UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
650 Capitol Mall, Suite 5-100
Sacramento, California 95814-4700

Refer to NMFS No: WCRO-2020-01671

January 8, 2021

Dominic Vitali
District 10 Environmental Chief
California Department of Transportation
Office of the District 10 Director
P.O. Box 2048
Stockton, California 95201

Re: Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Faith Home Road and Garner Road Connection Project - STPL 5938 (240)

Dear Mr. Vitali:

Thank you for your letter of June 9, 2020, requesting initiation of consultation with NOAA's National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 *et seq*.) for the Faith Home Road and Garner Road Connection Project (Project). This consultation was conducted in accordance with the 2019 revised regulations that implement section 7 of the ESA (50 CFR 402, 84 FR 45016).

NMFS recognizes that the California Department of Transportation (Caltrans) has assumed the Federal Highway Administration's (FHWA) responsibilities under Federal environmental laws for this project as allowed by a Memorandum of Understanding (NEPA Assignment) with the FHWA effective October 1, 2012, and renewed April 18, 2019, pursuant to 23 USC 326.

Thank you, also, for your request for consultation pursuant to the essential fish habitat (EFH) provisions in Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1855(b)) for this action.

The enclosed biological opinion, based on the biological assessment and best available scientific and commercial information, concludes that the Project is not likely to jeopardize the continued existence of the threatened California Central Valley steelhead (*Oncorhynchus mykiss*), and is not likely to adversely affect Central Valley spring-run Chinook salmon (*O. tshawytscha*). The Project is not likely to destroy or adversely modify California Central Valley steelhead designated critical habitat. There is no designated critical habitat for Central Valley spring-run Chinook salmon within the Project action area. NMFS has included an incidental take statement with reasonable and prudent measures and non-discretionary terms and conditions that are necessary and appropriate to avoid, minimize, or monitor incidental take of listed species associated with the Project.

NMFS' review concludes that the Project will adversely affect Pacific salmon EFH in the action area and has included conservation recommendations, including adoption of the ESA reasonable and prudent measures and associated terms and conditions from the biological opinion.

Caltrans has a statutory requirement under section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act to submit a detailed written response to NMFS within 30 days of receipt of these conservation recommendations.

Please contact Kristin Begun at the NMFS California Central Valley Office by email at kristin.begun@noaa.gov if you have any questions concerning this consultation, or if you require additional information.

Sincerely,

A. Catherine Marcinkevage

Cathy Marcinkevage
Assistant Regional Administrator

Enclosure

cc: To the file 151422-WCR2020-SA00026

Electronic copy only:
Mr. David Moore, Associate Environmental Planner, Caltrans,
David.j.moore@dot.ca.gov
Mr. Christopher Brady, Deputy Director, Stanislaus County Public Works,
bradyc@stancounty.com
Mr. Jeffery Little, Vice President at Sycamore Environmental Consultants, Inc.,
Jeffery.Little@sycamoreenv.com

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Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response

Faith Home Road and Garner Road Connection Project - STPL 5938 (240)
NMFS Consultation Number: WCRO-2020-01671

Action Agency: California Department of Transportation

Affected Species and NMFS' Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species?	Is Action Likely To Jeopardize the Species?	Is Action Likely to Adversely Affect Critical Habitat?	Is Action Likely To Destroy or Adversely Modify Critical Habitat?
California Central Valley steelhead *(Oncorhynchus mykiss)* distinct population segment (DPS)	Threatened	Yes	No	Yes	No
Central Valley spring-run Chinook salmon (*O. tshawytscha*) evolutionary significant unit (ESU)	Threatened	No	N/A	N/A	N/A

Fishery Management Plan That Identifies EFH in the Project Area	Does Action Have an Adverse Effect on EFH?	Are EFH Conservation Recommendations Provided?
Pacific Coast Salmon	Yes	Yes

Consultation Conducted By: National Marine Fisheries Service, West Coast Region

Issued

A. Catherine Marcinkevage

By: Cathy Marcinkevage
Assistant Regional Administrator for the California Central Valley Office

Date: January 8, 2021

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1. INTRODUCTION

This Introduction section provides information relevant to the other sections of this document and is incorporated by reference into Sections 2 and 3, below.

1.1. Background

The National Marine Fisheries Service (NMFS) prepared the biological opinion and incidental take statement (ITS) portions of this document in accordance with section 7(b) of the Endangered Species Act (ESA) of 1973 (16 USC 1531 *et seq*.), and implementing regulations at 50 CFR 402, as amended.

We also completed an essential fish habitat (EFH) consultation on the proposed action, in accordance with section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. 1801 *et seq*.) and implementing regulations at 50 CFR 600.

We completed pre-dissemination review of this document using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (DQA) (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The concurrence letter will be available through NMFS' Environmental Consultation Organizer at https://www.fisheries.noaa.gov/resource/tool-app/environmental-consultation-organizer-eco. A complete record of this consultation is on file at NMFS' California Central Valley Office located in Sacramento, California.

1.2. Consultation History

- The California Department of Transportation (Caltrans) requested consultation with NMFS on June 9, 2020. A biological assessment (BA) for the Faith Home Road and Garner Road Connection Project (Project) and a cover letter were provided electronically. The initiation package included California Central Valley (CCV) steelhead DPS and their critical habitat, as well as EFH for Pacific Coast Salmon.

- On June 22, 2020, NMFS informed Caltrans during a phone call that NMFS would also be consulting on Central Valley (CV) spring-run Chinook salmon, since there is recent monitoring data indicating their presence in the action area.

- Between June 23 and July 16, 2020, NMFS and Caltrans corresponded via email to clarify information in the BA, including changing the in-water work window.

- Once clarifying information was received on July 16, 2020, NMFS considered the consultation initiation date to be June 9, 2020.

- On September 11, 2020, NMFS requested an extension to December. On September 14, 2020, an extension was granted to December 15, 2020.

- On November 9, 2020, NMFS requested a second extension while awaiting additional clarifying information in order to finish analyzing effects of the proposed action. On November 12, 2020, Caltrans granted NMFS an extension to January 10, 2021.

- On November 23, 2020, Caltrans led a group meeting with NMFS, Stanislaus County, and the consultant to discuss remaining questions from NMFS. Some questions were answered during the call, and the remainder of the requested information was provided via email on December 3, 2020.

1.3. Proposed Federal Action

Under the ESA, "action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies (50 CFR 402.02). Under MSA, Federal action means any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken by a Federal Agency (50 CFR 600.910).

1.3.1. Authorities and Discretion

The Project is federally funded through the Federal Highway Administration (FHWA). As part of its NEPA assignment of federal responsibilities by the FHWA, effective December 23, 2016, and pursuant to 23 USC 327, Caltrans is acting as the lead federal agency for Section 7 of the Federal Endangered Species Act. Permits, approvals, and concurrences related to biological resource issues will be required from the following agencies:

- U.S. Army Corps of Engineers – Clean Water Act, Section 404.

- California Department of Fish and Wildlife – California Endangered Species Act Section 1600-1602 Streambed Alteration Agreement.

- Regional Water Quality Control Board – Clean Water Act, Section 401 Water Quality Certification.

- Regional Water Quality Control Board – National Pollutant Discharge Elimination System (NPDES) Permit.

- U.S. Fish and Wildlife Service – Federal Endangered Species Act, Informal Section 7, Letter of Concurrence.

1.3.2. Project Location

The Project is located in Stanislaus County, just east of the City of Modesto. It extends from the existing Faith Home Road/Hatch Road intersection, north across the Tuolumne River to the existing Garner Road/Finch Road intersection for roughly one mile. The Project is located on the Ceres 7.5" USGS topographic quad (T3S, R9E, Section 36; T4S, R9E, Section 1 and 12; T4S, R10E, Section 6 and 7, Mt. Diablo Base and Meridian.

1.3.3. Proposed Project

The Project is proposed by Caltrans, in cooperation with the Stanislaus County Public Works Department and the Stanislaus Council of Governments. The Project involves construction of a two-lane expressway from the existing Faith Home Road/Hatch Road intersection north to the Garner Road/Finch Road intersection. The two-lane expressway may be widened to four lanes in the future. The proposed Project includes improvements to both intersections, a new bridge over the Ceres Main Canal, approximately one mile of new road on an S-curve alignment, a new bridge over the Tuolumne River, a raised causeway or viaduct structure over the floodplain to the north of the river, and a bridge for the railroad tracks at the north end of the Project.

The Project will fill an existing transportation gap, and allow vehicles access from Riverbank, Modesto, and Ceres to State Route 99. Construction is anticipated to begin in 2025 and be completed in 2027. In-water work was initially proposed to be conducted from March 1 to June 30, but after discussion with Caltrans, the new proposed in-water work window will be from July 1 to October 31.

As part of the proposed Project, Caltrans/Stanislaus County will purchase 0.34 mitigation credits from a NMFS-approved mitigation bank to benefit listed fish subject to temporary and permanent impacts from the construction of the bridge over the Tuolumne River. Purchase of credits from an approved mitigation bank will benefit the same juvenile CCV steelhead that use the construction portion of the action area, by providing similar habitats for fish, which benefit juveniles by providing excellent rearing habitat to increase the likelihood of survival.

1.3.4. Construction Activities

Expressway and Alignment

The Project will construct a new two-lane expressway and bridge over the Tuolumne River between Modesto and Ceres that can be widened to four lanes in the future. The proposed one-mile long expressway is within the Modesto City-County Airport Safety Air Traffic Zone that limits the use of street lighting along the route. To increase safety, a concrete median safety barrier is proposed for the route to create a divided expressway.

The Faith Home/Hatch Road intersection at the southern project limits and the Garner/Finch Road intersection at the northern project limits are fixed points to which the new expressway will connect (Figure 1). A reverse “S-curve” alignment will allow the new expressway to align with the existing intersections. The S-curve will be located north of the Tuolumne River, over the floodplain.

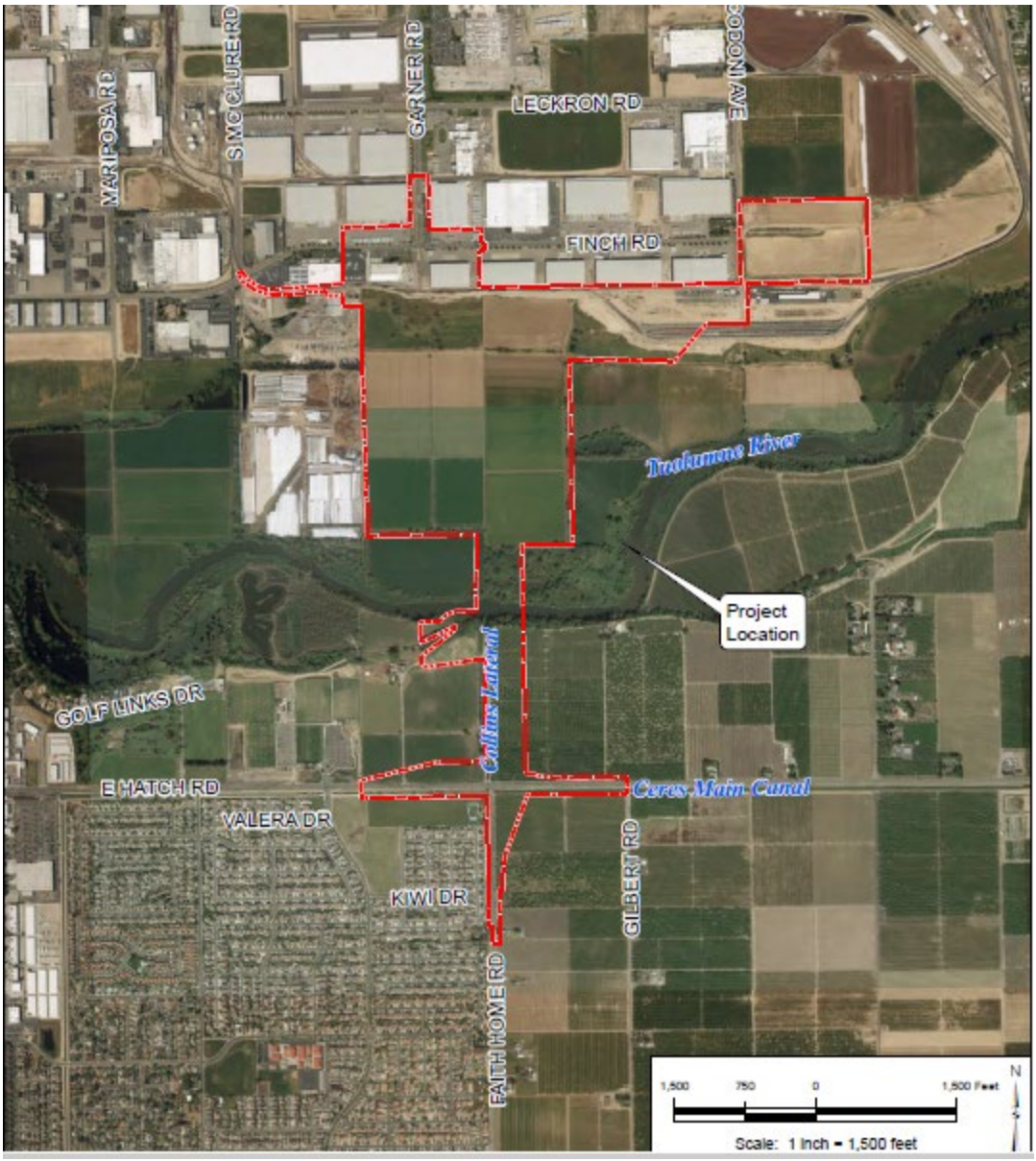


Figure 1. Aerial view of the Project location. A new 2-lane expressway will extend over the Tuolumne River from the Faith Home Road/Hatch Road intersection (bottom, center) to the Garner Road/Finch Road intersection (top, left of center). Figure from Caltrans (2020) Biological Assessment.

The expressway will head north from Hatch Road, staying on the east side of the Turlock Irrigation District Faith Home spill ditch to the Tuolumne River. The proposed new Tuolumne River Bridge will cross the river at a perpendicular angle, accommodating the shortest possible bridge length. After crossing the river, the bridge would transition to shorter bridge spans and more shallow structure depths over the floodplain. On the north side of the river, the expressway will cross a 500-foot wide area of riparian forest before crossing over irrigated agricultural fields and landing on a new peninsula berm. The alignment will go below the railroad tracks before coming up to meet the Garner/Finch Road intersection at grade.

Faith Home/Hatch Road Intersection to Tuolumne River

The Ceres Main Canal is parallel to and south of Hatch Road. Faith Home Road crosses the Ceres Main Canal via a bridge just south of the Faith Home/Hatch Road Intersection. The proposed Project will construct a new, wider bridge east and upstream of the existing bridge. The shift of the new bridge to the east avoids the Ceres Main Canal gate control system for the spill ditch, which heads north to the Tuolumne River.

The spill ditch control structure has both automatic and manual controls that allow high flows in the Ceres Main Canal to be directed into the spill ditch and return to the Tuolumne River. The automatic control structure allows the spillway to be in continuous use, as needed. Peak times are during winter storms and during the irrigation season.

The spill ditch is approximately 1,620 feet long. A portion of the spill ditch on the riverbank is a covered concrete tube, which contains the splash and spray as water flows down the steep bank. Most of the spill ditch is an unlined ditch with a dirt bottom. An underground irrigation supply line crosses over the spill ditch via a flume approximately 1,300 feet north of Hatch Road. The irrigation supply lateral pipe is likely an unreinforced concrete pipe east of the spillway. It will be replaced with a reinforced concrete pipe under the expressway.

Tuolumne River Bridge

The main bridge frame piers over the Tuolumne River and north floodplain will be designed to support the initial 2-lane bridge, as well as the future 4-lane bridge. The bridge frame is proposed to be a five-span, 861-foot long cast-in-place (CIP) post-tensioned concrete box girder bridge.

Each pier of the main bridge frame will use two 10-foot diameter cast-in-drilled-hole (CIDH) columns. The first of the center spans will clear the river's main channel. The north bank CIDH piles will be located outside of the Tuolumne River ordinary high water mark (OHWM). The two CIDH piles for the pier along the south side of the main river channel will be within the OHWM. No permanent bridge foundations will be placed within the ordinary low water mark (OLWM) of the Tuolumne River.

The CIDH piles for both the north and south piers will be constructed within a permanent or temporary casing that will be dewatered. Construction of all CIDH pile foundations and supporting columns for the new Tuolumne River bridge crossing are expected to occur in the first year of construction.

The south end of the main river bridge would be supported by a seat abutment. The abutment would be at the top of the bluff approximately 120 feet south of the river channel, founded on 14-inch steel "H" piles driven with an impact hammer. Pile installation will require 25 to 30 strikes per foot. It is anticipated that 22 piles per abutment will be installed to a 100- to 115-foot depth at a rate of 4 to 6 piles per day over a period of 5 to 8 days.

Construction of this bridge requires falsework across the river and a parallel temporary work trestle. The trestle and falsework supports constructed within the river will use 14-inch steel "H" piles driven by a vibratory hammer. The temporary work trestle and falsework would not hinder upstream and downstream passage of boats. Due to challenging south bank access, the trestle

may need to continue from the south end by turning 90 degrees and run along the south bluff west and downstream. Temporary trestle and falsework supports would stay in-place over the 2-year construction period. The temporary falsework and trestle piles will be removed post-construction using a vibratory extractor.

Viaduct Structure

North of the main river bridge frame, two additional causeway bridge frames will be constructed that continue over the Tuolumne River floodplain and existing farmland. The causeway box girder is proposed to be a conventional four-span, 450-foot long, CIP post-tensioned concrete box girder bridge type utilizing three 120-foot spans with a 90-foot end span. Each pier will utilize two columns, each on a large diameter CIDH pile constructed within a permanent or temporary casing. A shallower causeway slab bridge frame will connect to the causeway box girder frame and continue north, ending on a peninsula berm that extends approximately 1,500 feet south of the north bluff. The causeway slab bridge is proposed to be a six span 512-foot long CIP pre-stressed slab bridge utilizing 93-foot long interior spans and 70-foot long end spans. Each pier support will utilize eight columns, each on a small diameter CIDH pile constructed within a temporary casing. All causeway bridge foundations will be outside the main river channel and will utilize CIDH pile foundations using permanent or temporary casings. No cofferdams will be required, but pile casings for the causeway box girder frame near the river may require de-watering during construction. The Project will require approximately 160,000 cubic yards of borrow material to construct the peninsula berm and the railroad improvements.

A drain pipe will be needed on both sides of the peninsula embankment to drain accumulated stormwater runoff collected in the depressed section of Faith Home Road below the proposed undercrossing. The stormwater runoff will be primarily captured and percolated within adjacent bioswales and ditches. Remaining incidental runoff will be treated via bioswales before heading towards the Tuolumne River. The overland release to the river may be conveyed through a rock-lined ditch. A culvert system may be used to discharge the runoff onto the river bank.

Project Schedule

Construction of Phase 1 of the Project is anticipated to begin in 2025 and be completed in 2027. In the first year of construction the Project intends to accomplish all work in the railroad right of way, retaining wall construction in the Gilton right-of-way, main Tuolumne River Bridge work trestle and all foundations and columns, peninsula fill extending out from the north bluff, power pole relocations, and the new Ceres/Turlock Irrigation District Main Canal bridge. In the second year of construction, the Project intends to complete the main Tuolumne River bridge abutments, falsework and superstructure, excavation below grade separation including retaining walls and concrete boat pavement section, all roadway pavement, drainage, barrier, rails and fences, roadway signs, signals and striping, and removal of the Tuolumne River work trestle and falsework. The Project will result in a complete two-lane facility. The improvements to a full four-lane facility are funding and need dependent and therefore, are not currently scheduled.

1.3.5. Conservation Measures

To minimize or avoid impacts to listed fish species and surrounding riparian habitat, proposed conservation measures include the following (refer to Section 1.4.5.3 of the Caltrans Biological Assessment (Caltrans 2020) for the complete list:

- In-water work will occur during the least sensitive periods relative to the potential effects on listed salmonids and their habitat (July 1 through October 31).

- Equipment will be inspected daily for leaks and cleaned of any external petroleum products, hydraulic fluid, coolants, and other deleterious materials prior to operating.

- When night work cannot be avoided, disturbance of sensitive species and habitats will be avoided and minimized. Lights on work areas will be shielded and focused to minimize fugitive lighting that may otherwise shine on the water affecting migrating fish.

- An underslung work platform, temporary work trestle or similar structure will be installed to prevent debris from falling into the river.

- Any excavated material that will not be placed back in the channel or on the bank after construction will be hauled to an approved disposal site. Gravel and large woody debris excavated from the channel that is temporarily stockpiled for reuse in the channel will be stored in a manner that prevents mixing with river flows.

- Materials that are left in the river channel will be composed of washed, rounded, spawning-sized gravel between 0.4 to 4 inches in diameter. Gravel left in place will be modified (i.e., manually spread out using hand tools if necessary) to ensure adequate passage for all life stages of fish present, and then allowed to disperse naturally by high winter flows.

- If pumps are used to temporarily divert or dewater the Tuolumne River during construction, a NMFS-approved fish screen will be used to prevent entrainment of small fish. An open basin will be constructed before dewatering. The open basin will be inspected for fish, which will be relocated to the Tuolumne River adjacent to the work zone by a qualified biologist.

- A wood block, bubble curtain, or similar protection will be used to reduce noise and vibration associated with in-river pile-driving activities.

- Where temporary vegetation removal occurs, native species will be re-established.

- Bank stabilization will incorporate bioengineering solutions consistent with site-specific engineering requirements, when feasible. Where rock slope protection (RSP) is necessary, native riparian vegetation and/or large woody debris may be incorporated into the RSP.

- A qualified NMFS-approved biologist will:
    - Inspect the site at least once per week to monitor compliance with best management practices (BMPs) (silt fence, straw wattles, etc.).
    - Be present during in-water activities. If list species are observed, construction will be halted. If fish remain in the construction zone for 48 hours or more, NMFS will be contacted for further guidance.
    - Conduct, monitor, and supervise all capture, handling, exclusion, and relocation.
    - Maintain detailed records of the species, numbers, life stages, and size classes of listed species observed, collected, relocated, injured, and killed, date and time of each activity or observation.
    - If electrofishing is used, the biologist will have appropriate training and experience, and all electrofishing will be conducted according to the NMFS (2000) Guidelines for Electrofishing.

1.3.6. Other Project-Related Activities

We considered, under the ESA, whether or not the proposed action would cause any other activities and determined that it would cause the following activities:

Increased vehicle traffic over the new Tuolumne River Bridge will likely result in an increase in contaminants into the river. With the construction of the new expressway, traffic in this area is likely to increase. With increased vehicle traffic, contaminants from tire wear, oil leaks, and exhaust are likely to be transported from the road to the waterway during rain events. This is likely to impact water quality in the immediate area.

Urban stormwater runoff poses a significant threat to aquatic organisms, such as salmonids and macroinvertebrate prey items. Contaminated stormwater runoff is known to result in lethal effects to Coho salmon, which are more sensitive to contaminants than Chinook and steelhead, but likely also result in negative effects to these species. Symptoms to adult and juvenile Coho include circular surface swimming, gaping, a loss of equilibrium, and immobility, and death (Chow *et al.* 2019).

As urban areas expand and infrastructure increases, impacts to streams and rivers are likely to increase. The need for more green stormwater infrastructure is apparent. Green stormwater infrastructures have been shown to remove contaminants and protect both Coho juveniles (McIntyre *et al.* 2015) and adults (Spromberg and Scholz 2011). Since the Project is implementing bioswales to capture and filter runoff prior to it entering the waterway, toxicity will be reduced, resulting in limited impacts to salmonids.

2. ENDANGERED SPECIES ACT: BIOLOGICAL OPINION AND INCIDENTAL TAKE STATEMENT

The ESA establishes a national program for conserving threatened and endangered species of fish, wildlife, plants, and the habitat upon which they depend. As required by section 7(a)(2) of the ESA, each Federal agency must ensure that its actions are not likely to jeopardize the continued existence of endangered or threatened species, or adversely modify or destroy their designated critical habitat. Per the requirements of the ESA, Federal action agencies consult with NMFS and section 7(b)(3) requires that, at the conclusion of consultation, NMFS provide an opinion stating how the agency's actions would affect listed species and their critical habitats. If incidental take is reasonably certain to occur, section 7(b)(4) requires NMFS to provide an ITS that specifies the impact of any incidental taking and includes non-discretionary reasonable and prudent measures (RPMs) and terms and conditions to minimize such impacts.

2.1. Analytical Approach

This biological opinion includes both a jeopardy analysis and an adverse modification analysis. The jeopardy analysis relies upon the regulatory definition of "jeopardize the continued existence of" a listed species, which is "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 CFR 402.02). Therefore, the jeopardy analysis considers both survival and recovery of the species.

This biological opinion relies on the definition of "destruction or adverse modification," which "means a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species" (50 CFR 402.02).

The designation(s) of critical habitat for (species) use(s) the term primary constituent element (PCE) or essential features. The 2016 critical habitat regulations (50 CFR 424.12) replaced this term with physical or biological features (PBFs). The shift in terminology does not change the approach used in conducting a "destruction or adverse modification" analysis, which is the same regardless of whether the original designation identified PCEs, PBFs, or essential features. In this biological opinion, we use the term PBF to mean PCE or essential feature, as appropriate for the specific critical habitat.

The 2019 regulations define effects of the action using the term "consequences" (50 CFR 402.02). As explained in the preamble to the regulations (84 FR 44977), that definition does not change the scope of our analysis and in this opinion we use the terms "effects" and "consequences" interchangeably.

We use the following approach to determine whether a proposed action is likely to jeopardize listed species or destroy or adversely modify critical habitat:

- Evaluate the rangewide status of the species and critical habitat expected to be adversely affected by the proposed action.

- Evaluate the environmental baseline of the species and critical habitat.

- Evaluate the effects of the proposed action on species and their habitat using an exposure-response approach.

- Evaluate cumulative effects.

- In the integration and synthesis, add the effects of the action and cumulative effects to the environmental baseline, and, in light of the status of the species and critical habitat, analyze whether the proposed action is likely to: (1) directly or indirectly reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species, or (2) directly or indirectly result in an alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species.

- If necessary, suggest a reasonable and prudent alternative to the proposed action.

2.2. Rangewide Status of the Species and Critical Habitat

This biological opinion examines the status of each species that would be adversely affected by the proposed action. The status is determined by the level of extinction risk that the listed species face, based on parameters considered in documents such as recovery plans, status reviews, and listing decisions. This informs the description of the species' likelihood of both survival and recovery. The species status section also helps to inform the description of the species' "reproduction, numbers, or distribution" as described in 50 CFR 402.02. The opinion also examines the condition of critical habitat throughout the designated area, evaluates the conservation value of the various watersheds and coastal and marine environments that make up the designated area, and discusses the function of the PBFs that are essential for the conservation of the species. See Table 1 below for the current status of CCV steelhead and CV spring-run Chinook salmon, and Table 2 for current status of CCV steelhead designated critical habitat.

Table 1. Species Status.

Critical Habitat	Designation Date and Federal Register Notice	Description
Central Valley spring-run Chinook salmon ESU	Threatened, 70 FR 37160; June 28, 2005	According to the NMFS' 5-year species status review (NMFS 2016b), the status of the CV spring-run Chinook salmon ESU, until 2015, was improved since the 2010 5-year species status review. The improved status is due to extensive restoration, and increases in spatial structure with historically extirpated populations (Battle and Clear creeks) trending in the positive direction. Recent declines of many of the dependent populations, high pre-spawn and egg mortality during the 2012 to 2016 drought, and uncertain juvenile survival during the drought are likely increasing the ESU's extinction risk. Monitoring data showed a high of nearly 24,000 adults returning in 2013 (CDFW 2018), to sharp declines in adult returns in the 5-year average of approximately 5,800 fish from 2014 to 2018 (CDFW 2020). However this trend was somewhat reversed in 2019, when over 20,000 adult spring-run Chinook salmon returned to the Central Valley river systems.
California Central Valley steelhead DPS	Threatened, 71 FR 834; January 5, 2006	According to the NMFS' (2016a) 5-year species status review, the status of CCV steelhead appears to have changed little since the 2011 status review that concluded that the DPS was in danger of extinction. Most wild CCV populations are very small, are not monitored, and may lack the resiliency to persist for protracted periods if subjected to additional stressors, particularly widespread stressors such as climate change. The genetic diversity of CCV steelhead has likely been impacted by low population sizes and high numbers of hatchery fish relative to wild fish. The life-history diversity of the DPS is mostly unknown, as very few studies have been published on traits such as age structure, size at age, or growth rates in CCV steelhead.

Table 2. Description of critical habitat, designation details and status summary.

Critical Habitat	Designation Date and Federal Register Notice	Description
California Central Valley Steelhead	September 2, 2005, 70 FR 52488	Critical habitat for CCV steelhead includes stream reaches of the Feather, Yuba, and American rivers, Big Chico, Butte, Deer, Mill, Battle, Antelope, and Clear creeks, the Sacramento River, the Yolo Bypass, as well as portions of the legal Delta, and the San Joaquin River basin upstream to the confluence of the Merced River and major tributaries up to the first impassable dam. Critical habitat includes the stream channels in the designated stream reaches and the lateral extent as defined by the ordinary high-water line. In areas where the ordinary high-water line has not been defined, the lateral extent will be defined by the bankfull elevation. Physical and biological features considered essential to the conservation of the species include: spawning habitat; freshwater rearing habitat; freshwater migration corridors; and estuarine areas. Although the current conditions of PBFs for CCV steelhead critical habitat in the Central Valley are significantly limited and degraded, the habitat remaining is considered highly valuable.

Critical Habitat	Designation Date and Federal Register Notice	Description
California Central Valley steelhead DPS	September 2, 2005; 70 FR 52488	Critical habitat for CCV steelhead includes stream reaches of the Feather, Yuba and American rivers, Big Chico, Butte, Deer, Mill, Battle, Antelope, and Clear creeks, the Sacramento River, the Yolo Bypass, as well as most portions of the legal Delta and the San Joaquin River basin upstream to the confluence of the Merced River and major tributaries up to the first impassable dam. In addition, portions of the San Francisco Bay-San Pablo Bay-Suisun Bay estuarine complex [approximately 254 square miles, with the South San Francisco Bay hydrologic sub area being excluded; (70 FR 52531)] which provides rearing and migratory habitat for this ESU are included. Critical habitat also includes the stream channels in the designated stream reaches and the lateral extent as defined by the ordinary high-water line. In areas where the ordinary high-water line has not been defined, the lateral extent will be defined by the bankfull elevation. In estuarine areas the extreme high water is the best descriptor of lateral extent. This is the area inundated by extreme high tide and encompasses habitat areas typically inundated and regularly occupied during the winter, spring and summer when juvenile salmon are migrating in the nearshore zone and relying heavily on forage, cover, and refuge qualities provided by these occupied habitats. PBFs considered essential to the conservation of the species include: Spawning habitat; freshwater rearing habitat; freshwater migration corridors; and estuarine areas as previously described for CV spring-run Chinook salmon. Although the current conditions of PBFs for CCV steelhead critical habitat in the Central Valley are significantly limited and degraded, the habitat remaining is considered highly valuable.

2.2.1. Climate Change

One major factor affecting the rangewide status of the threatened and endangered anadromous fish in the Central Valley and aquatic habitat at large is climate change. Warmer temperatures associated with climate change reduce snowpack and alter the seasonality and volume of seasonal hydrograph patterns (Cohen *et al.* 2000). Central California has shown trends toward warmer winters since the 1940s (Dettinger and Cayan 1995). An altered seasonality results in runoff events occurring earlier in the year due to a shift in precipitation falling as rain rather than snow (Roos 1991, Dettinger 2004). Specifically, the Sacramento River basin annual runoff amount for April-July has been decreasing since about 1950 (Roos 1987, Roos 1991). Increased temperatures influence the timing and magnitude patterns of the hydrograph.

The magnitude of snowpack reductions is subject to annual variability in precipitation and air temperature. The large spring snow water equivalent (SWE) percentage changes, late in the snow season, are due to a variety of factors including reduction in winter precipitation and temperature increases that rapidly melt spring snowpack (VanRheenen 2004). Factors modeled by

VanRheenen (2004) show that the melt season shifts to earlier in the year, leading to a large percent reduction of spring SWE (up to 100% in shallow snowpack areas). Additionally, an air temperature increase of 2.1°C (3.8°F) is expected to result in a loss of about half of the average April snowpack storage (VanRheenen 2004). The decrease in spring SWE (as a percentage) would be greatest in the region of the Sacramento River watershed, at the north end of the Central Valley, where snowpack is shallower than in the San Joaquin River watersheds to the south.

The latest computer models predict that without drastic cutbacks in emissions of carbon dioxide and other gases released by the burning of fossil fuels, the average global surface temperature may rise by 2°C (3.6°F) in the 21st century (IPCC 2018). Much of that increase likely will occur in the oceans, and evidence suggests that the most dramatic changes in ocean temperature are now occurring in the Pacific (Noakes 1998). Increased ocean temperatures will result in increased ocean acidity, decreased oxygen levels, a shift in marine species to higher latitudes, and degradation to marine ecosystems (IPCC 2018). Using objectively analyzed data, Huang and Liu (2000) estimated a warming of about 0.9°F per century in the Northern Pacific Ocean.

Sea levels are expected to rise by 0.5 to 1.0 meters (1.6 to 3.3 feet) along the Pacific coast in the next century mainly due to warmer ocean temperatures, which lead to thermal expansion much the same way that hot air expands. This will cause increased sedimentation, erosion, coastal flooding, and permanent inundation of low-lying natural ecosystems (e.g., estuarine, riverine, mud flats) in the Delta. Increased winter precipitation, decreased snow pack, permafrost degradation, and glacier retreat due to warmer temperatures will cause landslides in unstable mountainous regions, which will directly impact salmonids while migrating or rearing in the Delta (*e.g.*, warmer temperatures, turbidity) and would also affect their spawning success upstream, and impact PBFs of their critical habitat.

Droughts along the West Coast and in the interior Central Valley of California are already occurring and are likely to increase with climate change. This means decreased groundwater storage and stream flow in those areas, decreasing salmonid survival and reducing water supplies in the dry summer season when irrigation and domestic water use are greatest. Global warming may also change the chemical composition of the water that fish inhabit: the amount of oxygen in the water declines, while pollution, acidity, and salinity levels may increase. Warmer stream temperatures will allow for invasive species to overtake native fish species and impact predator-prey relationships (Peterson and Kitchell 2001, Stachowicz *et al.* 2002).

In light of the predicted impacts of global warming, the Central Valley has been modeled to have an increase of between 2°C (3.6°F) and 7°C (12.6°F) by the year 2100 (Dettinger *et al.* 2004, Hayhoe *et al.* 2004, Van Rheenen *et al.* 2004, U.S. Bureau of Reclamation 2014) with a drier hydrology predominated by precipitation rather than snowfall. The Sierra Nevada snowpack is likely to decrease by as much as 70 to 90 percent by the end of this century under the highest emission scenarios modeled (Hayhoe *et al.* 2004). This will alter river runoff patterns and transform the tributaries that feed the Central Valley from a spring/summer snowmelt dominated system to a winter rain dominated system. Summer temperatures and flow levels will likely become unsuitable for salmonid survival. The cold snowmelt that furnishes the late spring and early summer runoff will be replaced by warmer precipitation runoff. Without the necessary cold

water pool from snowmelt, water temperatures could potentially rise above thermal tolerances for salmonids that must spawn and rear below reservoirs in the summer and fall.

Those tributaries without cold water refugia will be more susceptible to impacts of climate change. CCV steelhead will experience similar effects of climate change as Chinook salmon, since they are also blocked from the vast majority of their historic spawning and rearing habitat. However, the effects may be greater, since juvenile CCV steelhead rear in the stream for one to two summers prior to emigrating as smolts. In the Central Valley, summer and fall temperatures below the dams in many streams already exceed the recommended temperatures for optimal growth of juvenile CCV steelhead, which range from 15°C to 19°C (59°F to 66°F) (Myrick and Cech 1998).

In summary, observed and predicted climate change effects are generally detrimental to these species (McClure 2011, Wade *et al*. 2013), so unless offset by improvements, the status of the species is likely to decline over time. While there is uncertainty associated with climate change projections, which increase over time, the direction of change is relatively certain (McClure *et al*. 2013).

2.3. Action Area

"Action area" means all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 CFR 402.02).

The action area includes the construction footprint, as well as surrounding areas potentially affected by construction of the expressway and bridge, associated improvements to roads, intersections, utility relocation, fill, borrow, and potential staging areas. The action area encompasses portions of Garner Road and Finch Road, East Hatch Road and Faith Home Road, a stretch of the Modesto & Empire Traction railyard, a portion of the Tuolumne River, two irrigation canals, and privately-owned agriculture and orchard fields. It begins along Garner Road approximately 770 feet north of the Finch Road intersection, includes an approximately 8,230-foot proposed road corridor, and ends along Faith Home Road, 1,600 feet south of the intersection with East Hatch Road.

Since Caltrans/Stanislaus County plans to purchase 0.34 mitigation credits from a mitigation bank for temporary and permanent disturbance, the action area also includes the mitigation bank from which Caltrans/Stanislaus County will purchase these credits affected by the mitigation bank. Mitigation banks that have service areas within the project area include: 1) the Cosumnes Floodplain Mitigation Bank, which is a 472-acre floodplain site at the confluence of the Cosumnes River and Mokelumne River, 2) Bullock Bend Mitigation Bank, a 119.65-acre floodplain site along the Sacramento River at the confluence of the Feather River, 3) Fremont Landing Conservation Bank, a 100-acre bank on the floodplain adjacent to the Sacramento River at its confluence with the Feather River, and 4) Liberty Island Conservation Bank, a 186-acre conservation bank located at the southern end of the Yolo Bypass in the Sacramento-San Joaquin River Delta. These banks have service areas relevant to the Project. The Cosumnes Floodplain Mitigation Bank is physically closest to the project area.

2.4. Environmental Baseline

The "environmental baseline" refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultations, and the impact of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline (50 CFR 402.02).

2.4.1. Occurrence of Listed Species and Critical Habitat

The federally listed anadromous species that use and occupy the action area are migrating adult and juvenile CCV steelhead and CV spring-run Chinook salmon. The action area is within designated critical habitat for CCV steelhead. The San Joaquin River mainstem in the action area is the primary migration corridor for both adult and juvenile life stages spawned in the San Joaquin River basin to the Delta, which contains important rearing habitat for juveniles. All anadromous fish that utilize the San Joaquin River Basin must also pass by this location at least twice to successfully complete their life histories.

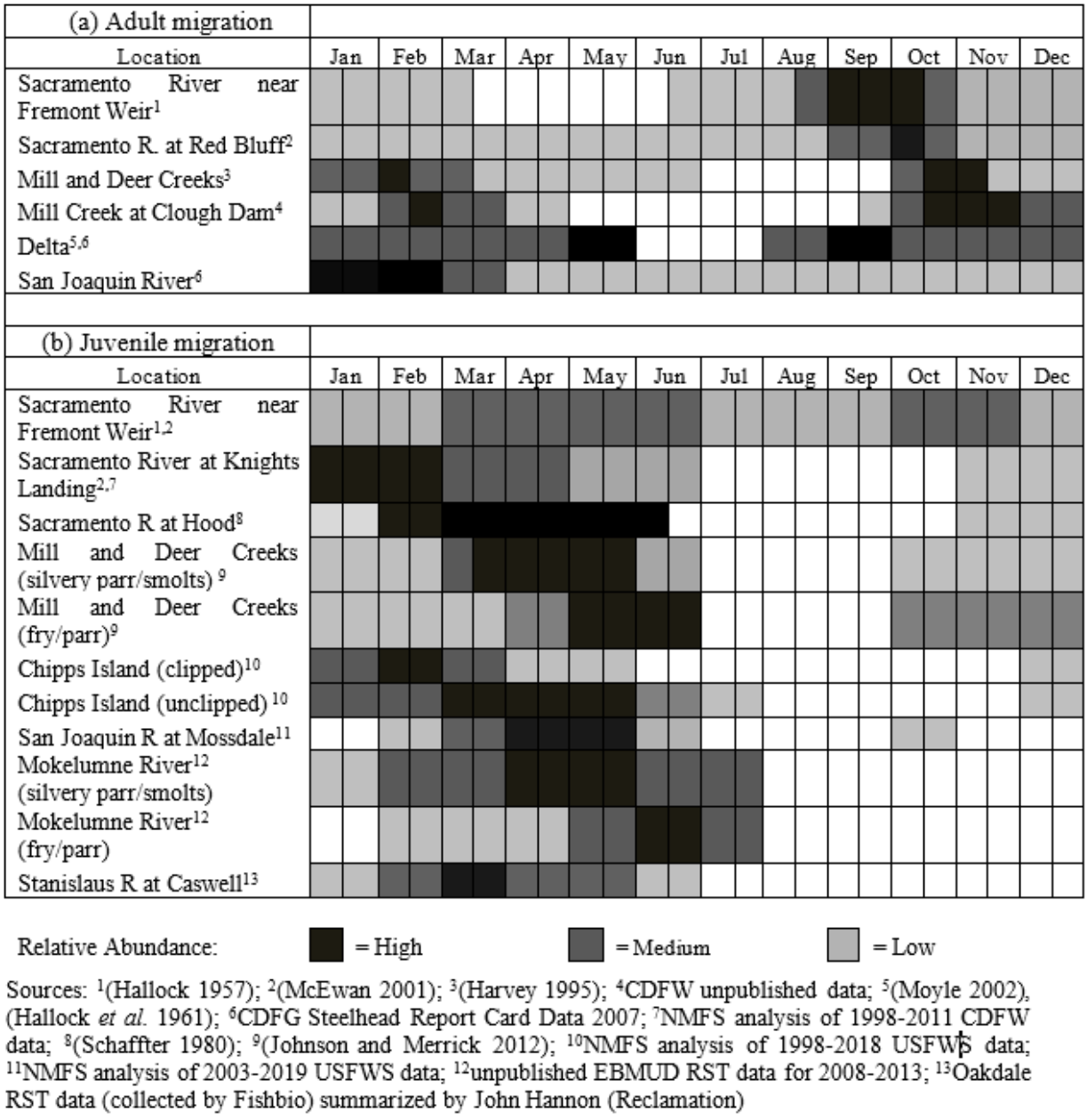
Since CV spring-run Chinook salmon will not be present during in-water construction activities, and there is no critical habitat for CV spring-run Chinook salmon in the action area, this species will no longer be discussed in the biological opinion, until section 2.12 ("Not Likely to Adversely Affect" Determinations).

CCV steelhead

It is believed that all current stocks of CCV steelhead have a winter-run timing, meaning they may migrate up rivers in the winter starting with the first pulse of notable rain run-off (Moyle *et al.* 1995). The life history strategies of steelhead are extremely variable between individuals, and it is important to take into account that steelhead are iteroparous (*i.e.,* can spawn more than once in their lifetime (Busby *et al.* 1996)) and therefore may be expected to emigrate back down the system after spawning. As such, the determination of the presence or absence of steelhead in the Delta accounted for both upstream and downstream migrating adult steelhead (kelts).

Adult steelhead enter freshwater in August (Moyle 2002) and peak migration of adults moving upriver occurs in August through September, Figure 2, (Hallock *et al.* 1957). Adult steelhead will hold until flows are high enough in the tributaries to migrate upstream where they will spawn from December to April (Hallock *et al.* 1961). After spawning, most surviving steelhead kelts migrate back to the ocean and reach the Sacramento River during March and April, and have a high presence in the Delta in May. Migrating adult steelhead present in the San Joaquin River occur from July to March, with highest abundance between December and January (Figure 2). Small, remnant populations of CCV steelhead are known to occur on the Stanislaus River and the Tuolumne River and their presence is assumed on the Merced River due to proximity, similar

habitats, historical presence, and recent otolith chemistry studies verifying at least one steelhead in the limited samples collected from the river (Zimmerman *et al.* 2008). Outmigrating juveniles from the Merced River would have to pass through the action area during their emigration to the ocean. Juveniles would emigrate from February through June, with the core of their migration occurring March through May.



Sources: [1](Hallock 1957); [2](McEwan 2001); [3](Harvey 1995); [4]CDFW unpublished data; [5](Moyle 2002), (Hallock *et al.* 1961); [6]CDFG Steelhead Report Card Data 2007; [7]NMFS analysis of 1998-2011 CDFW data; [8](Schaffter 1980); [9](Johnson and Merrick 2012); [10]NMFS analysis of 1998-2018 USFWS data; [11]NMFS analysis of 2003-2019 USFWS data; [12]unpublished EBMUD RST data for 2008-2013; [13]Oakdale RST data (collected by Fishbio) summarized by John Hannon (Reclamation)

Figure 2. The temporal occurrence of (a) adult and (b) juvenile California Central Valley steelhead at locations in the Central Valley.

CCV Steelhead Critical Habitat

The PBFs for CCV steelhead critical habitat in the action area include: (1) freshwater migration corridors and (2) rearing habitat. The freshwater migration utility in the action area is of fair quality, since flows of the lower San Joaquin River are typically of adequate magnitude, quality, and temperatures to support adult and juvenile migration. Most importantly, this section of CCV steelhead critical habitat serves as a migration corridor for all of the adults and juveniles produced and supported by the San Joaquin River and its major tributaries.

During the summer months, migrating and rearing habitat is of poor quality due unsuitable water temperatures and low flows. In addition rearing habitat is poor as well as the San Joaquin River is leveed and channelized. The floodplain habitat which would otherwise normally exist has been largely removed near the action area due to the high levees, which limits the value of the area for juvenile rearing. Migratory habitat for adults and juveniles should largely not be impacted due to the project timing because the work window is mostly outside of their migration periods.

Factors Affecting Listed Species and Critical Habitat in the Action Area

The action area encompasses a small portion of the area utilized by the CCV steelhead DPS. This section will focus on the specific factors in the action area that are most relevant to the proposed action.

The Tuolumne River has been degraded from its historic condition. Many anthropomorphic and naturally occurring factors have led to the decline of anadromous fish in the surrounding lotic ecosystem. Due to the construction of La Grange and New Don Pedro dams, as well as various other dams and water diversions constructed on the Tuolumne River, flows and temperatures through the action area have been altered from their natural and historic regimes. Overall, water management now reduces natural variability by creating more uniform flows year-round. Current flood control practices upstream require peak flood discharges to be held back and released over a period of weeks to avoid overwhelming the flood control structures downstream of the reservoirs (*i.e.*, levees and bypasses).

Consequently, managed flows in the mainstem of the river often truncate the peak of the flood hydrograph and extended the reservoir releases over a longer period. These actions reduce or eliminate the scouring flows necessary to mobilize gravel and clean sediment from the spawning reaches of the river channel and disrupt natural sediment transfer in general. Altered flow regimes can influence migratory cues, water quality (including contaminants, dissolved oxygen, and nutrients for primary productivity), and temperature.

Drought conditions have played a significant role in recent years as flows have decreased and temperatures have increased, leading to unfavorable environmental conditions in the river. This has resulted in negative impacts to listed fish as well as impacts to critical habitat. Increased temperatures have the potential to disrupt aquatic macroinvertebrate production, leading to declines in food availability in the action area (Ward and Stanford 1982). In addition, due to low-flows, high concentrations of inorganic nutrients from agricultural activity may occur in the action area (Paerl *et al.* 2011). For CCV steelhead, rearing site and migration corridor PBFs have been partially degraded as a result of flow and temperature alteration due to dam construction.

Artificially created levees have been constructed along the banks of the Tuolumne River, substantially reducing the density of riparian vegetation within the action area. Riparian vegetation provides a host of ecosystem services and its removal has diminished habitat value within the action area. Riparian vegetation plays a key role in the value for the conservation of the species of rearing habitat for all salmonid life stages. It provides shading to lower stream temperatures; increases the recruitment of large woody material into the river, increasing habitat complexity; provides shelter from predators; and enhances the productivity of aquatic macroinvertebrates (Anderson and Sedell 1979, Pusey and Arthington 2003). It has also been shown to directly influence channel morphology and may be directly correlated with improved water quality in aquatic systems (Schlosser and Karr 1981, Dosskey *et al.* 2010).

Point and non-point sources of pollution resulting from agricultural discharge and urban and industrial development occur upstream of and within the action area. Environmental stressors as a result of low water quality can lower reproductive success and may account for low productivity rates in fish. Organic contaminants from agricultural drain water, urban and agricultural runoff from storm events, and high trace element (*i.e.,* heavy metals) concentrations may deleteriously affect early life-stage survival of fish in the San Joaquin River (USFWS 1995).

Importance of the Action Area to the Survival and Recovery of Listed Species

The Tuolumne River in the action area contains rearing habitat and a migration corridor for juvenile CCV steelhead. The Project's action area comprises approximately 100 linear meters of the river (0.06 RM). The Tuolumne River totals 53.32 RM from La Grange Dam to the confluence of the San Joaquin River, making the action area approximately 0.11% of the total length of possible rearing habitat in the Tuolumne River. The lower Tuolumne River is classified as a Core 2 watershed for CCV steelhead in the recovery plan (NMFS 2014). Core 2 watersheds have "populations [that] meet, or have the potential to meet, the biological recovery standard for moderate risk of extinction" (NMFS 2014). Besides maintaining any Core 2 populations, establishing and maintaining two viable populations of CCV steelhead in the San Joaquin River basin (southern Sierra Nevada diversity group) is vital to the recovery of the species (NMFS 2014).

Since it provides passage for CCV steelhead between the Delta and their spawning habitat upstream, the migration corridor PBF is important for their survival and recovery. Adult CCV steelhead return from the ocean via the Tuolumne River to spawn upstream.

Climate Change

Rangewide climate change information for CCV steelhead is presented in section 2.2.1 of this biological opinion.

In the future, the action area will likely experience additional changes in environmental conditions due to climate change. These changes may overlap with the direct and indirect effects of long term proposed actions. Thus, for long-term actions, we can no longer assume current environmental variability adequately describes environmental baseline conditions. Instead, we need to project baseline conditions into the future, synchronizing our projections with the duration of the effects of the proposed action we are analyzing.

Within the context of the relatively brief period of time over which the proposed action is scheduled to be constructed, however, the near term effects of global climate change are unlikely to result in any perceptible declines to the overall health or distribution of CCV steelhead within the action area that are the subject of this consultation.

Mitigation Banks

Mitigation banks present a unique factual situation, and this warrants a particular approach to how they are addressed. Specifically, when NMFS is consulting on a proposed action that includes mitigation bank credit purchases, it is likely that physical restoration work at the bank site has already occurred and/or that a section 7 consultation occurred at the time of bank establishment. A traditional reading of "environmental baseline" might suggest that the overall ecological benefits of the mitigation bank actions therefore belong in the environmental baseline. However, under this reading, all proposed actions, whether or not they included proposed credit purchases, would benefit from the environmental 'lift' of the entire mitigation bank because it would be factored into the environmental baseline. In addition, where proposed actions did include credit purchases, it would not be possible to attribute their benefits to the proposed action, without double counting. These consequences undermine the purposes of mitigation banks and do not reflect their unique circumstances. Specifically, mitigation banks are established based on the expectation of future credit purchases. In addition, credit purchases as part of a proposed action will also be the subject of a future section 7 consultation.

It is therefore appropriate to treat the beneficial effects of the bank as accruing incrementally at the time of specific credit purchases, not at the time of bank establishment or at the time of bank restoration work. Thus, for all projects within the service area of a bank, only the benefits attributable to credits sold are relevant to the environmental baseline. Where a proposed action includes credit purchases, the benefits attributable to those credit purchases are considered effects of the action. That approach is taken in this biological opinion.

There are several conservation or mitigation banks approved by NMFS with service areas that include the action area considered in this biological opinion. These banks may offer salmonid credits or credits that would benefit steelhead habitat.

Bullock Bend Mitigation Bank: Established in 2016, the Bullock Bend Mitigation Bank is a 116.15-acre floodplain site along the Sacramento River at the confluence of the Feather River (Sacramento River Mile 80) and is approved by NMFS to provide credits for impacts to CCV steelhead. There are salmonid floodplain restoration, salmonid floodplain enhancement and salmonid riparian forest credits available. To date, there have been approximately 4.75 of 119.65 credits sold and the ecological value (increased rearing habitat for juvenile salmonids) of the sold credits are part of the environmental baseline. All features of this bank are designated critical habitat for CCV steelhead as analyzed in this biological opinion.

Cosumnes Floodplain Mitigation Bank: Established in 2009. The Cosumnes Floodplain Mitigation Bank is a 493-acre floodplain site located at the confluence of the Cosumnes and Mokelumne rivers and is approved by NMFS to provide credits for impacts to CCV steelhead and Essential Fish Habitat of Pacific salmon. To date, there are 25 floodplain mosaic wetland

credits available and 20,000 linear feet of shaded riverine aquatic credits available. The ecological value (increased rearing habitat for juvenile CCV steelhead) of the sold credits are part of the environmental baseline. All features of this bank are designated critical habitat for the species analyzed in this biological opinion.

Fremont Landing Conservation Bank: Established in 2006, the Fremont Landing Conservation Bank is a 100-acre site near the confluence of the Feather River and the Sacramento River, at river mile 78 through 80, on the west bank of the Sacramento River. It is approved by NMFS to provide credits for impacts to listed salmonids. Out of 100 acres of potential credits, approximately 74.8 acres have been sold/withdrawn and the ecological value (increased rearing habitat for juvenile salmonids) of these credits are part of the environmental baseline. All features of this bank are designated critical habitat for CCV steelhead as analyzed in this biological opinion.

Liberty Island Conservation Bank: Established in 2010, the Liberty Island Conservation Bank is a 186-acre site located at the southern end of the Yolo Bypass on Liberty Island in the Delta. Out of the credits relating to salmonid restoration or preservation, approximately 74 acre credits have been sold/withdrawn. It is approved by NMFS to provide credits for impacts to listed salmonids. There are riparian shaded aquatic, salmonid preservation, and salmonid restoration credits available, and the ecological value of the sold credits (increased rearing habitat for juvenile salmonids) are part of the environmental baseline. All features of this bank are designated critical habitat for CCV steelhead as analyzed in this biological opinion.

NMFS CCV Steelhead Recovery Plan Action Recommendations

The NMFS Recovery Plan (NMFS 2014) identifies recovery goals for the San Joaquin Basin populations of CCV steelhead, whose range includes the proposed action area. Recovery efforts focus on addressing several key stressors that are vital to CCV steelhead: (1) elevated water temperatures affecting adult migration and holding; (2) low flows and poor fish passage facilities, affecting attraction and migratory cues of migrating adults; and (3) possible catastrophic events (*e.g.*, fire or volcanic activity).

CCV Steelhead DPS

The NMFS Recovery Plan (NMFS 2014) strategy for CCV steelhead lists the San Joaquin River's eastside tributaries (Stanislaus, Tuolumne, and Merced rivers) as Core 2 populations (meaning these watersheds have the potential to support viable populations, due to lower abundance, or amount and quality of habitat) downstream of major dams, and as candidates to reach viable population status if reintroduced upstream of the dams, and lists the San Joaquin River, below Friant Dam, as a candidate to reach viable population status.

2.5. Effects of the Action

Under the ESA, "effects of the action" are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved

in the action (see 50 CFR 402.17). In our analysis, which describes the effects of the proposed action, we considered 50 CFR 402.17(a) and (b).

To evaluate the effects of this Project, we analyzed construction-related impacts and the fish response to habitat alterations. In addition, we reviewed and considered the proposed conservation measures and the plan to purchase mitigation bank credits. This assessment relied on the information described in the Caltrans (2020) BA for this Project, phone and email communications, information in an errata provided by Caltrans, and the new agreed upon in-water work window (changed from March 1 to June 30, to July 1 to October 31).

Our assessment considers the nature, duration, and extent of the proposed actions relative to the spawning, rearing, and migration timing, behavior, and habitat requirements of all life stages of federally listed fish in the action area. Impacts to aquatic resources include both short- and long-term effects. Short-term effects, which are related primarily to construction activities, include increased suspended sediment and turbidity, temporary habitat disturbance, and noise from pile-driving activities. Long-term impacts include the installation of structures and associated impacts along the riverbank and to riparian habitat. The Project will contribute to the continued confinement of the riverine system that in turn negatively impacts listed fish species and their designated critical habitat.

2.5.1. Effects of the Proposed Action to Listed Fish Species

Construction-Related Effects

Adult and juvenile CCV steelhead are known to occur in the action area and adult CCV steelhead may be present in low numbers during the in-water construction work window as they migrate upstream toward their spawning grounds. Juvenile CCV steelhead outmigrate from February through June, however, some may rear in the area year round. No spawning habitat for CCV steelhead is present in the action area, therefore no adverse effects to spawning adults or incubating eggs are expected.

Pile Driving

In-water construction will involve equipment and activities that will produce underwater noise and vibration, thereby temporarily altering in-river conditions. These changes can impair feeding behaviors, which, in turn, impact growth and survival of fish. Juvenile fish are the most vulnerable to these changes, since adults are able to more quickly swim away from the area of disturbance. These individuals would travel to adjacent areas with similar habitats resulting in temporary displacement from rearing habitat. Other individuals may remain in the area during work activities, and would be susceptible to noise impacts.

When piles are impact-driven into riverbed substrate, sound propagates through the water that can kill, injure, or disturb fish. The most common form of acute injury to fish resulting from impact pile driving is barotrauma to the fish's swim bladder. When sound propagates through the water, tissues of the swim bladder may become ruptured or torn as the sound wave passes through the fish and pressure levels rapidly rise and fall, causing the swim bladder to expand and contract. Internal organs adjacent to the swim bladder may be injured as well (Gaspin 1975). Salmonids have physostomous swim bladders that may become injured in this way. Other

injuries that have been documented include structural damage to auditory organs (Enger 1981, Hastings 1995, Hastings 1996) causing equilibrium problems (Hastings 1995, Hastings 1996). The fitness of salmonids may be reduced if they experience these injuries as their behaviors for swimming, predator avoidance, feeding, and migrating may become temporarily or permanently impaired.

The Fisheries Hydroacoustic Working Group (FHWG 2008) has established threshold sound levels in which acute injury, cumulative injury (sound exposure level [SEL] for fish either ≥ 2 grams or < 2 grams), or behavioral effects (root mean squared [RMS]) may occur. Those levels are 206-dB_{PEAK}, 187-dB_{SEL}, 183-dB_{SEL}, and 150-dB_{RMS} respectively (Table 3). The degree to which an individual fish exposed to underwater sound will be affected is dependent on a number of variables, such as the species of fish, size of the fish, presence of a swim bladder, sound pressure intensity and frequency, shape of the sound wave (rise time), depth of the water around the pile, and the bottom substrate composition and texture. Responses can vary from a startle response to immediate mortality. Acute injury or death may occur to any sized fish, if they are within range of the source of sound to the extent that the sound exceeds a threshold of 206-dB_{PEAK} at any given time. Acute injury may also occur as a result of cumulative exposure to sound pressure if fish are exposed to levels exceeding 187-dB_{SEL} (for fish ≥2g) and 183-dB_{SEL} (for fish <2g).

Table 3. Summary of interim criteria for injury to fish assuming a distance of 10 meters (source level from the driven pile).

Interim Criteria for Injury	Interim Criteria in Decibels (dB)	Fish Response
Peak	206 dB	physical injury
Cumulative SEL	187 dB (for fish 2 grams or larger); 183 dB (for fish less than 2 grams)	physical injury
Root Mean Square (RMS)	150 dB	behavioral response

Behavioral effects may occur if sound levels exceed the established threshold of 150-dB_{RMS}. These behavioral changes may have deleterious effects to growth and survival of fish in the action area. Sound waves below 150-dB_{RMS} are considered to be "effective quiet" and are not considered to be harmful to fish. Behavioral effects can include disruptions in feeding behavior, predatory avoidance behavior, and migratory behavior; impacting overall fitness of a species. "Agitation" is indicated by a change in swimming behavior, such as detected by Shin (1995) with salmonids, or "alarm" detected by McCauley (2003). Additionally, Popper (1997) observed a "startle" response indicated by a quick burst in swimming following pile strikes.

Pile-driving activities for the proposed Project are scheduled to occur during the July 1 through October 31 in-water work window. The main bridge frame piers will each be supported by two

10-foot CIDH columns, one on the north bank (outside of the OHWM) and one on the south side (within the OHWM). Bridge piers will be constructed within a drilled casing and dewatered. Piles will be installed within the 10-foot diameter casings using a vibratory hammer.

Temporary falsework across the river and a trestle parallel to the river bank will require a total of 135 14-inch H-piles, driven by a vibratory hammer over 15-20 days (10-12 per day). These structures will be removed after construction of the bridge with a vibratory extractor. Since the acoustic effects are less by using a vibratory hammer than impact hammer driving, Caltrans does not plan to employ any attenuation methods to reduce the sound caused by installing the piles. Currently, NMFS does not have established thresholds for the use of vibratory hammers.

A load restrike test on 15 falsework piles (11 in-water and 4 on land) and two trestle piles will require an additional 30 strikes per pile with an impact hammer, 24 hours after they are set (Table 4).

Table 4. Hydroacoustic sound levels for falsework and trestle piles during re-strike testing.

Pile Type	Driver Type	Number of Strikes Per Pile	Strikes Per Day	Reference Distance (m)	Attenuation (dB)	Peak (dB)	SEL (dB)	RMS (dB)	Distance (m) to Threshold			
									Onset of Physical Injury			Behavior
									Peak dB	Cumulative SEL dB		RMS dB
										Fish >2 g	Fish < 2 g	
									206 dB	187 dB	183 dB	150 dB
14" H-Piles (in-water)	impact hammer	30	90	10	5	203	172	182	6	24	45	1359
14" H-Piles (on land)	impact hammer	30	90	10	10	198	167	177	3	9	17	631

Peak, SEL, RMS values were provided by Caltrans via email communication.

The abutment structure located 120 feet south of the river will require twenty-two 14-inch H-piles driven with approximately 30 strikes per pile with an impact hammer. Pile driving of the abutment will take 3 days to complete at 300 strikes/day (10 piles max/day over 2 days and 1 day of 60 strikes)) (Table 5).

Table 5. Hydroacoustic sound levels for abutment piles on land.

Pile Type	Driver Type	Number of Strikes Per Pile	Strikes Per Day	Reference Distance (m)	Attenuation (dB)	Peak (dB)	SEL (dB)	RMS (dB)	Distance (m) to Threshold			
									Onset of Physical Injury			Behavior
									Peak dB	Cumulative SEL dB		RMS dB
										Fish >2 g	Fish < 2 g	
									206 dB	187 dB	183 dB	150 dB
14" H-Piles (on land)	impact hammer	30	300	10	10	198	167	177	3	21	38	631

Peak, SEL, RMS values were provided by Caltrans via email communication.

The Tuolumne River serves as an upstream and downstream migration corridor and rearing habitat for CCV steelhead. It is expected that pile driving may result in injury, death, or harassment (behavioral effects) of CCV steelhead. Though pile driving may affect or delay migratory behavior, it is not expected to prevent salmonids from passing upstream or downstream, because pile driving will not occur at night, when the majority of fish migrate.

Adult CCV steelhead may be migrating upriver to their spawning grounds from August to October, and kelts (adults returning to the ocean) may be migrating downstream around March to April. Therefore, some adult CCV steelhead may be present during pile-driving work. Juvenile CCV steelhead typically outmigrate down the Tuolumne River from January to May, peaking in March and April. However, juveniles may rear in the area year round and, therefore, may be present in the action area during pile-driving activity.

Although a small number of adult and juvenile CCV steelhead may be present in the action area during pile-driving activity, they are expected to exhibit a behavioral response and few are expected to be injured or killed as a result of the proposed action; since juveniles are less likely to exhibit evasion behavior, it is more likely that the individual steelhead taken will be juveniles.

Dewatering and Fish Capture and Relocation Activities

Dewatering will be required during bridge pier construction. Each pier on either side of the Tuolumne River will utilize two 10-foot diameter CIDH piles. The CIDH piles for both the north and south bridge piers will be constructed within a permanent or temporary casing, which will be dewatered. Any fish observed in the open casing will be relocated to the active flow of Tuolumne River adjacent to the work zone by a qualified biologist.

Pumps used during dewatering activities will be fitted with NMFS-approved fish screens. Pumped water will be discharged to an upland area providing overland flow and infiltration (such as a sediment basin or to a Baker tank) before returning to the river.

A qualified biologist will use nets to remove any remaining fish prior to the installation of the temporary gravel berm and dewatering structures. If the biologist is unable to capture fish using standard methods (*i.e.*, nets), electrofishing may be used. The electrofishing unit operator would have appropriate training and experience in electrofishing techniques.

The pier installation process will likely startle most of the fish near the construction site and cause them to leave the immediate area of work. However, it is possible that some fish will be entrained within the casing or remain present in the action area. Although work is scheduled to occur when list fish are least likely to be present, adult and juvenile CCV steelhead may still be in the action area in low numbers at the time when installation starts to the time it is dewatered, although adults are less likely to become entrained than juveniles due to their large size and better swimming ability.

The capture and relocation of salmonids associated with the dewatering could induce physiological stress, even when a skilled fish biologist performs the relocation. The capture and relocation of salmonids associated with the dewatering of the pile casings are expected to adversely affect a small number of juvenile CCV steelhead if present in the action area. Because of the variability and uncertainty associated with the population size of the species, annual variation in the timing of migration, and variability regarding individual habitat use of the action area, the actual number of individuals present in the action area during the in-water work window is not known. However, there would be few individuals present since most juvenile salmonids would have left the action area by late spring, therefore impacts resulting from dewatering activities are expected to adversely affect a low number of fish.

Contaminants

The proposed action will involve heavy construction equipment and activities that could impair water quality if a spill were to occur. Potential sources of pollutants include gasoline, lubricants, and other petroleum-based products, which could enter the waterway as a result of spills or leakage from machinery, and could potentially injure listed salmonids. The exposure to these substances can kill fish directly in high enough concentrations through acute toxicity or suffocation from lack of oxygen. These chemicals may also harm the prey of listed fish species, reducing their ability to feed and therefore grow and survive.

Adult and juvenile CCV steelhead may be present in the action area during construction activities and would potentially be acutely injured by a pollution event if one occurred. Adult and juvenile CCV steelhead could also be indirectly affected by a pollution event if contaminants were to settle within substrate in the active channel that may become disturbed at a later time.

However, with the adherence of BMPs that dictate the use, containment, and cleanup of contaminants, the use of toxic substances at the construction site will aid in minimizing or avoiding potential adverse effects to listed fish species. With these avoidance and minimization measures in place, potential temporary or long-term adverse effects resulting from the incursion of contaminants into the Tuolumne River are not expected to occur.

Turbidity and Sedimentation

Increased turbidity and sedimentation may occur during pile-driving activities within the active channel. Driving of the temporary and permanent piles will disturb the substrate possibly resulting in increased turbidity and sedimentation. Pile-driving activities include:

- 135 total temporary falsework and trestle piles installed with a vibratory hammer over 15-20 days.
- Load restrike test of 17 falsework and trestle piles (including 4 on land) over 4 days.
- Removal of temporary falsework and trestle pile over 7-10 days.
- Four CIDH piles installed within 10-foot diameter casings with a vibratory hammer.

RSP placement would also contribute to increased sedimentation and turbidity. Sources outside of the active channel include disturbance of soil from staging areas and access road for heavy equipment, vegetation removal, and grading activities.

Juvenile and adult CCV steelhead are known to use the action area as a migration corridor and for rearing during the proposed in-water work window and are therefore expected to be present during construction activities. Increased sedimentation and turbidity could have adverse effects to adult fish though gill fouling, reduced foraging ability and reduced predator avoidance (Kemp *et al.* 2011). Juvenile salmonids are unlikely to avoid increased levels of turbidity below a level of 70 nephelometric turbidity units (NTU) (Bash *et al.* 2001). As a result, they may be at greater risk to turbidity and sediment-related effects than adults.

One effect of turbidity that has important implications for juvenile salmonids is that predator avoidance behavior has been shown to decrease at increased levels of turbidity (Gregory 1993). Growth and survival amidst increased sediment and turbidity levels have also been shown to decrease resulting from reduced prey detection and availability. Physical injury is also possible due to increased activity, aggression, and gill fouling (Suttle *et al.* 2004, Kemp *et al.* 2011).

Pile-driving activities will occur during daylight hours, when listed fish species are less likely to be migrating through the action area. Other construction activities on land may occur at night. Sedimentation and turbidity events associated with construction activities are expected to be localized and transient in nature. As such, the proposed action is expected to result in short-term, localized increases in turbidity and sedimentation. Therefore, there could be some impacts to juvenile and adult CCV steelhead, if they are present during in-water construction activities.

Habitat Alteration

The new bridge will result in shading from the trestles and the permanent bridge structures placed in the Tuolumne River. During construction, shaded riverine aquatic habitat will be impacted from clearing, grading, and access activities, and from construction of the new bridge. Project activities will result in the temporary loss of 0.28 acres and permanent loss of 0.02 acres of shaded riverine aquatic habitat. The proposed action may include the placement of approximately 170 cubic yards of RSP at the north bank (80 feet of shoreline) to reduce bank erosion during rain events.

The temporary and permanent loss of shaded riverine aquatic habitat may cause behavioral modification of juvenile fish avoiding the disturbed areas and experiencing reduced growth and survival. Reduction in cover may lead to increased predation by predatory fishes, birds, or mammals. Loss of riparian habitat may reduce food availability, which may result in increased competition and an increased susceptibility to predation.

The number of individual fish that will be affected is difficult to quantify, but we expect that harm will be directly associated with the temporary removal of 0.28 acres of riparian vegetation, permanent increase in the spatial footprint of the bridge columns by 0.02 acres, and the placement of approximately 170 cubic yards of RSP, by providing habitat for predators that feed on out-migrating smolts. We expect there to be adverse effects in the form of harm from habitat degradation and death from predation along 80 feet of shoreline below the OHWM for a period of at least 50 years, which is the standard engineered life expectancy of a levee repair project.

Stormwater Runoff

The new Tuolumne River Bridge will result in increased vehicle traffic in this area. Pollutants from increased traffic have the potential to be transported via stormwater runoff into the river. Urban stormwater runoff contributes significantly to the degradation of aquatic habitats. Urban runoff carries toxins, such as heavy metals and petroleum byproducts from highways, parking lots and other impervious surfaces into the creeks where salmon spawn, rear, and migrate.

Motor vehicles release a broad range of chemicals into the environment due to tire and brake pad wear, leaking crankcase oil and transmission fluid, and tailpipe exhaust (Chow *et al.* 2019).

These contaminants accumulate on roads and other impervious surfaces and are then mobilized into stormwater runoff during rain events.

When salmonids return to their natal streams, they are exposed to these pollutants. Juvenile fish are also exposed while outmigrating back towards the ocean. Given that CCV steelhead are iteroparous (can spawn more than once in their lifetime), they are susceptible to exposure each time they pass through a highly urban area. Juvenile CCV steelhead also spend more time in freshwater than other salmonid species, making them more vulnerable to prolonged exposure. Since urbanization is expanding, exposure to these pollutants is a population level threat to all salmonids, since they spend part of their lives in freshwater river systems.

Symptoms of exposure to pollutants in runoff include surface swimming, loss of equilibrium, and death. Studies on Coho salmon in the Puget Sound area show that there is a short time (a few hours) between the onset of symptoms and death, and that moving exposed fish to clean water does not improve their condition (Chow *et al.* 2019). Coho salmon are more sensitive to these pollutants than Chinook salmon or steelhead, however, these species are also susceptible to the effects of stormwater runoff.

Results of studies similar to the one referenced above, reinforce the need for green stormwater infrastructure that limit polluted runoff. The proposed action includes the installation of a drain pipe at the peninsula berm on the north side of the river to drain accumulated stormwater runoff collected in the depressed section of Faith Home Road. The stormwater runoff will be captured and percolated within adjacent bioswales and ditches. The overland release to the river may be conveyed through a rock-lined ditch. A culvert system may be used to discharge the runoff onto the river bank.

The use of bioswales at the north end of the bridge will help to filter and reduce the amount of polluted stormwater runoff that enters the Tuolumne River from the north side of the bridge. Since the proposed action does not include stormwater treatment at the south side of the bridge, some stormwater runoff from the bridge is expected to directly enter the Tuolumne River without treatment, posing a long-term risk of exposure to salmonids and other aquatic species. Overall, the Project is not expected to result in significant toxicity levels that will result in adverse effects to listed fish species in the action area, but it will contribute to the impacts of urbanization and increased vehicle traffic with runoff that leads to waterways.

2.5.2. Effects of the Proposed Action on Critical Habitat

Critical habitat has been designated in the action area for CCV steelhead. As described earlier, the PBFs within the action area for CCV steelhead are freshwater rearing sites and freshwater migration corridors. The proposed Project is expected to cause short-term and long-term effects to critical habitat for CCV steelhead. Potential Project effects include temporary water quality degradation from localized increases in turbidity and suspended sediment, temporary in-channel disturbance from pile driving and other construction activities, and permanent habitat loss/modification of critical habitat from the permanent placement of the new bridge. The long-term effects will result in permanent loss and of 0.02 acres of critical habitat, but will not adversely modify it.

Riparian Vegetation Removal

Shaded riverine aquatic habitat will be impacted during the clearing, grading, and access activities, and from construction of the new bridge. These activities have the potential to result in short- and long-term adverse effects to critical habitat PBFs. Riparian vegetation plays a key role in the conservation value of rearing habitat for many salmonid life stages. It provides shading to reduce stream temperatures, increases the recruitment of large woody material into the river, increasing habitat complexity, provides shelter from predators, and enhances the productivity of aquatic macroinvertebrates (Anderson and Sedell 1979, Pusey and Arthington 2003). Removal of shaded riverine aquatic habitat can impact important food sources for salmonids.

Riparian vegetation has also been shown to directly influence channel morphology and may be directly correlated with improved water quality in riverine systems through biogeochemical cycling, soil and channel chemistry, water movement, and erosion (Schlosser and Karr 1981, Dosskey *et al.* 2010). The removal of riverside riparian vegetation is expected to cause river banks to be less stable and more prone to erosion, which is likely to result in increased turbidity and suspended sediment in the Tuolumne River during rain events.

Shaded riverine aquatic habitat is currently present along both the north and south sides of the river in the action area. The surrounding community consists of riparian forest, disturbed ruderal, and agricultural areas. 0.28 acres of shaded riverine aquatic habitat will be temporarily impacted during clearing and grubbing activities, and 0.02 acres of shaded riverine aquatic habitat will be permanently converted as a result of construction of the new bridge.

The proposed action will result in the temporary loss of 0.28 acres and permanent loss of 0.02 acres of shaded riverine aquatic habitat due to disturbance from Project activities. This loss of riparian habitat will result in the degradation of migratory corridors and rearing critical habitat PBFs for CCV steelhead. NMFS expects the loss of riparian habitat to result in adverse effects in the form of harm from habitat degradation along the shoreline where vegetation is lost and will not be replaced.

Turbidity and Sedimentation

The action area contains rearing habitat and migratory corridor PBFs for CCV steelhead. The proposed action is expected to cause temporary water quality degradation from localized increases in turbidity and suspended sediment during pile driving and associated construction activities. Kemp *et al.* (2011) describe a suite of physiochemical effects to lotic aquatic systems resulting from increased sedimentation and turbidity-related events. Sedimentation events have the potential to increase turbidity on a broad temporal scale and reduce oxygen supply, and may also result in reduced benthic invertebrate density and result in the loss of physical habitat.

The Project is expected to cause temporary water quality degradation from localized increases in turbidity and suspended sediment, and in-channel disturbance from pile driving temporary and permanent piles into the river bottom and banks. BMPs and minimization and avoidance measures will be implemented during construction to minimize project-disturbed sediment from resulting in prolonged and elevated turbidity and sedimentation. Associated turbidity elevations are also expected to return to ambient conditions soon after in-water activities have ceased for the day. With the minimization and avoidance measures included in the proposed action,

turbidity and sedimentation are not expected to reach levels that result in adverse effects to PBFs of designated critical habitat for CCV steelhead in the action area.

Structural Shading and Habitat Loss

The new bridge will result in temporary shading from the trestles in the amount of 0.14 acres (6,390 square feet), and the permanent shading from the new bridge over the Tuolumne River in the amount of 0.29 acres (12,780 square feet). This will degrade the PBF of migratory corridors by increasing the predation risk.

Overwater structures can alter underwater light conditions and provide potential holding conditions for juvenile and adult fish, including species that prey on juvenile listed fishes. The increase in riverine shading may result in associated riparian vegetation receiving less sunlight for photosynthesis, as well as in-water vegetation receiving less light for photosynthesis. This can result in decreased fish habitat quality and decreased insect productivity (Pincetich 2019). Salmonids may benefit from the overwater shade as a cooling measure for water temperatures. Blocking light can also prevent stream eutrophication (an overabundance of nutrients in a water body) such as algal blooms. Eutrophication may reduce oxygen levels for fish and other species (Pincetich 2019). However, because there is suitable habitat for CCV steelhead both upstream and downstream of the action area, the effects of the overwater structure are expected to be minor.

A temporary gravel berm may be used to limit contact between construction activities and CCV steelhead, and reduce the risk of siltation and increased turbidity in the Tuolumne River. The berm would be approximately 0.03 acres (50 feet by 30 feet) on the edge of the river in 1 to 2 feet of water. The berm would be composed of washed, rounded, spawning-sized gravel between 0.4 to 4 inches in diameter. The gravel would be spread out (using had tools if necessary) to ensure adequate passage for all life stages of fish present in the action area. The temporary gravel berm would allow continued flow down the river, and would not act as a barrier to migrating fish. A qualified biologist will be present during these activities. Although, due to limited steep access in this area, the gravel berm is unlikely to be implemented.

The proposed action may include the placement of RSP at the north bank. Approximately 170 cubic yards of RSP may be placed below the OHWM to reduce runoff erosion, creating an area of unproductive, low-quality habitat along the interface of the channel bottom and the bank slope.

The effects of the proposed action will result in continued fragmentation of existing habitat, and conversion of nearshore aquatic to simplified habitats that have adverse effects on CCV steelhead. This Project is expected to adversely impact the rearing and migration corridor PBFs of critical habitat for juvenile CCV steelhead. Implementing the proposed Project will affect freshwater rearing sites due to the installation of RSP and the bridge structure, which reduces natural cover and support of juvenile growth and mobility.

The construction of temporary falsework, trestles, and gravel berm, would temporarily affect up to 0.17 (0.14 + 0.03) acres of aquatic habitat along the banks of the Tuolumne River. Although various special-status fish species are present seasonally in the area, the habitat found in the

action area does not include salmonid spawning habitat, however, adult and juvenile CCV steelhead use the area as a migratory corridor and for rearing during juvenile downstream migration.

The PBF of migratory corridors for adults is not expected to be impacted, as migrating adult steelhead are unlikely to use the nearshore habitat that will be affected by the Project, since they tend to stay in deeper waters. Furthermore, the site will not install any features that are expected to block or impede juvenile or adult migration. No spawning habitat for CCV steelhead is present in the action area, therefore no adverse effects to spawning adults or incubating eggs are expected.

Mitigation/Conservation Bank Credit Purchases

The proposed action includes purchase of 0.34 shaded riverine aquatic habitat compensatory mitigation credits, which will help restore and preserve, in perpetuity, designated critical habitat for CCV steelhead. Since the mitigation banks are *en route* to spawning grounds, improved floodplain and rearing habitats are likely to improve growth and survival of juveniles and adults, as well as increase food production, provide shelter from predators, and restore beneficial flow.

To address impacts to riparian and aquatic habitats, the proposed action includes purchase of shaded riverine aquatic habitat compensatory mitigation bank credits at a 1:1 ratio for temporary riparian impacts (0.28) and a 3:1 ratio for permanent riparian habitat impacts (0.2 x 3 = 0.6). The purchase of mitigation credits will address the loss of ecosystem functions due to the modification of the riverbank. These credit purchases are ecologically relevant to the impacts and the species affected because the banks include shaded riverine aquatic and floodplain riparian credits with habitat values that are already established and meeting performance standards.

The Cosumnes Floodplain Mitigation Bank is located approximately 90 miles upstream from the project site and it benefits the same juvenile CCV steelhead that use the construction portion of the action area. Cosumnes Floodplain Mitigation Bank contains shaded riverine aquatic habitat, as well as riparian, perennial, and seasonal wetland, and riparian forest and shrub scrub habitat, which all benefit juvenile salmonids by providing excellent rearing habitat to increase the likelihood of individual survival as fish outmigrate towards the ocean.

The purchase of credits provides a high level of certainty that the benefits of a credit purchase will be realized because each of the NMFS-approved banks considered in this opinion have mechanisms in place to ensure credit values are met over time. Such mechanisms include legally binding conservation easements, long-term management plans, detailed performance standards, credit release schedules that are based on meeting performance standards, monitoring plans and annual monitoring reporting to NMFS, non-wasting endowment funds that are used to manage and maintain the bank and habitat values in perpetuity, performance security requirements, a remedial action plan, and site inspections by NMFS.

In addition, each bank has a detailed credit schedule and credit transactions and credit availability are tracked on the Regulatory In-lieu Fee and Bank Information Tracking System (RIBITS). RIBITS was developed by the U.S. Army Corps of Engineers with support from the Environmental Protection Agency, the U.S. Fish and Wildlife Service, the FHWA, and NMFS to

provide better information on mitigation and conservation banking and in-lieu fee programs across the country. RIBITS allows users to access information on the types and numbers of mitigation and conservation bank and in-lieu fee program sites, associated documents, mitigation credit availability, service areas, as well as information on national and local policies and procedures that affect mitigation and conservation bank and in-lieu fee program development and operation.

2.6. Cumulative Effects

"Cumulative effects" are those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation (50 CFR 402.02 and 402.17(a)). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Some continuing non-Federal activities are reasonably certain to contribute to climate effects within the action area. However, it is difficult if not impossible to distinguish between the action area's future environmental conditions caused by global climate change that are properly part of the environmental baseline *vs.* cumulative effects. Therefore, all relevant future climate-related environmental conditions in the action area are described in the environmental baseline (Section 2.4).

2.6.1. Agricultural Practices

Agricultural practices in the action area may adversely affect riparian habitats through upland modifications of the watershed that lead to increased siltation, reductions in water flow, or agricultural run-off. Grazing activities from cattle operations can degrade or reduce suitable critical habitat for listed salmonids by increasing erosion and sedimentation as well as introducing nitrogen, ammonia, and other nutrients into the watershed, which can flow into the receiving waters of the associated watersheds. Stormwater and irrigation discharges related to both agricultural and urban activities contain numerous pesticides and herbicides that may adversely affect listed salmonids reproductive success and survival rates (Dubrovsky *et al.* 1998, Daughton 2003).

2.6.2. Water Diversions

Water diversions for municipal and industrial use are found in action area. Depending on the size, location, and season of operation, these unscreened diversions entrain and kill many life stages of aquatic species, including juvenile listed anadromous species.

2.6.3. Increased Urbanization

Increases in urbanization and housing developments can impact habitat by altering watershed characteristics, and changing both water use and stormwater runoff patterns. Increased growth would place additional burdens on resource allocations, including natural gas, electricity, and water, as well as on infrastructure, such as wastewater sanitation plants, roads and highways, and public utilities. Some of these actions, particularly those which are situated away from

waterbodies, would not require Federal permits, and thus would not undergo review through the ESA section 7 consultation process with NMFS.

Increased urbanization also is expected to result in increased recreational activities in the region. Among the activities expected to increase in volume and frequency is recreational boating. Boating activities typically result in increased wave action and propeller wash in waterways. This potentially would degrade riparian and wetland habitat by eroding channel banks and mid-channel islands, thereby causing an increase in siltation and turbidity. Wakes and propeller wash also churn up benthic sediments, thereby potentially re-suspending contaminated sediments and degrading areas of submerged vegetation. This, in turn, would reduce habitat quality for the invertebrate forage base required for the survival of juvenile salmonids moving through the system. Increased recreational boat operation is anticipated to result in more contamination from the operation of gasoline and diesel powered engines on watercraft entering the associated water bodies.

2.6.4. Rock Revetment and Levee Repair Projects

Depending on the scope of the action, some non-federal RSP projects carried out by state or local agencies do not require federal permits. These types of actions, as well as illegal placement of riprap, occur within the watershed. The effects of such actions result in continued degradation, simplification and fragmentation of riparian and freshwater habitat.

2.7. Integration and Synthesis

The Integration and Synthesis section is the final step in our assessment of the risk posed to species and critical habitat as a result of implementing the proposed action. In this section, we add the effects of the action (Section 2.5) to the environmental baseline (Section 2.4) and the cumulative effects (Section 2.6), taking into account the status of the species and critical habitat (Section 2.2), to formulate the agency's biological opinion as to whether the proposed action is likely to: (1) Reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing its numbers, reproduction, or distribution; or (2) appreciably diminish the value of designated or proposed critical habitat as a whole for the conservation of the species.

2.7.1. Status of the CCV Steelhead DPS

The 2016 status review (NMFS 2016a) concluded that overall, the status of CCV steelhead appears to have changed little since the 2011 status review. Therefore, NMFS concluded that CCV steelhead should remain listed as threatened, as the DPS is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Further, there is still a general lack of data on the status of wild steelhead populations. There are some encouraging signs, as several hatcheries in the Central Valley (such as Mokelumne River), have experienced increased returns of steelhead over the last few years. There has also been a slight increase in the percentage of wild steelhead in salvage at the south Delta fish facilities, and the percent of wild fish in those data remains much higher than at Chipps Island.

Although there have been recent restoration efforts in the San Joaquin River tributaries, CCV steelhead populations in the San Joaquin Basin continue to show an overall very low abundance, and fluctuating return rates. The NMFS Recovery Plan (NMFS 2014) strategy for CCV steelhead lists the San Joaquin River's eastside tributaries (Stanislaus, Tuolumne, and Merced rivers) as Core 2 populations, meaning these watersheds have the potential to support viable populations, due to lower abundance, or amount and quality of habitat downstream of major dams, and as candidates to reach viable population status if reintroduced upstream of the dams, and lists the San Joaquin River, below Friant Dam, as a candidate to reach viable population status. The action area serves as a migratory corridor to these eastside tributaries.

The Project is expected to adversely affect a small number of juvenile and adult CCV steelhead through pile driving, dewatering, and fish capture and relocation. Exposure to pile-driving activities and associated effects will be limited to the months of July through October. With the minimization and avoidance measures in place, the effects to fish due to sedimentation or turbidity, general construction, or contamination are expected to be minor and unlikely to adversely affect fish.

Pile driving is expected to result in adverse effects in the form of behavioral effects, injury, or death from acoustic impacts. Behavioral effects from pile driving is expected to include temporary disruptions in the feeding, sheltering, and migratory behavior of CCV steelhead. Although pile driving is expected to result in short-term delay of migration, the activity is not expected to prevent salmonids from passing upstream or downstream because pile driving will not be continuous through the day, and will not occur at night, when the majority of fish migrate. Pile-driving effects will be minimized by avoiding the peak migration periods of CCV steelhead.

Juvenile CCV steelhead may be harassed, injured, or killed when they are captured and relocated from the area to be dewatered. However, the measures proposed will minimize the likelihood of injuries and mortalities.

2.7.2. Status of the Environmental Baseline and Cumulative Effects in the Action Area

CCV steelhead use the action area as a primary migratory corridor to and from their natal tributaries to complete their life cycle. The San Joaquin River migratory corridor is an essential piece of the recovery strategy (NMFS 2014), which provides for two viable populations to be established in the basin. Currently, the San Joaquin River, although degraded due to levees and lack of floodplain habitat, provides important habitat crucial for the recovery.

The Cumulative Effects section of this biological opinion describes how continuing or future effects, such as the discharge of point and non-point source chemical contaminant discharges and increased urbanization, affect the species in the action area. These actions typically result in habitat fragmentation and conversion of complex nearshore aquatic habitat to simplified habitats that incrementally reduces the carrying capacity of migratory corridors.

2.7.3. Summary of Project Effects on Listed Species

Construction-related Effects

During construction, some behavioral effects, as well as injury or death to a low number of individual fish, are likely to result during installation of the bridge piers and dewatering activities. Construction would occur during the summer and early fall months, when the abundance of individual fish is low and outside of most of the migrating adult and juvenile timing period, which would result in correspondingly low levels of injury or death. In addition, during construction activities, some water quality impacts may occur, such as sedimentation and increased turbidity, but with the implementation of minimization measures, impacts would be minimal to listed species.

Long-Term Effects

The long-term effects of the Project include increases in vehicle traffic over the Tuolumne River bridge, which is expected to have a minimal impact to water quality in the immediate area, which, cumulatively with other urban runoff, may affect individual CCV steelhead in the Tuolumne River and downstream into the San Joaquin River. Long-term effects would also include habitat modification from the permanent placement of structures and potential RSP in the river.

2.7.4. Summary of Project Effects on CCV Steelhead Critical Habitat

The migratory corridor and freshwater rearing sites PBFs of CCV steelhead critical habitat are expected to be adversely affected by the removal of aquatic habitat as a result of 80 feet of RSP placed along the Tuolumne River. Approximately 170 cubic yards of RSP May be placed below to OHWM. PBFs will also be adversely affected by the new bridge footprint and support structures. This will result in a net loss of 0.02 acres of permanent habitat impacts and 0.28 acres of temporary impacts to shaded riverine habitat, which will reduce the quantity and quality of existing PBFs in the action area.

The removal of 0.28 acres of shaded riverine aquatic habitat temporarily and 0.02 acres permanently is expected to result in the temporary and permanent reduction of food sources for outmigrating juvenile CCV steelhead. Anticipated long-term adverse effects include the impacts related to shading from the bridge and permanent structures (bridge pier and RSP) reducing the complexity of the action area.

During construction activities, there would be temporary increases in turbidity which are expected to temporarily decrease the quality of habitat.

As discussed in Section 2.5.2 above, as mitigation for Project impacts, Caltrans/Stanislaus County plan to purchase credits from NMFS-approved mitigation bank at a 3:1 ratio for all habitats permanently impacted and 1:1 for habitat temporarily impacted. The purchase of mitigation credits is expected to benefit the PBFs of freshwater rearing habitat and migration corridors for juvenile salmon and steelhead by providing suitable floodplain and riparian habitat. The floodplain and riparian habitat in the bank benefit the growth and survival of rearing salmonids by providing habitat with abundant food in the form of aquatic invertebrates, structural diversity such as instream woody material, and cooler stream temperatures.

2.7.5. Summary

Combining the adverse effects associated with the proposed action described above, environmental baseline, cumulative effects, and status of the species and critical habitat, the Project is not expected to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing their numbers, reproduction, or distribution; or appreciably diminish the value of designated critical habitat for the conservation of the species.

Viable salmonid population parameters for the species of spatial structure, diversity, abundance, and productivity are not expected to be appreciably reduced as a result of the proposed Project. Construction is expected to cause adverse effects to a small number of adult and juvenile CCV steelhead. The construction timing will avoid the largest proportions (peak) of juvenile and adult CCV steelhead that migrate through the action area, reducing the number of fish that are likely to be present.

Construction-related impacts are expected to primarily be limited to harassment, which will be temporary and will not impede adult fish from reaching upstream spawning and holding habitat, or juvenile fish from migrating downstream, capture during relocation, and a very small proportion that may be injured or killed as a result of dewatering and relocation. Exposure to pile-driving activities is also expected to adversely affect a small number of juvenile and adult CCV steelhead.

CCV steelhead in the Tuolumne River are identified in the NMFS Central Valley Salmon and Steelhead Recovery Plan (NMFS 2014) as a Core 2 population. Core 2 populations meet, or have the potential to meet, the biological recovery standard for moderate risk of extinction. These watersheds have lower potential to support viable populations, due to lower abundance, or amount and quality of habitat. These populations provide increased life history diversity to the DPS and are likely to provide a buffering effect against local catastrophic occurrences that could affect other nearby populations, especially in geographic areas where the number of Core 1 populations is lowest.
Bridge construction is not identified as a key threat. Key recovery actions for the Tuolumne River focus on stream flow restoration downstream of flow-regulating dams and also conducting surveys and improving scientific understanding as to why resident *O. mykiss* greatly outnumber anadromous CCV steelhead.

The following Tuolumne River (TUR) Recovery Actions represent actions from the NMFS Recovery Plan for CCV steelhead (NMFS 2014):

- Implement a steelhead passage program for La Grange and Don Pedro dams (TUR 1.1).
- Continue to implement projects to increase the availability and quality of spawning and rearing habitat in the Tuolumne (TUR2.2). Implement floodplain and side channel projects to improve river function and increase habitat diversity (TUR 2.7).
- Restore riparian habitat to promote shading and habitat diversity (TUR 2.9).

Overall, considering the status of the species, the environmental baseline, and cumulative effects, NMFS expects that any adverse effects of the proposed action are not the type or magnitude that are expected to appreciably reduce the likelihood of both the survival and recovery of the affected listed species in the action area, or at the DPS level. Nor are any adverse effects of the proposed action to critical habitat expected to appreciably reduce the value of designated critical habitat for the conservation of the species.

Within the context of the relatively brief period of time over which the proposed action is scheduled to occur, the short-term effects of global climate change are unlikely to result in any perceptible declines to the overall health or distribution of the listed populations of anadromous fish within the action area that are the subject of this consultation.

2.8. Conclusion

After reviewing and analyzing the current status of the listed species and critical habitat, the environmental baseline within the action area, the effects of the proposed action, the effects of other activities caused by the proposed action, and cumulative effects, it is NMFS' biological opinion that the proposed action is not likely to jeopardize the continued existence of CCV steelhead or destroy or adversely modify CCV steelhead designated critical habitat.

2.9. Incidental Take Statement

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is further defined by regulation to include significant habitat modification or degradation that actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, or sheltering (50 CFR 222.102). "Incidental take" is defined by regulation as takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant (50 CFR 402.02). Section 7(b)(4) and section 7(o)(2) provide that taking that is incidental to an otherwise lawful agency action is not considered to be prohibited taking under the ESA if that action is performed in compliance with the terms and conditions of this ITS.

2.9.1. Amount or Extent of Take

In the biological opinion, NMFS determined that incidental take is reasonably certain to occur as follows:

NMFS anticipates incidental take of CCV steelhead due to the implementation of the proposed Project's construction activities, including pile driving, dewatering, and fish relocation. Because of the proposed timing of the in-water work for the construction phase of the Project, adult and juvenile CCV steelhead are expected to be present, but actual numbers of fish adversely affected by the construction actions are expected to be low.

While individual fish will be present in the action area, NMFS cannot, using the best available information, precisely quantify and track the amount or number of individuals that are expected to be incidentally taken (injure, harm, kill, etc.) per species as a result of the Project. This is due to the variability and uncertainty associated with the response of listed species to the effects of the Project, the varying population size of each species, annual variations in the timing of spawning and migration, individual habitat use within the action area, and difficulty in observing injured or dead fish. However, it is possible to estimate the extent of incidental take by designating as ecological surrogates. These surrogates are elements of the Project that are expected to result in incidental take, are more predictable and/or measurable, and are capable of being monitored to determine the extent of take that is occurring.

The most appropriate threshold for incidental take is an ecological surrogate of habitat disturbance, which includes the factors (*e.g.,* pile driving associated with the Project) causing fish to relocate and rear in other locations and reduce the carrying capacity of the existing habitat. NMFS will describe the causal link between the surrogate and take of the species, why it is not practical to express the amount of anticipated take or to monitor take related impacts in terms of individuals of the listed species, and sets a clear standard for determining when the amount or extent of the taking has been exceeded.

The behavioral modifications of fish responses that result from the habitat disturbance are described below. NMFS anticipates that take during construction activities will be limited to:

Construction Related Incidental Take

Incidental take of adult and juvenile CCV steelhead is expected to occur during the 4-month construction period occurring between July 1 and October 31 as a result of exposure to the noise generated by pile-driving activities. Quantification of the number of fish exposed to the pile driving associated noise and turbidity is not currently possible with available monitoring data. All fish present during construction activities are expected to be exposed to pile-driving noise disturbance. Only the level of acoustic noise generated during the pile-driving phases of the Project can be accurately and consistently measured, thus providing a quantifiable metric for determining incidental take of listed fish. Therefore, the measurement of acoustic noise generated during the impact pile driving of the piles described in the proposed Project, will serve as a physically measurable surrogate for the incidental take of listed fish species. The numbers and types of piles to be installed, as well as the anticipated number of strikes per pile, were described previously in section 1.3.4.

Adjusted source sound metrics for 14-inch in-water falsework and trestle H-piles during re-strike testing (attenuated):

- The Peak is 203 dB and the SELaccumulated is 172 dB at 10 meters (33 feet) and the calculated distance to each of the applicable thresholds is as follows
    - Distance to 206 dB-peak = 6 meter (20 feet)
    - Distance to 187 dB-SELaccumulated = 24 meters/ 79 feet (for fish ≥ 2 grams)
    - Distance to 183 dB-SELaccumulated = 45 meters/ 148 feet (for fish < 2 grams)
    - Distance to 150 dB-RMS = 1,359 meters/ 4,459 feet

Adjusted source sound metrics for 14-inch abutment H-piles 120 feet south of the river on land (attenuated). Some of these sound levels will not reach the river:

- The SELaccumulated is 167 dB at 10 meters (33 feet) and the calculated distance to each of the applicable thresholds is as follows
    - Distance to 206 dB-peak = 3 meter (9.8 feet)
    - Distance to 187 dB-SELaccumulated = 21 meters/ 69 feet (for fish ≥ 2 grams)
    - Distance to 183 dB-SELaccumulated = 38 meters/ 125 feet (for fish < 2 grams)
    - Distance to 150 dB-RMS = 631 meters/ 2,070 feet

If any of the sound thresholds at the specified distances (derived from the NMFS pile driving calculator values) are exceeded, the proposed Project will be considered to have exceeded anticipated take levels, triggering the need to reinitiate consultation on the Project.

Incidental Take during Dewatering

Take in the form of capture, handling, injury, and death to juvenile CCV steelhead is anticipated to occur during dewatering activities. Fish collected during dewatering will be released back into the Tuolumne River downstream of the construction site. The total area to be dewatered will be approximately 78.5 square feet, or 0.002 acres. Dewatering is estimated to occur for up to 122 days during the in water work window (July 1 to October 31); the NMFS-approved biologist will be present for all dewatering activities.

Habitat Alteration-Related Incidental Take

Take in the form of harm to juvenile CCV steelhead from loss and degradation of shaded riverine aquatic habitat and river channel habitat due to the bridge structure, is expected to result in injury and death from habitat modifications that reduce the quantity and quality of rearing habitat and by creating habitat conditions that increase the likelihood of predation associated with increasing the spatial footprint of the bridge pier by 0.02 acres (and by the potential placement of approximately 170 cubic yards of RSP).

The temporary loss of 0.28 acres and permanent loss of 0.02 acres of shaded riverine aquatic habitat may cause behavioral modification of juvenile fish avoiding the disturbed areas and experiencing reduced growth and survival. Reduction in cover may lead to increased predation by predatory fishes, birds, or mammals. Loss of riparian habitat may reduce food availability, which may result in increased competition and an increased susceptibility to predation.

If any specific parameter of this ecological surrogate is exceeded, the anticipated incidental take levels described are also exceeded, thus triggering the need to reinitiate consultation.

2.9.2. Effect of the Take

In the biological opinion, NMFS determined that the amount or extent of anticipated take, coupled with other effects of the proposed action, are not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

2.9.3. Reasonable and Prudent Measures

"Reasonable and prudent measures" are non-discretionary measures that are necessary or appropriate to minimize the impact of the amount or extent of incidental take (50 CFR 402.02).

1. Measures shall be taken by Caltrans or its applicant to minimize the potential underwater sound impacts related to pile driving on to listed species.
2. Electrofishing operations conducted during the fish rescue operations, shall be conducted according to the NMFS (2000) Guidelines for Electrofishing, and all electrofishing operators shall have proper training.
3. Measures shall be taken by Caltrans or its applicant to reduce mortality of listed species requiring capture/relocation in association with dewatering activities.
4. Mitigation bank credits (0.34 acres) shall be purchased by Caltrans or its applicant to benefit listed fish species subject to degradation and alteration of habitats in the action area as a result of construction activities and permanent placement of RSP and bridge structures.
5. At least 90 days before groundbreaking, Caltrans and its applicant will provide to NMFS for review and approval a report describing how impacts of the incidental take on listed species in the action area will be monitored and documented.
6. Caltrans or Applicant shall notify NMFS of any unauthorized activities (regardless of who conducted said activities) or emergencies resulting in any adverse impacts not described in the BA and addressed in this opinion. This notification shall be made within 48 hours or sooner, if possible.
7. Within 90 days of project completion, Caltrans is required to submit a report that provides NMFS with documentation that the amount or extent of take was not exceeded, confirmation that the mitigation bank credits described in RPM 4 have been purchased, and that all conservation measures and terms and conditions were followed.

2.9.4. Terms and Conditions

The terms and conditions described below are non-discretionary, and Caltrans or any applicant must comply with them in order to implement the RPMs (50 CFR 402.14). Caltrans or any applicant has a continuing duty to monitor the impacts of incidental take and must report the progress of the action and its impact on the species as specified in this ITS (50 CFR 402.14). If the entity to whom a term and condition is directed does not comply with the following terms and conditions, protective coverage for the proposed action would likely lapse.

1. The following terms and conditions implement reasonable and prudent measure 1:

a. Noise attenuation methods, such as a wood block, bubble curtain, or similar method, shall be used to keep sound levels indicated in the surrogate.

b. If sound levels exceed those indicated in the surrogate, pile driving shall cease and Caltrans shall call NMFS to discuss additional measures for reducing the levels.

c. Pile-driving activity shall occur during daylight hours only, to ensure listed fish species are allowed upstream and downstream passage at night when they typically migrate (the periods from 10 pm to 8 am are typical periods for the migration of most of the listed species in their juvenile and adult life stages).

d. No simultaneous pile driving shall occur. If piles are driven with multiple impact hammers in the same day, pile strikes occurring at the same time shall be avoided in order to avoid potential overlapping sound in the river amplifying sound impacts to fish greater than sound levels described above in section 1.3.4.

e. In-water pile-driving activities shall be restricted to July 1 to October 31. No in-water pile-driving activity is to extend past this date, as it may pose a significant disturbance to anadromous fish migration through the Tuolumne River.

2. The following terms and conditions implement reasonable and prudent measure 2:

a. All electrofishing activity shall be conducted in accordance to the NMFS (2000) Guidelines for Electrofishing.

b. Electrofishing operator must have appropriate training and experience with electrofishing techniques. Operators should be familiar with electric circuit and field theory, safety, and fish injury awareness and minimization. Operator should have at least 50 hours of electrofishing experience in the field using similar equipment.

c. Electrofishing equipment must be in good working condition and operators should go through the manufacturer's preseason checks, adhere to all provisions, and record maintenance work in a logbook. Each electrofishing session must start with all settings (voltage, pulse width, and pulse rate) set to the minimums needed to capture fish. These settings should be gradually increased only to the point where fish are immobilized and captured.

d. If any listed salmonids are captured during electrofishing, the biologist shall immediately return the fish to the water in a manner that will not induce further harm (*i.e.*, not to be susceptible to the electric current for a second time). This can be accomplished by temporarily stopping electrofishing, or returning the fish to the water downstream of the activity, providing enough distance from the anodes that the fish would not be shocked again.

3. The following terms and conditions implement reasonable and prudent measure 3:

a. During dewatering activities, a qualified fish biologist shall be present on site to make observations, and capture/relocate fish if they become entrapped in the dewatered area.

b. Only fish biologists trained in salmonid capture and relocation shall remove and relocate fish during dewatering activities.

c. Any captured listed fish species shall be immediately relocated back into the Tuolumne River downstream of the construction activity.

4. The following terms and conditions implement reasonable and prudent measure 4:

a. Mitigation bank credits will be purchased from one of the NMFS-approved conservation or mitigation banks discussed in this biological opinion at a ratio of 1:1 (0.28 acre credits) for temporary effects and 3:1 (0.02 acre credits) for permanent effects, for a total of 0.34 credits. The purchase of these credits will benefit the individual fish that migrate through the action area by offsetting ecological impacts of the Project.

5. The following terms and conditions implement reasonable and prudent measure 5:

a. At least 90 days prior to groundbreaking activities, Caltrans and its applicant will provide to NMFS for review and approval a report describing how impacts of the incidental take on listed species in the action area will be monitored and documented. These will include how acoustic noise generated during the impact hammer activity will be measured to ensure the surrogate for noise impacts will not be exceeded.

6. The following terms and conditions implement reasonable and prudent measure 6:

a. Caltrans or Applicant shall notify NMFS of any unauthorized activities (regardless of who conducted said activities) or emergencies resulting in any adverse impacts not described in the BA and addressed in this biological opinion.

b. The notification of any such activities shall be made to NMFS within 48 hours or sooner, if possible.

7. The following terms and conditions implement reasonable and prudent measure 7:

a. The report shall include a summary description of projected and actual start dates, progress, and completion of the Project and verify that take was not exceeded, confirmation that the mitigation bank credits have been purchased, all avoidance and minimization measures were followed, area of any on-site revegetation, and observation of listed fish species. Updates and reports required by these terms and conditions shall be submitted by December 31 of the construction year:

Electronically to the NMFS CCVO at the following e-mail address:

ccvo.consultations@noaa.gov

And mailed to:

Cathy Marcinkevage
Assistant Regional Administrator
Central Valley Office
National Marine Fisheries Service
650 Capitol Mall, Suite 5-100
Sacramento CA 95814
FAX: (916) 930-3629
Phone: (916) 930-3600

Any observations of listed fish species mortalities or abnormal behavior shall immediately be reported to NMFS per the instructions in Term and Condition 5.a. within 24 hours. This information shall include species observed, life history stage, location (including GPS coordinates if available), number of fish observed, time of day, as well as any other relevant details that are available. If possible, mortalities shall be collected, frozen, and individually labeled with appropriate information. Any dead specimen(s) should be placed in a cooler with ice and either held for pick up by NMFS personnel or an individual designated by NMFS to do so, or sent to:

NMFS Southwest Fisheries Science Center
Fisheries Ecology Division
110 Shaffer Road
Santa Cruz, California 95060

2.10. Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Specifically, conservation recommendations are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02).

1. Caltrans should provide a NMFS-approved Worker Environmental Awareness Training Program for construction personnel to be conducted by a qualified biologist for all construction workers prior to the commencement of construction activities. The program should provide workers with information on their responsibilities with regard to federally-listed fish, their critical habitat, an overview of the life-history of the species, information on take prohibitions, protections under the ESA, and an explanation of terms and conditions identified in this biological opinion. Completion of this training is consistent with agency requirements set forth in section 7(a)(1).

2. Caltrans should encourage green infrastructure be incorporated into new construction, particularly near waterways, so that future infrastructure does not contribute to water quality issues due to stormwater runoff, including chemicals and particles from vehicle tire wear. Green infrastructure includes bioswales, planting vegetation instead of impervious material, and filtering runoff prior to entering a waterway.

3. Caltrans should limit the amount of RSP used for bank and in-stream protection in the Central Valley to the minimum amount needed for erosion and scour. Engineering plans should be provided to the contractors that clearly show the amount of RSP to be placed at the project site. Limitation of RSP in design considerations is consistent with agency requirements set forth in section 7(a)(1).

4. Caltrans should consider using alternative methods to traditional RSP for bridge projects and incorporating geotextiles for bank erosion control and prevention. Bioengineered products are available on the market and can be used to protect areas against erosive forces along shorelines and is an alternative to using RSP. Implementation of RSP alternatives in design considerations is consistent with agency requirements set forth in section 7(a)(1).

2.11. Reinitiation of Consultation

This concludes formal consultation for the Faith Home Road and Garner Road Connection Project.

As 50 CFR 402.16 states, reinitiation of consultation is required and shall be requested by the Federal agency or by the Service where discretionary Federal agency involvement or control over the action has been retained or is authorized by law and if: (1) The amount or extent of incidental taking specified in the ITS is exceeded, (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion, (3) the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion, or (4) a new species is listed or critical habitat designated that may be affected by the action.

2.12. "Not Likely to Adversely Affect" Determinations

The applicable standard to find that a Project is "not likely to adversely affect" ESA listed species or critical habitat is that all of the effects of the action are expected to be insignificant, discountable, or completely beneficial. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are extremely unlikely to occur. Beneficial effects are contemporaneous positive effects without any adverse effects on the species.

NMFS has determined that while the Project may affect salmonids in the action area, the Project is not likely to adversely affect CV spring-run Chinook salmon, since they are unlikely to be present in the action area during in-water construction activities. In-water work is scheduled to occur during the July 1 to October 31 in-water work window. CV spring-run adults typically

migrate upstream towards their spawning grounds during the springtime, and "spring-running" Chinook salmon have been observed in the Tuolumne River from March to June (Franks 2014). Juvenile CV spring-run Chinook salmon are likely to be outmigrating from November to May, particularly during December through February. Therefore, the probability of effects of the Project on CV spring-run Chinook salmon are expected to be discountable, since CV spring-run Chinook salmon are unlikely to be present during in-water construction activities.

There is no designated critical habitat for CV spring-run Chinook salmon in the Tuolumne River.

3. MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT ESSENTIAL FISH HABITAT RESPONSE

Section 305(b) of the MSA directs Federal agencies to consult with NMFS on all actions or proposed actions that may adversely affect EFH. Under the MSA, this consultation is intended to promote the conservation of EFH as necessary to support sustainable fisheries and the managed species' contribution to a healthy ecosystem. For the purposes of the MSA, EFH means "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity," and includes the physical, biological, and chemical properties that are used by fish (50 CFR 600.10). Adverse effect means any impact that reduces quality or quantity of EFH, and may include direct or indirect physical, chemical, or biological alteration of the waters or substrate and loss of (or injury to) benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality or quantity of EFH. Adverse effects on EFH may result from actions occurring within EFH or outside of it and may include site-specific or EFH-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). Section 305(b) of the MSA also requires NMFS to recommend measures that can be taken by the action agency to conserve EFH. Such recommendations may include measures to avoid, minimize, mitigate, or otherwise offset the adverse effects of the action on EFH [CFR 600.905(b)].

This analysis is based, in part, on the EFH assessment provided by Caltrans and descriptions of EFH for Pacific coast salmon (PFMC 2014), contained in the fishery management plans developed by the PFMC and approved by the Secretary of Commerce.

3.1. Essential Fish Habitat Affected by the Project

EFH designated under the Pacific Coast Salmon FMP may be affected by the proposed action. Species that utilize EFH designated under this FMP within the action area include spring-run, fall-run, and late fall-run Chinook salmon. The HAPC that may be either directly or indirectly adversely affected is "complex channels and floodplain habitats."

3.2. Adverse Effects on Essential Fish Habitat

Consistent with the ESA portion of this document, which determined that aspects of the proposed action will result in impacts to pacific coast salmonids and critical habitat, we conclude that aspects of the proposed action would also adversely affect EFH for these species. We

conclude that the following adverse effects on EFH designated for Pacific Coast Salmon are reasonably certain to occur:

Sedimentation and Turbidity
- Reduced habitat complexity
- Degraded water quality
- Reduction in aquatic macroinvertebrate production

Contaminants and Pollution-related Effects
- Degraded water quality
- Reduction in aquatic macroinvertebrate production, or bioaccumulation in prey

Temporary Dewatering of Casing
- Degraded water quality
- Temporary loss of habitat

In-channel Disturbance from Pile Driving
- Temporary habitat disturbance during impact hammering

3.3. Essential Fish Habitat Conservation Recommendations

NMFS determined that the following conservation recommendations are necessary to avoid, minimize, mitigate, or otherwise offset the impact of the proposed action on EFH.

(1) Caltrans should work cooperatively with other State and Federal agencies, private landowners, governments, and local watershed groups to identify opportunities for cooperative analysis and funding to support salmonid habitat restoration projects within the Tuolumne River Basin.

(2) Caltrans should purchase advance mitigation credits from a NMFS-approved conservation bank or in-lieu fee program with a service area that encompasses the proposed action area. The credits should be at a 3:1 ratio for the area of the new bridge over EFH and 1:1 for temporary habitat disturbance. Confirmation of the credit purchase should be made prior to construction.

Fully implementing these EFH conservation recommendations above would protect approximately 0.34 acres of designated EFH within the action area for Pacific coast salmon by avoiding or minimizing the adverse effects described in section 3.2, above, for Pacific Coast salmon.

3.4. Statutory Response Requirement

As required by section 305(b)(4)(B) of the MSA, Caltrans must provide a detailed response in writing to NMFS within 30 days after receiving an EFH Conservation Recommendation. Such a response must be provided at least 10 days prior to final approval of the action if the response is inconsistent with any of NMFS' EFH Conservation Recommendations unless NMFS and the

Federal agency have agreed to use alternative time frames for the Federal agency response. The response must include a description of the measures proposed by the agency for avoiding, minimizing, mitigating, or otherwise offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the Conservation Recommendations, the Federal agency must explain its reasons for not following the recommendations, including the scientific justification for any disagreements with NMFS over the anticipated effects of the action and the measures needed to avoid, minimize, mitigate, or offset such effects (50 CFR 600.920(k)(1)).

In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, we ask that in your statutory reply to the EFH portion of this consultation, you clearly identify the number of conservation recommendations accepted.

3.5. Supplemental Consultation

Caltrans must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a way that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH Conservation Recommendations (50 CFR 600.920(l)).

4. Data Quality Act Documentation and Pre-Dissemination Review

The Data Quality Act (DQA) specifies three components contributing to the quality of a document. They are utility, integrity, and objectivity. This section of the opinion addresses these DQA components, documents compliance with the DQA, and certifies that this opinion has undergone pre-dissemination review.

4.1. Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended user of this opinion is Caltrans. Other interested users could include the County of Stanislaus Department of Public Works and the Stanislaus Council of Governments. Individual copies of this opinion were provided to Caltrans. The document will be available within two weeks at the NOAA Library Institutional Repository Environmental Consultation Organizer (ECO). The format and naming adheres to conventional standards for style.

4.2. Integrity

This consultation was completed on a computer system managed by NMFS in accordance with relevant information technology security policies and standards set out in Appendix III, 'Security of Automated Information Resources,' Office of Management and Budget Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

4.3. Objectivity

Information Product Category: Natural Resource Plan

Standards: This consultation and supporting documents are clear, concise, complete, and unbiased; and were developed using commonly accepted scientific research methods. They adhere to published standards including the NMFS ESA Consultation Handbook, ESA regulations, 50 CFR 402.01 et seq., and the MSA implementing regulations regarding EFH, 50 CFR 600.

Best Available Information: This consultation and supporting documents use the best available information, as referenced in the References section. The analyses in this opinion and EFH consultation contain more background on information sources and quality.

Referencing: All supporting materials, information, data and analyses are properly referenced, consistent with standard scientific referencing style.

Review Process: This consultation was drafted by NMFS staff with training in ESA and MSA implementation, and reviewed in accordance with West Coast Region ESA quality control and assurance processes.

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