570, 1571, 1572, 1580, 1581, 1582, 1583, 1584, 1585, 1745, 1761, 1764, 1765, 2006 and 10504, Fish and Game Code; Sections 5003 and 5010, Public Resources Code; and Sections 25455, 26150 and 26155, Penal Code.

3. **Overview (Required) -** Summarize the proposed changes to regulations: Request to amend Title 14 § 551 (o)(24) – Hollenbeck Canyon to extend the American Crow season to coincide with the state American Crow hunting season.

4. **Rationale (Required) -** Describe the problem and the reason for the proposed change: Current regulations end the American Crow hunting season on February 1 in Hollenbeck Canyon. This regulation was to end hunting of the predator corvid prior to the birthing season. By extending the season the full 124 days after the first Saturday in December, more predator crows may be removed by hunters prior to the birthing and fledgling season which would assist in the recovery of birds species which nest in the Hollenbeck Canyon Wildlife Area. We understand the regulation change has been proposed by DFW Region Five leadership. We just want to get this matter on the Commissions radar when the regulation package comes before the commission next year. If it is not included, we believe we have a good cause to have the regulation adjusted to extend the crow hunting season in order to remove more birds which predate on nesting birds and their fledglings

SECTION II: Optional Information

5. Date of Petition: 12/5/2018

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):§ 551 (o)(24) – Hollenbeck Canyon
☐ 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
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: December 2019 or before.

10. Supporting documentation: Identify and attach to the petition any information supporting the proposal including data, reports and other documents: Letter from the San Diego County Wildlife Federation regarding the request for change to Title 14§ 551 (o)(24) – Hollenbeck Canyon.

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: No fiscal impact

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

SECTION 3: FGC Staff Only

Date received: RECEIVED CALIFORNIA FISH AND GAME COMMISSION 2018 DEC 2[illegible] PM 12: 3[illegible]

FGC staff action:
☑ Accept - complete
☐ Reject - incomplete
☐ Reject - outside scope of FGC authority
Tracking Number 2018-018 AM 1
Date petitioner was notified of receipt of petition and pending action: February 6, 2019

Meeting date for FGC consideration: April 17-18, 2019

FGC action:

- ☐ Denied by FGC
- ☐ Denied - same as petition ____________________
  Tracking Number
- ☐ Granted for consideration of regulation change