STAFF SUMMARY FOR DECEMBER 11-12, 2019

24. 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 wildlife and inland fisheries in nature. For this meeting:

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

(B) Action on pending regulation petitions referred to FGC staff or DFW for review – *none scheduled*

Summary of Previous/Future Actions

New petitions received	Oct 9-10, 2019; Valley Center
Today's actions on petitions	**Dec 11-12, 2019; Sacramento**

Background

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

(A) ***Petitions for regulation change***

Three petitions received at the Oct meeting are scheduled for action:

I. Petition #2019-019 AM 1: Remove reticulated Gila monster from the list of restricted species

II. Petition #2019-020: Increase brown trout bag and possession limits within the Klamath-Trinity rivers

III. Petition #2019-021: Change leader length restriction for fishing tackle in anadromous waters from less than six feet to less than thirteen feet

(B) ***Pending regulation petitions***

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

Significant Public Comments (N/A)

Recommendation

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

Exhibits

1. Table of petitions for regulation change, updated Nov 27, 2019
2. Petition #2019-19 AM 1, received Aug 22, 2019

Author: *Ari Cornman*

3. Petition #2019-20, received Aug 21, 2019
4. Petition #2019-21, received Oct 4, 2019

Motion/Direction

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

OR

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

CALIFORNIA FISH AND GAME COMMISSION PETITIONS FOR REGULATION CHANGE - ACTION

Revised 12/5/2019

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

Tracking No.	Date Received	Name of Petitioner	Subject of Request	Short Description	FGC Receipt Scheduled	FGC Action Scheduled	Staff Recommendation	Marine or Wildlife?
2019-019 AM 1	8/22/19	Leif Orrell	Remove reticulated Gila monster from list of restricted species	Remove “reticulated Gila monster (*Heloderma suspectum*)” from CCR 671 Title 14, restricted species list. Remove the phrase “This definition includes all specimens regardless of their origin even if they were produced in captivity” from the definition of Native Reptiles in Title 14. Remove the phrase “possess, purchase, propagate, sell, transport, import or export any native reptile or amphibian, or part thereof” from Title 14, Division 1, Subdivision 1, Chapter 5, CCR 40.	10/9-10/2019	12/11-12/2019	DENY: The Gila monster is designated a DFW Species of Special Concern; staff does not recommend any regulation changes that would reduce the protections it is currently afforded at this time.	Wildlife
2019-020	8/21/19	Justin Alvarez	Brown trout bag and posession limits	Within the Klamath River Basin, request that the bag and possession limits for recreational brown trout be raised to 10 and 20, respectively.	10/9-10/2019	12/11-12/2019	GRANT: The substance of the petition is being considered in the Klamath River sport fishing rulemaking.	Wildlife
2019-021	10/4/19	Thomas Savage	Leader length	Change leader length to ‘less than thirteen feet’ in place of the current six feet.	10/9-10/2019	12/11-12/2019	DENY: Leader length regulations have only been effective since March 1, 2018; FGC staff recommends waiting to gather information on the efficacy of the current regulations before making adjustments.	Wildlife

From: Leif Orrell [redacted]
Sent: Thursday, August 22, 2019 10:23 AM
To: FGC
Subject: Revised petition.
Attachments: FGC1.docx

FGC,
Attached is my revised petition of 21AUG19, I have noted updated authority for rule making and specified the requirement of receiving a response within ten days so that this petition may be given the adequate consideration I feel it deserves. Please feel free to contact me with any questions or concerns.

Leif Orrell
[redacted]
--
Leif Orrell

State of California – Fish and Game Commission
PETITION TO THE CALIFORNIA FISH AND GAME COMMISSION FOR REGULATION CHANGE
FGC 1 (NEW 10/23/14) Page 1 of 3

Tracking Number: (2019-019 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: Leif Landry Orrell
   Address: [redacted]
   Telephone number: [redacted]
   Email address: [redacted]

2. **Rulemaking Authority (Required) -** Reference to the statutory or constitutional authority of the Commission to take the action requested: Authority cited: Sections 2118 and 2120, Fish and Game Code. Reference: Sections 1002, 2116, 2118, 2118.2, 2118.4, 2119, 2120, 2122, 2123, 2124, 2125, 2126, 2127, 2150, 2190 and 2271, Fish and Game Code.

3. **Overview (Required) -** Summarize the proposed changes to regulations: 1. Remove Heloderma Suspectum Suspectum "Reticulated Gila Monster" from CCR 671 Title 14, restricted species list 2. Remove the phrase "This definition includes all specimens regardless of their origin even if they were produced in captivity" from the definition of Native Reptiles in Title 14 3. Remove the phrase "possess, purchase, propagate, sell, transport, import or export any native reptile or amphibian, or part thereof" from Title 14, Division 1, Subdivision 1, Chapter 5, CCR 40.

4. **Rationale (Required) -** Describe the problem and the reason for the proposed change: Heloderma Suspectum Suspectum is on the Restricted species list, CCR 671 Title 14. The rationale for this is "Those species listed because they pose a threat to native wildlife, the agriculture interests of the state or to public health or safety are termed "detrimental animals" and are designated by the letter "D". The department shall include the list of welfare and detrimental wild animals" Through my own research and the reading of research by others, the difference between the two Gila subspecies, H.S. Suspectum, and H.S. Cinctum, is negligible enough to be non-existent. These are essentially color morphs of the same species, which generally does not warrant enough for a definition of subspecies. The definition of this also limits the introduction of new genetic lines into *Cinctum's* range, as the interaction is interfered with by some geography. The two species' ranges do in fact overlap, but sparingly in some places due to human destruction of habitat and other factors. Further, the designation as a "Restricted

Species" implies danger either to the native *Cinctum* population from *Suspectum*, which is moot, or that *Suspectum* would somehow be more of a danger to humans than *Cinctum*, which is nonsense. The rationale for restricting one of these lizards is mooted by the fact that they interbreed regularly in overlapping ranges with no observable ill effects. Removing *Suspectum*, even if the subspecies are in fact separate, would allow responsible pet hobbyists to engage in meaningful study and education without impacting the native population of *Cinctum* because A. *Suspectum* and *Cinctum* are both widely cultivated in captivity, they would therefore avoid poaching risks or over collection of our native species. B. If they were to escape, there would be minimal impact on the native *Cinctum*, with *Suspectum* perhaps bolstering the genetic diversity of the species overall since their ranges currently overlap in many areas. C. Restricting BOTH subspecies so that they could not be kept as pets, even from captive bred populations as I propose, would not be of significant gain for the reasons listed above and they do not pose a significant threat to humans, or when interaction between the subspecies would occur. This would amount to restricting them from the pet trade "just to restrict something". Most descriptions and studies of the species do not even differentiate between the two subspecies when referring to range, color, temperament, diet, husbandry, or any other significant factors because the differences even on the genetic level seem to be nil. Restricting one or both of these species is disadvantageous to the honest pet and education trade because it is currently easier and less expensive to acquire a Gila outside the United States than it is to attempt to navigate the onerous permit process. Even in the unlikely event a permit were to be granted to an individual in the state of California, the process and regulations to obtain said permit is specifically prohibitive for hobbyists and those educators not part of an institution. Due to the species IUCN listing as "Least Concern" in conservation status, adopting the above suggestions will result in ethical study, education, enjoyment, preservation, and appreciation of a wonderful reptile that has been unavailable for the vast majority of Californians. SUBMITTED AS AMENDMENT 22AUG19 BY LEIF LANDRY ORRELL: I WAIVE MY RIGHT TO A RESPONSE WITHIN THE TEN DAY REQUIREMENT SPECIFIED BY THE COMISSION AND HAVE UPDATED THE RULEMAKING AUTHORITIES. I AM AVAILABLE FOR CONTACT BY PHONE DURING NORMAL WORKING HOURS.

SECTION II: Optional Information

5. Date of Petition: 12 Aug 19

6. Category of Proposed Change

☐ Sport Fishing
☐ Commercial Fishing
☐ Hunting
☒ Other, please specify: Restricted Species

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):1.67, 40
☐ Add New Title 14 Section(s):
☒ Repeal Title 14 Section(s): 671

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: January 1st, 2020

10. **Supporting documentation:** Identify and attach to the petition any information supporting the proposal including data, reports and other documents: References: https://www.heloderma.net/en/patterns.html, http://reptile-database.reptarium.cz/species?genus=Heloderma&species=suspectum, https://animals.sandiegozoo.org/animals/gila-monster,

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 Thursday, August 22, 2019 at 10:23 AM.

FGC staff action:

☑ Accept - complete
☐ Reject - incomplete
☐ Reject - outside scope of FGC authority
Tracking Number 2019-019 AM 1

Date petitioner was notified of receipt of petition and pending action: September 6, 2019

Meeting date for FGC consideration: December 11-12, 2019

FGC action:

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

From: Justin Alvarez <jalvarez@hoopa-nsn.gov>
Sent: Wednesday, August 21, 2019 3:17 PM
To: FGC
Cc: Shaffer, Kevin@Wildlife
Subject: RE: FGC - Petition 2019-011
Attachments: FGC1_Brown Trout_v2.docx; brown trout letter.pdf; BrownTroutPlanLetterOfSupportUSFWS.pdf; Hoopa letter of support.pdf; Trinity Brown Trout Manuscript.pdf

Dear Commissioners,
I would like to withdraw my previous petition (2019-011) regarding changes to the Bag and Possession Limit for Brown Trout in the Klamath Basin and submit the attached petition.
Thank you,
Justin Alvarez

Justin Alvarez
Habitat Division Lead
Hoopa Tribal Fisheries
190 Loop Rd
Hoopa, CA 95546
Office # 530-625-4267x1020
Cell # [redacted]

Tracking Number: (2019-020)

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: PO Box 417, Hoopa, CA 95546
Telephone number: (530)6254267
Email address: jalvarez@hoopa-nsn.gov

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 10 and 20 respectively.

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: August 21, 2019**

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

7. **The proposal is to:** (*To determine section number(s), see current year regulation booklet or* *https://govt.westlaw.com/calregs*)
☒ Amend Title 14 Section(s):7.50(b)(91.1)(C)1a & 7.50(b)(91.1)(E)
☐ 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: Effective with release of 2020 supplemental regulations.

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

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:

Withdraw previous petition FGC1 Tracking Number: 2019-011.

SECTION 3: FGC Staff Only

Date received: Received by email on Wednesday, August 21, 2019 at 4:01 PM.

FGC staff action:

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

Tracking Number 2019-020

Date petitioner was notified of receipt of petition and pending action: September 6, 2019

Meeting date for FGC consideration: December 11-12, 2019

FGC action:

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

Received by email on Wednesday, August 21, 2019 at 4:01 PM as a supporting letter to petition 2019-020

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

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Arcata Fish and Wildlife Office
1655 Heindon Road
Arcata, California, 95521
Phone: (707) 822-7201 FAX: (707) 822-8411

August 14, 2019

Director Chuck H. Bonham
California Department of Fish and Wildlife
1416 Ninth Street, 12th Floor
Sacramento, California, 95814

Director Bonham:

This letter is in response to an August 7, 2019 formal request from the Hoopa Valley Tribe seeking the Service's support for the development and implementation of a Brown Trout Management Plan for the Trinity River by the California Department of Fish and Wildlife (CDFW).

The Trinity River is the focus of a large-scale river restoration project targeting recovery of anadromous fish populations to support the dependent ocean commercial, ocean and in-river sport, and in-river tribal commercial and subsistence fisheries. The U.S Fish and Wildlife Service's Fish and Aquatic Conservation (FAC) Program works closely with state, federal and tribal managers under a broad array of authorities such as the Fish and Wildlife Coordination Act to recover and restore endangered, threatened and imperiled aquatic species, fulfill tribal and public trust and mitigation responsibilities, and to restore and conserve a wide range of fish populations and other aquatic resources. To this end, the U.S Fish and Wildlife Service has been a long-time partner in the restoration of the Trinity River and recovery of its native species.

Brown Trout were introduced to the Trinity River, with a growing body of evidence that suggests they have been suppressing native species recovery efforts. Brown Trout opportunistically feed on other fishes, and their impact to native species has been well documented in rivers across the United States, including the Trinity River. According to a recent study led by the Hoopa Valley Tribe, Brown Trout consumed over 20% of the native wild salmonid biomass in the 40-mile reach of the Trinity River downstream of Lewiston Dam.

A workshop was held in Arcata in 2018 to discuss Brown Trout in the Trinity River. The workshop was hosted by the Hoopa Valley Tribe, and included representatives from a wide array of partners, including California Department of Fish and Wildlife, Yurok Tribe, U.S. Forest Service, Humboldt State University and U.S. Fish and Wildlife Service. The workshop culminated in a recommendation supporting the development of a CDFW management plan for Brown Trout in the Trinity River, with an emphasis on conservation and recovery of native species.

The Fish and Aquatic Conservation Program in the Arcata Fish and Wildlife Service Office is in full support of the development and implementation of a Brown Trout management plan, and we are willing to provide technical support and assistance to develop the plan, as requested by the Tribe.

Sincerely,

Dan Everson
Field Supervisor, Arcata Fish and Wildlife Office

Received by email on Wednesday, August 21, 2019 at 4:01 PM as a supporting letter to petition 2019-020

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

Correspondence
Darren M. Ward, Department of Fisheries Biology, Humboldt State University, Arcata, CA.
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 abundance of predatory 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.

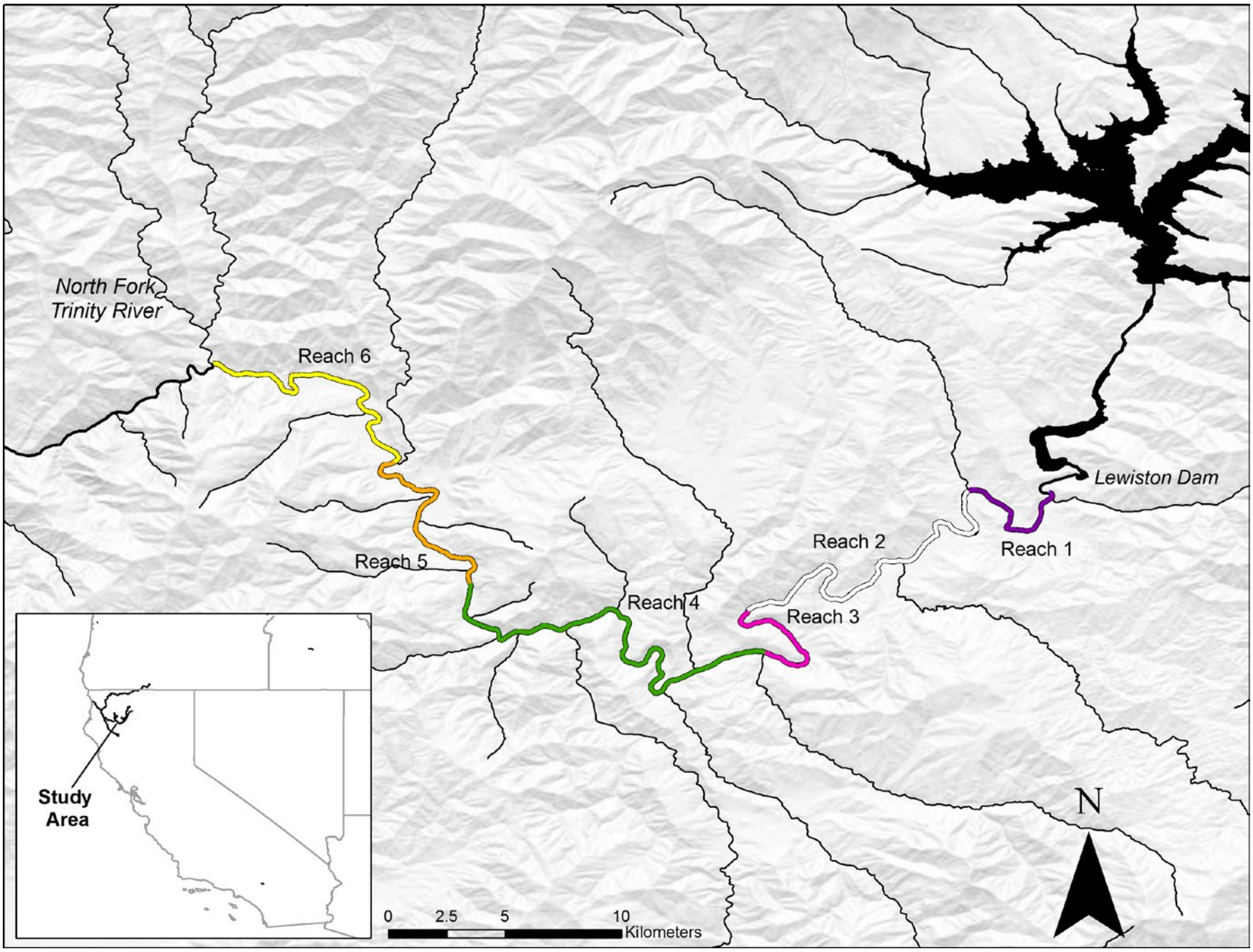

FIGURE 1 Map of the study area with an inset regional map of California. The Trinity River flows from right to left. The study area begins at Lewiston Dam and ends at the confluence of the main stem with the North Fork of the Trinity River. Within the study area, each reach is highlighted with the colour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

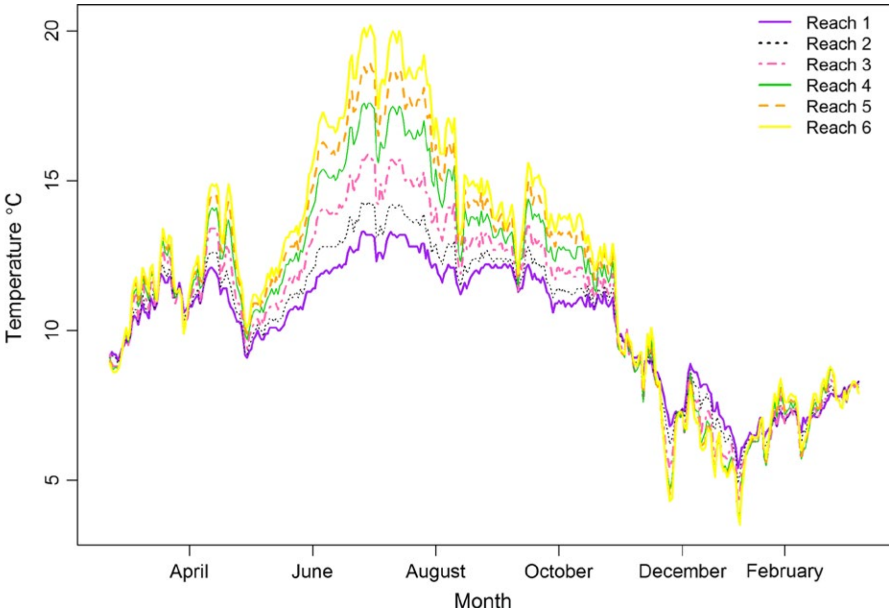

FIGURE 2 Temperature profiles of each reach where Reach 1 is the furthest upstream and Reach 6 is the furthest downstream. The colour of the line matches the colour of the reach in Figure 1

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

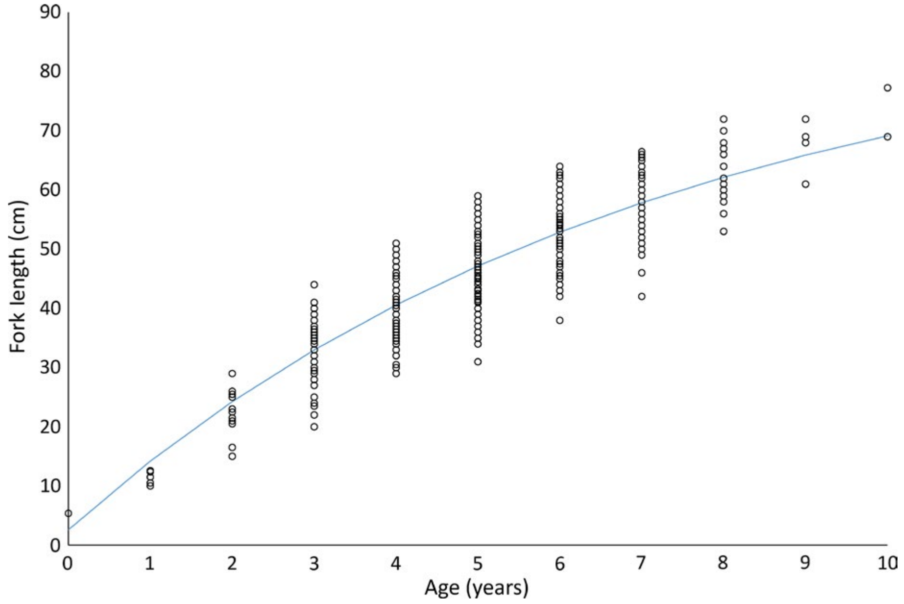

FIGURE 3 Age and size for all individual brown trout and the fitted Von Bertalanffy growth curve. Von Bertalanffy parameter estimates and standard errors are in Table 3

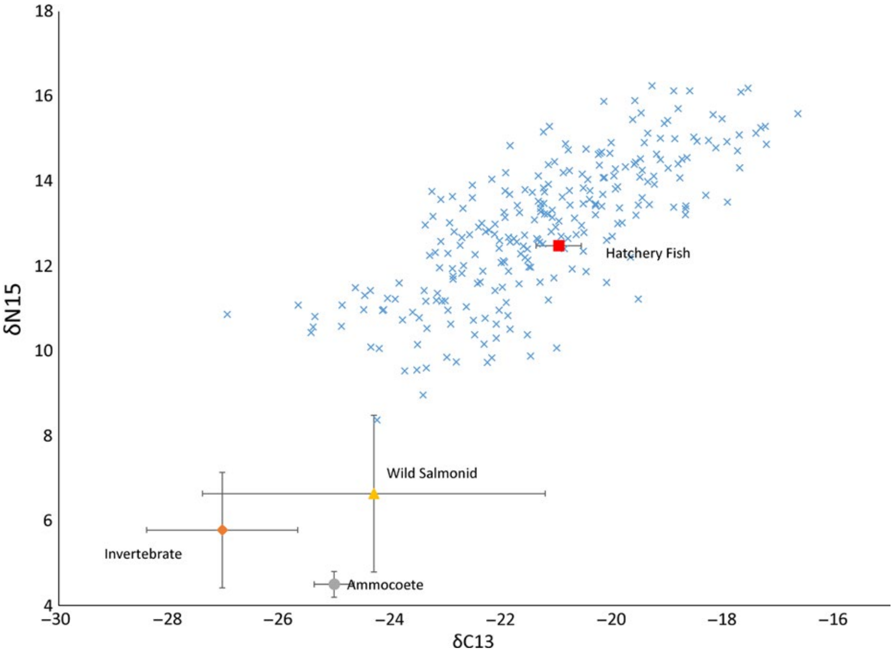

FIGURE 4 Isoplot of brown trout and prey items. Blue x's represent individual brown trout isotope ratios. Prey items are labelled and the location is the mean value for that prey category. The error bars are a single standard deviation

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 δ^{15}N and δ^{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

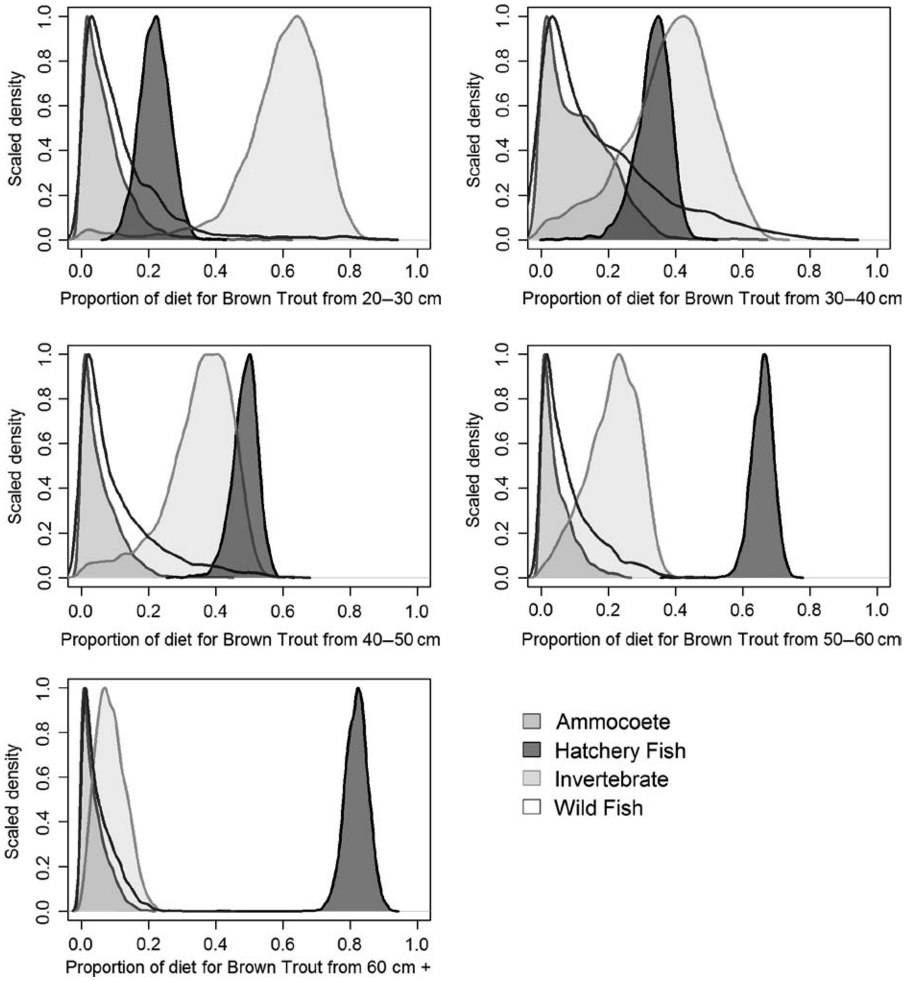

FIGURE 5 Diet proportions of brown trout grouped by fork length. Sample sizes for each size bin were *n* = 19 for 20–30 cm, *n* = 60 for 30–40 cm, *n* = 83 for 40–50 cm, *n* = 61 for 50–60 cm, and *n* = 30 for >60 cm

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.

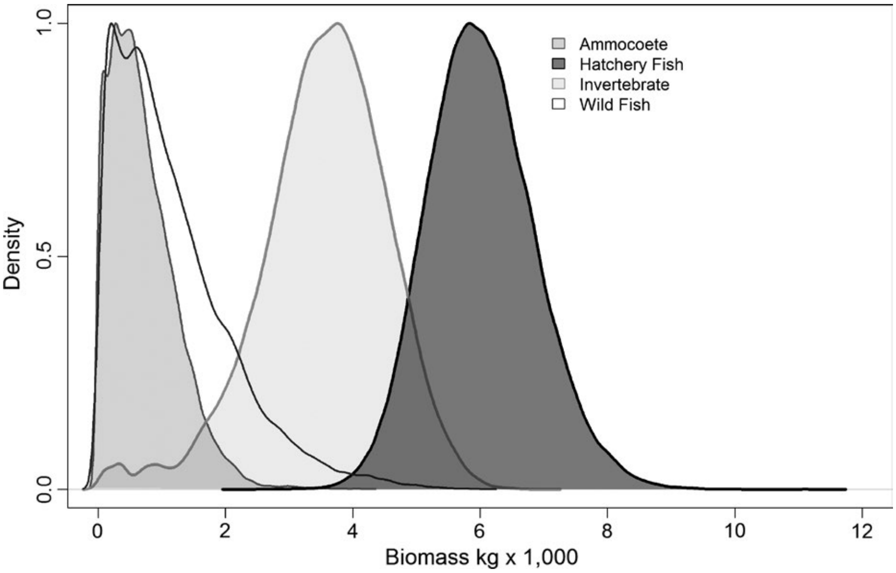

FIGURE 6 Estimated biomass of prey consumed by all brown trout >20 cm long in the Trinity River over the course of a year. Median consumption estimates were 5,930 kg of hatchery fish (95% CI 3,800–8,805 kg) 3,566 kg of invertebrates (95% CI 1,279–5,524 kg), 924 kg (95% CI 60–3,526 kg) of wild fish and 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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To: FGC
Subject: RE: Petition for Rule Change - 14 CCR § 2.05

From: Thomas Savage [redacted]
Sent: Friday, October 4, 2019 10:12 AM
To: FGC <FGC@fgc.ca.gov>
Subject: Petition for Rule Change - 14 CCR § 2.05

Fish and Game Commission,

Please review the attached for completeness and if anything is missing please let me know how to best complete so this request may be considered. I am available for question or clarification. If there are further details or explanation that would better support my perspective please let me know.

Verify receipt of this request.

Best,
-Tom Savage
[redacted]

State of California – Fish and Game Commission
PETITION TO THE CALIFORNIA FISH AND GAME COMMISSION FOR REGULATION CHANGE
FGC 1 (Rev 06/19) Page 1 of 3

Tracking Number: (2019-021)

To request a change to regulations under the authority of the California Fish and Game Commission (Commission), you are required to submit this completed form to: California Fish and Game Commission, (physical address) 1416 Ninth Street, Suite 1320, Sacramento, CA 95814, (mailing address) P.O. Box 944209, Sacramento, CA 94244-2090 or via email to FGC@fgc.ca.gov. Note: This form is not intended for listing petitions for threatened or endangered species (see Section 670.1 of Title 14).

Incomplete forms will not be accepted. A petition is incomplete if it is not submitted on this form or fails to contain necessary information in each of the required categories listed on this form (Section I). A petition will be rejected if it does not pertain to issues under the Commission's authority. A petition may be denied if any petition requesting a functionally equivalent regulation change was considered within the previous 12 months and no information or data is being submitted beyond what was previously submitted. If you need help with this form, please contact Commission staff at (916) 653-4899 or FGC@fgc.ca.gov.

SECTION I: Required Information.

Please be succinct. Responses for Section I should not exceed five pages

1. **Person or organization requesting the change (Required)**
Name of primary contact person: Thomas Savage
Address: [redacted]
Telephone number: [redacted]
Email address: [redacted]

2. **Rulemaking Authority (Required) -** Reference to the statutory or constitutional authority of the Commission to take the action requested: 14 CCR SS 2.05 Leader Length Restriction.

   It shall be unlawful to use any configuration of fishing tackle in anadromous waters unless the distance between the terminal hook or terminal lure and any weight attached to the line or leader, whether fixed or sliding, is less than six feet. For purposes of this section, "weight" includes any product used to submerge the line or leader, including non-buoyant artificial flies or artificial lures, but does not include integrated or sinking fly fishing lines, lead core lines used while trolling from a boat, dropper weights used while trolling from a boat, or clipped weights used with downrigger systems.

   Note: Authority cited: Sections 200, 205 and 219, Fish and Game Code. Reference: Section 205, Fish and Game Code.

3. **Overview (Required) -** Summarize the proposed changes to regulations: Change above to 'less than thirteen feet' in place of the current six feet.

4. **Rationale (Required) -** Describe the problem and the reason for the proposed change: I have been salmon fishing the American River since 2010 with a mixed learning experience from trial and error to what others were doing both in combat areas and less fished areas. I typically fish less crowded areas. From learned methods and practice, I ended up using a 9-12ft leader for

flossing for salmon that typically resulted in fish hooked in the mouth, not losing gear, or getting tangled in surrounding vegetation.

I participated in the ‘leader length study’ with Department of Fish and Wildlife during the November study timeframe years back. When using various leader lengths provided, I did not catch any salmon with leaders under 6ft while participating in the study. We fished the flats below the Sailors Bar Boat launch and there was ample salmon during that time. Leaders under 6ft do not drift in the water in a manor conducive to hooking salmon and the bounce of the weight on the main line seems to startle the fish further diminishing chances of a catch. For the reasons above, and the reasons of this rule feeling ‘nit-picky’ towards bank fisherman who already face many obstacles in getting to the water and following the rules to fairly and legally catch fish, I am requesting the rule be changed to a leader length of 13ft or less.

SECTION II: Optional Information

5. Date of Petition: 10/4/2019

6. Category of Proposed Change
X 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*)
X Amend Title 14 Section(s): 14 CCR § 2.05
☐ 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 X Not applicable.

9. **Effective date**: If applicable, identify the desired effective date of the regulation.
If the proposed change requires immediate implementation, explain the nature of the emergency: 2020

10. **Supporting documentation:** Identify and attach to the petition any information supporting the proposal including data, reports and other documents: None.

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: Diminished interest in bank fishing resulting in impacts to local economy that support these activities.

12. **Forms:** If applicable, list any forms to be created, amended or repealed: None.

SECTION 3: FGC Staff Only

Date received: Received by email on Friday, October 4, 2019 at 10:12 AM.

FGC staff action:

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

Tracking Number 2019-021

Date petitioner was notified of receipt of petition and pending action: October 9-10, 2019

Meeting date for FGC consideration: December 11-12, 2019

FGC action:

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