



# United States Department of the Interior

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South-Central California Area Office  
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IN REPLY REFER TO:

SCC-400  
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Cachuma Project

MAR 17 2020

VIA ELECTRONIC MAIL AND U.S. POSTAL SERVICE

Mr. Eric Oppenheimer  
Chief Deputy Director  
State Water Resources Control Board  
P.O. Box 100  
Sacramento, CA 95812-0100

Subject: Submittal of Water Rights Order WR-2019-0148 Term 20 Plan (Plan)

Dear Mr. Oppenheimer:

The Bureau of Reclamation (Reclamation) provides the attached Plan in accordance with Term 20 of the September 17, 2019 State Water Resources Control Board Final Order WR-2019-0148 (Order) for Reclamation's water rights permits 11308 and 11310 for the Cachuma Project in Santa Barbara County, California.

The Order requires the Plan identify the individual studies proposed to meet requirements of Term 24 as well as identify the following for each study: proposed study metrics, proposed study deadline(s), proposed study sequencing, proposed timing for submittal of each study draft Report to the National Marine Fisheries Service (NMFS)/California Department of Fish and Wildlife (CDFW), and proposed timing of submittal of each study Final Report.

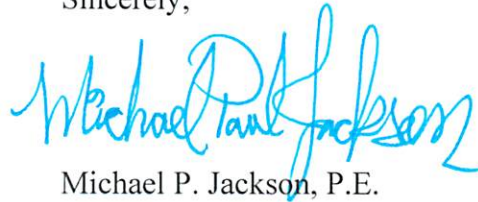
On January 23, 2020, Reclamation submitted the draft Plan to NMFS and CDFW and received the attached comments back on March 6, 2020.

Reclamation is not providing specific responses to the comments as they were similar and predominantly focused on the content and development of the various Term 24 studies rather than addressing the Plan for the Term 24 studies required under Term 20. Consequently, very minimal edits to the Plan were warranted. Reclamation did revise the section titled **Term 24(b)(1)** and the draft proposal to use the instream flow incremental method (IFIM) to conduct studies based on feedback provided by NMFS and CDFW.

Reclamation appreciates the comments provided by CDFW and NMFS on the content and development of the Term 24 plans and will consider and incorporate as appropriate these comments upon approval of the Plan by the Deputy Director.

If you have any questions regarding this submittal, please contact Mr. David E. Hyatt, Chief, Resource Management Division at (559) 262-0334, via email at [dhyatt@usbr.gov](mailto:dhyatt@usbr.gov), or for the hearing impaired at TTY (800) 877-8339.

Sincerely,



Michael P. Jackson, P.E.  
Area Manager

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Cachuma Order WR-2019-0148 Term 20 Plan  
CDFW Term 20 Plan comment letter dated March 6, 2020  
NMFS Term 20 comment letter dated March 2, 2020

cc: Mr. Erik Ekdahl  
State Water Resources Control Board  
P.O. Box 100  
Sacramento, CA 95812-0100  
(w/enclosures)

# RECLAMATION

*Managing Water in the West*

## Cachuma Order

## WR-2019-0148 Term 20 Plan



— BUREAU OF —  
RECLAMATION

Interior Region 10 California-Great Basin  
California\*, Nevada\*, Oregon\*

\*Partial

South-Central California Area Office

March 2020

## **Mission Statements**

The mission of the Department of the Interior is to conserve and manage the Nation's natural resources and cultural heritage for the benefit and enjoyment of the American people, provide scientific and other information about natural resources and natural hazards to address societal challenges and create opportunities for the American people, and honor the Nation's trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities to help them prosper.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

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## Introduction

On September 17, 2019 the State Water Resources Control Board (Water Board) adopted Final Order WR-2019-0148 (Order) amending the Bureau of Reclamation's (Reclamation) water rights permits 11308 and 11310 for the Cachuma Project in Santa Barbara County, California. Reclamation provides the following Plan in accordance with Term 20 of the Order. Specifically, the Term 20 Plan requires the identification of the individual studies proposed to meet requirements of Term 24 as well as identify the following for each study:

- Proposed study metrics.
- Proposed study deadline(s).
- Proposed study sequencing.
- Proposed timing for submittal of each study Draft Report to the National Marine Fisheries Service (NMFS)/California Department of Fish and Wildlife (CDFW).
- Proposed timing of submittal of each study Final Report.

Further, in accordance with Term 23, all of the studies will evaluate the following:

- Benefit to steelhead and other public trust resources.
- Viability of any proposed measure.
- Costs of any proposed measure.
- Potential impacts of the measure (i.e., water quality, fishery resources, water supplies, and downstream water rights).
- Any other Term 24 study-specific criteria.

It should be noted that the studies proposed are affected by a number of variables outside the control of Reclamation including but not limited to: climate change, ocean productivity, species distribution, and stock-recruitment relationship that effect steelhead population dynamics.

## Term 24 of Order WR-2019-0148

Term 24 of Order WR-2019-0148 requires Reclamation to “conduct the following studies to evaluate measures that may be necessary to keep the steelhead fishery in the Santa Ynez River below Bradbury Dam in good condition at the individual, population, and community level and shall be informed by current scientific information on southern California steelhead recovery, including NMFS’ 2012 Final Southern California Steelhead Recovery Plan”

### Term 24(a) of Order WR-2019-0148

Term 24(a) requires Reclamation to “Study and evaluate options for providing steelhead passage of adults and smolts around Bradbury Dam including: fish ladders, locks, elevators, and trap-and-truck operations, including associated collection facilities.”

Reclamation previously responded to the Water Board regarding this issue, please refer to Reclamation’s September 16, 2019 letter which is hereby incorporated by reference.

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**Term 24(b) of Order WR-2019-0148**

Term 24(b) requires Reclamation to conduct an instream flow study with the following components:

**Term 24(b)(1) – Evaluate the flow conditions necessary to protect each stage**

The Term 24(b)(1) component would evaluate steelhead habitat in the mainstem Lower Santa Ynez River (LYSR) to identify flows needed to support upstream and downstream passage of adults and juveniles, holding, spawning, incubation and rearing for *O. mykiss*. Where access is granted and stream conditions are suitable, the Term 24(b)(1) instream flow study component would employ an appropriate method of study. The study method would take into consideration methods such as the instream flow incremental method (IFIM) developed by the U.S. Fish and Wildlife Service, and other procedures such as but not limited to, the CDFW 2017 *Standard Operating Procedure for Critical Riffle Analysis for Fish Passage in California* and Booth et. al. 2013 *Determining appropriate instream flow for anadromous fish passage on an intermittent mainstem river, coastal southern California*.

In areas where access has not been granted, Light Detection and Ranging (LIDAR), or other suitable method(s), may be used to evaluate the quality and quantity of the aquatic habitat. In addition, a review of the available data from current monitoring, including previously conducted in-stream flow studies, and other available data and scientific literature would be conducted to evaluate the following: migration/incubation/ spawning/rearing time periods, migration rates, ramping rates, and migration flow requirements.

**Term 24(b)(2) – Assess Flow Conditions for hydrologic connectivity, channel morphology, and sediment transfer**

The Term 24(b)(2) component addresses two different instream flow conditions, (1) flow conditions necessary to ensure hydrologic connectivity and opportunities for steelhead movement, and (2) flow conditions necessary to ensure appropriate channel morphology and sediment transfer for steelhead habitat. Consequently, Term 24(b) has been separated into two subcomponents.

***Term 24(b)(2.1) – Assess flow conditions necessary to ensure hydrologic connectivity and opportunities for steelhead movement***

The Term 24(b)(2.1) subcomponent would synthesize historical (pre-dam) flow data to evaluate pre-dam connectivity in the LSYR. The subcomponent would evaluate flows in the mainstem and key tributaries, including inflow to the estuary and ocean connectivity to support steelhead life history needs. The subcomponent would also evaluate flows necessary to achieve hydrologic connectivity between habitats to support adult migration, spawning, rearing, and juvenile outmigration.

***Term 24(b)(2.2) – Assess flow conditions necessary to ensure appropriate channel morphology and sediment transport for steelhead habitat***

The Term 24(b)(2.2) subcomponent would identify flows needed to periodically provide: vegetation scour and natural succession, lateral migration of the active channel/re-working of

floodplain, and diversity of channel/habitat features (e.g., runs, riffles, pools, off-channel chutes, bars). The subcomponent would also evaluate the flow levels required to mobilize various sediment sizes in each management reach and options for recruitment or supplementation of gravels or other coarse sediment to improve steelhead habitat based on past hydrology and modeling of alternative instream flow schedules, the frequency and magnitude of dam spills and/or managed releases that would mobilize gravel bed movement. The subcomponent would develop a substrate budget based on current substrate size distribution and elevations in the LSYR to support a gravel augmentation and substrate maintenance plan.

**Term 24(b)(3) – Assess potential instream or streamside habitat restoration in relation to flow**

The Term 24(b)(3) component would evaluate options for spawning gravel augmentation in the LSYR and Hilton Creek. This component would use the results of the sediment transport assessment [Term 24(b)(2.2)] to inform flows needed to mobilize gravels as well as identify quantity, frequency, and potential locations for gravel enhancement. This component would also evaluate options for large woody debris (LWD) or boulder cluster placement in the LSYR and larger tributaries including quantity, frequency, and locations for LWD enhancement. The potential for additional cattle exclusion fencing in the Salsipuedes/El Jaro watershed would also be evaluated.

**Term 24(b)(4) – Evaluate water quality issues that may impact steelhead**

The Term 24(b)(4) component would evaluate existing water quality monitoring data, including results from previously conducted water quality flow analyses. This information would be used to evaluate the relationship between flow and longitudinal temperatures/dissolved oxygen as it moves downstream from the dam. This component would also assess measures that could be implemented to address water quality issues within the LSYR.

**Term 24(b)(5) – Evaluate operational changes to Bradbury Dam that could improve steelhead conditions**

The Term 24(b)(5) component would evaluate what, if any, operational changes formulated based on Term 24(b) could be implemented at Bradbury Dam.

**Term 24(b)(6) – Evaluate whether timing of 89-18 Water Rights releases should be revised**

The Term 24(b)(6) component would review historical WR 89-18 releases and hydrologic conditions when water rights releases have been made. The timing of water rights releases relative to habitat conditions in the LSYR would also be evaluated to assess whether a change in timing would benefit steelhead.

**Term 24(c) of Order WR-2019-0148**

The Term 24(c) component would evaluate the effects of predation and nonnative species on steelhead. Term 24(c) has been separated into the following four specific components:



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**Term 24(c)(1) – Evaluate effect of flows on habitat conditions to reduce predation and proliferation of nonnative species**

This subcomponent would evaluate the effects of flows, including but not limited to Table 2 Flows, on supporting habitat conditions that reduce predation and the proliferation of nonnative species. The 24(b) Instream Flow Study would be used to evaluate habitat conditions for bass and other non-native species to develop measures to curtail the proliferation of non-native species or reduce non-native populations.

**Term 24(c)(2) – Evaluate measures to prevent introduction/reintroduction of invasive species**

This subcomponent would evaluate reasonable measures to prevent the introduction or reintroduction of invasive species. Specifically, the following sources of invasive species introductions to the LSYR would be evaluated:

- Lake Cachuma
- Private ponds
- Public releases into the LSYR

This subcomponent would also evaluate prevention measures through (1) possible control measures to prevent introductions from Lake Cachuma, (2) options for public education and signage, and (3) options for limiting introductions from private ponds during spill-over or water release events.

**Term 24(c)(3) – Evaluate effects of beaver dams on passage opportunities and distribution of steelhead**

This subcomponent would evaluate the effects of beaver dams on passage opportunities and distribution of steelhead as well as develop measures to reduce impacts. Existing LSYR monitoring data would be evaluated to identify the relationship between beaver dams/pools vs *O. mykiss* distribution. This subcomponent would also evaluate existing LSYR monitoring data on beaver dam upstream passage barrier severity using NMFS/CDFW salmonid passage criteria. A field study on beaver dam upstream passage severity at various flow levels would be conducted. The field study would include a PIT tag study on smolt passage around beaver dams. PIT tag arrays positioned upstream and downstream of selected beaver dam pools would be used to estimate pool escapement at various flow levels.

**Term 24(c)(4) – Identify measures to reduce impacts on steelhead from beavers**

This subcomponent would evaluate authorized beaver population control measures, such as trap and relocate, euthanasia, and flow measures to control or limit the beaver population. The subcomponent would also evaluate beaver dam management measures that could be used to remove dams and/or limit building of dams through use of flow devices/dam building deterrents (i.e. beaver deceivers or other related devices), manual dam notching to allow easier removal during high flows, removal of inactive dams.

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## **Metrics for Proposed Measures**

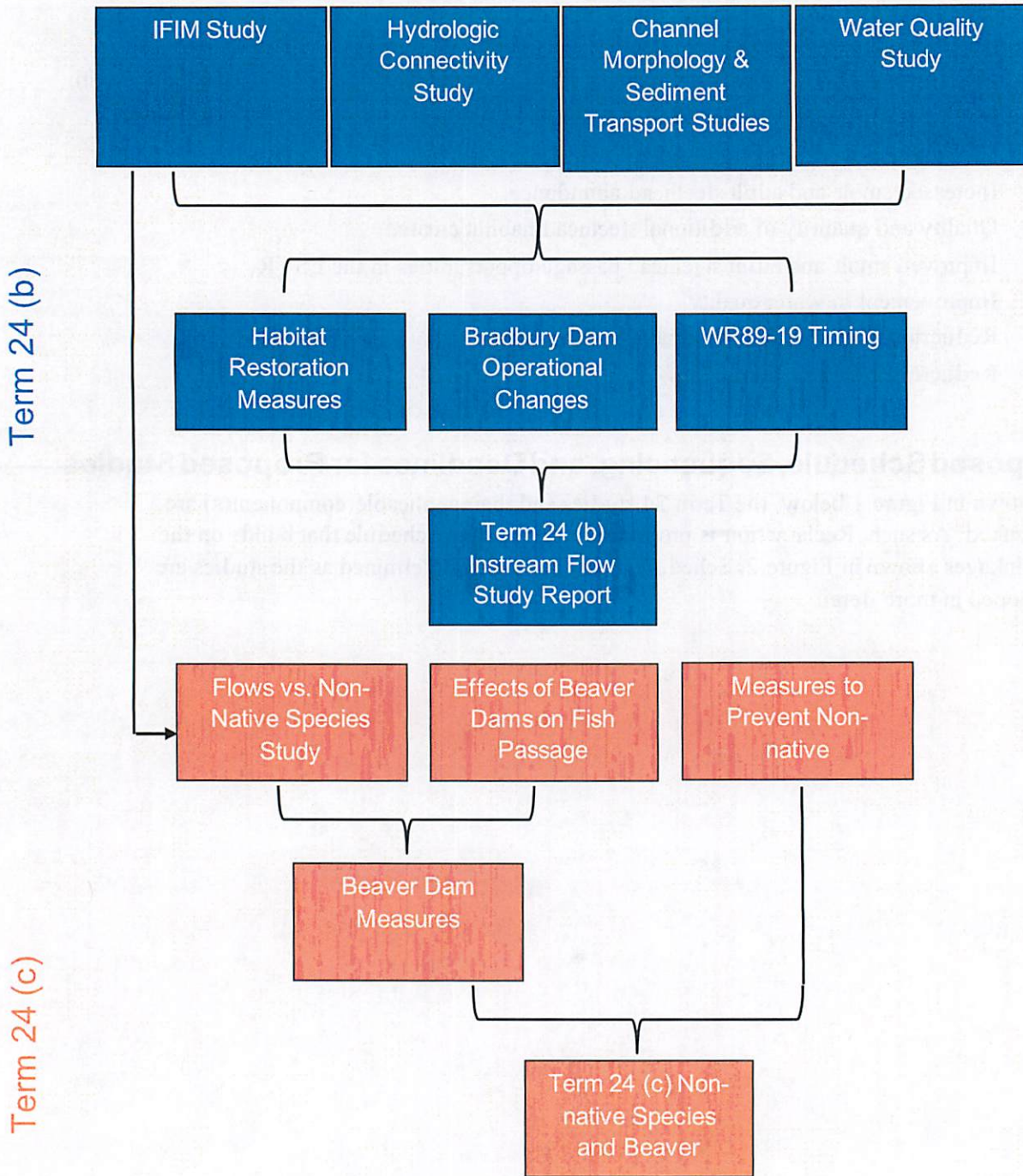
Term 20 requires the description of appropriate metrics for a given measure identified from implementation of the Term 24 studies that would restore steelhead to good condition. As the studies have yet to be implemented to identify such measures, description of exact metrics are premature. However, the following preliminary metrics would likely be used in conjunction with more specific metrics identified during development of each individual study and applicable component(s):

- Increased smolt and adult steelhead abundance.
- Quality and quantity of additional steelhead habitat created.
- Improved smolt and adult steelhead passage opportunities in the LSYR.
- Improvement in water quality.
- Reduction in predation and numbers of non-native fish.
- Reduction in beaver dams.

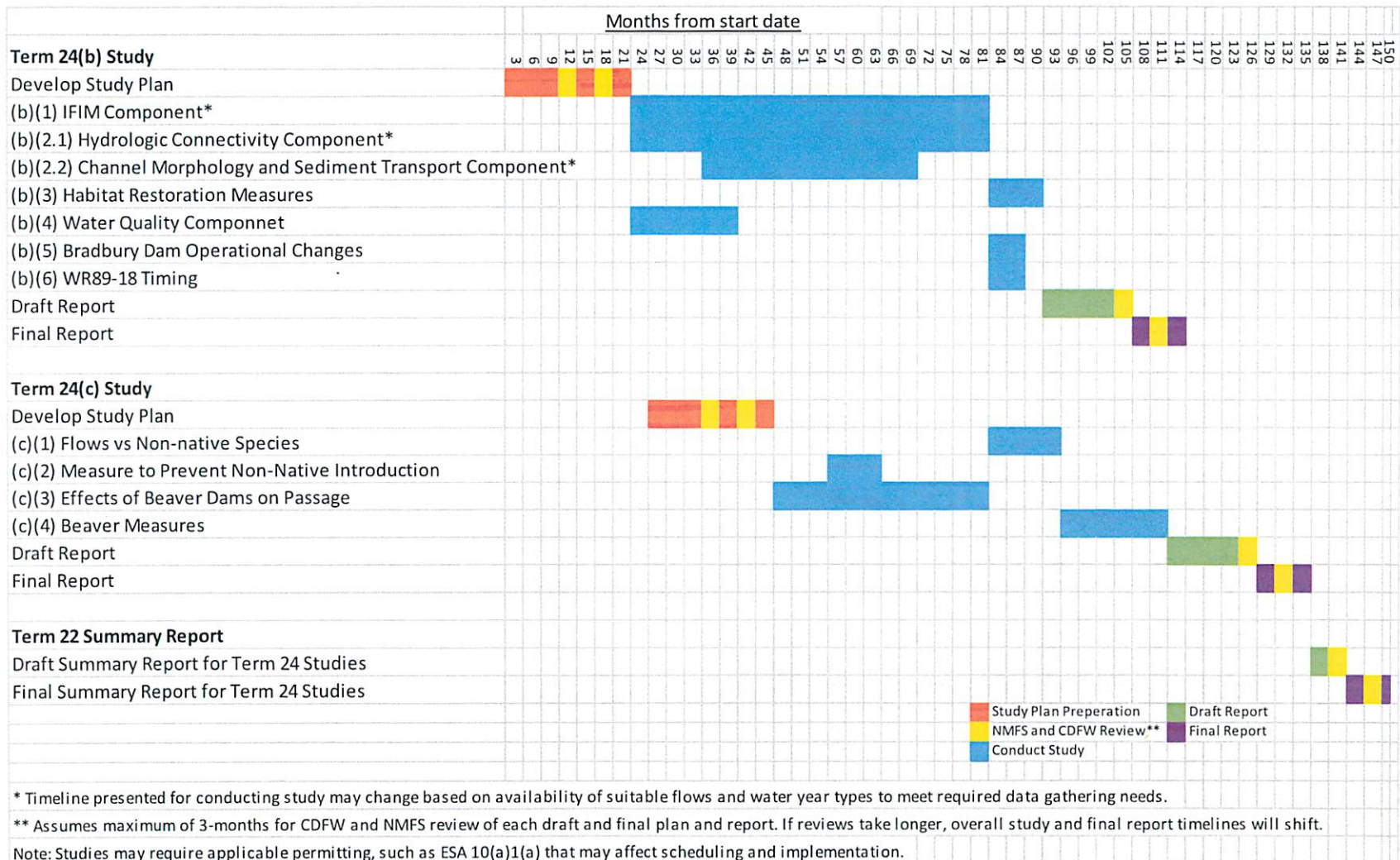
## **Proposed Schedule, Sequencing, and Deadlines for Proposed Studies**

As shown in Figure 1 below, the Term 24 studies and their applicable component(s) are interlinked. As such, Reclamation is proposing a preliminary schedule that builds on the interlinkages shown in Figure 2. Scheduling will be further determined as the studies are developed in more detail.

Figure 1. Flow Chart Depicting Interlinkages between Term 24 Studies



**Figure 2. Proposed Preliminary Scheduling, Deadlines, and Sequencing**





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March 6, 2020

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1243 N Street  
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[dhyatt@usbr.gov](mailto:dhyatt@usbr.gov)

**Subject: California Department of Fish and Wildlife Comments on U.S. Bureau of Reclamation's Draft Cachuma Order WR-2019-0148 Term 20 Plan**

Dear Mr. Hyatt:

California Department of Fish and Wildlife (CDFW) received the U.S. Bureau of Reclamation's (USBR) Draft Cachuma Order WR-2019-0148 Term 20 Plan (Draft Plan) on January 23, 2020. CDFW appreciates this opportunity to comment on the Draft Plan and encourages the USBR to consider CDFW's previous comments provided on December 9, 2016, May 29, 2019, and September 13, 2019 (see Attachment A- CDFW Comment Letters) during the review and adoption processes of the Final Order WR-2019-048 (Final Order) that amends the Bureau's State Water Resources Control Board's (SWRCB) Water Rights permit number 11308 and 11310 for the operation of Bradbury Dam.

CDFW is California's Trustee Agency for fish and wildlife resources and holds those resources in trust by statute for all the people of the State [(Fish & G. Code §§ 711.7, subd. (a) & 1802; Pub. Resources Code § 21070; CEQA Guidelines § 15386, subd. (a))]. CDFW, in its trustee capacity, has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species including wetlands and estuarine habitat (Fish & G. Code § 1802). Similarly, for purposes of CEQA, CDFW is directed charged by law to provide, as available, biological expertise during public agency environmental review efforts, focusing specifically on projects and related activities that have the potential to adversely affect fish and wildlife resources.

The following comments and recommendations are based on an independent review by our CDFW Senior Hydraulic Engineer, Mark Gard, (see Attachment B- CDFW Engineering Comments) of the Draft Plan provided by USBR.

### **General Comments**

**CDFW COMMENT #1:** CDFW recommends the title of the Draft Plan be changed to Draft Cachuma Order WR-2019-0148 Term 24 Plan to adequately represent the subsections of the terms that are being discussed. Term 24 of Order WR-2019-0148 requires [USBR] to do the following:

*"...conduct the following studies to evaluate measures that may be necessary to keep the steelhead fishery in the Santa Ynez River below Bradbury Dam in good*

*condition at the individual, population, and community level and shall be informed by current scientific information on southern California steelhead recovery, including NMFS' 2012 Final Southern California Steelhead Recovery Plan".*

**CDFW COMMENT #2:** The Draft Plan is a responsive document to the SWRCB's Final Order. The Draft Plan should function as a standalone document and all necessary information should be included. As a responsive document the introduction should include all directives and constraints given by the SWRCB (e.g., reasonable and prudent measures). The introduction should also describe in more detail the documents that will be used to inform the Draft Plan.

**Term 24(a) of Order WR-2019-0148**

**CDFW COMMENT #3:** Federal reclamation law requires that the USBR comply with California state water law when diverting water. State water law requirements include obtaining a permit from the SWRCB for diversions that have begun after 1914. Because USBR diversion began after 1914, USBR must comply with in order to lawfully divert water for this project.

**CDFW COMMENT #4:** CDFW disagrees with the USBR conclusion that it is unable to perform fish passage feasibility studies as required by Term 24(a) of its permit issued by the SWRCB. CDFW recommends USBR provide an update regarding the status of the fish passage feasibility studies. The completion of the studies and the reports are due 24 months from the date of the Final Order.

**Term 24(b) of Order WR-2019-0148**

**CDFW COMMENT #5:** The Term 24(b) study plan does not include the evaluations of channel incisions. CDFW recommends Term 24(b) evaluate 1) channel incision (including effects on tributary access) as a result of the impoundment of sediment behind Bradbury Dam, 2) the direct and indirect effects of channel incision on channel morphology, fish and wildlife, and appropriate beneficial uses.

The evaluation should include a recommendation and timeline to remediate direct and indirect impacts from the impoundment of sediment behind Bradbury Dam and provide potential operational changes to facilitate sediment movement through or around the dam.

**CDFW COMMENT #6:** CDFW recommends the Term 24(b) study plans be developed and submitted to National Marine Fisheries Service (NMFS) and CDFW for review and approval prior to initiation of the Term 24(b) studies. The following should be referred to as an example of the appropriate level of detail for the Term 24(b) study plans:

*CDFW. 2017a. Study plan habitat and instream flow evaluation for steelhead (Oncorhynchus mykiss) in the Ventura River, Ventura County. January 2017. Available online at: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=137996&inline>*

**Term 24(b)(1) – Evaluate the flow conditions necessary to protect each stage**

**CDFW COMMENT #7:** The role of streamflow in the life history of anadromous steelhead can be divided into two basic categories: 1) creation and maintenance of essential freshwater habitat (principally for spawning and rearing), and 2) providing opportunities for migratory

behavior (both seasonal upstream migration and downstream emigration) for both adults and juveniles to move between the marine and freshwater habitats.

The Term 24(b)(1) study plan proposes to use the Instream Flow Incremental Methodology (IFIM) developed by the U.S. Fish and Wildlife Service (USFWS) to identify and evaluate appropriate flow conditions for adult and juvenile steelhead in the lower Santa Ynez River. This is not an appropriate or adequate methodology to satisfy Term 24(b)(1). The IFIM is a methodology for determining instream flow needs for fish and wildlife, but was not intended to assess the flow requirements for anadromous fishes because their life cycle involves moving long distances and over critical riffles between the freshwater and marine environment.

**CDFW COMMENT #8:** The previously conducted instream flow studies evaluating migration flow requirements are not consistent with the methods of CDFW (2017b), and thus the results of these studies should not be used to evaluate the magnitude of migration flow requirements. CDFW recommends that the magnitude of upstream and downstream passage flows should be assessed using the following methods from CDFW's standard operating procedure analysis:

*CDFW. 2017b. Standard Operating Procedure for Critical Riffle Analysis for Fish Passage in California. CDFW-IFP-001. September 2017. Available online at: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=150377&inline>*

**CDFW COMMENT #9:** CDFW recommends the timing and duration of upstream and downstream passage flows be assessed using the methods in:

*Booth, D.B., Y. Cui, Z. Diggory, D. Pedersen, J. Kear and M. Bowen. 2013. Determining appropriate instream flows for anadromous fish passage on an intermittent mainstream river, coastal southern California, USA. Ecohydrology 2013; e1396. Available online at: <https://doi.org/10.1002/eco.1396>*

**CDFW COMMENT #10:** Flows needed for upstream passage should consider both physical conditions at critical riffles and compensation for surface-flow loss through percolation.

**CDFW COMMENT #11:** Fry and juvenile rearing habitat should be quantified using the methods in:

*Harrison, L.R., A Pike and D.A. Boughton. 2017. Coupled geomorphic and habitat response to a flood pulse revealed by remote sensing. Ecohydrology 2017; e1845. Available online at: <https://doi.org/10.1002/eco.1845>*

**CDFW COMMENT #12:** The instream flow study should be conducted consistent with the standards in:

*USFWS (United States Fish and Wildlife Service). 2011. Sacramento Fish and Wildlife Office Standards for Physical Habitat Simulation Studies. Sacramento Field and Wildlife Office Prepared by The Restoration and Monitoring Program. Available online at: [http://www.donpedro-relicensing.com/Documents/20140226-5254\(29159448\)-USFWS%20Enclosures.pdf](http://www.donpedro-relicensing.com/Documents/20140226-5254(29159448)-USFWS%20Enclosures.pdf)*

**Term 24(b)(2.1) – Assess flow conditions necessary to ensure hydrologic connectivity and opportunities for steelhead movement**

**CDFW COMMENT #13:** Improved fish passage opportunities for both smolt and adult steelhead must not be limited to the Lower Santa Ynez River. The SWRCB has repeatedly indicated, the SWRCB's interest in and jurisdiction over the public trust interests in the steelhead (and other public trust resources) of the Santa Ynez River is not limited to the Lower Santa Ynez River. It includes the entire River and extends above Bradbury Dam.

**CDFW COMMENT #14:** The Term 24(b)(2.1) study plan description covers hydrologic connectivity in the Lower Santa Ynez River (mainstem and "key" tributaries). The Term 24(b)(2.1) study plan does not specify what hydrologic connectivity means, in particular, as it relates to the migration of both adult and juvenile steelhead.

**CDFW COMMENT #15:** The assessment of flow conditions must consider the flows for adult outmigration for the entire San Ynez River Watershed (i.e., including tributaries). CDFW recommends USBR assess the flow conditions necessary to guarantee hydrologic connectivity and opportunities for movement between the habitats needed by each stage of the steelhead life cycle.

**CDFW COMMENT #16:** An instream flow study to identify an adequate flow regime that supports the migratory behavior and ecology of adult and juvenile steelhead in their freshwater habitats should expressly recognize and take into consideration a number of factors in its analysis; these include, but are not limited to:

- 1) In semi-arid regions, rainfall events can trigger periods of elevated discharge that serve as the primary environmental cue for migration of steelhead into, within, and out of a watershed. As such, the elevated discharge promotes migration opportunities for this species that would otherwise not exist.
- 2) Streams in Southern California watersheds can experience high runoff of short duration. Peak counts or observation of steelhead migrants coincide with these elevated discharges. This underscores the functional value and importance of periods of elevated discharge for migration of steelhead in rivers such as the Santa Ynez River that are characterized by a naturally "flashy" discharge.
- 3) Steelhead show positive rheotaxis (facing into a current) that provides important cues for fish navigating its way upstream.
- 4) Steelhead can more easily navigate streams at higher discharge rates because of the increased number of pathways through a complex channel morphology provided by higher flows.
- 5) Steelhead do not enter and subsequently migrate upstream as a single "run," but rather enter river systems in "waves". Each rainfall-induced discharge event prompts additional steelhead to enter a river from the ocean, while at the same time, adults already in the river migrate further upstream to the spawning areas. This behavior reflects an evolutionary adaptation to the rainfall and runoff pattern of Southern California watersheds, and underscores the ecological importance of the natural hydrological regime of repeated rainfall events and migratory opportunities that promote fish passage throughout the watershed.



**Term 24(b)(2.2) – Assess flow conditions necessary to ensure appropriate channel morphology and sediment transport for steelhead habitat**

**CDFW COMMENT #17:** The forces of streamflow operating on the geomorphic setting, in conjunction with vegetative cover, is principally responsible for creating a wide variety of habitats used by steelhead to complete the freshwater phase of their life cycle. Critical functions of streamflow include the flushing of fine sediments from spawning and rearing habitats, distribution of nutrients, recruitment and sorting of spawning gravels, recruitment and sorting of large woody debris, and the maintenance of riparian vegetation.

Reduced frequency and/or magnitude of channel forming flows has resulted in changes to channel size and shape. Bradbury Dam and Cachuma Reservoir attenuate natural annual flood flows. Large flood releases are less frequent since completion of Bradbury Dam in 1953. Typically, unimpaired alluvial stream channel morphology is the result of flood flows within one- to five-year recurrence intervals. Interactions between natural hydrologic cycles, flood flow regulation, sediment regulation, riparian vegetation, shallow groundwater processes, and channel manipulation all complicate the response of channels downstream from Bradbury Dam.

The approach that CDFW utilizes when identifying appropriate streamflow regime for steelhead in Southern California involves quantitatively estimating the unimpaired pattern (i.e., timing, frequency, duration, and rate-of-change) and magnitude of streamflow in the watershed. Specific quantitative data are drawn from USGS gauging stations, and if necessary, supplemented by models using appropriate rainfall/runoff coefficients. These data form the basis for identifying an appropriate streamflow regime. The advantage of this approach involves using the knowledge of the natural (pre-dam) pattern and magnitude of streamflow. The unimpaired pattern and magnitude of streamflow can be used for promoting viability of a population in an individual watershed. These modeled streamflow regimes will include characteristics and conditions that define the evolution of the species' essential life history traits, individual population's abundance, distribution, and population growth rates.

Channel changes due to flow regulation and/or sediment trapping, precede changes in fish habitat, and must be understood to effectively manage flows for fish passage and other life history phases. Cachuma Reservoir's storage capacity has diminished over the past 60-plus years as all bed material and portions of the finer grained sediment load become trapped behind the dam. The San Ynez River downstream of Bradbury Dam is deprived of bedload material for some distance until tributary sediment inputs contribute to the mainstem. Flood flow regulation can cause tributary confluences to aggrade downstream from large impoundments such as Bradbury Dam. The reduced frequency and/or magnitude of effective sediment transporting flows can result in localized sediment accumulations in streams that are generally degrading.

**CDFW COMMENT #18:** CDFW recommends the Term 24(b)(2.2) study plan include an assessment of stream bank stability, channel incision rates, and perched tributaries that will provide sufficient habitat to keep steelhead in good condition in.

**CDFW COMMENT #19:** CDFW recommends the Term 24(b)(2.2) study plan evaluate the magnitude, duration and frequency of high flows needed to moderate the effects of beaver

dams and encroachment of vegetation in the active river channel, and to establish and maintain pools for juvenile steelhead rearing.

**CDFW COMMENT #20:** CDFW recommends the Term 24(b)(2.2) study plan estimate the volume and spatial distribution of sediment deficiency, including particle-size disparity, and sediment transport capacity in the Santa Ynez River below Bradbury Dam.

**CDFW COMMENT #21:** In order to maximize migratory conditions, CDFW recommends that the following information be developed as part of the Term 24(b)(2.2) study plan:

- 1) Investigate changes in channel geometry since completion of Bradbury Dam and make correlations to fish habitat changes;
- 2) Determine how channel and fish habitat might be improved through incrementally reinstating historic channel forming flow regimes as baseline for assessing management alternatives;
- 3) Determine the distance downstream from Bradbury Dam where tributary inputs of bed material achieve approximate equilibrium with regulated sediment transport capacity;
- 4) Assess the potential to improve fish habitat by managing releases to shift the equilibrium point upstream or downstream; and,
- 5) Prepare a sediment augmentation plan to approximately satisfy the downstream sediment deficit.

**Term 24(b)(3) – Assess potential instream or streamside habitat restoration in relation to flow**

**CDFW COMMENT #22:** The Term 24(b)(3) study plan description focuses on three potential habitat restoration actions:

- 1) spawning gravel augmentation in the Lower Santa Ynez River and Hilton Creek;
- 2) addition of large woody debris (LWD) or boulder clusters in the Lower Santa Ynez River and large tributaries; and,
- 3) installation of cattle exclusion fencing in the Salsipuedes/El Jaro watershed.

Because the scope, scale and exact locations of these habitat restoration measures is not specified it is not clear how the implementation of these actions will to be assessed. CDFW recommends the Term 24(b)(3) study plan provide more specificity regarding these potential habitat restoration actions. Examples include; clarify the apparent inconsistencies regarding proposed gravel augmentation quantities as specified in Table 1 of the Lower Santa Ynez River Habitat Enhancement Plan (i.e., 200 tons per year, 2,800 pounds per year, versus 1,500 cubic yards per year); describe the prospective sizes of LWD and boulders to be installed relative to site-specific hydraulic and hydrologic conditions (e.g., channel width and slope, and discharge magnitude); clarify whether the proposed fencing excludes cattle from one or both sides of the river; clarify the location of fence endpoints and stream crossings; and, clarify the location of related cattle-watering facilities.

**CDFW COMMENT #23:** CDFW recommends the Term 24(b)(3) study plan identify gravel and cobble dispersal mechanisms, including active placement to restore bars and riffles; active injection during high river discharge events; and, strategic stockpiling for passive dispersal.

**CDFW COMMENT #24:** CDFW recommends the Term 24(b)(3) study plan identify the sources of augmented gravel.

**CDFW COMMENT #25:** CDFW recommends the Term 24(b)(3) study plan include a detailed monitoring plan that will quantify geomorphic and habitat responses in the river resulting from implementation of gravel augmentation.

**CDFW COMMENT #26:** CDFW recommends USBR include a discussion of the role of LWD in forming steelhead habitat in a Southern California river in the Term 24(b)(3) study plan. For more information, please see Thompson *et al.* (2007):

*Thompson L. C., J. L. Voss, R. E. Larsen, W. D. Tietje, R. A. Cooper, and Peter B. Moyle. 2007. Role of Hardwood in Forming Habitat for Southern California Steelhead. General Technical Report PSW-GTR-19. Cooperative Extension, Integrated Hardwood Range Management Program, University of California, Berkeley. Available online at: [https://www.fs.fed.us/psw/publications/documents/psw\\_gtr217/psw\\_gtr217\\_307.pdf](https://www.fs.fed.us/psw/publications/documents/psw_gtr217/psw_gtr217_307.pdf)*

**CDFW COMMENT #27:** In CDFW's previously submitted comment letters (see Attachment A-CDFW Comment Letters), CDFW stated that a number of studies have already been completed to assess and identify habitat in need of instream enhancements. CDFW recommends the Term 24(b)(3) study plan refer to the following studies for instream habitat enhancement:

*Stoecker Ecological. 2004. Steelhead Migration Barrier Inventory and Recovery Opportunities for the Santa Ynez River, California. Available online at: <http://stoeckerecological.com/reports/SantaYnezReport.PDF>*

*Block, H. and A. Francis. 2013. Santa Ynez River Watershed Report Final Report, May, 2013. Available online at: [https://www.waterboards.ca.gov/centralcoast/water\\_issues/programs/tmdl/docs/santa\\_ynez/nutrient/sy\\_watershed\\_report\\_may2013.pdf](https://www.waterboards.ca.gov/centralcoast/water_issues/programs/tmdl/docs/santa_ynez/nutrient/sy_watershed_report_may2013.pdf)*

#### **Term 24(b)(4) – Evaluate water quality issues that may impact steelhead**

**CDFW COMMENT #28:** The assessment of water quality issues in the Term 24(b)(4) study plan is missing nutrient loading, a water temperature model, and details regarding specific methods and locations at which water quality parameters would be measured.

**CDFW COMMENT #29:** CDFW recommends the Term 24(b)(4) study plan evaluate water quality issues which may impact steelhead including, but not limited to, elevated temperatures, low dissolved oxygen, nutrient loading, and sediment transport. The Term 24(b)(4) study plan should also include potential measures to address these issues.

**CDFW COMMENT #30:** A water temperature model should be developed in the Term 24(b)(4) study plan to assess what flows are needed to maintain suitable water temperatures for steelhead from Bradbury Dam to the estuary.

**CDFW COMMENT #31:** The Term 24(b)(4) study plan should include the specific methods (including frequency, timing, and locations) at which the water quality parameters (water

temperature, dissolved oxygen, and fine sediments) would be measured. The Term 24(b)(4) study plan should also include standards used to evaluate the suitability of these water quality conditions to support all life stages of steelhead. Evaluation of existing water quality monitoring data should include records from all National Pollution District Elimination System (NPDES) for point waste discharges to the Santa Ynez River, data from the Total Maximum Daily Load (TMDL) studies, and standards for no-point waste discharges to the Santa Ynez River.

**CDFW COMMENT #32:** Additionally, the Term 24(b)(4) study plan for Term 24(b)(4) should address the expected effects of discharging State Water Project water into the Santa Ynez River on steelhead and designated critical habitat, including, but not limited, to juvenile steelhead olfactory-imprinting and rearing habitat conditions (e.g., water quality).

**Term 24(b)(5) – Evaluate operational changes to Bradbury Dam that could improve steelhead conditions**

**CDFW COMMENT #33:** The SWRCB's Order WR 2019-0148 now applies to operation of Bradbury Dam.

**CDFW COMMENT #34:** In addition to the water release provisions related to water supply (including groundwater recharge), the evaluation in the Term 24(b)(5) study plan should include flood control operations: the Term 24(b)(5) study plan should evaluate timing rate (cfs), and location of water that will be released into Hilton Creek under each operational scenario at Bradbury Dam. A review of NMFS' November 28, 2016, draft biological opinion for operation and maintenance of Bradbury Dam may assist USBR in finalizing this component of the Term 24(b)(5) study plan (NMFS 2016):

*National Marine Fisheries Service. 2016. Draft Endangered Species Act Section 7(a)(12) Biological Opinion for the Operation and Maintenance of the Cachuma Project. November 28, 2016. Copy Available Upon Request.*

**Term 24(b)(6) – Evaluate whether timing of 89-18 Water Rights releases should be revised**

**CDFW COMMENT #35:** The Term 24(b)(6) study plan should include provisions for determining the effects of water releases on steelhead adult and juveniles. This should be done by setting up trapping or tagging and passive integrated transponder (PIT) tag arrays to identify movement of fish following water releases that occur outside of the normal rain cycle (e.g. late summer).

**CDFW COMMENT #36:** The Term 24(b)(6) study plan does not fully described the water releases from Bradbury Dam necessary to support downstream water rights in the Santa Ynez River (i.e., Order WR 89-18) and associated alluvial groundwater pumping.

CDFW recommends that Bradbury Dam water releases and associated alluvial groundwater pumping be fully described and related to the water operations stipulated in the SWRCB's Order WR 2019-0148. Specifically, this should include the evaluation of the effects of water releases on designated critical habitat for endangered steelhead. For this reason, the Term 24(b)(6) study plan should include an updated description that clearly and completely describes

the expected consequences of the authorized releases on freshwater rearing areas, freshwater spawning areas, and freshwater migration corridors.

**Term 24(c)(1) – Evaluate effect of flows on habitat conditions to reduce predation and proliferation of nonnative species**

**CDFW COMMENT #37:** The Draft Plan indicates that the Instream Flow Study identified above in Term 24(b) (i.e., IFIM) would be used to evaluate 1) habitat conditions for bass and other non-native species; and, 2) develop measures to curtail the proliferation on non-native species to reduce non-native populations.

CDFW recommends instead of the USFWS IFIM methodology for USBR to use the standard operating procedure for critical riffle analysis using CDFW's methodology (CDFW 2017a) be one appropriate method to assess habitat conditions for the non-migratory non-native species, and could be used in conjunction with the approach described above for the native, migratory steelhead of the Santa Ynez River.

**CDFW COMMENT #38:** CDFW recommends flows into the Lower Santa Ynez River associated with Lake Cachuma reservoir spills of Bradbury Dam should be also be evaluated.

**Term 24(c)(2) – Evaluate Measures to prevent introduction/reintroduction of invasive species**

**CDFW COMMENT #39:** The plan should evaluate methods to stop the release of non-native fish and invertebrates from Bradbury Dam including methods employed at Grizzly Valley Dam on Lake Davis.

**CDFW COMMENT #40:** This component identifies the principal sources of non-native species into the Lower Santa Ynez River (including Cachuma Reservoir), but does not acknowledge the populations of non-native fish and invertebrate species within the mainstem of the upper Santa Ynez River. As noted previously, the SWRCB has repeatedly indicated, the SWRCB's interest in and jurisdiction over, the public trust interests in the steelhead (and other public trust resources) of the Santa Ynez River, is not limited to the Lower Santa Ynez River, but also extends above Bradbury Dam.

**CDFW COMMENT #41:** CDFW recommends that measures to control non-native aquatic fish and invertebrate species must address all their sources to be effective. Prevention and control measures (including public education) must address the entire Santa Ynez River. Best management practices for the control of non-native include *using "large mesh" seines rather than "small mesh" seines to minimize adverse impacts to steelhead.*

**Term 24(c)(3) – Evaluate effect of beaver dams on passage opportunities and distribution of steelhead**

**CDFW COMMENT #42:** The Term 24(c)(3) study plan should include an evaluation of growth rates of steelhead found in beaver ponds vs. outside of beaver ponds. The study of invasive fish presence should also be included as part of this section.

**CDFW COMMENT #43:** Native beavers are not an invasive species that require additional studies in the Final Draft Order. Beavers have been a part of the Santa Ynez River ecosystem for the past 76 years (prior to construction of Bradbury Dam). Beaver dams have been shown to create holding habitat and benefit growths of salmonids. Additionally, beavers attenuate stream flows and provide instream complexity that is often missing in urban or agricultural areas. Studies regarding invasive fish species should be a priority for USBR.

**CDFW COMMENT #44:** CDFW recommends less attention on beaver studies and more resources directed to the non-native predatory species studies.

**Term 24(c)(4) – Identify measures to reduce impacts on steelhead from beavers**

**CDFW COMMENT #45:** Contrary to USBR's concerns of beavers, steelhead are not impacted by beavers. Lawsuits have stemmed from this issue. For example, on May 30, 2019 the Center for Biological Diversity filed a 60-Day Notice of Intent to Sue against the Wildlife Services Program (within the U.S. Department of Agriculture Animal and Plant Health Inspection Service), the USFWS and NMFS because they were in violation of Section 7 of the Endangered Species Act (FESA), 16 U.S.C. 1536, and the ESA 's consultation regulations, 50 C.C.R. Part 402. This is because programs to kill hundreds of beavers in California continued to do so without analyzing the impacts to endangered wildlife that use habitat created by beavers such as steelhead, tidewater goby and salmon. On July 30, 2019 the USFWS (Adkins 2019ab) agreed to complete an analysis of its "beaver damage management program" and will stop killing beavers in California's "critical habitats" of salmon and steelhead and several other endangered species until more research is performed.

Bouwes et al. (2016) completed a twenty-year study on how beaver dams and beaver dam analogs (BDAs) impact steelhead in the Columbia River Basin. Much of their data indicates a positive response towards increasing the quantity and quality of habitat needed by steelhead and more importantly "that neither beaver dams nor BDAs, are barriers to spawner or juvenile movement" (Bouwes et al. 2016; Pollock et al. 2012).

**CDFW COMMENT #46:** CDFW recommends that USBR review the following references to recognize the benefits of beaver dams:

*Adkins, Collette L. 2019a. Notification of Violations of the Endangered Species Act and its Regulations Regarding APHIS-Wildlife Services' Beaver Killing and Dam Removal in California, Press Releases May 30, 2019. Available online at:*  
<https://biologicaldiversity.org/w/news/press-releases/lawsuit-launched-to-protect-endangered-california-salmon-harmed-by-federal-beaver-killing-2019-05-30/>

*Adkins, Collette L. 2019b. Notification of Violations of the Endangered Species Act and its Regulations Regarding APHIS-Wildlife Services' Beaver Killing and Dam Removal in California, Press Releases July 30, 2019. Available online at:*  
<https://biologicaldiversity.org/w/news/press-releases/legal-action-forces-trump-administration-curb-killing-california-beavers-2019-07-30/>

*Bouwes, N et al. 2016. Ecosystem experiment reveals benefits of natural and simulated beaver dams to a threatened population of steelhead (Oncorhynchus mykiss). Sci Rep. 6, 28581; doi: 10.1038/srep28581. Available online at:*

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U.S. Bureau of Reclamation  
March 6, 2020  
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<https://www.researchgate.net/publication/304782958> *Ecosystem experiment reveals benefits of natural and simulated beaver dams to a threatened population of steelhead *Oncorhynchus mykiss**

Pollock, M.M., J.M. Wheaton, N. Bouwes, C. Volk, N. Weber, and C.E. Jordan. 2012. *Working with beaver to restore salmon habitat in the Bridge Creek intensively monitored watershed: Design rationale and hypotheses*. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-120, 47 p. Available online at: <https://www.nwfsc.noaa.gov/research/divisions/fe/documents/NMFS-NWFSC-120.pdf>

**CDFW COMMENT #47:** CDFW asserts that beaver dam do not cause detrimental effects on fish passage. CDFW recommends more attention to be focused on Bradbury Dam operational changes and timing of releases. CDFW recommends that a complete analysis of the beaver damage management program be performed, since numerous studies show beavers benefit endangered steelhead by building ponds and increasing habitat for wildlife.

#### **Figure 1. Flow Chart Depicting Interlinkages between Term 24 Studies**

**CDFW COMMENT #48:** Operation of Bradbury Dam and WR89-19 timing play a role in the introduction of non-native fish and invertebrates into the Lower Santa Ynez River below Bradbury Dam and as such should be shown on the flow chart as having that connection.

**CDFW COMMENT #49:** The flow chart should also show the interconnection of the top tier studies with the Term 24(c) measures to prevent non-natives (see Attachment C- CDFW recommendations on Figure 1. Flow Chart).

#### **Figure 2. Proposed Preliminary Scheduling, Deadlines, and Sequencing**

**CDFW COMMENT #50:** Figure 2 identifies each study plan (i.e. Term 24(b)(4) Water Quality Study, etc.) that correlates with each Term (24) study plan. CDFW recommends USBR provide a full title to each study plan throughout the Draft Plan.

CDFW appreciates the opportunity to comment on the Draft Plan. CDFW looks forward to working with the USBR to plan and conduct crucial studies contained in the Final Order. These studies will provide critical information needed for the operation of Bradbury Dam that will achieve full public trust protection pursuant to Fish and Game Code section and the Public Trust Doctrine.

If you have questions regarding this letter and further coordination on these issues, please contact Mary Ngo, Senior Environmental Scientist (Specialist) at (562) 342-2140 and [Mary.Ngo@wildlife.ca.gov](mailto:Mary.Ngo@wildlife.ca.gov).

Sincerely,



Erinn Wilson  
Environmental Program Manager  
South Coast Region

David E. Hyatt  
U.S. Bureau of Reclamation  
March 6, 2020  
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Enclosures:

ATTACHMENT A- CDFW Comment Letters  
ATTACHMENT B- CDFW Engineering Comments  
ATTACHMENT C- CDFW recommendations on Figure 1. Flow Chart

ec: CDFW

Steve Gibson, Senior Environmental Scientist (Supervisory) (Los Alamitos)  
Mary Larson, Senior Environmental Scientist (Supervisory) (Los Alamitos)  
Mary Ngo, Senior Environmental Scientist (Specialist) (Los Alamitos)  
Steve Slack, Environmental Scientist (Los Alamitos)  
Dolores, Duarte, Executive Secretary (San Diego)  
Lillian McDougall, Instream Flow Environmental Scientist (Sacramento)  
Nancee Murray, Attorney IV (Sacramento)  
Mark Gard, Senior Hydraulic Engineer (Sacramento)

National Oceanic Atmospheric Administration (NOAA)  
Darren Brumback, Fisheries Biologist  
[Darren.Brumback@noaa.gov](mailto:Darren.Brumback@noaa.gov)



**ATTACHMENT A- CDFW Comment Letters**



State of California – Natural Resources Agency  
DEPARTMENT OF FISH AND WILDLIFE  
Office of The General Counsel  
1416 Ninth Street, Room 1341  
Sacramento, CA 95814  
[www.wildlife.ca.gov](http://www.wildlife.ca.gov)

EDMUND G. BROWN JR., Governor  
CHARLTON H. BONHAM, Director



December 9, 2016

Public Comment  
Cachuma Project Draft Order  
Deadline: 12/9/16 12:00 noon

Jeanine Townsend  
Clerk to the Board  
State Water Resources Control Board  
P.O. Box 100  
Sacramento, CA 95812-0100



VIA EMAIL

Re: California Department of Fish and Wildlife (CDFW) Comments on Draft Order Amending the Bureau of Reclamation's Water Rights for the Cachuma Project (1 Order)

Dear Ms. Townsend:

Enclosed are the general and specific comments of CDFW regarding the Draft Order. CDFW appreciates this opportunity to comment on the Draft Order and urges the State Water Resources Control Board (SWRCB) to adopt an Order amending the Bureau of Reclamation's (Bureau) water rights permits for the Cachuma Project without further delay or additional evidentiary hearings at this time.

CDFW's specific comments to the Ordering Sections of the Draft Order are attached as Attachment 1 to this letter.

CDFW participated in the evidentiary hearings in the Phase 2 of the SWRCB proceedings. As stated in our Closing Statement at the end of the evidentiary hearings *twelve years ago*, this Draft Order is a critical step in the SWRCB's administration of the Bureau's water rights permits for the Cachuma Project on the Santa Ynez River. *And*, the Draft Order should only be considered a first step in an ongoing adaptive management strategy. The Draft Order only requires flow supplementation in wet and above normal water years. The slightly higher flows in only two water year types does not fulfill the SWRCB's obligation under the Public Trust Doctrine or Fish and Game Code section 5937 to keep fish in good condition. Instead, much of the success of the Draft Order will be determined by future studies, ongoing monitoring of the effectiveness of the terms and conditions in the Order and an ability to adapt to what that monitoring reveals about its effectiveness. The SWRCB must require studies of the terms and conditions of the Order, regular monitoring of the conditions in the river and the effectiveness of the Order in mitigating impacts to the steelhead fishery and other public trust resources, and must reopen these permits in the near term future if the studies or monitoring demonstrate a need for an alternative flow release schedule or other non-flow conditions necessary to fully discharge its duty under the Public Trust Doctrine.

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Additionally, it is absolutely vital that the SWRCB order the immediate commencement of a proper study of the feasibility of providing passage for steelhead around Bradbury Dam. The Draft Order did not clearly specify a time period in which a fish passage study must be commenced and when it must be completed. Similarly, the Draft Order allowed the Bureau to forego implementation of any tributary passage barrier and habitat restoration efforts in the revised project description. Additionally, the Draft Order allowed for *all other* studies, crucial to the success of determining what must be done to mitigate for the ruinous effect that the construction of Bradbury Dam has had on a formerly magnificent run of steelhead trout (*Oncorhynchus mykiss*), to be deferred pending the completion of the fish passage study, which could drag on for a decade or longer, without a specified end date. Deferring the start of *all other* studies is not biologically defensible or acceptable and tributary passage impediments must continue to be addressed while the feasibility of fish passage over or around Bradbury Dam is evaluated. The studies in the Draft Order must be done concurrently in order to better understand the effects of the terms and conditions of the Draft Order and to adaptively manage in the future. Again, the Draft Order is a step in the right direction of protecting public trust resources, but is not the final step. CDFW appreciates the SWRCB taking that step in better protecting public trust resources in the Santa Ynez River. Also, the studies required by the Draft Order will help inform the next step toward adequate protection of those public trust resources.

Because the Draft Order relies heavily on studies that will be done in the future by the Bureau in order to "improve the state of knowledge concerning the measures necessary to protect the steelhead fishery", many of CDFW's specific comments on Attachment 1 relate to the method and timing of "consultation" with CDFW. Improving the state of knowledge requires that studies be done in a scientifically justified way, with advance and ongoing input from CDFW and the National Marine Fisheries Service (NMFS). CDFW believes that its proposed edits to Section 11 of the Draft Order are necessary to producing the information that is critical to the success of further defining the next steps to be taken toward adequate protection of the steelhead fishery.

The Draft Order also excused the Bureau from implementing barrier fixes in tributaries below Bradbury Dam for steelhead passage, which would conflict with the requirements in the 2000 NMFS Biological Opinion. CDFW specific comments to Draft Order section 8(b) are designed to require improvements in downstream tributaries. It will take several years to complete the proposed fish passage study, as well as implement fish passage around Bradbury Dam, if found to be feasible. In the intervening years, steelhead still need access to the spawning, rearing and summer holding habitat in the principal tributaries of Salsipuedes, El Jaro, Quiota and Hilton Creeks. The SWRCB should require the Bureau to remove or modify several existing barriers in these tributaries, as these tributaries are currently maintaining the population within the Santa Ynez watershed.

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In its Specific Comments, CDFW also recommends the deletion of Section 9 (c). Section 9(b) addresses instances in which CDFW or NMFS determines flows would harm the fishery and provides that in such instances, the Executive Director may reduce or terminate such flows. Proposed Section 9 (c) is duplicative and conflicting with Section 9 (b) in that it unilaterally allows Member Units to make an unspecified demonstration of harm to the fishery, without the procedural steps outlined in 9 (b). Section 9 (c) should be deleted to avoid unnecessary confusion and conflict with Section 9(b).

CDFW also recommends deletion of an element of a study described in Section 11(b) regarding beavers. Beavers have been a part of the Santa Ynez River ecosystem for the past 76 years (prior to construction of Bradbury Dam). Beaver dams have been shown to create holding habitat and benefit growth of salmonids. Additionally, beavers attenuate stream flows and provide instream complexity that is often missing in urban or agricultural area. Studies regarding invasive species should be a priority, and beavers here are not an invasive species that require additional studies in the Draft Order.

CDFW also encourages the SWRCB to increase its emphasis on monitoring in the Draft Order. Rather than a subsection, CDFW, in Attachment 1, recommends that monitoring be given its own section and be acknowledged for the important role that monitoring will take in this step toward improving the state of knowledge concerning the measures necessary to protect the steelhead fishery in the Santa Ynez River. A steelhead monitoring plan needs to assess the population status and trend for the Santa Ynez steelhead population. The plan should follow the California Coastal Salmonid Monitoring Plan (Adams et al. 2011) and provide data that will determine the viability of the steelhead population. The California Coastal Salmonid Monitoring Plan was developed by the Department of Fish and Wildlife and the National Oceanic and Atmospheric Administration's Science Center and is being used by the Department and its partners to monitor coastal salmon and steelhead populations within the state. Toward that end, the Department has provided funding to various non-profit groups to provide training for entities conducting salmonid monitoring in the state. The California Coastal Salmonid Monitoring Plan provides standard protocols for assessing and monitoring populations of salmonids, and allows for consolidation of data from multiple sources for management purposes. The use of the California Coastal Salmonid Monitoring Plan in this Order will build on the existing COMB project as well as be able to combine their data, collected over the past 10 years, in trend analysis with new data. The use of the California Coastal Salmonid Monitoring Plan here will further cement the collaborative nature of the partnership that has been in effective of the past 12 years between CDFW, the Bureau, NMFS and the member units. It will also allow CDFW to more actively participate in survey design, on the ground data collection, and data analyses.

CDFW appreciates the opportunity to comment on the Draft Order, and acknowledges this important step the SWRCB is taking in adopting the long awaited changes to the Bureau's permits to operate the Cachuma Project. CDFW looks forward to working with

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the Bureau, NMFS, the Member Units, and the SWRCB as these parties go forward and implement the interim conditions in the Draft Order, plan and conduct crucial studies contained in the Draft Order, and ultimately determine more permanent conditions for operation of the Cachuma Project that will achieve full public trust protection pursuant to Fish and Game Code section 5937 and the Public Trust Doctrine.

Sincerely,



Nancee M. Murray  
Attorney IV  
Office of the General Counsel

cc: Cachuma Project Evidentiary Hearings Service List (updated 09/07/2016)

<b>Section of Draft Order</b>	<b>Revisions</b>
11.8	The first sentence should be revised to read: ...set forth at pages 71-72, and the Terms and Conditions, set forth at pages 72-82...
11.8b	The language should be revised to read: Notwithstanding the foregoing, rightholder shall be required to implement tributary passage impediment and barrier fixes as described herein Quiota Creek (four road crossings) and Hilton Creek (Highway 154).
11.8c	The language should be revised to read: The State Water Board reserves authority to modify this term based on any <u>major</u> modification to the 2000 Biological Opinion. Any modification to this term shall be made in accordance with section 780 of title 23 of the California Code of Regulations.
11.9	New language should be added below Table 2: During Below Normal, Dry and Critical Years, rightholder shall release or bypass water in accordance with the 2000 Biological Opinion, or any revised Biological Opinion that may be issued by NMFS.
11.9c	The following language should be deleted:  <del>The Executive Director may terminate the requirement to meet the Table 2 Flows, or may allow a reduction in the flows required, if CDFW, NMFS, rightholder, or Member Units demonstrate to the Executive Director's satisfaction that the flows will not benefit the fishery or are likely to harm the fishery.</del>
11.9e	The first sentence should be revised to read: If CDFW or NMFS <u>directs</u> a change to the schedule of Table 2 Flows pursuant Paragraph 9d, but...
11.9g	A new subsection should be added as Section 9g and should read as follows: If after 6 years after implementation of Table 1 and 2 the steelhead population has not reached the minimum requirements outlined below, the Board will reopen Permits 11308 and 11310 to determine what alternative flow releases are necessary to comply with the Public Trust Doctrine and Fish and Game Code 5937. For the six year period: <ol style="list-style-type: none"> <li>1) With less than three wet or above average water year types (and when the lagoon is open/passable), the average returning adult spawners must be nine and the average number of outmigrating smolts must be at least 12,000.</li> <li>2) With three or greater wet or above average water year types (and when the lagoon is open/passable), the average returning adult spawners must be at least fifteen and the average number of outmigrating smolts must be at least 18,000.</li> </ol>
11.11	The first sentence should be revised to read: To determine the measures necessary to protect the public trust resources of the Santa Ynez River, the rightholder shall conduct the following studies <u>after</u> consultation with CDFW and NMFS.  New language should be added after the first paragraph of Section 11 to read as follows:  For all draft and final reports and studies required by this Paragraph and Order, the rightholder shall consult with CDFW and NMFS. For the purpose of this Order, consultation shall include, but is not limited to: within 30 business days of adoption of this order, the rightholder shall contact and schedule ongoing and regular consultation

	<p>meetings with CDFW and NMFS. Upon completion of any study plan component (draft or final), the rightholder shall transmit the study plan to CDFW and NMFS. The rightholder shall provide CDFW and NMFS with at least a 30 business day comment period on the study plan prior to submittal to the Deputy Director. This 30 business day comment period shall apply to any draft, final or revised study plan and any draft, final or revised report or submission to the Deputy Director that may add to the record. Rightholder must include in any study plan submission to the Deputy Director, CDFW or NMFS comments and provide an explanation of how the document information was changed based on those comments or provide an explanation of the rightholder's reasons for not incorporating changes based on comments from CDFW and/or NMFS.</p> <p>At the first of these consultation meetings, the rightholder, CDFW and NMFS shall create a detailed study plan schedule. There are multiple components to the study plan schedule that will require individual studies resulting in data necessary to evaluate fish in good condition.</p> <p>After consultation with CDFW and NMFS, the rightholder must submit a study plan schedule to the Deputy Director within 120 business days from the date of this Order.</p> <p>In addition to the regular ongoing meetings, the rightholder shall hold an annual meeting with CDFW and NMFS during the period of time that studies described in this Order are being conducted. The annual meeting will be held in July, unless a different date is mutually agreed upon in writing. At the annual meeting, the rightholder must present data collected in the previous year, report progress on each study identified in the study plan schedule, and report projected work and schedule for the following year.</p> <p>All studies and reports described in this Order, unless specifically noted otherwise, must be completed within 3 years from the date of this Order.</p>
<p>11.11b(1)</p>	<p>The following language should be deleted:</p> <p><del>Based on the significant potential benefit of providing passage around Bradbury Dam, it may be possible to defer the remaining studies pending completion of the passage study. If passage is feasible and likely to achieve good condition of the steelhead fishery, the remaining study requirements may continue to be deferred pending implementation of measures that provide passage around Bradbury Dam and monitoring to determine whether good condition of the fishery is likely to be achieved.</del></p>
<p>11.11b(2)</p>	<p>The language should be revised to read: Rightholder shall develop and conduct an Instream Flow Incremental Methodology (IFIM) study. In addition to the IFIM study, rightholder shall 1) evaluate water quality, including but not limited to temperature, dissolved oxygen, nutrient loading and sediment; and 2) an evaluation of channel morphology and sediment transfer, including but not limited to stream bank stability, incision rates, and perched tributaries. The study shall evaluate channel incision (including effects on tributary access) due to the impoundment of sediment behind Bradbury Dam, as well as the direct and indirect effects on channel morphology, fish and wildlife, and appropriate beneficial uses. The evaluation shall include a</p>

	<p>recommendation and timeline to remediate direct and indirect impacts from the impoundment of sediment behind Bradbury Dam, as well as potential operational changes to facilitate sediment movement through or around the dam, and improve or sustain water quality levels. The studies required in this subsection will help to determine flows and non-flow conditions necessary to keep the Santa Ynez River steelhead fishery in good condition at the individual, population and community level.</p>
11.11b(3)	<p>The second sentence should be deleted as follows:</p> <p><del>In addition, the study shall determine the effects of beaver dams on passage opportunities and distribution of steelhead and measures that could be implemented to reduce the impacts on steelhead in the river.</del></p>
11.11b(4)	<p>The language should be revised to read: ...Rightholder shall conduct a study that evaluates stream and streamside habitat restoration and habitat improvements that could be completed to improve steelhead conditions in the lower Santa Ynez River watershed in addition to the Table 2 Flows, including but not limited to fixing impediments and barriers to passage or providing passage upstream and downstream of Bradbury Dam.</p>
11.11c	<p>Add the following language to the first sentence: ...4) <u>timelines for submitting drafts to CDFW and NMFS for comment...</u> and 5) <u>the proposed deadlines for submitting the completed reports to the Deputy Director that describe the studies and their results.</u></p> <p>The following language should be deleted:</p> <p><del>Rightholder shall consult with CDFW and NMFS regarding the development and scope of the study plan as well as each individual study. Within 180 days from the date of this order, rightholder shall submit a study plan to the Deputy Director for the Deputy Director's review and approval. The Deputy Director may direct the rightholder to make any changes to the study plan necessary to ensure a timely and meaningful evaluation of the measures necessary to protect public trust resources in the Santa Ynez River. In addition, The Deputy Director may require the rightholder to conduct the studies in phases, or to refine or augment the studies based on the results of an earlier phase. Rightholder shall make any changes to the study plan that the Deputy Director requires within the period that the Deputy Director specifies and shall conduct and report on the studies in accordance with the approved study plan. The Deputy Director may require updates and revisions to the study plan as studies are completed and new information is available.</del></p>
11.12	<p>The language should be revised to read: Right holder shall: Maintain a continuous record of the daily instream flows and flow depths in the Santa Ynez River at Highway 154 and at Alisal Road, Salsipuedes Creek, and other sites that the Deputy Director deems suitable, sufficient to document compliance with the terms of this permit. The continuous record of the daily stream flows and flow depths shall be made available <u>daily</u> on a publicly accessible website.</p> <p>The following language should be deleted:</p> <p><del>2) Implement the monitoring program described in the revised Biological Assessment</del></p>

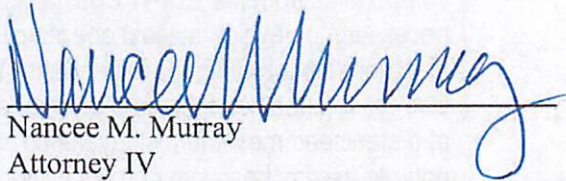


	<p><del>(2000) to evaluate steelhead and their habitat within the lower Santa Ynez River. The monitoring program shall be implemented regardless of which flow requirements are in effect. The Deputy Director may amend the monitoring requirements to require additional monitoring or refine existing requirements.</del></p>
<p>11.13</p>	<p>A new section 13 should be added to the Order that specifically addresses the monitoring program:</p> <p>The new section 13 should read as follows: Implement the monitoring program described in the revised Biological Assessment (2000) with the inclusion of components from the CDFW Coastal Monitoring Program (Adams et. al. 2011) necessary to develop at least one life cycle monitoring station to evaluate steelhead and their habitat within the lower Santa Ynez River. This includes biweekly red surveys for steelhead during the winter spawning season as well as the development of a steelhead movement study during summer and fall. A PIT tag study must also be done to assess freshwater productivity. Smolt production must be evaluated by mark – recapture at the weir traps. The rightholder will establish a Biological Advisory Committee (BAC) composed of the rightholder, CDFW, NMFS and USFWS. The function of the BAC will be to advise the rightholder on implementation of the monitoring program. The monitoring program shall be implemented regardless of which flow requirements are in effect. The BAC will meet annually in July to review all steelhead and habitat monitoring data collected in the previous twelve month period, the summary analysis and trend for all previous year data collections as well as discuss the upcoming year's monitoring studies. Additional meetings will be scheduled based upon the need to evaluate new information. The Deputy Director may amend the monitoring requirements to require additional monitoring or refine existing requirements.</p>

CERTIFICATE OF SERVICE

I hereby certify that I have on this day electronically filed the foregoing California Department of Fish and Wildlife's Comments on the Draft Order Amending the Bureau of Reclamations Water Rights for the Cachuma Project with the State Water Resources Control Board (CDFW Comments). I have also electronically filed the same CDFW Comments to the Cachuma Project Evidentiary Hearings Service List, last updated on 09/07/2016.

Dated this 9th day of December, 2016



Nancee M. Murray  
Attorney IV  
California Department of Fish and Wildlife



State of California – Natural Resources Agency  
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GAVIN NEWSOM, Governor  
CHARLTON H. BONHAM, Director



May 29, 2019

Ms. Jeanine Townsend  
Clerk of the Board  
State Water Resources Control Board  
P.O. Box 100  
Sacramento, CA 95812-0100  
[commentletters@waterboards.ca.gov](mailto:commentletters@waterboards.ca.gov)

**Subject: California Department of Fish and Wildlife (CDFW) Comments on Revised Draft Order Amending the Bureau of Reclamation's Water Rights Permits 11308 and 11310 for the Cachuma Project (Revised Draft Order)**

Dear Ms. Townsend:

Enclosed are CDFW comments regarding the Revised Draft Order amending the Bureau of Reclamation's (Bureau) Water Rights Permits 11308 and 11310 for the Cachuma Project (Revised Draft Order). CDFW appreciates this opportunity to comment on the Revised Draft Order and urges the State Water Resources Control Board (SWRCB) to adopt a Final Order amending the Bureau's water rights permits for the Cachuma Project without further delay or additional evidentiary hearings at this time.

CDFW appreciates SWRCB incorporating several of our comments from our December 9, 2016 comment letter. The Revised Draft Order takes steps forward to improve protection of public trust resources in the Santa Ynez River. CDFW recommends that SWRCB incorporate the remaining CDFW comments in the Final Order. These additional revisions and clarifications of the terms are needed for the SWRCB to fully discharge its duty under the Public Trust Doctrine. CDFW's comments to the Ordering Sections of the Revised Draft Order are attached as Attachment 1 to this letter.

As trustee for the state's fish and wildlife resources, CDFW has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable population of such species. In that capacity, CDFW administers California Endangered Species Act (CESA) and other provisions of the California Fish and Game Code that afford protection to the state's fish and wildlife resources.

It is CDFW's goal and responsibility to protect and maintain viable populations of fish and wildlife resources throughout the state. Species and watershed protection, providing fishery access to headwater reaches, and providing adequate instream flows for all life stages of fishery resources are focal points of CDFW's efforts to retain native populations of fish and wildlife.

The Revised Draft Order only requires flow supplementation in wet and above normal years. The wet and above normal year flows do not fulfill the SWRCB's obligation under the Public Trust Doctrine or Fish and Game Code section 5937 to keep fish in good condition. CDFW recommends that the Revised Draft Order direct the release or bypass of water during below normal, dry, and critical years in accordance with the 2000 Biological Opinion or any revised

Biological Opinion that may be issued by National Marine Fisheries Service (NMFS). CDFW also recommends that Section 5.3.3.5. (pg. 89-90) include dry and normal rain years in the Revised Draft Order to avoid impacts to steelhead from lack of fish passage and access to habitat above Bradbury Dam.

The Revised Draft Order allows the Bureau to forego implementation of any tributary passage barrier and habitat restoration efforts and excused (Term 15.b. pg.133) the Bureau from implementing barrier fixes in tributaries below Bradbury Dam for steelhead passage that would conflict with the requirements in the 2000 NMFS Biological Opinion. CDFW's specific comments to the Revised Draft Order Term 15.b. (Pg. 133) are designed to require improvements in downstream tributaries.

As a result of extended drought and wildfires, steelhead in southern California have been severely impacted in the past 9 years. As stated in the FEIR, over-summering rearing habitat, water quality, the amount of physical space available, and passage opportunities are limiting factors for steelhead populations in the Santa Ynez River. (FEIR, Vol. II, p. 4.7-45, FEIR, Vol. III, Appendix C, 1999 Biological Assessment, p. 2-34; MU-226, p. 9.) Without access to habitat above Bradbury Dam, at a minimum, more habitat will need to be provided below Bradbury Dam to improve the steelhead population's condition. CDFW recommends that Term 15.c. require the implementation of habitat restoration projects identified in readily available public documents (i.e., Steelhead Migration Barrier Inventory and Recovery Opportunities for the Santa Ynez River, California 2004<sup>1</sup>, Santa Ynez River Watershed Report Final Report: May, 2013<sup>2</sup>) within two years of the Final Order.

CDFW recommends that the SWRCB require the Bureau to restore passage upstream of Bradbury Dam to mitigate for steelhead population decline and impacts associated with inaccessible upstream steelhead habitat that can support essential life history functions to reduce extirpation in the Santa Ynez River watershed.

CDFW recommends updating Table A (pg. 25) to include foothill yellow-legged frog (*Rana boylei*) a species that was designated as a state candidate for listing on June 21, 2017<sup>3</sup>. During CESA candidacy, a species is afforded protections as a listed species and "take<sup>4</sup>" is prohibited unless authorized by CDFW pursuant to Fish and Game Code section 2080.1, 2081, subdivision (a) or (b), 2089.6, or 2835, or by the Commission pursuant to Fish and Game Code section 2084.

Term 24 (c) should be amended to delete the element regarding beavers. Beavers have been a part of the Santa Ynez River ecosystem for the past 76 years (prior to construction of Bradbury Dam). Beaver dams have been shown to create holding habitat and benefit growths of salmonids. Additionally, beavers attenuate stream flows and provide instream complexity

<sup>1</sup> Stoecker, M.W. 2004. Steelhead Migration Barrier Inventory and Recovery Opportunities for the Santa Ynez River, Ca. <http://stoeckerecological.com/reports/SantaYnezReport.PDF>

<sup>2</sup> Block, H. and Francis, A. 2013. Pacific State Marine Fisheries Commission and California Department of Fish and Wildlife. Santa Ynez River Watershed Report: May 2013 [https://www.waterboards.ca.gov/centralcoast/water\\_issues/programs/tmdl/docs/santa\\_ynez/nutrient/sy\\_watershed\\_report\\_may2013.pdf](https://www.waterboards.ca.gov/centralcoast/water_issues/programs/tmdl/docs/santa_ynez/nutrient/sy_watershed_report_may2013.pdf)

<sup>3</sup> California Department of Fish and Wildlife. Considerations for Conserving the Foothill Yellow-Legged Frog <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=157562&inline>

<sup>4</sup> California Fish and Game Code. Pursuant to Fish and Game code section 86, "take" means hunt, pursue, catch, capture, or kill or attempt to hunt, pursue, catch, capture, or kill."

Jeanine Townsend  
State Water Resources Control Board  
May 29, 2019  
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that is often missing in urban or agricultural areas. Studies regarding invasive fish species should be a priority for the Bureau, and beavers here are not an invasive species that require additional studies in the Revised Draft Order.

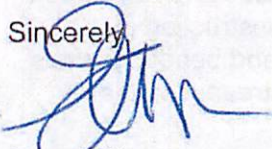
CDFW recommends that a detailed description of a consistent and repeatable monitoring methodology be included in the monitoring plan. The methodology should be able to accurately characterize instream and riparian habitats and distinguish between steelhead, rainbow trout, smolt, migrant fish, and resident fish. A steelhead monitoring, and adaptive management plan needs to assess the population status and trend for the Santa Ynez River steelhead population. The plan should follow the 2011 California Coastal Salmonid Population Monitoring Plan<sup>5</sup> and provide data that will determine the viability of the steelhead population. The 2011 California Coastal Salmonid Population Monitoring Plan was based on Fish Bulletin 180<sup>3</sup> and has identified appropriate sampling protocols that were developed by CDFW and NMFS which includes recent scientific studies that have not been identified in the 2000 Biological Opinion.

The Revised Draft Order states that there is no evidence of record that the City of Santa Barbara's desalination facility is in operation (pg. 86 and 114). The City of Santa Barbara's desalination facility has been in operation since 2017 and has a potential capacity of 10,000 acre-feet a year (AFY), but currently produces 3,125 AFY<sup>6</sup>. CDFW recommends that the SWRCB take official notice of the existence and operation of the City of Santa Barbara's desalination facility and that the final order reflect the desalination facility's 10,000 AFY capacity in the water supply and impacts analysis.

CDFW appreciates the opportunity to comment on the Revised Draft Order and acknowledges this important step the SWRCB is taking in adopting the long-awaited changes to the Bureau's permits to operate the Cachuma Project. CDFW looks forward to working with the Bureau, NMFS, the City of Santa Barbara, Goleta Water District, Montecito Water District, Carpinteria Valley Water District, and the Santa Ynez River Water Conservation District, Improvement District No. 1 (the Member Units), and the SWRCB as these parties go forward and implement the interim conditions in the Revised Draft Order, plan and conduct crucial studies contained in the Draft Order, and ultimately determine more permanent conditions for operation for the Cachuma Project that will achieve full public trust protection pursuant to Fish and Game Code section and the Public Trust Doctrine.

If you have questions regarding this letter and further coordination on these issues, please contact Mary Ngo at (562) 342-2140 and [Mary.Ngo@wildlife.ca.gov](mailto:Mary.Ngo@wildlife.ca.gov).

Sincerely,



Erin Wilson  
Environmental Program Manager

<sup>5</sup> Adams, P.B., Boydston, L.B, Gallagher, S.P., Lacy, M.K., McDonald, T., Shaffer, K.E. 2011. California Coastal Salmonid Population Monitoring: Strategy, Design, and Methods. <https://www.calfish.org/ProgramsData/ConservationandManagement/CaliforniaCoastalMonitoring.aspx> and <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=30284>

<sup>6</sup> City of Santa Barbara  
<https://www.santabarbaraca.gov/gov/depts/pw/resources/system/sources/desalination/default.asp>

Jeanine Townsend  
State Water Resources Control Board  
May 29, 2019  
Page 4 of 4

cc: Cachuma Project Evidentiary Hearings Service List (updated 03/26/2019)

ec: CDFW  
Erinn Wilson, EPMI (Los Alamitos)  
Randy Rodriguez, SES-Supervisory (Los Alamitos)  
Mary Larson, SES-Supervisory (Los Alamitos)  
Mary Ngo, SES-Specialist (Los Alamitos)  
Nancee Murray, Attorney IV (Sacramento)

<b>Section 11 of Revised Draft Order</b>	<b>Requested Revisions</b>
15, Pg. 132	<p>The language should be revised to read:</p> <p>Except as otherwise provided in this term and in term 16 below, right holder shall operate and maintain the Cachuma Project and implement conservation measures including but not limited to those described in Revised Section 3 (Proposed Project) of the Biological Assessment for Cachuma Project Operations and the Lower Santa Ynez River, June 2000, and right holder shall comply with all of the Reasonable and Prudent Measures 5 and 7 through 13, set forth at page 68, and the Terms and Conditions, set forth at pages 70–78, in the National Marine Fisheries Service's (NMFS) Biological Opinion: U.S. Bureau of Reclamation operation and maintenance of the Cachuma Project on the Lower Santa Ynez River in Santa Barbara County, California, September 2000 (2000 Biological Opinion). To prevent any conflicting requirements upon issuance of any new Biological Opinion, the State Water Board's Executive Director (Executive Director) may modify this term upon request of right holder after receiving the approval of NMFS. Any modification to this term shall be made in accordance with section 780 of title 23 of the California Code of Regulations <u>and in compliance with any new Biological Opinion.</u></p>
15, Pg. 132-133	<p>Previous language should be added back into Term in the Revised Draft Order and should be updated to read:</p> <p><u>The State Water Board reserves authority to modify this term based on any modification to the 2000 Biological Opinion or any revised or subsequent Biological Opinion that may be issued by NMFS.</u></p>
15.c., Pg. 133	<p>The language should be revised to read:</p> <p>Right holder, <u>in coordination with NMFS and CDFW,</u> shall proceed with rescue efforts within a period necessary to prevent steelhead mortality following any flow interruption of the Hilton Creek Watering System. Right holder shall post all flow interruptions of the Hilton Creek Watering System and rescue efforts on a publicly accessible website. <u>Right holder shall begin implementation of habitat restoration projects identified in readily available public documents (i.e. Steelhead Migration Barrier Inventory and Recovery Opportunities for the Santa Ynez River, California 2004, Santa Ynez River Watershed Report Final Report: May, 2013) within two years of the order.</u></p>
16.b., Pg. 134	<p>New language should be added below Table 2:</p> <p><u>During Below Normal, Dry and Critical Years, right holder shall release or bypass water in accordance with the 2000 Biological Opinion, or any revised or subsequent Biological Opinion that may be issued by NMFS.</u></p>

<p>16.g., Pg. 135</p>	<p>A new paragraph should be added as Term 16.g. and should read as follows:</p> <p><u>If after 6 years after implementation of Table 1 and Table 2 the steelhead population has not reached the minimum requirements outlined below, the Board will reopen Permits 11308 and 11310 to determine what alternative flow releases are necessary to comply with the Public Trust Doctrine and Fish and Game Code 5937.</u></p> <p><u>For the six-year period:</u></p> <ol style="list-style-type: none"> <li>1) <u>With less than three wet or above average water year types (and when the lagoon is open/passable), the average returning adult spawners must be nine and the average number of out-migrating smolts must be at least 12,000.</u></li> <li>2) <u>With three or greater wet or above average water year types (and when the lagoon is open/passable), the average returning adult spawners must be at least fifteen and the average number of out-migrating smolts must be at least 18,000.</u></li> </ol>
<p>17, Pg. 136-137</p>	<p>Three new paragraphs should be added after Term 17.1 to read as follows:</p> <p><u>At the first of these consultation meeting, the right holder, CDFW and NMFS shall create a detailed study plan schedule. There are multiple components to the study plan schedule that will require individual studies resulting in data necessary to evaluate fish in good condition.</u></p> <p><u>After consultation with CDFW and NMFS, the right holder must submit a study plan schedule to the Deputy Director within 120 business days from the date of this Order.</u></p> <p><u>All studies and reports described in this Order, unless specifically noted otherwise, must be completed within 3 years from the date of this Order.</u></p>
<p>17.(5), Pg. 136-137</p>	<p>The language should be revised to read:</p> <p><u>In addition to the regular ongoing meetings, right holder shall establish a Biological Advisory Committee (BAC) composed of the right holder, CDFW, NMFS and USFWS and shall hold an annual meeting during each year that studies described in this Order are being conducted. The function of the BAC will be to advise the right holder on the studies and on implementation of the monitoring program. The annual meeting will be held in July, unless a different date is mutually agreed upon in writing. At the annual meeting, right holder must present data collected in the previous year and report progress on each study identified in the approved study plan and compliance with this Order. Each meeting also shall consist of reviewing all steelhead and habitat monitoring data collected in the previous twelve-month period, the summary analysis and trend for all previous year data collections as well as discussing the upcoming year's monitoring studies. Additional meetings shall be scheduled based upon the need to evaluate new information.</u></p>
<p>24.b.(2),</p>	<p>The language should be revised to read:</p>



Pg. 140	Assess the flow conditions necessary to ensure hydrologic connectivity and opportunities for movement between the habitats needed by each stage of the steelhead life cycle, including tributary access, and appropriate channel morphology and sediment transfer, <u>including, but not limited to, stream bank stability, channel incision rates, and perched tributaries</u> that will provide sufficient habitat to keep steelhead in good condition;
24.b.(3), Pg. 140	Term 24.b.(3) should be deleted. A number of studies have already been completed to assess the habitat which has identified needed instream enhancements. The Revised Draft Order should require coordination with CDFW and NMFS and refer to the following studies for implementation: Steelhead Migration Barrier Inventory and Recovery Opportunities for the Santa Ynez River, California (2004) and Santa Ynez River Watershed Report Final Report: May, 2013.
24.b.(4), Pg. 140	The language should be revised to read:  Evaluate water quality issues that may impact steelhead including, but not limited to, elevated temperatures, low dissolved oxygen, <u>nutrient loading</u> , and sediment transport and potential measures to address these issues;
24.b.(1) to 24.b.(6), Pg. 140-141	A new subparagraph should be added in Term 24.b to read as follows:  <u>Evaluate channel incision (including effects on tributary access) due to the impoundment of sediment behind Bradbury Dam, as well as the direct and indirect effects on channel morphology, fish and wildlife, and appropriate beneficial uses. The evaluation shall include a recommendation and timeline to remediate direct and indirect impacts from the impoundment of sediment behind Bradbury Dam, as well as potential operational changes to facilitate sediment movement through or around the dam, and improve or sustain water quality levels.</u>
24.c., Pg. 141	The third sentence should be deleted as follows:  Study and evaluate the effects of predation, particularly by piscivorous (fish-eating) fish, and nonnative species on steelhead in the Santa Ynez River, and measures that could be implemented to reduce the impacts of those species on steelhead in the river. The study shall specifically evaluate the effects of flows, including but not limited to Table 2 Flows, on supporting habitat conditions that reduce predation and the proliferation of nonnative <u>fish species</u> , as well as reasonable measures to prevent the introduction or reintroduction of invasive <u>fish species</u> . <del>In addition, the study shall determine the effects of beaver dams on passage opportunities and distribution of steelhead and measures that could be implemented to reduce any impacts on steelhead in the river from beavers.</del>
26, Pg. 141	The language should be revised to read:

	<p>Right holder shall implement the monitoring program described in the 2000 Revised Biological Assessment or <u>any revised or subsequent Biological Opinion that may be issued by NMFS</u> with consideration of other existing monitoring programs including the California Coastal Salmonid Monitoring Plan <u>to develop at least one life cycle monitoring station to evaluate steelhead and their habitat within the lower Santa Ynez River. This includes biweekly redd (nest) surveys for steelhead during the winter spawning season as well as the development of a steelhead movement study during summer and fall. A passive integrated transponder (PIT) tag study must also be done to assess freshwater productivity. Smolt production must be evaluated by mark – recapture at the weir traps. The monitoring program shall be implemented regardless of which flow requirements are in effect.</u> The Deputy Director may amend the monitoring requirements to require additional monitoring or refine existing requirements.</p>
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Cachuma Project Evidentiary Hearing

**UPDATED SERVICE LIST**

(March 26, 2019)

Corrected for typographical errors

**The parties whose email addresses are listed below agreed to accept electronic service, pursuant to the rules specified in the hearing notice.**

<p>Cachuma Conservation Release Board Mr. Kevin O'Brien Downey Brand LLP 621 Capitol Mall, Floor 18 Sacramento, CA 95814 <a href="mailto:kobrien@downeybrand.com">kobrien@downeybrand.com</a> <a href="mailto:nbigley@downeybrand.com">nbigley@downeybrand.com</a> <a href="mailto:pcantle@ccrb-board.org">pcantle@ccrb-board.org</a></p> <p><i>updated 02/25/2019</i></p>	<p>City of Solvang Mr. Christopher L. Campbell Baker, Manock &amp; Jensen 5260 N. Palm Avenue, Suite 421 Fresno, CA 93704 <a href="mailto:ccampbell@bakermanock.com">ccampbell@bakermanock.com</a></p> <p><i>updated 07/29/2011</i></p>
<p>Santa Ynez River Water Conservation District, Improvement District No. 1 Mr. Paeter Garcia 3622 Sagunto St. Santa Ynez, CA 93460 <a href="mailto:pgarcia@syrwd.org">pgarcia@syrwd.org</a></p> <p>Mr. Steve M. Anderson Best Best &amp; Krieger LLP 3390 University Avenue, 5<sup>th</sup> Floor Riverside, CA 92501 <a href="mailto:steve.anderson@bbklaw.com">steve.anderson@bbklaw.com</a></p> <p><i>updated 03/09/2018</i></p>	<p>City of Lompoc Mr. Nicholas A. Jacobs Somach, Simmons &amp; Dunn 500 Capitol Mall Suite 1000 Sacramento CA 95814 <a href="mailto:njacobs@somachlaw.com">njacobs@somachlaw.com</a></p> <p><i>updated 01/06/2014</i></p>
<p>Santa Ynez River Water Conservation District Mr. Steven M. Torigiani Law Offices of Young Wooldridge, LLP 1800 30<sup>th</sup> Street, 4<sup>th</sup> Floor Bakersfield, CA 93301 <a href="mailto:storigiani@youngwooldridge.com">storigiani@youngwooldridge.com</a></p> <p><i>updated 02/26/19</i></p>	<p>California Trout, Inc. Ms. Linda Krop Ms. Maggie Hall Ms. Tara Messing Environmental Defense Center 906 Garden Street Santa Barbara, CA 93101 <a href="mailto:lkrop@environmentaldefensecenter.org">lkrop@environmentaldefensecenter.org</a> <a href="mailto:mhall@environmentaldefensecenter.org">mhall@environmentaldefensecenter.org</a> <a href="mailto:tmessing@environmentaldefensecenter.org">tmessing@environmentaldefensecenter.org</a></p> <p><i>updated 03/08/2018</i></p>

Cachuma Project Evidentiary Hearing

**UPDATED SERVICE LIST**

(March 26, 2019)

Corrected for typographical errors

**The parties whose email addresses are listed below agreed to accept electronic service, pursuant to the rules specified in the hearing notice.**

County of Santa Barbara Mr. Michael C. Ghizzoni, County Counsel Ms. Johannah Hartley, Deputy 105 E. Anapamu Street Santa Barbara, CA 93101 <a href="mailto:jhartley@co.santa-barbara.ca.us">jhartley@co.santa-barbara.ca.us</a>  <i>updated 03/09/2018</i>	U.S Bureau of Reclamation Ms. Amy Aufdemberge 2800 Cottage Way, Room E-1712 Sacramento, CA 95825 Fax (916) 978-5694 <a href="mailto:AMY.AUFDEMBERGE@sol.doi.gov">AMY.AUFDEMBERGE@sol.doi.gov</a>  <i>updated 08/12/16</i>
California Department of Fish and Wildlife Ms. Nancee Murray Senior Staff Counsel 1416 Ninth Street, 12 <sup>th</sup> Floor Sacramento, CA 95814 <a href="mailto:Nancee.Murray@wildlife.ca.gov">Nancee.Murray@wildlife.ca.gov</a>  <i>updated 08/15/2016</i>	Bureau of Reclamation, Mid-Pacific Region Mr. Michael Jackson Area Manager South-Central California Area Office 1243 N Street Fresno, CA 93721-1813 <a href="mailto:mjackson@usbr.gov">mjackson@usbr.gov</a>
Montecito Water District Mr. Robert E. Donlan Ellison, Schneider & Harris L.L.P. 2600 Capitol Avenue, Suite 400 Sacramento, CA 95816 <a href="mailto:red@eslawfirm.com">red@eslawfirm.com</a>	Santa Barbara County CEO's Office Ms. Terri Maus-Nisich, Assistant CEO 105 E. Anapuma Street, 4 <sup>th</sup> Floor Santa Barbara, CA 93101 <a href="mailto:tmaus@co.santa-barbara.ca.us">tmaus@co.santa-barbara.ca.us</a>  <i>updated 09/07/2016</i>

**The parties listed below did not agree to accept electronic service, pursuant to the rules specified by this hearing notice.**

NOAA Office of General Counsel Southwest Region Mr. Dan Hytrek 501 West Ocean Blvd., Suite 4470 Long Beach, CA 90802-4213 <a href="mailto:Dan.Hytrek@noaa.gov">Dan.Hytrek@noaa.gov</a>  <i>updated 05/13/2011</i>	
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GAVIN NEWSOM, Governor  
CHARLTON H. BONHAM, Director



September 13, 2019

Ms. Jeanine Townsend  
Clerk of the Board  
State Water Resources Control Board  
P.O. Box 100  
Sacramento, CA 95812-0100  
[commentletters@waterboards.ca.gov](mailto:commentletters@waterboards.ca.gov)

**Subject: California Department of Fish and Wildlife (CDFW) Comments on Final Draft Order Amending the Bureau of Reclamation's Water Rights Permits 11308 and 11310 for the Cachuma Project (Final Draft Order)**

Dear Ms. Townsend:

CDFW appreciates this opportunity to comment on the Proposed Resolution and encourages the State Water Resources Control Board (SWRCB) to adopt the Final Draft Order amending the Bureau's water rights permits for the Cachuma Project on September 17, 2019 without further delay or additional evidentiary hearings at this time.

CDFW appreciates that the Final Draft Order takes steps forward to improve protection of public trust resources in the Santa Ynez River with modifications to various draft orders to require fish passage feasibility studies to pass around or over Bradbury Dam. We appreciate the steps towards the improved flow releases for above normal and wet and also releases for summer habitat maintenance. However, CDFW has concerns that it doesn't address normal and dry year releases and doesn't address free passage of adult steelhead from the ocean and their subsequent return and that of smolt passing to the ocean is still restricted by the current proposed flow regime.

As trustee for the state's fish and wildlife resources, CDFW has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable population of such species. In that capacity, CDFW administers California Endangered Species Act (CESA) and other provisions of the California Fish and Game Code that afford protection to the state's fish and wildlife resources.

It is CDFW's goal and responsibility to protect and maintain viable populations of fish and wildlife resources throughout the state. Species and watershed protection, providing fishery access to headwater reaches, and providing adequate instream flows for all life stages of fishery resources are focal points of CDFW's efforts to retain native populations of fish and wildlife.

CDFW requests that CDFW's following comments on the Table 2 Flows in the Final Draft Order be formally recorded.

- CDFW has provided recommendations in previous draft orders to direct the release or bypass of water during below normal, dry, and critical years in accordance with the 2000 Biological Opinion or any revised Biological Opinion that may be issued by

National Marine Fisheries Service (NMFS). The Final Draft Order only requires flow supplementation in wet and above normal years. The wet and above normal year flows do not fulfill the SWRCB's obligation under the Public Trust Doctrine or Fish and Game Code section 5937 to keep fish in good condition. CDFW has provided recommendations that the Final Draft Order include dry and normal rain years to avoid impacts to steelhead from lack of fish passage and access to habitat above Bradbury Dam.

- Beavers have been a part of the Santa Ynez River ecosystem for the past 76 years (prior to construction of Bradbury Dam). Beaver dams have been shown to create holding habitat and benefit growths of salmonids. Additionally, beavers attenuate stream flows and provide instream complexity that is often missing in urban or agricultural areas. Studies regarding invasive fish species should be a priority for the Bureau, and beavers here are not an invasive species that require additional studies in the Final Draft Order

CDFW appreciates the opportunity to comment on the Final Draft Order and acknowledges this important step the SWRCB is taking in adopting the long-awaited changes to the Bureau's permits to operate the Cachuma Project. CDFW looks forward to working with the Bureau, NMFS, the City of Santa Barbara, Goleta Water District, Montecito Water District, Carpinteria Valley Water District, and the Santa Ynez River Water Conservation District, Improvement District No. 1 (the Member Units), and the SWRCB as these parties go forward to plan and conduct crucial studies contained in the Draft Order, and ultimately determine more permanent conditions for operation for the Cachuma Project that will achieve full public trust protection pursuant to Fish and Game Code section and the Public Trust Doctrine.

If you have questions regarding this letter and further coordination on these issues, please contact Mary Ngo at (562) 342-2140 and [Mary.Ngo@wildlife.ca.gov](mailto:Mary.Ngo@wildlife.ca.gov).

Sincerely,



Erinn Wilson  
Environmental Program Manager

cc: Cachuma Project Evidentiary Hearings Service List (updated 06/10/2019)

ec: CDFW  
Mary Larson, SES-Supervisory (Los Alamitos)  
Mary Ngo, SES-Specialist (Los Alamitos)  
Nancee Murray, Attorney IV (Sacramento)

**ATTACHMENT B- CDFW Engineering Comments**

CDFW Engineering Comments on Jan 2020 BOR draft plan:

Study plans should be developed and submitted to NMFS and CDFW for review and approval prior to initiation of the studies. See CDFW (2017a) for an example of the appropriate level of detail that should be included in the study plans.

Term 24(b)(1):

1. The role of streamflow in the life history of anadromous *O. mykiss* is complex, but can be divided into two basic categories: 1) creation and maintenance of essential freshwater habitat, principally for spawning and rearing, and 2) providing opportunities for migratory behavior (both seasonal upstream migration and downstream emigration) of both adults and juveniles in moving between the marine and freshwater habitats.
2. The draft plan proposes to use the Instream Flow Incremental Methodology (IFIM) developed by the U.S. Fish and Wildlife Service to identify and evaluate appropriate flow conditions for adult and juvenile steelhead in the lower Santa Ynez River. This methodology is a standard method for determining instream flow needs for fish and wildlife, but was not intended to assess the flow requirements for anadromous fishes whose life cycle involves moving long distances between the freshwater and marine environment, and is therefore not an appropriate or adequate methodology to satisfy Term 24(b)(1).
3. The magnitude of upstream and downstream passage flows should be assessed using the methods in CDFW (2017b). In this regard, the previously conducted instream flow studies evaluating migration flow requirements are not consistent with the methods in CDFW (2017b), and thus the results of these studies should not be used to evaluate the magnitude of migration flow requirements.
4. The timing and duration of upstream and downstream passage flows should be assessed using the methods in Booth et al. (2013).
5. Flows needed for upstream passage should take into account both physical conditions at critical riffles and compensation for surface-flow loss through percolation.
6. Fry and juvenile rearing habitat should be quantified using the methods in Harrison et al. (2017).
7. The instream flow study should be conducted consistent with the standards in USFWS (2011).

Term 24(b)(2.1):

1. The draft plan only covers connectivity in the Lower Santa Ynez River (mainstem and “key” tributaries), and does not specify what is entailed by connectivity, particularly as it relates to the migration of both adult and juvenile steelhead. Improved steelhead passage opportunities for both smolt and adult should not be limited to the Lower Santa Ynez River. As the SWRCB has repeatedly indicated, the Board’s interest in and jurisdiction over the public trust interests in the steelhead (and other public trust resources) of the Santa Ynez River is not limited to the Lower Santa Ynez River, but also extends above Bradbury Dam.
2. An instream flow study to identify a flow regime that supports the migratory behavior and ecology of adult and juvenile steelhead in their freshwater habitats should expressly recognize and take into account a number of factors in its analysis; these include, but are not limited to the following:



- A) In semi-arid regions, rainfall events can trigger periods of elevated discharge that serve as the primary environmental cue for migration of steelhead into, within, and out of a watershed. As such, the elevated discharge promotes migration opportunities for this species that would otherwise not exist; water depth across a channel section alone is not a sufficient measure of the adequacy of a flow to promote and facilitate migration of either adult or juvenile steelhead.
- B) Streams in southern California watersheds can experience high runoff of short duration, and peak counts or observation of steelhead migrants coincide with elevated discharge steelhead. This underscores the functional value and importance of periods of elevated discharge for migration of steelhead in rivers such as the Santa Ynez River that are characterized by a naturally "flashy" discharge.
- C) Steelhead show positive rheotaxis (facing into a current) that provides important cues for fish negotiating its way upstream. Steelhead can also more easily navigate streams at higher rather than lower discharge because of the increased number of pathways through a complex channel morphology that higher flows provide.
- D) Steelhead do not enter and subsequently migrate upstream as a single "run," but rather enter river systems in "waves," with each rainfall-induced discharge event prompting additional steelhead to enter a river, and in-river adults to migrate farther upstream, ultimately to the upper spawning reaches. This behavior reflects an evolutionary adaptation to the rainfall and runoff pattern of southern California watersheds, and underscores the ecological importance of repeated rainfall events and migratory opportunities to promote movement of fish throughout the watershed. This pattern of migration also promotes biological diversity by allowing fish to occupy and utilize a variety of steelhead habitat types.

**Term 24(b)(2.2):**

1. The forces of streamflow operating on the geomorphic setting, in conjunction with vegetative cover, is principally responsible for creating a wide variety of habitats used by steelhead to complete the freshwater phase of their life cycle. The creation of basic stream channel morphologic features (pools, runs, glides, undercut banks, gravel bars, etc.), and lagoon sandbar formation and breaching are all important functions of streamflow. Other critical functions of streamflow include the flushing of fine sediments from spawning and rearing habitats, distribution of nutrients, recruitment and sorting of spawning gravels and large woody debris, and the maintenance of riparian vegetation.
2. The mainstem of the Santa Ynez River generally consists of two different channel types: cobble bedded and sand bedded dominated channels. The tributaries to the mainstem of the Santa Ynez River include cobble and boulder, and step pool dominated channels. Upstream from Bradbury Dam/Lake Cachuma the river is confined by valley walls, the channel is cobble bedded and bed features are influenced by bedrock exposures. Downstream from Bradbury Dam, beginning near Solvang, the river channel is predominantly sand bedded and the river valley includes floodplains of various heights and widths. Over a variable zone there is a transition between these two different channel types from a confined course bedded stream to an unconfined fine bedded stream. The distinct geomorphology of these three reaches provides for distinct steelhead habitats and distinct management opportunities. The tributaries

downstream of Bradbury Dam tend to have lower gradients in their lower reaches than do tributaries above Bradbury Dam, and have less well developed step and cobble and boulder dominated channels.

3. Bradbury Dam and Cachuma Reservoir attenuates annual flood flows and large flood releases are less frequent since completion of Bradbury Dam in 1953. Alluvial stream channel morphology is the result of flood flows within 1-5 year recurrence intervals. Reduced frequency and/or magnitude of channel forming flows has resulted in changes to channel size and shape. Interactions between natural hydrologic cycles, flood flow regulation, sediment regulation, riparian vegetation and shallow groundwater processes, and channel manipulation all complicate the response of channels downstream from Bradbury Dam.
4. The study should evaluate the magnitude, duration and frequency of high flows needed to moderate the effects of beaver dams and encroachment of vegetation in the active river channel, and to establish and maintain pools for juvenile steelhead rearing.
5. The study should estimate the volume and spatial distribution of sediment deficiency, including particle-size disparity, and sediment transport capacity in the Santa Ynez River below Bradbury Dam.
6. The approach that CDFW utilizes when identifying appropriate streamflow regime for steelhead in southern California involves quantitatively estimating the unimpaired pattern (*i.e.*, timing, frequency, duration, and rate-of-change) and magnitude of streamflow in the watershed. Specific quantitative data are drawn from USGS gauging stations, and if necessary, supplemented by models using appropriate rainfall/runoff coefficients; these data form the basis for identifying an appropriate of the streamflow regime. The advantage of this approach involves using the knowledge of the natural or pre-impact pattern and magnitude of streamflow, and therefore the streamflow characteristics and conditions that determined the evolution of the species' essential life history traits, as well as the individual population's abundance, distribution, and population growth rates. Thus, the unimpaired pattern and magnitude of streamflow can be used for promoting viability of a population in an individual watershed.
7. Channel changes, due to flow regulation and/or sediment trapping, precede changes in fish habitat, and must be understood to effectively management flows for fish passage and other life history phases. In order to maximize migratory conditions, the following information should be developed as part of the Study Plan for Term 24(b)(2.2):
  - A) Storage in Cachuma Reservoir has diminished over the past 60+ years because the reservoir is an effective trap for all bed material and portions of the finer grained sediment load. The channel downstream has been deprived of bedload material for some distance downstream of Bradbury Dam until tributary inputs contributes to the sediment deficit.
  - B) Investigate changes in channel geometry since completion of Bradbury Dam. Relate to fish habitat changes. Determine how channel and fish habitat might be improved through incrementally reinstating historic channel forming flow regime, as baseline for assessing management alternatives. Determine the distance downstream from Bradbury Dam where tributary inputs of bed material achieve approximate equilibrium with regulated sediment transport capacity. Assess the potential to improve fish habitat by managing releases to shift the equilibrium point upstream or downstream. Prepare a sediment augmentation plan to approximately satisfy the downstream sediment deficit.

- C) Flood flow regulation can cause tributary confluences to aggrade downstream from large impoundments such as Bradbury Dam. The reduced frequency and/or magnitude of effective sediment transporting flows can result in localized sediment accumulations in streams that are generally degrading.
- D) Flood flow regulation can cause tributary confluences to aggrade downstream from large impoundments such as Bradbury Dam. The reduced frequency and/or magnitude of effective sediment transporting flows can result in localized sediment accumulations in streams that are generally degrading.

Term 24(b)(3):

1. The draft plan focuses on three potential habitat restoration actions: spawning gravel augmentation in the Lower Santa Ynez River and Hilton Creek; addition of large woody debris or boulder clusters in the Lower Santa Ynez River and larger tributaries; and installation of cattle exclusion fencing in the Salsipuedes/El Jaro watershed.
2. Because the scope, scale and exact locations of these habitat restoration measures is not specified it is not clear how these measures are to be assessed. The Study Plan should provide more specificity regarding these potential habitat restoration actions. For example, the clarify the apparent inconsistencies regarding proposed gravel augmentation as specified in Table 1 of the Lower Santa Ynez River Habitat Enhancement Plan (*i.e.*, 200 tons per year, 2,800 pounds per year, versus 1,500 cubic yards per year); describe the prospective sizes of LWD and boulders to be installed relative to site-specific hydraulic and hydrologic conditions (*e.g.*, channel width and slope, and discharge magnitude); and whether the proposed fencing excludes cattle from one or both sides of the stream and the design of fence endpoints and stream crossings, and related cattle-watering facilities.
3. The study should identify gravel dispersal mechanisms, including active placement to restore bars and riffles, active injection during high river discharge events, and strategic stockpiling for passive dispersal.
4. The study should identify gravel sources to be used.
5. Effectiveness monitoring is needed to quantify geomorphic and habitat responses in the river resulting from implementation of gravel augmentation.
6. For a discussion of the role of large woody debris in forming habitat in a southern California steelhead river, see Thompson *et al.* 2007.

Term 24(b)(4):

1. A water temperature model should be developed to assess what flows are needed to maintain suitable water temperatures for steelhead from Bradbury Dam to the estuary.
2. The Study Plan should include the specific methods (including frequency and timing) and locations at which the water quality parameters (water temperature, dissolved oxygen, and fine sediments) would be measured, as well as the standards that would be used to evaluate the suitability of these water quality conditions to support all life stages of steelhead trout. Evaluation of existing water quality monitoring data should include records from all National Pollution District Elimination System (NPDES) for point waste discharges to the Santa Ynez River,

as well as data from the Total Maximum Daily (TMDL) studies and standards for no-point waste discharges to the Santa Ynez River.

3. Additionally, the Study Plan should address the expected effects of discharging State Water Project water into the Santa Ynez River on steelhead and designated critical habitat, including but not limited to juvenile steelhead olfactory-imprinting and rearing habitat conditions (*e.g.*, water quality).

**Term 24(b)(5):**

1. The Board's Order WR 2019-0148 now applies to operation of the Cachuma Project. In addition to the water release provisions related to water supply (including groundwater recharge), the evaluation should also include flood control operations. Also, the timing and rate (cfs) and location of water that will be released into Hilton Creek under each operational scenario of the Cachuma Project should be evaluated. A review of NMFS' November 28, 2016, draft biological opinion for operation and maintenance of the Cachuma Project may assist Reclamation finalizing this component of the Study Plan (NMFS 2016).

**Term 24(b)(6):**

1. The water releases from Bradbury Dam to support downstream water rights in the Santa Ynez River (*i.e.*, Order WR 89-18) and associated alluvial groundwater pumping should be fully described and related to the water operations stipulated in the Board's Order WR 2019-0148. Specifically, the effects of water releases on designated critical habitat for endangered steelhead should be evaluated. For this reason, the Study Plan should include an updated description that clearly and completely describes the expected consequences of the authorized releases on freshwater rearing areas, freshwater spawning areas, and freshwater migration corridors.

**Term 24(c)(1):**

1. The draft plan indicates that the Instream Flow Study identified above in Term 24(b) (*i.e.*, IFIM) would be used to evaluate habitat conditions for bass and other non-native species and develop measures to curtail the proliferation of non-native species to reduce non-native populations. The IFIM methodology would be one appropriate method to assess habitat conditions for the non-migratory non-native species, and therefore could be used in conjunction with the approach described above for the native, migratory steelhead of the Santa Ynez River.
2. Additionally, flows into the Lower Santa Ynez River associated with spills of Bradbury Dam should be also be evaluated.

**Term 24(c)(2):**

1. This component identifies the principal sources of non-native species into the Lower Santa Ynez River (including Cachuma Reservoir), but does not acknowledge the populations of non-native species within the mainstem of the upper Santa Ynez River. As noted previously, the SWRCB has

repeatedly indicated, the Board's interest in and jurisdiction over the public trust interests in the steelhead (and other public trust resources) of the Santa Ynez River is not limited to the Lower Santa Ynez River, but also extends above Bradbury Dam.

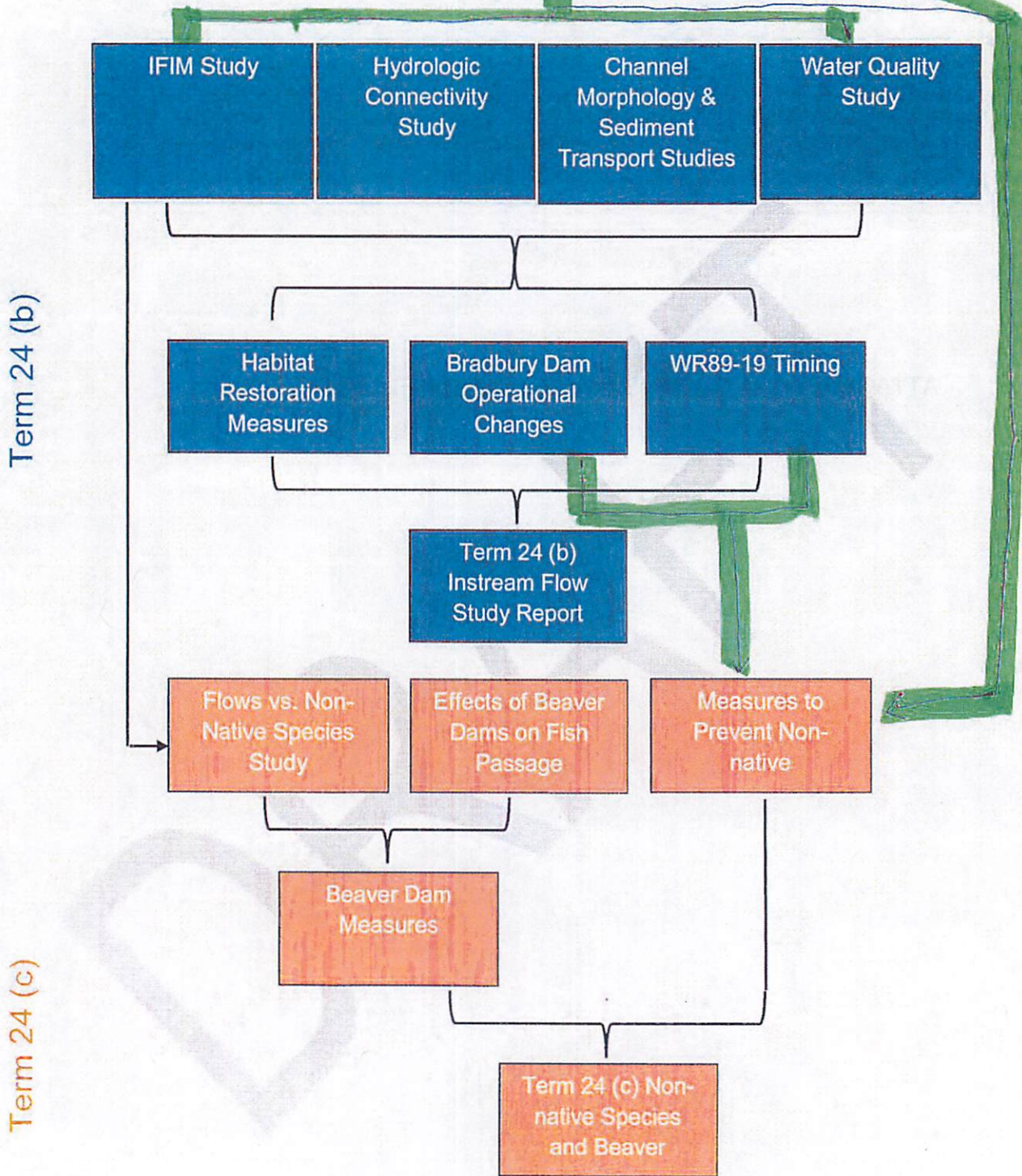
2. Measures to control non-native species must address all their sources to be effective; consequently, prevention and control measures (including public education) must address the upper and well as the lower reaches of the Santa Ynez River. Best management practices for the control of non-native include using "large mesh" seines rather than "small mesh" seines to minimize adverse impacts to *O. mykiss*.

## References

- Booth, D.B., Y. Cui, Z. Diggory, D. Pedersen, J. Kear and M. Bowen. 2013. Determining appropriate instream flows for anadromous fish passage on an intermittent mainstream river, coastal southern California, USA. *Ecohydrology* 2013;e1396. <https://doi.org/10.1002/eco.1396>
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- CDFW. 2017b. Standard Operating Procedure for Critical Riffle Analysis for Fish Passage in California. CDFW-IFP-001. September 2017. <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=150377&inline>
- National Marine Fisheries Service. 2016. Draft Endangered Species Act Section 7(a)(12) Biological Opinion for the Operation and Maintenance of the Cachuma Project. November 28, 2016.
- Harrison, L.R., A Pike and D.A. Boughton. 2017. Coupled geomorphic and habitat response to a flood pulse revealed by remote sensing. *Ecohydrology* 2017;e1845. <https://doi.org/10.1002/eco.1845>
- Thompson L. C., J. L. Voss, R. E. Larsen, W. D. Tietje, R. A. Cooper, and Peter B. Moyle. 2007. Role of Hardwood in Forming Habitat for Southern California Steelhead. General Technical Report PSW-GTR-19. Cooperative Extension, Integrated Hardwood Range Management Program, University of California, Berkeley.
- USFWS (United States Fish and Wildlife Service). 2011. Sacramento Fish and Wildlife Office Standards for Physical Habitat Simulation Studies. Sacramento Field and Wildlife Office Prepared by The Restoration and Monitoring Program.

**ATTACHMENT C- CDFW recommendations on Figure 1. Flow Chart**

Figure 1. Flow Chart Depicting Interlinkages between Term 24 Studies



2020 MAR -6 PM 1: 52



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NATIONAL MARINE FISHERIES SERVICE  
West Coast Region  
501 West Ocean Boulevard, Suite 4200  
Long Beach, California 90802-4213

March 2, 2020

David E. Hyatt  
Resource Management Division Chief  
U.S. Bureau of Reclamation  
1243 N. Street  
Fresno, CA 93727

Re: Comments on Draft Study Plan pursuant to Term 20 and 24 of the State Water Resources Control Board's Order WR-2019-0148 for the Cachuma Project.

Dear Mr. Hyatt:

Thank you for providing the Draft Study Plan to NOAA's National Marine Fisheries Service (NMFS) pursuant to Term 20 and 24 of the State Water Resources Control Board's (SWRCB) Order WR-2019-0148 for the Cachuma Project.

Per the provisions of Term 17(3) and Term 20 of the SWRCB's Order, NMFS provides the enclosed comments on the Draft Study Plan dated January 2020.

In general, the Draft Study Plan appears to be an incomplete outline of the specific study components identified in Term 20 and Term 24 of the SWRCB's Order WR-2019. The most significant omission is the response to Term 24(a) that requires the Bureau of Reclamation (Bureau) to evaluate options for providing passage of endangered steelhead (*Oncorhynchus mykiss*) adults and smolts around Bradbury Dam. Rather than providing a study plan to address this component of Term 24, the Draft Study Plan only refers to the Bureau's September 16, 2019, letter to the SWRCB requesting a reconsideration of the SWRCB's decision on Order WR-2019-0148 to delete this component, as well as any reference to NMFS' 2016 Draft Biological Opinion for the Cachuma Project.

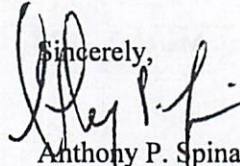
Many of the descriptions of the other study elements are extremely general (and in several cases simply repeat the language of Term 20 and 24), and do not provide sufficient detail to give adequate direction to those who may be tasked with conducting the various studies.

The enclosure provides specific comments on the individual elements of required studies that should allow the Bureau to revise the Draft Study Plan to meet the SWRCB's study requirements.





Please contact either Mark Capelli at (805) 963-6478 or [Mark.Capelli@noaa.gov](mailto:Mark.Capelli@noaa.gov) should you have a question regarding the contents of this letter or enclosure.

Sincerely,  
  
Anthony P. Spina  
Chief, Southern California Branch  
California Coastal Office

Enclosure

Cc: Mary Larson, California Department of Fish and Wildlife, Region 5  
Chris Dellith, U.S. Fish and Wildlife Service, Ventura Field Office  
Kristie Klose, U.S. Forest Service Los Padres National Forest  
Jeanine Townsend, State Water Resources Control Board  
Administrative File: 151422SWR2010PR00316

COPY

Enclosure

**NOAA's National Marine Fisheries Service's Comments on the Bureau of Reclamation's  
January 2020 Draft WR-2019-0148 Term 20 Plan for the Cachuma Project, Santa Ynez  
River, Santa Barbara County, California**

March 2, 2010

NOAA's National Marine Fisheries Service (NMFS) have developed the following technical comments on the Bureau of Reclamation's (Bureau) draft study plan (dated January 2020) for the Cachuma Project (Project). The study plan is a requirement of Terms 20 and 24 of the State Water Resources Control Board's (SWRCB) Order WR-2019-0148 for the Project. These comments are provided in accordance with the provisions of Term 17(3) and Term 20 of the SWRCB's Order.

Our comments are organized according to the individual terms of the Order, as they relate to the Bureau's draft study plan:

**Term 24(a) Study and evaluate options for providing steelhead passage of adults and smolts around Bradbury Dam including: fish ladders, locks, elevators, and trap-and-truck operations, including associated collection facilities. The study shall also include, but shall not be limited to, an evaluation of reservoir outlet works, collectors, transport methods, and upstream and downstream release sites.**

General Comment: The Draft Study Plan omits any provisions to study and evaluate options for providing steelhead passage of adults or smolts around Bradbury Dam, but only refers to the Bureau's letter requesting reconsideration and elimination of Term 24(a).

This omission disregards the repeated acknowledgement in the SWRCB's Order WR-2019-0148 for the Cachuma Project that fish passage around Bradbury Dam is an integral element in the suite of conservation measures necessary for the protection of the public trust interest in the steelhead resources of the Santa Ynez River. For example, the SWRCB noted that:

“ . . . passage around Bradbury Dam, where the majority of the historic spawning and rearing habitat occurred and still persists, and other habitat restoration actions by other agencies and private and public interests to address the ecosystem as a whole will be necessary to solve this complex problem of restoring viable steelhead runs in the Santa Ynez River watershed. To improve the state of knowledge concerning the measures necessary to protect the steelhead fishery, this order also requires Reclamation to study the feasibility of additional measures that may be necessary to restore the fishery, including the feasibility of providing fish passage around Bradbury Dam.” (pp. 3-4)

The SWRCB further noted:

“During the hearing, the fisheries agencies presented substantial evidence regarding the importance of passage around Bradbury Dam to the recovery of the steelhead population. Steelhead evolved having access to the Santa Ynez River headwaters above Bradbury

Dam. (R.T., October 23, 2003, p. 548:13-548:14.) Historically, steelhead used the mainstem of the Santa Ynez River as a migration corridor to reach the tributaries above Bradbury Dam to spawn and rear in the summer. (*Id.*, p. 548:20-548:24.) As stated earlier, upstream of Bradbury Dam, there are 248 miles of habitat in the tributaries, and 43 miles of habitat in the river main-stem. (NOAA-7A, NOAA-7B, NOAA-7C.) Historically, steelhead over-summered in these upper reaches, where water temperature and dissolved oxygen levels are consistently more favorable, when water temperatures in the mainstem became unfavorable or flow was nonexistent. (R.T. October 23, 2003, pp. 583:24 to 584:10; FEIR, Vol. II, p. 4.7-22.) After construction of Bradbury Dam all of this favorable upstream habitat was blocked. Experts from the fishery agencies testified that the lower Santa Ynez River will not support a robust population of steelhead and that passage to these upstream reaches is necessary for recovery of the steelhead population. (DFG-4, p. 7; R.T., March 30, 2012, p. 18:1-18:8; R.T., October 23, 2003, p. 554:7-554:13; R.T., November 12, 2003, p. 748:3-748:11.) Based on this evidence, this order requires Reclamation to study, *as expeditiously as possible*, the feasibility of providing passage upstream and downstream of Bradbury Dam. The study is required to conform to the *Santa Ynez River Fish Passage Feasibility Analysis* submitted by NMFS (on February 16, 2004) and CDFW (February 17, 2004) unless variations are approved by the Deputy Director.” (Emphasis added) (p. 96)

To be consistent with the SWRCB’s Order WR-2019-0148 for the Cachuma Project the draft study plan must be modified to specifically include a detailed fish passage study plan as outlined in NMFS and the California Department of Fish and Wildlife’s (CDFW) “Santa Ynez River Fish Passage Feasibility Study Analysis” noted above.

The essential elements of this analysis include a phased, adaptive management approach beginning with an analysis of temporary or interim measures that might be taken for the purpose of improving and stabilizing the size of the steelhead run in the Santa Ynez River. Each phase of this stepwise approach must include objective measurable performance criteria that can be used to provide a metric against which success or failure of the proposed fish passage actions to be taken. (See the attached Santa Ynez River Fish Passage Feasibility Analysis submitted by NMFS and the CDFW as part of the resource agencies testimony before the SWRCB In the Matter of Permits 11308 and 11310 (Applications 11331 and 11332) held by the United States Bureau of Reclamation for the Cachuma Project on the Santa Ynez River.)

While measures providing passage opportunities for smolts and adults can and should be examined in parallel, NMFS recommends that the Bureau undertake a study to initiate a program of assisted migration of juvenile *O. mykiss* located above Bradbury Dam, as part of the initial phase of a comprehensive fish passage program for Bradbury Dam. This study and the associated implementation of the plan would be aimed at the substantial population of native *O. mykiss* that is currently located in the mainstem and tributaries above Bradbury Dam. Implementation of an assisted migration program as soon as practicable that facilitates the emigration of above-dam smolts to the estuary and the ocean would allow these fish to contribute to the existing depressed anadromous runs of steelhead and thus assist in improving and stabilizing the size of the adult steelhead run in the Santa Ynez River. Some of the elements of such an assisted migration study would include:

- 1) Identifying the behavioral patterns (including timing of smolting and downstream movement) of juvenile *O. mykiss* that occur within the upper reaches of the Santa Ynez River and tributaries above Bradbury Dam.
- 2) Characterizing the spatial and temporal conditions suitable for steelhead rearing within the upper reaches of the Santa Ynez River and tributaries above Bradbury Dam.
- 3) Assessing the hydrodynamics of Cachuma Reservoir (and related existing and proposed operation of Bradbury Dam) as they may affect the timing and behavior of smolt emigration from the upper reaches of the Santa Ynez River and tributaries.
- 4) Identifying the frequency, timing and duration of flow conditions in the upper reaches of the Santa Ynez River and tributaries that provide connectivity to the Cachuma Reservoir, and the mainstem of the Santa Ynez River below Bradbury Dam.
- 5) Characterizing the flow conditions (including frequency, timing, duration, and rate of change, as well as water temperatures) in the upper reaches of the Santa Ynez River and tributaries above Bradbury Dam that promote and facilitate emigration of smolts.
- 6) Identifying and describing a range of assisted fish-passage alternatives (including collection and transport of smolts around Cachuma Reservoir and Bradbury Dam), and the operational components of an assisted migration program.
- 7) Identifying measures to evaluate the effectiveness of an assisted fish-passage program in moving smolts around Cachuma Reservoir and Bradbury Dam that originate from the Santa Ynez River and tributaries above Bradbury Dam.
- 8) Monitoring the response of the adult steelhead population of the Santa Ynez River resulting from implementing an assisted fish passage program for smolts originating from the Santa Ynez River and tributaries above Bradbury Dam and the Cachuma Reservoir.

For an example of a pre-implementation study plan for downstream passage of native *O. mykiss* located above another southern California impoundment that impedes downstream emigration of smolts see Merz *et al.* 2019.

**Term 24(b)(1) Evaluate the flow conditions necessary to protect each stage of the steelhead life-cycle, and maintain the abundance, productivity, genetic and life history diversity and spatial structure of the population, including an evaluation of the need frequency, duration, timing, and rate of change of flows for the protection of steelhead and other native species.**

General Comment: The role of streamflow in the life history of anadromous *O. mykiss* is complex, but can be divided into two basic categories: 1) creation and maintenance of essential freshwater habitat, principally for spawning and rearing, and 2) providing opportunities for migratory behavior for both adults and juvenile *O. mykiss* moving between the marine and freshwater habitats, *i.e.*, both upstream and downstream migration.

The draft study plan proposes to use the Instream Flow Incremental Methodology (IFIM) developed by the U.S. Fish and Wildlife Service to identify and evaluate appropriate flow conditions for adult and juvenile steelhead in the lower Santa Ynez River. This methodology is a standard method for determining the minimum instream flow needs for fish and wildlife; however, minimum flows cannot satisfactorily address the broader life history needs and habitat requirements of steelhead and, by extension the long-term survival and recovery of this endangered species. Further, the IFIM was not intended to assess the flow requirements for anadromous fishes whose life cycle involves migrating long distances between the freshwater and marine environment. Therefore, this proposed methodology is not an appropriate or adequate methodology to satisfy Term 24(b)(1).

As the SWRCB noted in its adopted findings for Order WR-2019-0148 for the Cachuma Project:

“Additionally, an IFIM study is not specifically intended to address aspects of river flow which are pertinent to anadromous fish. As noted in NMFS December 8, 2016 comment letter, an IFIM deals primarily with water conditions important to sustaining an existing standing crop of fish residing in a river or stream, but does not specifically address the flows necessary to induce or facilitate migration of fish, either from or to the ocean. This aspect of a flow regime is particularly important for highly migratory fish species such as steelhead. Specially, IFIM analyses do not promote the elements of the natural flow regime, which are important to maintaining native species, including steelhead, life history diversity, and habitat conditions under which these species have evolved. (NMFS, December 8, 2016 comment letter, p. 15.)” (p. 97)

The SWRCB also noted the deficiencies in several previous IFIM studies done for the lower Santa Ynez River. See for example, its adopted findings for Order WR-2019-0148 for the Cachuma Project at pp. 73, 76, and 97.

**Term 24(b)(2.1) Assess the flow conditions necessary to ensure hydrologic connectivity and opportunity for movement between the habitats needed by each stage of the steelhead life cycle, including tributary access.**

General Comment: The draft study plan only covers connectivity in the Lower Santa Ynez River (mainstem and “key” tributaries), and does not specify what is entailed by connectivity, particularly as it relates to the migration and movement of both adult and juvenile steelhead. Furthermore, improved steelhead passage opportunities for both smolt and adult should not be limited to the Lower Santa Ynez River. As the SWRCB has repeatedly indicated, the Board’s interest in and jurisdiction over the public trust interests in the steelhead (and other public trust resources) of the Santa Ynez River is not limited to the Lower Santa Ynez River, but also extends above Bradbury Dam.

An instream flow study to identify a flow regime that supports the migratory behavior and ecology of adult and juvenile steelhead in their freshwater habitats should expressly recognize and take into account a number of factors in the analysis; these include, but are not limited the following:

- 1) In semi-arid regions, rainfall events can trigger periods of elevated discharge that serve as the primary environmental cue for migration of steelhead into, within, and out of a watershed. As such, the elevated discharge promotes migration opportunities for this species that would otherwise not exist; water depth across a channel section alone is not a sufficient measure of the adequacy of a flow to promote and facilitate migration of either adult or juvenile steelhead.
- 2) Streams in southern California watersheds can experience high runoff of short duration, and peak counts or observation of steelhead migrants coincide with elevated discharge. This underscores the functional value and importance of periods of elevated discharge for migration of steelhead in rivers such as the Santa Ynez River that are characterized by a naturally "flashy" discharge.
- 3) Steelhead show positive rheotaxis (facing into a current) that provides important cues for fish negotiating its way upstream. Steelhead can also more easily navigate streams at higher rather than lower discharge because of the increased number of pathways through a complex channel morphology that higher flows provide.
- 4) Steelhead do not enter and subsequently migrate upstream as a single "run," but rather enter river systems in pulses with each rainfall-induced discharge event prompting additional steelhead to enter a river, and in-river adults to migrate farther upstream, ultimately to the upper spawning reaches. This behavior reflects an evolutionary adaptation to the rainfall and runoff pattern of southern California watersheds, and underscores the ecological importance of repeated rainfall events and migratory opportunities to promote movement of fish throughout the watershed. This pattern of migration also promotes biological diversity by allowing fish to occupy and utilize a variety of steelhead habitat types distributed throughout the watershed. (See additional comments below regarding proposed metrics.)

See also the CDFW methods for assessing appropriate magnitude of upstream and downstream passage flows (CDFW 2017); and for an specifically example of assessing the timing and duration of upstream and downstream passage in a southern California watershed, Booth *et al.* (2013).

**Term 24(b)(2.2) Assess the flow conditions necessary to ensure appropriate channel morphology and sediment transfer that will provide sufficient habitat to keep steelhead in good condition.**

General Comment: The forces of streamflow operating on the geomorphic setting, in conjunction with vegetation, is principally responsible for creating a wide variety of habitats types used by steelhead to complete the freshwater phase of their life cycle. The creation of basic river channel morphologic features (pools, runs, glides, undercut banks, gravel bars, *etc.*), and lagoon sandbar formation and breaching are all important functions of streamflow. Other critical functions of streamflow include the flushing of fine sediments from spawning and rearing habitats, distribution of nutrients, recruitment and sorting of spawning gravels and large woody debris, and the maintenance of riparian vegetation.

The mainstem of the Santa Ynez River includes cobble bedded and sand bedded dominated channel reaches. The tributaries to the mainstem of the Santa Ynez River include cobble and boulder, and step-pool dominated channels. Upstream from Bradbury Dam/Lake Cachuma the river is confined by valley walls, the channel is cobble bedded and bed features are influenced by bedrock exposures. Downstream from Bradbury Dam, beginning near Solvang, the river channel is predominantly sand bedded and the river valley includes floodplains of various heights and widths. Over a variable zone, there is a transition between these two different channel types from a confined course bedded stream to an unconfined fine bedded stream. The distinct geomorphology of these three reaches provides for distinct steelhead habitats and distinct management opportunities. The tributaries downstream of Bradbury Dam tend to have lower gradients in their lower reaches than do tributaries above Bradbury Dam, and have less well developed step-pool and cobble and boulder dominated channels.

Bradbury Dam and Cachuma Reservoir attenuates annual flood flows and large flood releases are less frequent since completion of Bradbury Dam in 1953. Alluvial stream channel morphology is the result of flood flows within 1-5 year recurrence intervals. Reduced frequency and/or magnitude of channel forming flows has resulted in changes to channel size and shape. Interactions between natural hydrologic cycles, flood flow regulation, sediment regulation, riparian vegetation and shallow groundwater processes, and channel manipulation all complicate the response of river channels below Bradbury Dam.

Channel changes, due to flow regulation and/or sediment trapping, lead to changes in steelhead habitat, and must be understood to effectively manage flows for steelhead passage and other life history phases. In order to maximize migratory conditions the following information should be developed as part of the study plan for Term24(b)(2.2);

- 1) Storage in Cachuma Reservoir has diminished over the past 60+ years because the reservoir is an effective trap for all bed material and portions of the finer grained sediment load. The Santa Ynez River channel has been deprived of bedload material for some distance downstream of Bradbury Dam until tributary inputs may reduce the sediment deficit.

Investigate changes in channel geometry since completion of Bradbury Dam and related influence on fish habitat. This investigation should inform how river channel function and fish habitat could be improved through incrementally reinstating or emulating the historic channel forming flow regime, as baseline for assessing management alternatives.

- 2) Determine the distance downstream from Bradbury Dam where tributary inputs of bed material achieve approximate equilibrium with regulated sediment transport capacity. The geomorphic unit ultimately should inform and result in a sediment augmentation plan to balance the downstream sediment deficit in conjunction with managed water releases from Bradbury Dam to improve habitat for steelhead. The sediment augmentation plan should have clearly defined objectives, specific methods for achieving and maintaining

those objectives, and a well-constructed implementation, effectiveness and performance-monitoring program.

- 3) Flood flow regulation can cause tributary confluences to aggrade downstream from large impoundments such as Bradbury Dam. The reduced frequency and/or magnitude of effective sediment transporting flows can result in localized sediment accumulations in streams that are generally degrading.

Investigate the tributary mouths downstream from Bradbury Dam for evidence of aggradation, and relate to fish passage effectiveness and connectivity.

As noted above the draft study proposal to utilize IFIM (and its microhabitat component model, the Physical Habitat Simulation Mode) is not adequate to address the requirements of Term 24(b) in an ecologically meaningful way, for a number of reasons. The literature reviewing the limitations of this method is extensive. In addition, the establishment of minimum flows does not account for the ecology and behavior of steelhead, or the important role of natural flow regimes in creating and maintaining habitat that is of appropriate quality and availability for the species.

The approach that NMFS utilizes when identifying appropriate streamflow regime for steelhead in southern California involves quantitatively estimating the unimpaired pattern (*i.e.*, timing, frequency, duration, and rate-of-change) and magnitude of streamflow in the watershed. Specific quantitative data are drawn from USGS gauging stations, and if necessary, supplemented by models using appropriate rainfall/runoff coefficients; these data form the basis for identifying an appropriate of the streamflow regime. The advantage of this approach involves using the knowledge of the natural or pre-impact pattern and magnitude of streamflow, and therefore the streamflow characteristics and conditions that determined the evolution of the species' essential life history traits, as well as the individual population's abundance, distribution, and population growth rates. Thus, the unimpaired pattern and magnitude of streamflow can be used for promoting viability of a population in an individual watershed.

For a recent analysis of the effects of geomorphic habitat response to flood pulses in the Lower Santa Ynez River, see Harrison *et al.* (2017).

As noted above, protecting the public trust interest in the steelhead resources of the Santa Ynez River would, at a minimum, require the population to be viable, and the specific relationship between steelhead population viability and streamflow characteristics of the Santa Ynez River watershed can be used to provide quantitative metrics in assessing and promoting this viability.

**Term 24(b)(3) Assess potential instream or streamside habitat restoration in measures and potential effects on quantity and quality of steelhead habitat in relation to flow.**

General Comment: The draft study plan focuses on three potential habitat restoration actions: spawning gravel augmentation in the Lower Santa Ynez River and Hilton Creek; addition of large woody debris or boulder clusters in the Lower Santa Ynez River and larger tributaries; and installation of cattle exclusion fencing in the Salsipuedes/El Jaro watershed.



Because the scope, scale and exact locations of these habitat restoration measures is not specified, it is not clear how these measures would be assessed. The draft study plan should provide more specificity regarding these potential habitat restoration actions. For example, clarify the apparent inconsistencies regarding proposed gravel augmentation as specified in Table 1 of the Lower Santa Ynez River Habitat Enhancement Plan (*i.e.*, 200 tons per year, 2,800 pounds per year, versus 1,500 cubic yards per year); describe the prospective sizes of LWD and boulders to be installed relative to site-specific hydraulic and hydrologic conditions (*e.g.*, channel width and slope, and discharge magnitude); and explain whether the proposed fencing excludes cattle from one or both sides of the stream and the design of fence endpoints and stream crossings, and related cattle-watering facilities.

For a discussion of the role of large woody debris in forming habitat in a southern California steelhead river, see Thompson *et al.* 2007

**Term 24(b)(4) Evaluate water quality issues that may impact steelhead including but not limited to elevated temperatures, low dissolved oxygen, and sediment transport and potential measures to address these issues.**

The study plan should include the specific methods (including frequency and timing) and locations at which the water quality parameters (water temperature, dissolved oxygen, and fine sediments) would be measured, as well as the standards that would be used to evaluate the suitability of these water quality conditions to support all life stages of steelhead. Evaluation of existing water quality monitoring data should include records from all National Pollution District Elimination System (NPDES) for point waste discharges to the Santa Ynez River, as well as data from the Total Maximum Daily (TMDL) studies and standards for no-point waste discharges to the Santa Ynez River.

Additionally, the draft study plan should address the expected effects of discharging State Water Project water into the Santa Ynez River on steelhead and designated critical habitat, including but not limited to juvenile steelhead olfactory-imprinting and rearing habitat conditions (*e.g.*, water quality).

**Term 24(b)(5) Evaluate operational changes to Bradbury Dam that could improve steelhead conditions.**

The Board's Order WR 2019-0148 now applies to operation of the Cachuma Project. In addition to the water release provisions related to water supply (including groundwater recharge), the evaluation should also include flood control operations. Also, the timing and rate (cfs) and location of water that will be released into Hilton Creek under each operational scenario of the Cachuma Project should be evaluated. A review of NMFS' November 28, 2016, draft biological opinion for operation and maintenance of the Cachuma Project may assist Reclamation finalizing this component of the draft study plan (NMFS 2016a).

See additional comments above regarding assessing flow conditions to protect all life stage of steelhead, hydrologic connectivity, channel morphology, and sediment transfer.

**Term 24(b)(6) Evaluate whether the timing of releases made pursuant to Water Rights Order 89-18 should be revised.**

The water releases from Bradbury Dam to support downstream water rights in the Santa Ynez River (*i.e.*, Order WR 89-18) and associated alluvial groundwater pumping should be fully described and related to the water operations stipulated in the Board's Order WR 2019-0148.

Specifically, the effects of water releases on designated critical habitat for endangered steelhead should be evaluated. For this reason, the study plan should include an updated description that clearly and completely describes the expected consequences of the authorized releases on freshwater rearing areas, freshwater spawning areas, and freshwater migration corridors.

**Term 24(c)(1) Evaluate the effect of flows on habitat conditions to reduce predation and proliferation of nonnative species.**

The draft study plan indicates that the Instream Flow Study identified above in Term 24(b) (*i.e.*, IFIM) would be used to evaluate habitat conditions for bass and other non-native species and develop measures to curtail the proliferation of non-native species to reduce non-native populations. The IFIM methodology would be one appropriate method to assess habitat conditions for the non-migratory non-native species, and therefore could be used in conjunction with the approach described above for the native, migratory steelhead of the Santa Ynez River.

Additionally, flows into the Lower Santa Ynez River associated with spills of Bradbury Dam should be also be evaluated.

**Term 24(c)(2) Evaluate measures to prevent the introduction/reintroduction of invasive species.**

General Comment: This component identifies the principal sources of non-native species into the Lower Santa Ynez River (including Cachuma Reservoir), but does not acknowledge the populations of non-native species within the mainstem of the upper Santa Ynez River. As noted previously, the SWRCB has repeatedly indicated, the Board's interest in and jurisdiction over the public trust interests in the steelhead (and other public trust resources) of the Santa Ynez River is not limited to the Lower Santa Ynez River, but also extends above Bradbury Dam.

Measures to control non-native species must identify and address all their sources to be effective; consequently, prevention and control measures (including public education) must address the upper and the lower reaches of the Santa Ynez River. Best management practices for the control of non-native include using "large mesh" seines rather than "small mesh" seines to minimize adverse impacts to *O. mykiss*.

**Term 24(c)(3) Evaluate effects of beaver dams on passage opportunities and distribution of steelhead.**

General Comment: The effects of beaver dams are not limited to impediments to volitional steelhead passage, but may also include providing suitable refugia habitat for non-native species

that can prey upon, compete with or serve as vectors for infectious diseases that can adversely affect adult and juvenile health or survival.

We would note that beavers exist above as well as below Bradbury Dam in the mainstem of the Santa Ynez River and the population as a whole should be considered in this component of the study plan.

**Term 24(c)(4) Identify measures to reduce impacts on steelhead from beavers.**

The draft study plan proposes to evaluate beaver control measures such as trap, re-locate, euthanasia, and flow measures, as well as removal or limit the building of dams through the use of flow devises or dam building deterrents such as beaver deceivers and manual notching of beaver dams.

The study plan should include a fuller description of these control measures. Regarding specific technologies such as beaver pond leveler the design specifications should be included, *e.g.*, the length and diameter of fishway pipes; water depth and velocity at each end and through the fishway pipes over the range of river discharges the devices would be deployed; the area and height of predator-exclusion cages; and, the mesh shape and dimension of predator-exclusion cages.

Additionally, the potential consequences of installing proposed beaver-pond-leveler-devices in the Santa Ynez River and associated tributaries on juvenile and adult steelhead and physical and biological features of designated critical habitat. These include but are not be limited to:

- 1) reduced or precluded upstream and downstream movement of juvenile and adult steelhead;
- 2) entrapment of juvenile and adult steelhead within predator-exclusion cages;
- 3) impingement of steelhead on predator-exclusion cages;
- 4) reduced area and depth of pool habitat; and
- 5) reduced or eliminated thermal stratification of pool habitats.

**Metrics for Proposed Measures**

General Comment: The proposed metrics are expressed as general types of metrics to be used in evaluating the effectiveness of individual measures, but do not indicate in a quantitative way how these metrics would be expressed or measured. Additionally, the proposed metrics for the proposed measures do not expressly relate their effectiveness in achieving of either the population or Distinct Population Segment viability criteria identified in NMFS' Southern California Steelhead Recovery Plan (2012). These include mean annual runs-size, which results in an extinction risk of <5% within 100 year, and an anadromous fraction (*i.e.*,  $N = 100\%$  of mean annual run size). See NMFS 2012, Table 6-1" Biological Recovery Criteria for the

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Southern California Steelhead DPS”, p. 6-4. Protecting the public trust interest in the steelhead resources of the Santa Ynez River would, at a minimum, require the population to be viable, and the viability criteria are intended to provide quantitative metrics in assessing this viability.

### **Increased smolt and adult production abundance**

Smolt production is a function of specific habitats (and habitat conditions controlled by conservation measures such as prescribed flows). Because of advances in electronic-tagging technology, various aspects of smolt production can now be estimated in river systems. Tagging juvenile *O. mykiss* and subsequently estimating smolt production from tagged fish that have migrated downstream towards the estuary and the ocean, past a set of tag-reading stations on the river can, with an appropriate sample design, be used to estimate smolt production as a function of some common variables of interest to managers (e.g., habitat conditions, growth and survival rates, genetics, etc.). This monitoring method provides a tool for determining if the anadromous fraction of an *O. mykiss* population (i.e., the form listed as endangered in southern California) is responding (and to what degree) to management activities. It can also inform management decisions that can promote one life-history pathway over another.

Some of the important metrics that can be used in assessing smolt production by electronic-tagging technology include:

- 1) the number of juvenile *O. mykiss* expressing smolting characteristics (either as an absolute number or as a percentage of the entire rearing *O. mykiss* population);
- 2) the time it takes rearing juvenile *O. mykiss* to reach a smolting stage (either in absolute time, or the number of rearing seasons);
- 3) the size at which rearing juvenile *O. mykiss* reach a smolt stage; and
- 4) the number of smolts that successfully emigrate out of the freshwater environment to the marine environment (either as an absolute number or as a percentage of the total emigrating population).

Since it is the anadromous form of *O. mykiss* that is rare and endangered in southern California, not the resident form, it is important to understand the dynamics of rearing juvenile *O. mykiss* that will emigrate as smolts.

For a description of estimating the run size by tagging juveniles and monitoring out migrants, see Boughton 2010.

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Other important metrics are the absolute and relative number of juvenile *O. mykiss* that reach a smolting stage that do so in the upstream freshwater environment versus the estuarine environment. This metric is important because studies have shown that juvenile steelhead rearing in an estuarine environment can reach a smolting size more quickly and achieve a larger size at time of entry into the ocean. This larger size increases their survival rate, and therefore the chances of returning as mature adult steelhead to spawn and increase the productivity of the

population. The estuary can also provide an important refugia habitat for rearing juvenile steelhead when upstream freshwater conditions are less suitable because of low flows and warmer water conditions in the summer (Bond *et al.* 2008, Hayes *et al.* 2008, Hayes *et al.* 2011).

The general characterization of this metric in the draft study plan does not, but should, distinguish between these important facets of smolt production or identify the specific means by which they would be measured.

NMFS, in cooperation with its co-manager the CDFW, have developed a California Coastal Salmonid Monitoring Plan (CMP) (Adams *et al.* 2011). The CMP is based on NMFS' Viable Salmonid Population conceptual framework referred to (p. 24) in the revised draft order (McElhany *et al.* 2000).

The CMP identifies statistically appropriate and reliable methods for measuring the four general key characteristics of an anadromous salmonid population such as steelhead: abundance, productivity, spatial structure, and diversity. The purpose of the CMP is to collect statistically valid, ecologically meaningful data on the status of salmonid fishes inhabiting California's coastal watersheds (NMFS 2016b).

For anadromous steelhead, abundance is best measured in terms of annually returning adults from the ocean. In southern California where abundance of returning steelhead has been severely Depressed, and the episodic nature of the streamflow makes it difficult to work in the Channel when upstream migration of adults is most likely to occur, monitoring adults can be challenging and the results statistically inconclusive. To address the special steelhead monitoring challenges in southern California, NMFS and the CDFW have developed an updated strategy for Salmonid Viability Monitoring in the Southern Coastal Area (Monterey to the U.S.-Mexico border). This update expands the original approach for the Southern Coastal Area; more closely integrates the monitoring plan with the Federal steelhead recovery plans; and identifies a wider variety of methodologies to be used for monitoring under a range of circumstances (Boughton and Nelson 2020).

Specific metrics that can be used to track the increase (or decrease) of adult steelhead production in response to various conservation measures, include:

- 1) the percentage of emigrating smolts reaching an adult stage and entering the freshwater system in any given year (rate of survival);
- 2) the absolute number of adults entering the freshwater system in any given year; and
- 3) the average run size of adults over a three year period (this last metric is used in the population viability criteria identified in NMFS' Southern California Steelhead Recovery Plan for the purposes of delisting the species).

Another aspect of adult production is the number of adults (either as an absolute number or a relative number) that survive as kelts to return to the ocean and return as repeat spawners (either by over-summering or returning directly to the ocean in the same year they initially entered

freshwater). The general characterization of this metric does not distinguish between these important facets of adult production or identify the specific means by which they would be measured.

### **Quality and quantity of additional steelhead habitat created**

There are a number of distinctive types of steelhead habitats that fall within the general heading of “steelhead habitat” Assuming the phrase “steelhead habitat created” refers to freshwater environment of steelhead, these would include, but not be limited to:

- 1) estuarine habitat (with suitable water quality and hydrologic conditions);
- 2) migratory corridors to and from the ocean (characterized by appropriate physical and hydrological characteristics);
- 3) spawning habitat (characterized by suitable substrate and flow conditions);
- 4) rearing habitat (characterized by suitable food sources and sheltering characteristics); and refugia habitat (characterized by suitable overwintering characteristics, including pool/riffle features, water temperatures, and food sources).

In addition to the quality and quantity of additional steelhead habitat created by restoration measures, another important, though often overlooked aspect of steelhead habitat, is the diversity of the habitat. Large inland watersheds such as the Santa Ynez River are designated as Core 1 populations in NMFS’ Southern California Steelhead Recovery Plan, in part because of the wide diversity of habitats that occur in the watershed; this diversity is not confined to the mainstem, or to any one tributary, but is derived from the entirety of the watershed. The general characterization of this metric does not, but should, distinguish between these important facets of steelhead habitats or identify the specific means by which they would be measured.

### **Improved smolt and adult steelhead passage opportunities in the Lower Santa Ynez River**

As noted above, improved steelhead passage opportunities for both smolt and adult should not be limited to the Lower Santa Ynez River. As the SWRCB has repeatedly indicated, the Board’s interest in and jurisdiction over the public trust interests in the steelhead (and other public trust resources) of the Santa Ynez River is not limited to the Lower Santa Ynez River, but also extends above Bradbury Dam.

In Order WR-2019-0148 for the Cachuma Project the SWRCB, in section 5.3.2, “Passage Measures Needed to Protect Steelhead in the Santa Ynez River” specifically noted that:

“Testimony and evidence submitted by CDFW and NMFS clearly indicate the necessity of providing steelhead passage around Bradbury Dam. Prior to the construction of Bradbury Dam, steelhead accessed the upper reaches of the Santa Ynez River and could take advantage of the permanent water supplies in these reaches for spawning, rearing (the most limiting habitat), and summer refugia. (R.T. October 23, 2003, pp. 548:8 to 549:2; p. 554:9-554:13; NOAA-2, p. 5; NOAA-3, p. 2; NOAA-4, p.3; NOAA-5, p. 3;

NOAA-6, pp. 3-4.) As stated earlier, 71 percent of the potential steelhead spawning and rearing habitat is upstream of Bradbury Dam with 43 miles of habitat in the main-stem river and 248 miles of habitat in the tributaries. (NOAA-7A, NOAA-7B, NOAA-7C.)” (p. 60)

This metric should therefore be modified to expressly include smolt and adult steelhead passage around Bradbury Dam. See additional comments under Term 24(a) “Study and evaluate options for providing steelhead passage of adults and smolts around Bradbury Dam including: fish ladders, locks, elevators, and trap-and-truck operations, including associated collection facilities. The study shall also include, but shall not be limited to, an evaluation of reservoir outlet works, collectors, transport methods, and upstream and downstream release sites.”

#### **Reduction in predation and numbers of non-native fish**

The metric is couched in broad terms with no indication to what extent the level of predation and/or number of non-native fish must be reduced to meaningfully protect native species (including, but not limited to steelhead) from predation by non-native fishes. As written, satisfaction of Term 24(c)(1) and Term 24(c)(2) could theoretically be met with any reduction, regardless of its efficacy in protecting native aquatic species.

#### **Reduction in beaver dams**

Again, the metric is couched in broad terms with no indication to what extent reduction in the number (or possibly location) of beaver dams must be reduced to meaningfully protect native species (including, but not limited to steelhead) from any adverse impacts to steelhead. As written, satisfaction of Term 24(c)(3) and Term 24(c)(4) could theoretically be met with any reduction, regardless of its efficacy in protecting native aquatic species.

#### **Figure 1. Flow Chart Depicting Interlinkages between Term 24 Studies**

This chart omits one of the express and critical studies identified by the SWRCB in its Order WR-2019-0148: Term 24(a) “Study and evaluate options for providing steelhead passage of adults and smolts around Bradbury Dam including: fish ladders, locks, elevators, and trap-and-truck operations, including associated collection facilities. The study shall also include, but shall not be limited to, an evaluation of reservoir outlet works, collectors, transport methods, and upstream and downstream release sites.” As noted above, regarding the strategy for providing steelhead passage around Bradbury Dam, the study should address the development of a program of assisted emigration of juvenile *O. mykiss* situated about Bradbury Dam in the tributaries as well as the mainstem that currently exhibit smolting characteristics, including downstream movement to the estuary and ocean. See additional comments above under Term 24(a).

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## Santa Ynez River Fish Passage Feasibility Analysis

### **I. Underlying Principles**

To approach an assessment of the feasibility of providing fish passage on the Santa Ynez River, a phased and systematic methodology is recommended, framed by the following underlying principles:

- assemble a wide array of possible passage alternatives,
- do not reject any fish passage alternative out of hand without adequate, detailed analysis,
- assume passage is feasible, rather than it is not feasible, since it is practiced regularly throughout the United States in widely varying geographic/geologic circumstances,
- comprehensive, objective analysis performed under the auspices and direct supervision of the State Water Resources Control Board and responsible agencies:
  - California Department of Fish and Game
  - NOAA Fisheries
  - U.S. Bureau of Reclamation,
- public participation via formal advisory consultation with water diversion/delivery contractors, public interest conservation groups, and any other interested parties, and
- Implementation in a phased, experimental approach under adaptive management methodology with measurable, objective performance criteria for success or failure of actions attempted.

This assessment, performed by fish passage specialists from each of the public trustee agencies, should be done in as transparent a fashion as possible, with quarterly progress summaries made available to all interested parties, and Phase I should be completed in a timely fashion, within a period of 12-18 months. The Bureau, in consultation with the Department and NOAA, should begin any field work to implement fish passage recommendations emerging from the feasibility study within 6-12 months of receiving the recommendation.

### **II. Recommended Phased Study Approach**

The fish passage feasibility study done on the Santa Ynez River should be performed in a phased, adaptive management protocol. This begins with an analysis of temporary measures that might be taken at existing low steelhead population levels, and progresses to less temporary measures when fish passage actions taken at existing low population levels become effective at improving and stabilizing the size of the run in the Santa Ynez River (the goal of any fish passage program). For each of the phases in this stepwise approach, objective, measurable performance criteria must be established beforehand in order to provide a yardstick against which to measure success or failure of proposed fish passage actions to be taken.

Phase I of such an approach begins at current, low (endangered) population numbers, a starting point. The methodology consists of following up serial questions about feasibility: Can spawners be effectively trapped? Can they be transported? Do they use the translocation site habitat for spawning? Are more

smolts produced as a result? Can smolts be effectively trapped and transported below Bradbury Dam? And so forth.

Phase II begins when Phase I results have shown that it is feasible to trap adult up migrant spawner steelhead in the Santa Ynez River, and down migrating smolts, have shown that spawners and smolts may be translocated without undue mortality, and that smolt production is rising over time in the Santa Ynez River as a result of these efforts, such that overall returning spawner numbers move out of the tens to the hundreds. More discussion of Phase II is given below.

Phase III would be implemented when the results of the less temporary measures proposed in Phase II begin to likewise show further improvements in run size on the Santa Ynez River, and returning spawners gain in numbers from the several hundreds to over a thousand returning spawner steelhead in years the sandbar is open at Surf. See below for further discussion of Phase III.

See Section V below for further detail.

Concurrent with Phase I of the fish passage feasibility study, but separate from such study, complementary studies should be undertaken to examine carrying capacity and habitat qualities of various possible receiver sites for transported spawner steelhead, and an analysis or review of existing trout population genetic structure (above and below dam) should be completed to answer questions about any potential genetic effects, positive or negative, of translocating migrating spawner steelhead to above-Dam habitats. There is no information required from these complementary studies to begin Phase I fish passage feasibility study. These studies can be useful to inform subsequent fish passage implementation Phases.

### **III. Possible Alternatives for Overall Feasibility Analysis (Upstream Migrants)**

As described above in the discussion of underlying principles, no alternative should be dismissed casually. Each should receive complete and detailed analysis before an assessment of feasibility is made. An explicit cost-benefit analysis should be provided for each component of the feasibility study. Some of the alternatives that should be analyzed are listed below, but this is by no means a comprehensive list; that list should be compiled by the Fish Passage Feasibility Study team.

- Complete Fish Ladder or Fishway
- Hilton Creek as Partial Instream Conveyance Plus Fish Ladder with Controlled Descent into Reservoir Holding Pen (coupled with Down migrant trap actions)
- Trap and Transport Facility on Bureau Property at Stilling Basin or in Hilton Creek
  - Instream, Hilton Creek: Simple floating picket weir and temporary trap, and/or
  - Instream, Mainstem on Bureau property: Same floating picket weir and temporary trap
- Trap types: adaptive management will determine method depending on critical factors such as streamflow, debris, number of fish, etc., but may include a floating picket weir, or a more permanent concrete weir and holding tanks.
- Transport methods: Again, adaptive management will determine the optimal method or combination of methods based on critical factors such as weather, road conditions, numbers of fish, etc. Methods can include ground, barge, or air transport.

- Release sites:
  - Santa Cruz Creek and tributaries (closest)
  - Mainstem between Red Rock Day Use Area and Gibraltar Dam
  - Mono and Indian Creeks
  - N. Fork Juncal
  - Mainstem above Gibraltar Reservoir
  - Mainstem above Juncal
  - Alisa! Creek above Alisa! Dam

#### **IV. Possible Alternatives for Overall Feasibility Analysis (Downstream Migrants-adults and smolts collected in a common facility)**

Moving spawners to good spawning and rearing habitat is only half of the issue of moving anadromous fish around dams. Downstream migrants, both adult and smolt, must also be accounted for. A variety of methods are available to assist down migrating fish in their passage to the ocean.

- At Reservoir Outlet Works-a floating collector at Bradbury Dam with holding tanks
- At Tributary Inlets to Cachuma Reservoir-Floating collectors and holding tanks on reservoir in each inlet bay with guide nets to the collectors.
- Instream Collectors-temporary, partial duty traps on tributaries with holding tanks
  - Trap types: instream floating conical trap, instream ramp trap, floating picket weir
- Collector types: floating barge with gulper (with or without guide nets), floating, fixed location gulper at reservoir outlet works
- Transport Methods: adaptive management will determine optimal transport methods depending again on critical factors such as weather, road condition, streamflows, numbers of fish, etc.
- Down migrant Release Sites
  - River below Bradbury Dam (or Stilling Basin)
  - Intermediate Site
  - Lagoon

#### **V. Phased Implementation Protocol based on Adaptive Management Principles**

For each of the implementation phases, objective and measurable criteria for determining success or failure should be established as yardsticks to gauge the results of actions against each question posed.

##### **Phase I: Low Population Size Methodology-a starting point**

Phase I, Steps 1 through 4 actions could be accomplished entirely within one winter adult migration season, provided at least several dozen adult fish were trapped successfully. Radio telemetry tags would be attached to all transported adult fish. Step 5 should be accomplished that same year in the spring with screw and/or ramp traps in tributaries where spawning was observed by trapped and transported adult fish. Step 6 should be accomplished over the course of the following one or two years with the same

screw or ramp traps deployed in spring and summer and possibly in winter, with adult trapping and transport occurring in each winter migration season. Step 7 would be accomplished beginning in the second spring following the initial adult trap and transport action, and would be continued every spring and early summer thereafter with screw traps, ramp traps, or temporary floating collectors in the reservoir to sample smolt-ready fish produced. Control groups could be established by collecting naturally produced juveniles from tributaries in which no trapped adults had been placed. Step 8 could be accomplished beginning in the second year following the initial adult trap and transport action by moving smolting steelhead downstream via several transport methods. Step 9 would begin as early as 3 seasons following the initial adult trap and transport action.

**Step 1: Test Adult Trapping Efficacy**

Question: Can adults be trapped with any regularity during migration period?

Suggested Method: Temporary upstream migrant trap facility at Bradbury Dam and/or Hilton Creek

**Step 2: Test Transportation Efficacy**

Questions: What is survivorship rate of transported adults under different transport length scenarios? What is most effective method to transport: truck, barge, fixed-wing aircraft, helicopter, some combination?

Suggested Method: Test different transport methods to chosen upstream release sites.

**Step 3: Test Release Efficacy, Alternate Release Sites**

Questions: Do released adults move upstream?

Are some release points better than others to facilitate movement of spawners to spawning habitat?

Are some tributaries better than others at facilitating this? (This is a larger question and cross-relates to habitat surveys of tributaries)

Suggested Method: Radio-telemetry tags on released fish to monitor movement

**Step 4: Monitoring of use of spawning habitat by adult spawners**

Questions: Do released adults actually use tributary or upper basin mainstem spawning habitat?

Are redds produced?

Suggested Method: Radio telemetry tags on released fish with on-ground spawning surveys

**Step 5: Monitoring YOY production from redds**

Questions: Do YOY fry successfully emerge from redds?

What is survivorship rate of fry to juveniles in tribs or upper basin mainstem rearing habitat?

Suggested Method: Temporary downstream migrant fry/smolt trap facility in tributary streams, monitoring, and either direct release or transport to release site below Bradbury Dam.

**Step 6: Monitoring juvenile survivorship in tributary/upper mainstem habitat**

Question: What is survivorship rate of juveniles in tribs and upper mainstem?

Suggested Method: Same as above.

**Step 7: Test smolt trapping and, Monitoring for Smolt production**

Questions: Are smolts produced? Can successful smolt trapping be carried out?

Suggested Solution: Traps can be partial sample collection such as floating tributary conical or ramp traps, or more permanent full collection gulpers. Start with a floating instream smolt/fry trap to determine smolt readiness and estimated production, graduate to larger capacity, more permanent facilities in reservoirs if production is successful.

#### Step 8: Test Transport of Smolts below Bradbury Dam

Question: Can trapped smolts be effectively transported below Bradbury Dam?

What is most effective method of transporting smolts? Truck, Barge, Helicopter? Do smolts transported below Bradbury Dam move downstream after release?

Are there ways to facilitate downstream movement (fences, flow pulses, etc?)

Suggested Method: Again, test various transport methods. Evaluate direct and delayed mortality, homing return efficacy, etc.

#### Step 9: Monitoring for return of tagged smolts (pit tags, fin clips, etc)

Question: Can smolts be effectively tagged so that returning adult migrants can be tied to trap-and-transport-assisted smolt production?

Suggested Method: Pit tags and/or coded wire tags on a selected sub-sample of smolts.

### Phase II. Moderate Population Size Methodology

If the low population size efforts result in increased numbers of adults returning below Bradbury Dam, a moderate-duty system designed, say, for up to 1,000 annual adult spawners, could be tested in a phased adaptive management protocol similar to the one described above.

Such a system might include

A semipermanent barrier weir and trap across both Hilton Creek and the mainstem with water-to-water transfer of captured fish from trap to transport tank and tank to release point. Pump-back attraction flow might be desirable to enhance adult fish attraction efficiency. Design and construction of such a semi-permanent trap facility would require approximately 2 years at the outside, assuming construction permits could be obtained without appeal from regulatory agencies. This activity could begin as early as the same winter season of the initial adult trap and transport action, with actual construction phased in when results of the initial spawning success and juvenile survival tests are evaluated.

An alternative to trapping low in Hilton Creek and the nearby mainstem would be to use Hilton Creek as a partial ladder, ensuring configuration and attraction flows so that upmigrating adults are facilitated in finding Hilton Creek attractive. Integrated with the plunge-pool and chute barrier modifications, Hilton Creek at the highest elevation of US Bureau of Reclamation property can be modified to trap upmigrating spawners to be transported around Cachuma Reservoir into, for example, the closest high-quality tributary, Santa Cruz Creek and its tributaries.

Another permutation of this that should be given serious evaluation is the feasibility of constructing a small ladder or fishway from the upper Bureau property boundary on Hilton Creek upward and over the

dam (less than 100 foot lift) with a controlled variable length descent and into a receiving pen in the Reservoir just below the Bureau's maintenance and office facility near the spillway gates. Fish may then be held in good condition for sorting, genetic identification as necessary, and subsequent transport to receiver tributaries for spawning. Design and construction of such a ladder and descent system would require approximately two to three years, and such effort could begin as early as the initial adult trap and transport action.

Phase II juvenile collection would be effected by construction of one or more floating collectors in the Cachuma and possibly Gibraltar reservoir, with or without guide nets. Design and construction of a floating collector that could be placed in either reservoir could be accomplished within 2 years, and could be initiated at beginning of the initial adult trap and transport action in Phase I or initiated once Phase I results indicated that Phase II methodology would be more effective than Phase I.

### Phase III. Higher Population Size Methodology

If the first two phased steps prove successful, a larger, high-service trap system designed for up to several thousand adult spawners annually in high water years should be evaluated. This might consist of a permanent concrete barrier dam at Hilton Creek and across the mainstem at the foot of Bradbury Dam, a permanent trap and holding system, hopper hoist system, rail crowder panels, and associated handling equipment with at least three 1,000 to 2,000 gallon aerated, refrigerated tank transport systems. Pump-back attraction flow would facilitate adult fish attraction efficiency. This larger, permanent adult trap could be designed and constructed within 4 to 5 years from inception, and could begin concurrently with the initial adult trap and transport action or deferred until the results of Phase II have reached the point where this would be the most likely method to produce consistent long-term sustainability of the run.

In both Phases II and III, juvenile fish collection and bypass systems would be required for Bradbury Dam and reservoir, and, depending on locations selected for adult release, Gibraltar Dam/Reservoir, Juncal Dam/Reservoir, and Alisa! Dam/Reservoir as well. Several feasible alternatives for collecting and bypassing smolt steelhead exist. Permanent, full-collection instream collectors are not recommended due to the volume of woody debris and sediment in high flows rendering instream devices relatively unreliable. Development and evaluation of floating collectors located at the inlet of each tributary below adult release points into the respective reservoirs should be studied. An alternative that should also be evaluated is the relative survivorship of down migrating smolts within the reservoirs with an eye toward capture at collectors located at or near the Dam sites. Design and construction of floating collectors could be accomplished within 4 years of the initial adult trap and transport action. Smolt survival studies could be accomplished during the first outmigration season following the initial trap and transport action, which is likely to be from one to three years following inception of Phase I. These studies would be continued concurrently with the conceptual design of the juvenile collection system. The preferred site for collection would become known as a result of the smolt survival studies, with the final design of the smolt collection system dependent upon the preferred location.

Such floating collectors would include attraction flows provided by low-head electric pumps supplied with fixed-grid or generator power to produce attraction flows between 30-250 cfs. Each collector would include a barge with transfer boat and holding tanks, sorting and handling facility, and water-to-water transfer of juvenile fish to downstream transport tank system or bypass pipe to shore-based facility.

The simplest collector system would include a single floating collector at each dam, located near the existing outlet works. Reservoir migration survival studies would be required to verify the feasibility of this option. This can be accomplished via through-reservoir survival radio tag tracking studies to assess potential losses to predators and migration success.

In the event that through-reservoir studies show an at-dam collector undesirable or infeasible, individual collectors would be required at each tributary inlet into which adults have been transported and released. Each inlet collector would include an exclusion barrier net positioned far enough out in the reservoir to lower average net approach velocity to below the structural strength of net material. Design and construction of multiple juvenile collectors would be accomplished at the same pace as for a single collector, with the required construction period increased proportionately to permit completion of each individual unit.

*Alisa Dam, Alisa Creek, Tributary to Santa Ynez River below Bradbury Dam*

For access above and below Alisa Dam, the scale of a passage system similar to that discussed above would be proportionally less than the systems designed for the much larger storage dams on the mainstem Santa Ynez River. A juvenile collection system may consist of nothing more than bypass outlets designed to meet bypass criteria for smolts (301:ps max. velocity, smooth interior, gradual bends >3 diameters in radius, no exit plunge in excess of 25 fps, etc.) A small fish ladder for adult passage might be feasible, and, if not, a simple floating picket weir or fixed Braille weir can be used. Design and construction of an adult passage system for Alisa Dam would require no more than 2 years, and such effort could begin entirely independent of mainstem Santa Ynez fish passage facility study and design.