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-2021-01389

August 13, 2021

Erin Dwyer
Branch Chief, North Region Environmental Management
California Department of Transportation, District 3
703 B Street
Marysville California, 95901

Re: Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the State Route 51 Capital City Bridge Deck Replacement Project Reinitiation 2021.

Dear Ms. Dwyer:

Thank you for your letter of May 19, 2021, requesting reinitiation 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 California Department of Transportation's (Caltrans) State Route (SR) 51 Capital City Bridge Deck Replacement Project. This consultation was conducted in accordance with the 2019 revised regulations that implement section 7 of the ESA (50 CFR Part 402, as amended; 84 Fed. Reg. 44976, 45016 (August 27, 2019)). 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.

Based on the best available scientific and commercial information, the biological opinion concludes that the SR 51 Bridge Deck Replacement Project is not likely to jeopardize the continued existence of the federally listed threatened Central Valley (CV) spring-run Chinook salmon evolutionarily significant unit (ESU) (*Oncorhynchus tshawytscha*), threatened California Central Valley (CCV) steelhead distinct population segment (DPS) (*O. mykiss*), endangered Sacramento River winter-run Chinook salmon (*O. tshawytscha*) or the threatened southern DPS (sDPS) of North American green sturgeon (*Acipenser medirostris*) and is not likely to destroy or adversely modify the designated critical habitats of CV spring-run Chinook salmon or CCV steelhead. For the above species, NMFS has included an incidental take statement with reasonable and prudent measures and terms and conditions that are necessary and appropriate to avoid, minimize, or monitor incidental take of listed species associated with the project. This reinitiated biological opinion provided replaces the original and thus the original 2020 opinion is no longer in effect.

NMFS recognizes that Caltrans has assumed the Federal Highway Administration's (FHWA) responsibilities under Federal environmental laws for this project as allowed by a Memorandum of Understanding (National Environmental Policy Act Assignment) with the FHWA effective

December 23, 2016. As such, Caltrans serves as the lead Federal Action Agency for the proposed project.

Please contact Lyla Pirkola in NMFS California Central Valley Office via email at lyla.pirkola@noaa.gov or via phone at (916) 930-5615 if you have any questions concerning this consultation, or if you require additional information.

Sincerely,

A. Catherine Marcinkevage

Cathy Marcinkevage
Assistant Regional Administrator
California Central Valley Office

Enclosure

cc: 151422-WCR2020-SA00020

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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

State Route 51 Capital City Bridge Deck Replacement Project Reinitiation 2021
NMFS Consultation Number: WCRO-2021-01389

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?
Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*) evolutionarily significant unit (ESU)	Threatened	Yes	No	Yes	No
Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*) ESU	Endangered	Yes	No	NA	NA
California Central Valley steelhead (*Oncorhynchus mykiss*) distinct population segment (DPS)	Threatened	Yes	No	Yes	No
Southern DPS of North American green sturgeon (*Acipenser medirostris*)	Threatened	Yes	No	NA	NA

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
California Central Valley Office.

Date: August 13, 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 (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 Part 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 Part 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 document will be available within two weeks at the NOAA Library Institutional Repository [https://repository.library.noaa.gov/welcome]. A complete record of this consultation is on file at NMFS California Central Valley Office in Sacramento, California.

1.2. Consultation History

- On January 9, 2020, NMFS and Caltrans met onsite to discuss project design and impacts to ESA listed fish.
- On April 23, 2020, NMFS received a request for formal consultation from Caltrans for the Project for anticipated effects to ESA-listed Sacramento River (SR) winter-run Chinook salmon, Central Valley (CV) spring-run Chinook salmon, California Central Valley (CCV) steelhead, and the southern distinct population segment (sDPS) green sturgeon.
- On May 4, 2020, NMFS responded with a letter of insufficiency requesting more information about the Project description and extent of effects.
- Additional information was received by NMFS on May 28, 2020.
- On June 12, 2020, Caltrans provided information regarding changes to the project action area. Consultation was initiated at this time.
- On October 7, 2020, NMFS issued a biological opinion for the project.
- On March 8, 2021, Caltrans, NMFS, CDFW, U.S. Army Corps of Engineers (the Corps), and the California State Water Resources Control Board met to discuss potential project changes including a change from the use of a temporary trestle to facilitate construction to the use of barges.
- On May 17, 2021, Caltrans, NMFS, and the U.S. Fish and Wildlife Service (USFWS) met to discuss reinitiation of consultation based on the proposed project changes.
- On May 19, 2021, NMFS received a request for reinitiation of formal consultation from Caltrans for the Project for anticipated effects to ESA-listed SR winter-run Chinook

salmon, CV spring-run Chinook salmon, CCV steelhead, and the southern sDPS of green sturgeon. Consultation was initiated at this time.
- On June 29, 2021 Caltrans and NMFS met to discuss additional changes to project activities and work windows.

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 the 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). We considered, under the ESA, whether or not the proposed action would cause any other activities that would have consequences on listed fish species and their critical habitat and determined that it would not. 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.

Project Description

Caltrans is proposing to remove and replace the existing concrete deck and steel girder strengthening post-tensioning systems on the American River Bridge and widen the superstructure of the bridge to accommodate traffic during construction. Caltrans will also construct the bridge substructure to accommodate the future deck widening of SR 51, which will provide a connection for bicyclists and pedestrians between the City of Sacramento to the American River Bike Trail and adjacent neighborhoods. This includes the following elements:

- Widen the approaches of SR 51 to accommodate the widening of the structure.
- Construct 30-feet (ft.) approach slabs.
- Widen abutments, footings, columns, and piers supported by piles.
- Remove and replace the existing concrete bridge deck.
- Provide a 14-ft. bike/pedestrian path on the northbound side of the bridge separated from the traffic by a 2-ft. concrete barrier.
- Create a temporary construction access roads and piers.
- Construct a retaining wall and sound wall from the existing wall along the northbound side of the highway and extend the retaining wall down the bike/pedestrian path.
- Lengthen existing box culvert.
- Remove vegetation and trees to accommodate widening of SR 51 for bridge deck construction staging.
- Widen the substructure to the ultimate width by 36 ft. 11 in. on the southbound side and 50 ft. 11 in. on the northbound side of the bridge.
- Widen superstructure by 15 ft. 6 in. on the southbound side of the structure and 31 ft. 6 in. on the northbound side of the structure to provide three lanes in each direction during construction.

Construction of In-water Piers

The new substructure of the bridge will be built to accommodate the proposed widening. Permanent and temporary piles will be required for the bridge foundations. A total of six piers

(numbers 3-8) will be located in-water. Cofferdams will be required to construct the in-water substructure. Retrofitting will be done by placing a total of 450 supportive 30 in. diameter steel shell piles filled with concrete and rebar. A total of 2.12 acres of riparian vegetation on the north and south banks of the American River will be removed to facilitate bridge deck widening work. In-water structure will result in a 0.334-acre loss of river habitat.

Floating work platforms (barges) will be used to facilitate construction activities. In order to facilitate the use of barges, the following steps will be necessary:

1) Construct two temporary access roads on the north side of the American River and east side of the bridge.
2) Construct temporary access piers. Each pier will require twenty 12-inch piles, which will be driven using vibratory or impact hammers.
3) Since the barges require 2 feet of clearance between the bottom of the barge and the riverbed for safe operation, dredging of material will occur. Based on a recent bathymetric survey, approximately 19,950 cubic yards of material would be dredged (255' from the edge of bridge deck on the east side of the bridge and 100' from the edge of bridge deck on the west side of the bridge) to create adequate vertical clearance. Dredging activities would take place from the temporary access piers and barges using an excavator. Approximately 600 cubic yards of material would be dredged per day using a single excavator with a 2 cubic yard bucket. Trained operators will be utilized to perform the excavation. Excavated materials will be contained on the material barges using a k-rail perimeter containment, in combination with a filter fabric liner. With the support of tugboats, barges would transport the dredged material to the access pier, where it would be directly loaded into trucks, using an excavator located on the pier, and hauled to a temporary storage location (to allow for the material to dewater) outside of the floodplain. Once dewatered, the material will be transported to a disposal location. Periodic maintenance dredging may be performed in subsequent seasons to maintain adequate clearance. The excavator would be equipped with GPS controls and a sensor on the boom to control the dredging activity so that dredging would only occur to the area and depth identified in plans.

The barges would support heavy equipment and construction materials for the purposes of pier installation and associated bridge widening activities. Barges would be tied to the mooring points during periods of inactivity and would remain in the American River through the duration of the work.

Once the barges are in place, the cofferdams will be constructed. The cofferdams used to isolate the pile footings will measure 22 ft. by 186 ft. The 20 in. wide sheet piles of the cofferdam will be driven using vibratory hammers. A total of 1,650 temporary sheet piles will be driven for the cofferdam installation (275 sheet piles per pier). There are six cofferdams to be installed in total. Some of the water in the cofferdam will come in contact with uncured concrete, have a higher pH and be contaminated with sediment. This water will be treated prior to reaching the preferred dewatering basin. Water pumped out of the cofferdam will be placed in one of three possible areas:

- Discharge water into local pipe network that is typically used for stormwater drainage.

- Discharge water into a nearby infiltration basin, if there is enough volume to take the moved water.
- Store water in temporary holding tanks as needed before discharging the water back into the river.

Some of the water in the cofferdam will come in contact with uncured concrete and will have a higher pH. This water will be treated with acid to balance the pH prior to reaching the dewatering basins.

After constructing the cofferdam, 450 supportive 30 in. diameter steel support piles will be driven 3 ft. from the existing pier, inside the cofferdam. Due to the silty substrate of the riverbed, the cofferdam cannot be dewatered until the seal course is placed; therefore, the cofferdam will be flooded during the pile driving of the 30 in. piles. The piles driven in the river will be driven in water depths that range from 5 to 17 ft. The steel piles will be driven using an impact hammer. Each steel pile will require 900 pile strikes to install. Nine piles will be driven per day for a total of 8,100 strikes per day.

Eighty-five days of pile driving will occur per season over two seasons. Driving may occur at up to nine piles per day. Approximately 85 ft. of each steel pipe pile will be driven below the riverbed and each pile will have approximately 90 ft. of exposed pile above the riverbed. All impact pile driving of the 30 in. steel piles at piers 3-8 will be performed behind an aquatic sound attenuation device that reduces transmission of sound through the water. No attenuation is proposed for land piers (numbers 9 – 11).

To facilitate bridge deck widening, near the top of the steel pipe piles a concrete seal course (a larger reinforced concrete footing) will be constructed. The seal course will be approximately 36 ft. by 20 ft. by 6 ft. deep on the left side and 50 ft. by 20 ft. by 6 ft. deep on the right side. After the placement of the seal course, the cofferdam will be dewatered in order to construct the new pile cap (footing).

To facilitate bridge deck widening, once the seal course is constructed and the cofferdam dewatered, the new pile cap will be constructed. The dimensions of the new pile cap will be approximately 36 ft. by 20 ft. by 4 ft. on the left side and 50 ft. by 20 ft. by 4 ft. on the right side. Fill for stabilization of the pile cap foundation will take place under submerged conditions (cannot completely dewater cofferdam).

The Project will utilize a staging area located at the Cal Expo parking area. The staging area occupies 12.7 acres within Cal Expo parking to allow for temporary access to the construction site. An access road over the top of the levee will lead to a temporary road consisting of temporary fill, spanning a Freshwater Emergent Wetland.

Construction activities will occur in four seasons. Construction at in-water piers 3-8 will likely be completed in fall of 2024, multiple seasons of in-water work may be needed. The remaining out-of-water piers 9-10 and bents 12-25 construction will be completed in fall of 2025. It will take approximately 900 days to complete construction. In-water work at piers 3-8 will occur from June 1-October 15, when sensitive fish species are less likely to be present.

1.4. Avoidance and Minimization Measures

The following BMPs are proposed by Caltrans to minimize or avoid overall impacts associated with the proposed action:

- All construction work that will take place in the channel will occur between June 1 to October 15 during anticipated summer low-flow period. This will minimize potential exposure of juveniles to pile driving noise/vibration, and to minimize fish entrapment within the cofferdams.
- In-channel work will not be conducted at night in order to afford fish quiet, unobstructed passage during nighttime migratory hours. Work occurring outside of the channel or within dewatered cofferdams may occur at night. Lighting will be directed away from the water surface.
- A qualified biologist will prepare and implement a fish salvage plan to recover any individuals entrapped in the cofferdams. The fish salvage plan will receive approval from NMFS prior to initiating any in-channel work. Since river conditions and specific cofferdam construction details are not currently known, a detailed fish relocation plan will be provided 30 days prior to construction. A contractor-supplied biologist will draft the plan to provide to Caltrans, who will then make any needed revisions. The plan will then be sent to NMFS for final approval. At a minimum, the plan will incorporate the following:
    - Provide for the collection, transfer and release of all entrapped, listed fish by a qualified biologist to a designated location downstream of project activities.
    - Recordation of the temperature (water and air), and pH within both the enclosure and within the free flowing river.
    - Ensure all rescued listedfish be kept in aerated water and at appropriate temperatures at all times prior to release.
- To minimize the potential for accidental spills of materials hazardous to the aquatic environment, a Spill Prevention Control and Countermeasure Plan (SPCCP) will be prepared.
- The number and size of piles will be limited to the minimum necessary to meet the engineering and design requirements.
- All impact pile driving of the 30 in. piles at piers 3-8 will be performed behind an aquatic sound attenuation device that reduces transmission of sound through the water. Any piles driven into the river channel will be installed using vibratory methods to the greatest extent prior to using impact methods. Aquatic sound attenuation systems may include:
    - Air bubble curtain used with attenuation casing (confined air bubble curtain).
    - De-watered attenuation casing.
    - De-watered cofferdam.
- The engineer will be required to inspect the sound attenuation system for proper operation before each deployment and as necessary during deployment. A sound attenuation system is not required for pile or casing installation using a vibratory hammer. The approved sound attenuation system must be operating prior to beginning pile driving at any given pile location. If the attenuation system fails, pile driving will immediately stop and may not resume at that location until it is again operating.
- Prior to initiating construction, fencing will be installed along the construction limits to prevent encroachment into the riparian areas adjacent to the construction site.

- Prior to construction, an acoustical monitoring plan to evaluate the sound levels during pile-driving activities will be prepared by a qualified biologist. The acoustical monitoring plan will receive approval from NMFS prior to in-channel work and will be implemented during all impact pile-driving activities. At a minimum, the plan will incorporate the following:
    - Daily acoustical monitoring by a qualified biologist during all pile-driving activities,
    - Measurement of underwater background levels using current NMFS methodology,
    - Require equipment for underwater sound monitoring (hydrophone, signal amplifier, and calibrator) to utilize current National Institute of Standards and Technology traceable calibration,
    - Require a minimum recordation distance of 10 meters from each pile being monitored, and
    - Provide for the collection and release of fish impacted by pile driving.
- Contract specifications will include the following BMPs, where applicable, to reduce erosion during construction.
    - Implementation of the Project will require approval of a site-specific Storm Water Pollution Prevention Plan (SWPPP) that would implement effective measures to protect water quality, which may include a hazardous spill prevention plan and additional erosion prevention techniques.
    - A specific work schedule will be implemented to coordinate the timing of land-disturbing activities and the installation of erosion and sedimentation control practices to reduce on-site erosion and off-site sedimentation.
    - Loose bulk materials will be applied to the soil surface as a temporary cover to reduce erosion by protecting bare soil from rainfall impact, increasing infiltration, and reducing runoff.
    - Stabilizing materials will be applied to the soil surface to prevent the movement of dust from exposed soil surfaces on construction sites as a result of wind, traffic, and grading activities.
    - Roughening and terracing will be implemented to create unevenness on bare soil through the construction of furrows running across a slope, creation of stair steps, or by utilization of construction equipment to track the soil surface. Surface roughening or terracing reduces erosion potential by decreasing runoff velocities, trapping sediment, and increasing infiltration of water into the soil, aiding in the establishment of vegetative cover from seed.
- Project activities that may affect the flow of the river through placement of fill and pier construction will comply with the 2001 NMFS Guidelines for Salmonid Passage at Stream Crossings, where applicable. The guidelines include, but are not limited to:
    - a minimum water depth (12 in. for adults and 6 in. for juveniles) at the lowest point of fish passage,
    - a maximum hydraulic drop of 1 ft. for adults and 6 in. for juveniles,
    - avoidance of abrupt changes in water surface and velocities, and
    - structures will be aligned with the stream, with no abrupt changes in flow direction upstream or downstream of the crossing.

- All water pumping or withdrawal from the river will comply with 1997 NMFS Fish Screening Criteria for Anadromous Salmonids, where applicable, to avoid entrainment of fish. The criteria include, but are not limited to, the following:
    - screen design must provide for uniform flow distribution over the surface of the screen;
    - screen material openings will not exceed 3/32 in. for fry-sized salmonids and will not exceed 1/4 in. for fingerling-sized salmonids;
    - the screen will be constructed at the diversion entrance. The screen face should be generally parallel to river flow and aligned with the adjacent bankline;
    - the design approach velocity will not exceed 0.33 ft. per second for fry-sized salmonids or 0.8 ft. per second for fingerling-sized salmonids; and
    - the screen design must provide for uniform flow distribution over the surface of the screen.
- All landscaping and revegetation will consist of Caltrans approved plants or seed mixes from native, locally adapted species.
- Prior to arrival at the Project site and prior to leaving the Project site, construction equipment that may contain invasive plants and/or seeds will be cleaned to reduce the spreading of noxious weeds.
- Caltrans will compensate for the permanent loss of 0.334 acres of in-water habitat of federally listed salmonids, as well as the permanent removal of 0.319 acres of riparian by purchasing mitigation credits at a 1:1 ratio at an approved NMFS mitigation bank.

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 reasonable and prudent measures (RPMs) and terms and conditions to minimize such impacts.

2.1. Analytical Approach

This 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 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 designations of critical habitat for CCV steelhead and CV spring-run Chinook salmon use 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 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 44976, 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 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 for species and Table 2 for critical habitat information.

Table 1. Description of species, current ESA listing classification and summary of species status.

Species	Listing Classification and Federal Register Notice	Status Summary
Sacramento River winter-run Chinook salmon ESU	Endangered, 70 FR 37160; June 28, 2005	According to the NMFS 5-year species status review (NMFS 2016c), the status of the winter-run Chinook salmon ESU, the extinction risk has increased from moderate risk to high risk of extinction since the 2007 and 2010 assessments. Based on the Lindley *et al*. (2007) criteria, the population is at high extinction risk in 2019. High extinction risk for the population was triggered by the hatchery influence criterion, with a mean of 66 percent hatchery origin spawners from 2016 through 2018. Several listing factors have contributed to the recent decline, including drought, poor ocean conditions, and hatchery influence. Thus, large-scale fish passage and habitat restoration actions are necessary for improving the winter-run Chinook salmon ESU viability.
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, has 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, uncertain juvenile survival during the drought are likely increasing the ESU's extinction risk. Monitoring data showed sharp declines in adult returns from 2014 through 2018 (CDFW 2018).

Species	Listing Classification and Federal Register Notice	Status Summary
California Central Valley steelhead DPS	Threatened, 71 FR 834; January 5, 2006	According to the NMFS 5-year species status review (NMFS 2016a), the status of CCV steelhead appears to have remained unchanged since the 2011 status review that concluded that the DPS was in danger of becoming endangered. Most natural-origin 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 natural-origin 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.
Southern DPS of North American green sturgeon	Threatened, 71 FR 17757; April 7, 2006	According to the NMFS 5-year species status review (NMFS 2015) and the 2018 final recovery plan (NMFS 2018b), some threats to the species have recently been eliminated, such as take from commercial fisheries and removal of some passage barriers. Also, several habitat restoration actions have occurred in the Sacramento River Basin, and spawning was documented on the Feather River. However, the species viability continues to face a moderate risk of extinction because many threats have not been addressed, and the majority of spawning occurs in a single reach of the main stem Sacramento River. Current threats include poaching and habitat degradation. A recent method has been developed to estimate the annual spawning run and population size in the upper Sacramento River so species can be evaluated relative to recovery criteria (Mora *et al*. 2017).

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

Critical Habitat	Designation Date and Federal Register Notice	Description
Central Valley spring-run Chinook salmon ESU	September 2, 2005; 70 FR 52488	Critical habitat for CV spring-run Chinook salmon includes stream reaches of the Feather, Yuba and American rivers, Big Chico, Butte, Deer, Mill, Battle, Antelope, and Clear creeks, the Sacramento River, as well as portions of the northern Delta. 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. PBFs 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 CV spring-run Chinook salmon critical habitat in the Central Valley are significantly limited and degraded, the habitat remaining is considered highly valuable.
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, as well as portions of the northern Delta. 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. PBFs 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.

2.2.1. Recovery Plans

In July 2014, NMFS released a final Recovery Plan for SR winter-run Chinook salmon, CV spring-run Chinook salmon, and CCV steelhead (NMFS 2014, Recovery Plan). The Recovery Plan outlines actions to restore habitat and access, and improve water quality and quantity

conditions in the Sacramento River to promote the recovery of listed salmonids. Key recovery actions in the Recovery Plan include conducting landscape-scale restoration throughout the Delta, incorporating ecosystem restoration into Central Valley flood control plans that includes breaching and setting back levees, and restoring flows throughout the Sacramento and San Joaquin River basins and the Delta. In August 2018, NMFS released a final Recovery Plan for the sDPS green sturgeon (NMFS 2018), which focuses on fish screening and passage projects, floodplain and river restoration, and riparian habitat protection in the Sacramento River Basin, the Delta, San Francisco Estuary, and nearshore coastal marine environment as strategies for recovery.

2.2.2. Global 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). Projected warming is expected to affect Central Valley Chinook salmon. Because the runs are restricted to low elevations as a result of impassable rim dams, if climate warms by 5°C (9°F), it is questionable whether any Central Valley Chinook salmon populations can persist (Williams 2006).

For winter-run Chinook salmon, the embryonic and larval life stages that are most vulnerable to warmer water temperatures occur during the summer, so this run is particularly at risk from climate warming. Spring-run Chinook salmon adults are vulnerable to climate change, because they over-summer in freshwater streams before spawning in autumn (Thompson *et al.* 2011). Spring-run Chinook salmon spawn primarily in the tributaries to the Sacramento River and those tributaries without cold-water refugia (usually input from springs) will be more susceptible to impacts of climate change.

Although steelhead will experience similar effects of climate change to Chinook salmon, as they are also blocked from the vast majority of their historic spawning and rearing habitat, the effects may be even greater in some cases, as juvenile steelhead need to 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 steelhead, which range from 14°C to 19°C (57°F to 66°F). The Anderson Cottonwood Irrigation Dam (ACID) is considered the upriver extent of green sturgeon passage in the Sacramento River. The upriver extent of green sturgeon spawning, however, is approximately 30 kilometers downriver of ACID where water temperature is higher than ACID during late spring and summer. Thus, if water temperatures increase with climate change, temperatures adjacent to ACID may remain within tolerable levels for the embryonic and larval life stages of green sturgeon, but temperatures at spawning locations lower in the river may be more affected.

Stream flow is a highly important variable and driving mechanism in fluvial ecosystems and climate has been identified as a landscape-scale driver of flow rates (Minshall 1988). Multiple climatological and hydrologic model predictions indicate that flows in the CCV will decrease throughout the 21st century as warming trends continue. Salmonids in the American River will likely face a decrease in flows, resulting in potentially lethal or sub-lethal water temperatures in summer months, impaired migration and decreased egg to fry recruitment.

In addition to altered flow regimes, some other aspects of stream systems that are particularly sensitive to changes in climate are sediment transport/channel alterations, nutrient loading and rates of nutrient cycling, fragmentation and isolation of cold-water habitats, altered exchanges with the riparian zone and life history characteristics of many aquatic insects (Meyer *et al*. 1999). Current warming trends and model predictions indicate that it is likely that climate change will result in some direct and indirect adverse effects to salmonids in the lower American River in the 21st century.

In summary, observed and predicted climate change effects are generally detrimental to the species (McClure 2011, Wade *et al.* 2013), so unless offset by improvements in other factors, the status of the species and critical habitat is likely to decline over time. The climate change projections referenced above cover the time period between the present and approximately 2100. While there is uncertainty associated with projections, which increases 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 project is located on the American River at the State Route 51 American River Bridge. The action area includes the American River 1,000 meters upstream and downstream of the bridge construction site where effects of pile driving and construction-related effects to water quality are expected to exceed ambient conditions. The action area also includes terrestrial clearing and staging areas adjacent to the river.

Since the proposed action includes the purchase of mitigation credits from a conservation bank, the action area also includes the areas affected by mitigation banks that have service areas relevant to the Project areas. These include the Fremont Landing Conservation Bank, which is a 100-acre site along the Sacramento River (Sacramento River Mile 78 through 80) and Bullock Bend Mitigation Bank, which is a 116.15-acre site along the Sacramento River (Sacramento River Mile 80.)

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. Status of Listed Species in the Action Area

The Action Area occurs on the lower American River and provides potential rearing habitat for CCV steelhead, CV spring-run Chinook salmon, SR winter-run Chinook salmon and sDPS green sturgeon. Due to observed life history patterns and known spawning behavior for these species, one or more of the following life stages may be present in the Action Area year-round: migrating adult CCV steelhead, and rearing or emigrating juvenile CCV steelhead, sDPS green sturgeon, CV spring-run and SR winter-run Chinook salmon. Table 3 shows United States Fish and Wildlife Service (USFWS) rotary screw trap data for fish captured on the lower American River. Abundance estimates may not be accurate, but the data does indicate presence of each run within the lower American River.

Table 3. Rotary screw trap data from sampling seasons in years 2013-2015 (From USFWS Comprehensive Assessment and Monitoring Program)

Taxon	**2013**	**2014**	**2015**
Spring-run Chinook salmon	93	1,856	703
Winter-run Chinook salmon	26	10	30
Steelhead	2,205	586	9

*Chinook runs identified by length-at-date criteria (PSFMC 2014)

CCV steelhead

CCV steelhead are known to spawn consistently in the lower American River, although naturally spawning fish are primarily hatchery-produced (Lindley *et al*. 2007). Although Hannon (2013) observed some returning adults with adipose fins (indicating wild origin) in the lower American River, the in-river population is thought to be composed entirely of individuals raised in Nimbus Hatchery or their descendants (NMFS 2009). Juveniles are known to rear in the lower American River throughout the year. All other life stages occur in the winter and spring months.

CV spring-run Chinook salmon

Historically, spring-run Chinook salmon occupied the lower and upper American River. However, the CCV spring-run Chinook salmon ESU as it exists today is primarily composed of strays from three self-sustaining populations that spawn in Deer Creek, Mill Creek and Butte Creek. The loss of the spawning population in the lower American River is likely due to habitat loss and loss of access to spawning habitat upstream of Nimbus and Folsom dams. USFWS rotary screw trap surveys have observed small numbers of juvenile spring-run Chinook salmon

in the lower American River, suggesting that they exhibit non-natal rearing there during winter and spring months (PSMFC 2014). USFWS has shown through genetic analysis in past surveys that many individuals identified initially as spring-run Chinook salmon (using length-at-date) were later identified as fall-run Chinook salmon, leading to an initial overestimate of spring-run Chinook salmon abundance.

SR winter-run Chinook salmon

Unlike the CCV spring-run Chinook salmon ESU, historically, there was never a SR winter-run Chinook salmon population that spawned in the American River. Currently, winter-run spawning is confined to the upper Sacramento River. USFWS rotary screw traps have captured small numbers of genetically identified juvenile winter-run in the lower American River suggesting that they exhibit non-natal rearing there during winter and spring months (PSMFC 2014).

sDPS green sturgeon

Portions of the lower American River may serve as rearing habitat for juvenile sturgeon during their downstream migration to the San Francisco Bay Delta and Estuary. Detailed information regarding historic and current abundance, distribution and seasonal occurrence of sDPS green sturgeon in the action area is limited due to a general dearth of green sturgeon monitoring. Adult green sturgeon begin to enter the Delta in late February and early March during the initiation of their upstream spawning run. The peak of adult entrance into the Delta appears to occur in late February through early April with fish arriving upstream in April and May. Adults continue to enter the Delta until early summer (June-July) as they move upriver to spawn. Some adult green sturgeon have been observed to rapidly move back downstream following spawning, while others linger in the upper Sacramento river until the following fall. It is possible that any of the juvenile, adult or sub-adult sturgeon that inhabit the lower Sacramento River will swim into the American River.

2.4.2. Status of Critical Habitat in the Action Area

CCV steelhead and CV spring-run Chinook salmon

The Action Area includes critical habitat that has been designated for CCV steelhead and CV spring-run Chinook salmon. Critical habitat was designated under the same federal ruling for these two species, as their habitat requirements are very similar. PBFs within the Action Area for these two species include: (1) freshwater rearing sites (2) freshwater migration corridors. These PBFs have been degraded from their historical condition due to human activity on and near the American River. The construction of Nimbus and Folsom dams has restricted access to historical spawning and rearing habitat for both species. Degradation of these PBFs has contributed to significant population declines within the American River. Drought conditions have also had detrimental effects to PBFs through reduced flows and increased water temperatures. These effects have led to reduced quality of rearing habitat and have likely limited migration corridors in summer months due to thermal barriers.

SR winter-run Chinook salmon and sDPS green sturgeon

Critical habitat features for SR winter-run Chinook salmon and sDPS green sturgeon do not exist within the Action Area. Critical habitat features for SR winter-run Chinook salmon exist in the mainstem of the Sacramento River, which is approximately 3.5 miles downstream of the Action Area. Critical habitat features for sDPS green sturgeon exist in the American River approximately 2 miles downstream of the Action Area.

2.4.3. Factors Affecting Listed Species and Critical Habitat in the Action Area

Range-wide factors that affect listed fish species are described in section 2.2. This section will focus on factors that are specific to the Action Area.

The lower American River has been degraded from its historic condition and many anthropomorphic and naturally occurring factors have led to the decline of anadromous fish in the system. Due to the construction of Nimbus and Folsom dams, flows and temperatures have been altered from their natural and historic regimes. Altered flow regimes can influence migratory cues, water quality (including contaminants, dissolved oxygen and nutrients for primary productivity) and temperature. Construction of the dams has also restricted access to historic spawning and rearing habitat, leading to the decline of anadromous fish abundance in the lower American River. Spawning site, rearing site and migration corridors have been degraded as a result of dam construction (Reynolds *et al.* 1993).

Previous drought conditions have played a significant role as flows have decreased and temperatures have increased, leading to unfavorable environmental conditions in the river. This has resulted in impacts to listed fish, as well as impacts to critical habitat. Heat stress, heat shock and disruption of migration due to thermal barriers have resulted from decreased flows in the river. Increased temperatures also have the potential to disrupt aquatic macroinvertebrate production, leading to declines in food availability (Ward and Stanford 1982).

It is likely that the in-river population of CCV steelhead is composed heavily of individuals raised in Nimbus Hatchery or their descendants (NMFS 2011). Hatchery production has been responsible for sustaining the CCV steelhead population in the American River, though there are likely hatchery-related genetic effects that have occurred within the population. Early broodstock used at Nimbus Hatchery contained steelhead from many different populations and geographic regions. There is also some concern that rainbow trout were introduced to the in-river population. Garza and Pierce (2008), using highly variable microsatellite markers from adults returning to the hatchery, identified over one third of the fish as hatchery rainbow trout. Reduced wild population size and altered selection regimes have likely led to the current genetic assemblage of CCV steelhead in the lower American River (Waples 1991).

The areas surrounding the lower American River have been heavily urbanized. This has likely increased the amount of contaminant loading in the aquatic ecosystem. Heavy metals, Polycyclic Aromatic Hydrocarbons, petroleum products, plastics, fertilizer and many other contaminants can enter the river via urban runoff. Shoreline areas along the lower American River have also been highly developed over time. Shore-side development leads to decreased recruitment of large woody material and results in a loss of habitat complexity, which is a critical component of the freshwater rearing site PCE.

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

The lower American River contains PBFs for rearing habitat for CCV steelhead, CV spring-run Chinook salmon, SR winter-run Chinook salmon and sDPS green sturgeon. The portion of the lower American River within the Action Area is designated critical habitat for CCV spring-run Chinook salmon and CCV steelhead. It contains rearing habitat and migration corridor PBFs for both species. SR winter-run Chinook salmon and sDPS green sturgeon individuals occur in the lower American River, presumably exhibiting non-natal rearing behavior, though it has not been designated as critical habitat for those species.

Based on the current status, range and estimated abundance of CCV steelhead, rearing habitat within the Action Area is also important for the viability of the in-river CCV steelhead population. Juveniles rear in the Action Area primarily in the winter and spring, but may be present year-round. For this reason, the flow and temperature regimes in the river can potentially have important implications for juvenile recruitment. Habitat complexity and food availability are also important components within the Action Area as they facilitate juvenile rearing and growth.

The portion of the lower American River contained in the Action Area is important for CCV spring-run Chinook salmon and SR winter-run Chinook salmon, because juveniles are known to exhibit non-natal rearing (PSMFC 2014). However, there is no evidence that they spawn in the Action Area. Therefore, it is important primarily because it increases the carrying capacity of total range of each run, providing additional rearing habitat. Habitat complexity and food availability within the Action Area contributes to the growth and survival of these runs.

2.4.5. Mitigation Banks and the Environmental Baseline

Mitigation banks present a unique factual situation, which warrant 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 opinion.

The Project occurs within the service area of two banks approved by NMFS with available credits for purchase or which are anticipated to have available credits for purchase prior to construction under the proposed action:

Bullock Bend Mitigation Bank: Established in 2016, the Bullock Bend Mitigation Bank is a 119.65-acre floodplain site along the Sacramento River at the confluence of the Feather River (Sacramento River Mile 106) and is approved by NMFS to provide credits for impacts to Sacramento River winter-run Chinook salmon, CV spring-run Chinook salmon and CCV steelhead. There are salmonid floodplain restoration, salmonid floodplain enhancement and salmonid riparian forest credits available. All features of this bank are designated critical habitat for the species analyzed in this opinion. The ecological value (increased rearing habitat for juvenile salmonids) of the credits that have been sold to-date is part of the environmental baseline.

Fremont Landing Conservation Bank: Established in 2006, the Fremont Landing Conservation Bank is 100-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 Sacramento River winter-run Chinook salmon, CV spring-run Chinook salmon and CCV steelhead. There are off-channel shaded aquatic habitat credits, riverine shaded aquatic habitat credits and floodplain credits available. All features of this bank are designated critical habitat for the species analyzed in this opinion. The ecological value (increased rearing habitat for juvenile salmonids) of the credits that have been sold to-date is part of the environmental baseline.

2.4.6. NMFS Recovery Plan Recommendations

The action area is located on the lower American River, which is utilized as juvenile rearing habitat for listed fish in the Sacramento River Basin, and as a migratory corridor for CCV steelhead. The NMFS Recovery Plan (NMFS 2014) identifies recovery actions for the Sacramento River Basin populations of listed salmonids whose range includes the proposed action area. Recommended recovery efforts focus on addressing several key stressors that are vital to listed salmonids: (1) passage impediments and barriers, (2) warm water temperatures for rearing, and (3) limited quantity and quality of rearing habitat. The NMFS Salmonid Recovery Plan (NMFS 2014) recovery criteria for the Northern Sierra Nevada Diversity Group (which includes the American River) CCV steelhead includes the need to establish and maintain four viable populations. The Recovery Plan describes the American River below Nimbus Dam as a Core 2 population (meaning these watersheds have the potential to support viable populations, but due to lower abundance, or amount and quality of habitat, are not expected to become Core 1 populations themselves). Additionally, if reintroduced upstream of Nimbus Dam, the potential population is considered a candidate for reaching viable population status. The NMFS Recovery Plan for the Southern Distinct Population Segment of North American Green Sturgeon (NMFS 2018) focuses on recovery actions in the Sacramento, Feather and Yuba Rivers. The American River, among other watersheds, which may have once provided spawning habitat based on

historical conditions, could be considered for additional spawning and rearing habitat to aid in the recovery of sDPS green sturgeon.

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).

2.5.1. Effects to Species

The following is an analysis of the potential effects to listed fish species in the American River that may occur as a result of implementing the proposed action. For our analysis, we have used the presence of listed species in the action area to determine the risk each species and life stage may face if exposed to Project impacts. The expected effects of the proposed action include impacts due to: (1) changes in water quality, (2) noise exposure, and (3) entrainment, dewatering, and fish relocation.

Water Quality

Sediment and Turbidity

Construction activities could result in increased turbidity, suspended sediment concentrations, and contaminant concentrations. Construction activities, including construction of the new in-water structures, use of staging areas, dredging and installation and removal of piles could disturb sediments and soils within and adjacent to waterways. Any construction-related erosion or disturbance of sediments and soils would increase turbidity and sedimentation downstream of the Project area. Dredging has the potential to disturb and suspend a significant volume of benthic sediment. Previous estimates of dredge-created turbidity have indicated that dredging can result in an increase in total suspended solids downstream of the dredging action. The distance that soils would be transported is dependent on river flows. The bridge deck replacement is anticipated to take four seasons to complete, with the majority of the work occurring over the summer work windows. NMFS anticipates that short-term construction-related turbidity events would occur for the duration of in-water construction during those four seasons.

Juvenile CCV steelhead, CV spring-run Chinook salmon and SR winter-run Chinook salmon are known to rear in the Action Area, particularly in riffle habitat areas. Juvenile salmonids are not likely to avoid increased levels of turbidity below a level of 70 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 1992). Growth and survival amidst increased sediment and turbidity levels have also been shown to decrease resulting from reduced prey detection and availability, and physical injury due to increased

activity, aggression and gill fouling (Suttle *et al*. 2004, Kemp *et al.* 2011). Sedimentation effects are expected to impact sections of the lower American River approximately 200 ft. downstream of the Project site, at which time individuals would be exposed to effects, such as predator avoidance and decreased feeding ability. Beyond 200 ft., mobilized sediment and increased turbidity are expected to return to background levels.

Sedimentation and turbidity are expected to have varying effects to fish at different life stages. The in-water work activities that would result in increased sediment and turbidity would occur during June to mid-October. This period coincides with when SR winter-run Chinook salmon and adult CV spring-run Chinook salmon are not expected to be present. Adult CCV steelhead may commence their upstream migration as early as October and juvenile CCV steelhead may be present year-round. NMFS expects that foraging subadult sDPS green sturgeon and rearing juvenile sDPS green sturgeon could be present in the Action Area. Some adverse effects are expected to impact CCV steelhead and sDPS green sturgeon if they are present in the Action Area.

If an adult salmonid were to enter the action area, they will likely exhibit avoidance behavior in response to construction and associated activities. Therefore, adverse effects are not expected to impact adults. Any increases in turbidity will most likely disrupt feeding and migratory behavior activities of juvenile salmonids. Turbidity and sedimentation events are not expected to affect visual feeding success of green sturgeon, as they are not believed to utilize visual cues (Sillman *et al*. 2005). Green sturgeon, which can occupy waters containing variable levels of suspended sediment and thus turbidity, are not expected to be impacted by the slight increase in the turbidity levels anticipated from the construction activities.

Because rearing juvenile steelhead are likely to be present in the Action Area during construction, injury or death are expected to occur as a result of sedimentation-related effects. Juvenile CV spring-run Chinook salmon and SR winter-run Chinook salmon are not expected to be rearing in the Action Area during construction, therefore adverse effects are not expected to impact juveniles of those ESUs.

Contaminants and Pollution

During construction, the potential exists for spills or leakage of toxic substances that could enter the waterways. Refueling, operation, and storage of construction equipment and materials could result in accidental spills of pollutants (*e.g*., fuels, lubricants, sealants, and oil). Adverse effects to listed fish may result from point and non-point source chemical contaminant discharges within the action area. These contaminants include, but are not limited to, oil and gasoline product discharges, lime, bentonite, and concrete. Disturbing benthic sediments through dredging is expected to mobilize and distribute a variety of contaminants. Some of these contaminants may be acutely or chronically harmful to salmonids (Allen and Hardy 1980). Some contaminants lack defined regulatory exposure criteria that are relevant to listed anadromous fish that could still result in direct or indirect adverse effects (Ewing 1999).

If contaminants are released during dredging or disposal activities, their effects may be subtle and difficult to directly observe. The effects of bioaccumulation are of particular concern as

pollutants can reach concentrations in higher trophic level organisms (*e.g*., salmonids) that far exceed ambient environmental levels (Allen and Hardy 1980). Bioaccumulation may therefore cause delayed stress, injury, or death as contaminants are transported from lower trophic levels (*e.g*., benthic invertebrates or other prey species) to predators long after the contaminants have entered the environment or food chain. It follows that some organisms may be negatively affected by contaminants even while regulatory thresholds for the contaminants are not exceeded during measurements of water or sediments.

High concentrations of contaminants can cause short-term and long-term effects to fish. The severity of these effects depends on the contaminant, the concentration, duration of exposure, and sensitivity of the affected life stage. Sublethal effects include increased susceptibility to disease that reduces the overall health and survival of the exposed fish. A long-term effect of contamination is reduced prey availability (Kidd *et al*. 2014). Invertebrate prey species survival can be reduced, therefore, less food is available for fish. In addition, fish that are consuming prey affected by contamination can absorb toxins directly. Green sturgeon may be more susceptible to aquatic contaminants, since they are benthic foragers. Studies on the similar white sturgeon found that bioaccumulation of pesticides and other contaminants adversely affect growth and reproductive development (Feist *et al*. 2005). Small numbers of juvenile CCV steelhead or sDPS green sturgeon may be present, however, implementation of avoidance and minimization measures, including implementation of a SWPPP and BMPs, would minimize any risk, and therefore, avoid potential for exposure to hazardous chemicals.

Noise Exposure

Pile Driving

Construction of the new in-water bridge structure will require the use of both vibratory and impact pile driving to install the sheet piling for cofferdams, steel pipe piles for the temporary barge access piers, steel piles for the piers and bents, and removal of temporary piles. During the construction period, steel pipe piles and sheetpiles will be temporarily placed into the American River by combination of vibratory hammer and impact hammer during the proposed in-water work window of June 1 to October 15 for up to 4 seasons. Once sheet piles are installed to form a cofferdam, the internal area will be dewatered so that foundation piles can be installed “in-the-dry.”

Pile driving near or in water has the potential to kill, injure, and cause delayed death to fish through infection of minute internal injuries, or cause sensory impairments leading to increased susceptibility to predation. The pressure waves generated from driving piles into river bed substrate propagate through the water and can damage a fish’s swim bladder and other internal organs by causing sudden rapid oscillations in pressure, which translates to rupturing or hemorrhaging tissue in the bladder when the air in swim bladders expand and contract (Gisiner 1998, Popper *et al*. 2006). Sensory cells and other internal organ tissue may also be damaged by pressure waves generated during pile driving activities as sound reverberates through a fish’s viscera (Caltrans 2015). In addition, morphological changes to the form and structure of auditory organs (saccular and lagenar maculae) have been observed after intense noise exposure (Hastings and Popper 2005). Smaller fish with lower mass are more susceptible to the impacts of elevated

sound fields than larger fish, so acute injuries resulting from acoustic impacts are expected to scale based on the mass of a given fish. Since juveniles and fry have less inertial resistance to a passing sound wave, they are more at risk for non-auditory tissue damage (Popper and Hastings 2009) than larger fish (yearlings and adults) of the same species. Beyond immediate injury, multiple studies have also shown responses in the form of behavioral changes in fish due to human-produced noises (Wardle *et al*. 2001, Slotte *et al*. 2004, Popper and Hastings 2009).

Based on recommendations from the Fisheries Hydroacoustic Working Group, NMFS uses interim dual metric criteria to assess onset of injury for fish exposed to pile-driving sounds (Caltrans 2015). The interim thresholds of underwater sound levels denote the expected instantaneous injury/mortality and cumulative injury, as well as a third threshold criterion for behavioral changes to fish. Vibratory pile driving generally stays below injurious thresholds, but often introduces pressure waves that will incite behavioral changes. Even at great distances from the pile driving location, underwater pressure changes/noises from pile driving is likely to cause flight, hiding, feeding interruption, area avoidance, and movement blockage, as long as pile driving is ongoing.

For a single strike, the peak exposure level (peak) above which injury is expected to occur is 206 decibels (dB) underwater (reference to one micro-pascal [1µpa] squared per second). However, cumulative acoustic effects are expected for any situation in which multiple strikes are being made to an object with a single strike peak dB level above the effective quiet threshold of 150 dB. Therefore, the accumulated sound exposure level (SEL) level above which injury to fish is expected to occur is 187 dB for fish greater than 2 grams in weight, and 183 dB for fish less than 2 grams. If either the peak SEL or the accumulated SEL threshold is exceeded, then physical injury is expected to occur to fish within the estimated distance thresholds. Underwater sound levels below injurious thresholds are expected to produce behavioral changes. NMFS uses a 150 dB root-mean-square (RMS) threshold for behavioral responses in salmonids and green sturgeon.

Caltrans will employ attenuation methods to reduce noise levels while impact pile driving the 30-inch piles at in-water piers 3-8, and the 18-inch piles for the temporary access piers. Attenuation methods can include dewatering the cofferdam, deploying a bubble curtain, a double-walled isolation casing or a dewatered isolation casing. Attenuation will not be used for piles driven on land; 5dB attenuation is assumed for those.

Noise levels for impact pile driving are as follows (and summarized in Table 4):

The peak level for attenuated impact driving 18-inch temporary pier piles in-water are estimated to be 203 dB at 10 meters and the distance to the 206 dB peak criteria is estimated to be less than 10 meters from the pile. The distance to the 187 dB cumulative SEL criteria would be approximately 201 meters from the pile and the distance to the 183 dB cumulative SEL criteria would be approximately 251 meters from the pile.

The peak level for attenuated impact driving of the 30-inch piles in-water may reach 205 dB at 10 meters. The distance to the 206 dB peak criteria would be less than 10 meters from the pile. The distance to the 187 dB cumulative SEL criteria and the 183 dB cumulative SEL criteria would be approximately 293 meters from the pile.

Peak levels at land-based piers 9 through 11, bents 12-25 and abutment 26 would not exceed the 206 dB peak criteria. The maximum impact zone for the cumulative SEL criteria is estimated to extend 293 meters (961 ft.) into the water. The maximum impact zone would occur when impact driving is nearest to the edge of water. As the distance between the pile driving operation and the edge of water increases, the size of the impact zone would decrease.

Table 4. Summary of Estimated Underwater Attenuated Sound Exposure Levels.

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
30" steel pipe pile in water (450)	impact hammer	900	8,100	10	5	205	172	185	9	293	293	2154
18" steel pipe pile in water (20)	impact hammer	400	3,600	10	5	203	171	182	6	201	251	1359

The distance that behavioral changes are expected is up to 2,154 meters from the driven pile, where the RMS sound will be above 150 dB RMS. SELs below 150 dB are assumed not to accumulate and cause fish injury, or be significantly different from ambient conditions (*i.e.,* effective quiet). Pressure levels in excess of 150 dB RMS are expected to cause temporary behavioral changes (startle and stress) that could decrease a fish's ability to avoid predators or delay normal migration past the work site. The background RMS sound pressure levels, or effective quiet, are assumed to be 150 dB RMS and the acoustic impact area is the area where the predicted RMS sound pressure level generated by pile driving exceeds this threshold.

Once the pressure waves attenuate below this level, fish are assumed to no longer be adversely affected by pile driving sounds. Under the concept of effective quiet being less than or equal to 150 dBRMS, the distance fish are expected to be adversely affected during pile driving is out to 2,154 meters from the location of the pile being driven, assuming a transmission loss constant of 15 (NMFS 2008). However, the Caltrans 2015 Pile Driving Compendium states, "it is not possible to reliably predict audibility (or detectability) with any certainty at distances beyond 500 to 1,000 meters. Consequently, the Project action area based on pile driving sound should never be considered to extend more than 1,000 meters (3,280 ft. or 0.62-mile) from the pile driving activity." Based on this guidance, noise effects are only considered within 1000 meters of the pile-driving activity.

The underwater sound conditions described above would be expected to occur on days when in-water pile driving of 30-inch steel pipe piles occur. Pile driving would occur only during daylight hours to minimize effects. Impact pile driving is expected to directly injure or kill fishes within certain distance thresholds, depending on the size of pile being driven, the number of strikes used in a day, and whether attenuation measures are being employed. Using the greatest numbers of strikes estimated to drive the largest piles, it is expected that fish may be killed within up to 10 meters (attenuated) to 18 meters (unattenuated) of the driven pile due to in-water impact pile

driving. Small numbers of juvenile and adult CCV steelhead, juvenile CV spring-run, SR winter-run Chinook salmon, and sDPS green sturgeon are expected to be affected.

Entrainment, Dewatering and Fish Relocation

Fish capture and relocation may be necessary during dewatering activities, if listed fish are present and found in the enclosed area of the cofferdam. Each step during the capture/relocation process could induce physiological stress leading to injury or death, even when a skilled fish biologist performs the relocation. The potential capture and relocation of CCV steelhead, CV spring-run Chinook salmon, SR winter-run Chinook salmon, and sDPS green sturgeon associated with the dewatering of the cofferdam are expected to adversely affect a small number of fish if present in the action area. Although upstream-migrating adult CCV steelhead and rearing or migration subadult/adult sDPS green sturgeon may occur in the Project area during in-water work, the large size and probable avoidance of the enclosed area makes it unlikely that they would be trapped in the cofferdams or dredging. Juvenile green sturgeon could occur in the action area, and may therefore become entrained.

Because of the variability and uncertainty associated with the population sizes of the species present, 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 and there is low probability of presence in the action area during the in-water work season. Juvenile CCV steelhead or green sturgeon that evade capture and remain in the construction area may be injured or killed from construction activities. This includes desiccation, if fish remain in the dewatered area, or death, if fish are crushed by personnel, barge operations, or equipment. However, because experienced biologists will be collecting fish, most are expected to be removed from the area. Juvenile CCV steelhead or green sturgeon may be present, and thus subject to the above effects. Effects to adult CCV steelhead and green sturgeon are improbable, due to their large size and probable avoidance.

The probability of entraining fish in a dredge is likely to be very low, because fish are likely to avoid the immediate vicinity of dredging operations, and because dredging operations proceed very slowly compared to the swimming ability of salmonids in general. Overall, no adults and few juvenile listed fish are expected to be entrained in the dredge. Any fish entrained in the dredge would be expected to die due to physical injury or suffocation in sediment coupled with the unlikelihood of release back into the river channel once entrained.

Juvenile and adolescent green sturgeon may be at an elevated risk of entrainment from the hydraulic dredge. Based on monitored entrainment rates observed in the Columbia River Basin (Reine and Clark 1998), juvenile white sturgeon (*Acipenser transmontanus*) were entrained by hydraulic dredging at high rates from localized areas known to have aggregations of sturgeon (sturgeon holes). The behavior of sturgeon apparently places them at risk of entrainment from dredging actions due to their preference for deep channels and holes and their reluctance to move away from those areas even when disturbed. Since NMFS assumes that juvenile sDPS green sturgeon may occupy the American River while dredging occurs, exposure to entrainment in the

action area may occur throughout the entire dredging window. While the number of individual fish actually entrained by dredging operations is anticipated to be extremely low due to the relatively expansive and unconstricted nature of the water ways in the action area, post-entrainment mortality rates for any individuals that are entrained are expected to be very high, approaching 100 percent.

2.5.2. Effects to Critical Habitat

The Project is expected to adversely affect PBFs of critical habitat for CCV steelhead and CV spring-run Chinook salmon (specifically, freshwater rearing and migration habitat). The proposed Project is expected to cause short-term and long-term permanent effects to critical habitat for CCV steelhead and CV spring-run Chinook salmon. Potential Project effects include temporary water quality degradation from localized increases in turbidity and suspended sediment, permanent habitat loss/modification of critical habitat, and temporary in-channel disturbance from pile driving, dredging and other construction activities. Long-term effects on designated critical habitat include degradation of the CCV steelhead and CV spring-run Chinook salmon PBFs of freshwater rearing habitat. This is expected to result in decrease of survival of fish in the action area, which is due to the overwater structure. Artificial shade can create sharp contrasting shadows that can impair fish vision, limit photosynthetic production, alter fish behavior and will create shadowed habitat, which may favor ambush predators.

Sedimentation and Turbidity

There is potential for degradation of PBFs resulting from turbidity and sedimentation associated with the proposed action. Kemp *et al.* (2011) describe a suite of physiochemical effects to lotic aquatic systems resulting from increased sedimentation and turbidity-related events. Sedimentation events in a system that shares both lotic and estuarine characteristics have the potential to increase turbidity on a broad temporal scale and reduce oxygen supply. These impacts could degrade the PBFs for CCV steelhead and CV spring-run Chinook salmon, such as riparian habitat, that provide the necessary habitat for successful juvenile development and survival. BMPs, such as groundcover and stabilization, will be implemented during construction to help prevent Project-disturbed soil on land from entering the water. With the minimization and avoidance measures included in the proposed action, turbidity and sedimentation are expected to result in minor and short-term effects to PBFs of designated critical habitat for CCV steelhead and CV spring-run Chinook salmon (freshwater rearing and migration habitat) in the action area.

Riparian Vegetation Removal

Removal of riparian vegetation will occur during the clearing of staging areas and access roads, and grading activities. These activities have the potential to result in adverse effects to critical habitat PBFs. Riparian vegetation plays a key role in the 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 that increases 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 riverine systems through biogeochemical cycling, soil and channel chemistry, water movement, and erosion

(Schlosser and Karr 1981, Dosskey *et al*. 2010). The proposed action will result in the permanent loss of 0.319 acres of riparian habitat due to disturbance from Project activities. This loss of riparian habitat will result in the degradation of migratory corridors and rearing habitat PBFs for CCV steelhead and CV spring-run Chinook salmon. Caltrans proposes to purchase compensatory mitigation credits at a 1:1 ratio to compensate for the permanent loss of 0.319 acres of riparian habitat. The purchase of mitigation credits are expected to offset impacts for CCV steelhead and CV spring-run Chinook salmon PBFs. The purchase of credits will be provided in the short-term as the purchase of credits at a mitigation bank ensures immediate and effective critical habitat benefits. These benefits are ensured as the bank is managed, monitored, and maintained in perpetuity.

Dredging

Caltrans proposes to dredge approximately 19,950 cubic yards of material to facilitate barge operations. This will temporarily degrade the PBFs of rearing and migratory corridors for listed fish. Oligochaetes and chironomids (dipterans) are the dominant prey items for CCV steelhead and CV spring-run produced in the silty and sandy substrates in this area. These organisms would be entrained by the dredge, particularly small demersal fish and benthic invertebrates. Reine and Clark (1998) estimated that the mean entrainment rate of a typical benthic invertebrate in the estuaries of the Pacific northwest, represented by sand shrimp (*Crangon* spp.), was 0.69 shrimp/cubic yard when the cutterhead was positioned at or near the bottom, but rose sharply to 3.4 shrimp/cubic yard when the cutterhead was raised above the substrate to clean the pipeline and cutterhead assembly. These rates correspond with a potential loss to the overall shrimp population ranging from 1.2 to 6.5 percent during the course of a "typical" dredging project in the estuaries of the Pacific Northwest. Likewise, benthic infauna, such as clams, would be entrained by the suction dredge in rates equivalent to their density on the channel bottom, as they have no ability to escape. The loss of benthic food resources, such as amphipods or isopods, could reduce fish growth rates and increase the energy expended searching for food, depending on the density of the animal assemblages on the channel bottom. Small invertebrates, such as annelids, crustaceans (amphipods, isopods), and other benthic fauna, would be unable to escape the suction of the hydraulic dredge and be lost to the system. Also, many benthic invertebrates have pelagic, surface-oriented larvae; therefore the loss of these benthic invertebrates may reduce the abundance of localized zooplankton populations in the upper regions of the water column where juvenile salmonids migrate.

The time needed to recolonize the dredged area is unknown and is complicated by variable maintenance dredging throughout the four seasons of work. However, CCV steelhead and CV spring-run Chinook should be able to find alternative foods and foraging areas adjacent to the action area. Overall, dredging is not likely to change the benthic habitat to the extent that critical habitat would be negatively affected in the reaches to be dredged.

Habitat Loss

Cofferdams and sheetpiles are expected to temporarily affect a maximum of 0.26 acres of critical habitat. Impacts are expected to include minor decreases in the flow regime and slight increases in temperatures. During the four seasons of in-water work, the entirety of the migratory corridor

will be decreased by a maximum of 1.97 acres, which is not expected to affect passage. The new bridge piles, pile caps, and seal course are expected to permanently affect 0.334 acres of critical habitat. This loss of habitat will result in the degradation of migratory corridors and rearing habitat PBFs for CCV steelhead and CV spring-run Chinook salmon. Caltrans proposes to purchase compensatory mitigation credits at a 1:1 ratio to compensate for the permanent loss of 0.334 acres of in-water habitat. The purchase of mitigation credits are expected to offset impacts for CCV steelhead and CV spring-run Chinook salmon PBFs. The purchase of credits will be provided in the short-term as the purchase of credits at a mitigation bank ensures immediate and effective critical habitat benefits. These benefits are ensured as the bank is managed, monitored, and maintained in perpetuity.

Structure Shading

The new bridge will shade the American River by 1.0 acres. 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 salmon and sturgeon both upstream and downstream of the Action Area, the effects of the overwater structure are expected to be minor.

2.5.3. Mitigation/Conservation Bank Credit Purchase

To address permanent loss of riparian and aquatic habitats, the proposed action includes purchase of mitigation bank credits at a 1:1 ratio. Caltrans will purchase 0.319-acre credits of salmonid or riparian Shaded Riparian Aquatic habitat credits for the permanent loss of 0.319 acres of riparian habitat. Caltrans will purchase 0.334 acres of salmonid credits for the permanent in water structure.

The purchase of compensatory mitigation credits will restore and preserve, in perpetuity, SRA habitat or similar types of riverine habitat that will be beneficial to salmonids. The mitigation banks that serve the action area offer floodplain or other habitat that can support migrating juvenile and adult CCV steelhead, SR winter-run Chinook salmon, CV spring-run Chinook salmon and sDPS green sturgeon in the same way that river margin habitat otherwise would have, had the project not occurred. SRA habitat types of conservation credits can benefit both adult and juvenile salmonids and sturgeon, even if such banks are located far from the action area and individuals affected by the project would be unlikely to benefit from the compensation purchase.

Both the riparian and aquatic habitat impacts affect designated critical habitat, as well as listed fish species, described above in this opinion. 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 PBFs of critical habitat and the species affected by the proposed action, because both banks include SRA, riparian forest and floodplain credits with habitat values that are already established and meeting performance standards. Also, the banks are located in areas that will benefit the affected DPSs and ESUs. The purchase of mitigation credits at one of these banks is expected to benefit the PBFs of freshwater rearing habitat and migration corridors for juvenile CCV steelhead by providing suitable floodplain and riparian habitat. The floodplains and riparian forest 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 (IWM) and cooler stream temperatures.

The purchase of credits provides a high level of certainty that the benefits of a credit purchase will be realized, because all 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 each tracks their credit transactions and availability on the Regulatory In-lieu fee and Bank Information Tracking System (RIBITS). RIBITS was developed by the Corps with support from the Environmental Protection Agency, the USFWS, 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 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).

The private and State activities described below are likely to adversely affect CCV steelhead, CV spring-run Chinook salmon, SR winter-run Chinook salmon, and sDPS green sturgeon, and the designated critical habitats of CCV steelhead and CV spring-run Chinook salmon. These

potential factors are ongoing and expected to continue into the future. However, the extent of the adverse effects from these activities is uncertain, and it is not possible to accurately predict the extent of the effects from these future non-Federal activities.

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 runoff. 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. 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 that 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.

2.6.3. Rock Revetment and Levee Repair Projects

Depending on the scope of the action, some non-Federal riprap 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. Summary Status of CCV steelhead DPS and Designated Critical Habitat

The 2016 status review (NMFS 2016) concluded that overall, the status of CCV steelhead appears to have changed little since the 2011 status review and 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 on the American River, CCV steelhead populations continue to show an overall very low abundance and fluctuating return rates. The lower American River contains a spawning population of CCV steelhead, making it an important tributary of the Sacramento River watershed in terms of range-wide recovery for this species. The lower American River population of CCV steelhead is thought to be composed entirely of hatchery-produced fish. This population may aid in the range-wide recovery of CCV steelhead by increasing range-wide abundance, though they may introduce hatchery-related genetic effects if there is range-wide genetic introgression within this DPS. Critical habitat PBFs within the action area (freshwater rearing and migration corridors) have been degraded due to human activity. Degradation of these PBFs has contributed to significant population declines within the American River. Construction of dams has led to loss and alteration of rearing habitat through reduced flows and increased water temperatures. Migration corridors have likely been limited due to thermal barriers.

2.7.2. Summary Status of CV spring-run Chinook salmon ESU and Designated Critical Habitat

CV spring-run Chinook salmon remain at moderate risk of extinction based on the evaluation for years 2012 – 2014 (Williams *et al*. 2016). However, based on the severity of the drought and the low escapements, as well as increased pre-spawn mortality in Butte, Mill, and Deer creeks in 2015 and 2021, there is concern that these CV spring-run Chinook salmon strongholds will deteriorate into high extinction risk in the coming years based on the population size or rate of decline criteria (NMFS 2016b). CV spring-run Chinook salmon utilize the lower American River

for non-natal rearing, making it an important tributary for increasing the range-wide carrying capacity for rearing juveniles of this run. The CV spring-run Chinook salmon critical habitat PBFs of freshwater rearing habitat in the action area has been degraded due to human activity. Construction of dams has led to loss and alteration of rearing habitat through reduced flows and increased water temperatures. Presence of dams also restricts access to historical spawning and rearing habitat in the American River.

2.7.3. Summary Status of SR winter-run Chinook salmon ESU

There are several criteria that would qualify the winter-run Chinook salmon population at moderate risk of extinction: continued low abundance, a negative growth rate over two complete generations, significant rate of decline since 2006, increased hatchery influence on the population, and increased risk of catastrophe. Because there is still only one population that spawns below Keswick Dam, winter-run Chinook salmon are at a high risk of extinction in the long term. SR winter-run Chinook salmon utilize the lower American River for non-natal rearing, making it a vital tributary for increasing the range-wide carrying capacity for rearing juveniles of this run.

2.7.4. Summary Status of sDPS green sturgeon

The federally listed sDPS green sturgeon and its designated critical habitat occur in the action area and may be affected by the proposed action. It was listed as threatened in 2006 and its designated critical habitat in 2009. Juvenile and subadult sDPS green sturgeon potentially rear in the action area. There is a strong need for additional information regarding sDPS green sturgeon, especially concerning a robust abundance estimate, a greater understanding of their biology, and further information about their micro- and macro-habitat ecology. The upstream portion of the American River is not known to currently host sDPS green sturgeon spawning, although it may have historically; therefore, the American River is not a main focus of their recovery plan. The recovery plan lists the American River as a watershed that might have once produced spawning habitat and could be considered for additional spawning and rearing habitat should recovery criteria be refined (NMFS 2018).

2.7.5. Status of the Environmental Baseline and Cumulative Effects

Listed salmonids primarily use the action area as a migration corridor and rearing site. Within the action area, the essential features of freshwater rearing and migration habitats for salmon, steelhead and green sturgeon have been transformed from a meandering waterway lined with a dense riparian vegetation, to a highly leveed system under varying degrees of constraint of riverine erosional processes and flooding. Levees have been constructed near the edge of the river and most floodplains have been completely separated and isolated from the American River (USFWS 2000). Severe long-term riparian vegetation losses have occurred in the lower American River, and there are large open gaps without the presence of these essential features due to the high amount of riprap (USFWS 2000). The change in the ecosystem as a result of halting the lateral migration of the river channel, the loss of floodplains, the removal of riparian vegetation and IWM have likely affected the functional ecological processes that are essential for growth and survival of salmon, steelhead and green sturgeon in the action area.

The Cumulative Effects section of this opinion describes how continuing or future effects, such as the discharge of point and non-point source chemical contaminants 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.

2.7.6. Summary of Project Effects to Listed Species

1) Short-term effects (Construction-related effects)
   During construction, some behavioral effects, as well as injury or death to individual fish, are likely to result. Construction activities would occur during summer and early fall months, when the abundance of individual fish is low and outside most of the migrating adult and juvenile timing period, which would result in correspondingly low numbers of fish injured or killed. In addition, during construction activities, some water quality impacts may occur, such as increased sediment and turbidity, dewatering, and noise-related effects. However, with the implementation of avoidance and minimization measures, impacts would be minimized and affect a low number of listed species.

2) Long-term effects
   SR winter-run Chinook salmon, CV spring-run Chinook salmon, CCV steelhead and sDPS green sturgeon individuals will at some point pass under the new bridge structure. Juveniles of these species would be susceptible to increased predation and decreased water quality from the presence of this overwater structure. The proportion of the populations that will come in contact with the bridge structure as fish migrate through or rear in the lower American River is unknown, since the spatial distribution of fish across the channel by the different fish species and life stages is unknown. However, it is certain that the bridge structure increases the risk to passing juvenile SR winter-run Chinook salmon, CV spring-run Chinook salmon, CCV steelhead and sDPS green sturgeon, resulting in adverse effects.

2.7.7. Summary of Project Effects to Critical Habitat

Critical habitat has been designated for CCV steelhead and CV spring-run Chinook salmon within the Action Area. Critical Habitat for SR winter-run Chinook salmon and sDPS green sturgeon occur downstream of the Action Area, but not within it. Within the action area, the relevant PBFs of the designated critical habitats for listed CCV steelhead and CV spring-run Chinook salmon are migratory corridors and rearing habitat.

Based on the effects of the proposed Project described previously in this opinion, the impacts are expected to degrade designated critical habitat for both CCV steelhead and CV spring-run Chinook salmon. The quality of the current conditions of the PBFs for CCV steelhead and CV spring-run Chinook salmon in the action area are poor compared to historical conditions (pre-levees). In particular, levees, riprapping, and removal of riparian vegetation have greatly diminished the value of the aquatic habitat in the action area by decreasing rearing area, food resources via food-web degradation, and complexity and diversity of habitat forms necessary for holding and rearing (channel diversity). Perpetuating the overwater structure and in-water

structure with the bridge widening construction would contribute to the degradation of designated critical habitat.

The temporary construction impacts to designated critical habitat would negatively affect the ability of CCV steelhead and CV spring-run Chinook salmon to use the action area as rearing habitat and as migratory corridors during the overlap of migration periods and construction, as discussed in the Effects to Species section. Construction effects would last for the entirety of each work season, but would not permanently modify critical habitat function, as noise and turbidity would end after construction ends. The presence of the structure and loss of both in-water and riparian habitats will continue into the foreseeable future, thus creating a minor perpetual source of predation and water quality impacts (both beneficial and adverse, see Section 2.5.2) to the action area, and a permanent adverse effect to rearing and migratory PBFs.

2.7.8. Mitigation Bank Credits

Caltrans' mitigation credit purchase is expected to mitigate some of the impacts from the State Route 51 Capital City Bridge Deck Replacement Project by providing benefits to the CCV steelhead DPS, CV spring-run Chinook salmon ESU, and SR winter-run Chinook ESU by improving riverine or floodplain habitat conditions elsewhere through restoration and ensuring their preservation into the future. The benefits offered to these populations are expected to exist in perpetuity. Although some of the banks that cover the action area in their service area may not technically offer sDPS green sturgeon credits, we expect that some sDPS green sturgeon individuals should benefit from the purchase of credits from these banks, since individuals should be able to access the purchased riverine habitat areas created and maintained by the banks/programs.

2.7.9. Summary of Risk to the DPS/ESU for each Species and Critical Habitat

Small numbers from the multiple populations of CV spring-run in the Sacramento River Basin and the single population of SR winter-run Chinook salmon use the American River as non-natal rearing habitat, and are expected to be affected by temporary and permanent project impacts. The Salmonid Recovery Plan stated that for SR winter-run Chinook salmon certain unoccupied historic habitats that may be essential for recovery could be recommended for future critical habitat. Non-natal rearing tributaries to the Sacramento River are included in those recommendations. Non-natal rearing areas have potential for high recovery value, because they provide improved growing conditions, particularly during high winter flow events on the Sacramento River. Although the American River does not support a viable population of SR winter-run, the non-natal rearing potential can provide important habitat for growth and rearing of juveniles of the ESU (NMFS 2014).

For CV spring-run Chinook salmon, recovery criteria includes maintenance/establishment of four viable populations within the Northern Sierra Nevada Diversity Group (which includes the American River), and nine viable populations for the ESU, only one of which is currently considered viable. Although the lower American River is not expected to support a viable population, similar to SR winter-run Chinook salmon, the non-natal rearing habitat can provide important PBFs for growing conditions. Although the proposed Project is expected to adversely

affect this small proportion of the ESU of these species, most of the range-wide habitat supporting the species is outside of the American River.

Recovery Criteria for CCV steelhead includes four viable populations in the Northern Sierra Nevada Diversity Group (NMFS 2014). The lower American River was identified as a Core 2 population, meaning the watershed may have important contributions in supporting other viable populations, but due to lower abundance, or amount and quality of habitat, is not expected to become Core 1/viable population. The lower American River currently contains a spawning population of CCV steelhead, however, it is thought to be composed entirely of hatchery-produced fish. This population may aid in the range-wide recovery of CCV steelhead by increasing range-wide abundance, though they may introduce negative hatchery-related genetic effects if there is range-wide genetic introgression within this DPS. The proposed Project impacts represent a small loss which is not expected to reach the designation scale for the CCV steelhead DPS as a whole. Permanent project impacts represent a small loss in the scope of available critical habitat at the designation scale for CVV steelhead though the intrinsic value of the action area for conservation of the species remains high.

Although the American River might have once produced spawning habitat PBFs for sDPS green sturgeon, the watershed is not currently a focus of recovery criteria for the DPS. The Recovery Plan lists the American River watershed as a potential location that could be considered for additional spawning and rearing habitat, should recovery criteria be refined (NMFS 2018). The project location may serve as juvenile rearing habitat for sDPS green sturgeon in the Sacramento River Basin, making it an important tributary for increasing the range-wide carrying capacity for juveniles. Adults and sub-adults may utilize the project area during migration to the Upper Sacramento River. Avoidance and minimization measures will minimize impacts to individuals. The proportion of the sDPS green sturgeon population utilizing the action area and exposed to proposed Project impacts is small.

The proposed project is expected to impact a small proportion of the single population of SR winter-run Chinook salmon ESU and sDPS of green sturgeon, and a small proportion of multiple populations of CV spring-run Chinook salmon and possibly CCV steelhead. Although there are long-term and short-term impacts to the listed ESUs/DPSs, the impacts are expected to be minor, and in some cases will occur during seasons when fish abundance is very low. The proposed project is not expected to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild, nor appreciably diminish the value of designated or proposed critical habitat for the conservation of the species.

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, CV spring-run Chinook salmon, SR winter-run Chinook salmon, or sDPS green sturgeon. Nor is the proposed action is likely to or destroy or adversely modify the designated critical habitat of CCV steelhead or CV spring-run Chinook salmon.

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 that juvenile CV spring-run and SR winter-run Chinook salmon, and juvenile and adult CCV steelhead and sDPS green sturgeon will be killed, injured, or harmed as a result of Project implementation, due to expected presence in the action area during the scheduled in-water work window. Specifically, take will result from dewatering, pile-driving activities, riparian vegetation removal, and bridge structure presence in critical habitat.

It is not practical to quantify or track the amount or number of individuals that are expected to be incidentally taken as a result of the proposed action, due to the variability associated with the response of listed fish to the effects of the proposed action, 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 ecological surrogates, and it is practical to quantify and monitor the surrogates to determine the extent of incidental take that is occurring. The most appropriate threshold for incidental take includes the ecological surrogates of: 1) temporary habitat disturbance that is expected to occur during dewatering and pile-driving activities, and 2) permanent habitat disturbance expected to occur due to riparian removal and bridge structure presence in critical habitat.

Pile driving, dredging, dewatering, capture, and handling result in fish behavioral modifications, stranding, harm, injury or death. Riparian removal and bridge structure shade reduces primary productivity, decreases prey availability and increase the presence of predatory fish, leading to harm or death. NMFS anticipates incidental take will be limited to the following forms:

1) Take in the form of harm, injury and death to listed fish, due to handling or stranding during the dewatering of approximately 0.263 acres of river habitat. This habitat disruption will affect the behavior of listed fish, resulting in displacement and increased

predation, and decreased feeding. In turn, these will result in decreased survival, reduced growth and reduced fitness, respectively. Due to the timing of the activity, actual numbers for each species is expected to be low.

2) Take in the form of harm, injury and death to listed fish, due to pile driving. The 150dB RMS behavioral threshold is expected to be 2,154 meters from the pile resulting in stress to fish, interruptions in migration, increased predation and decreased feeding within this range. The 187dB and 183dB cumulative thresholds for injury are expected to be 293 meters from the pile, and the peak 206dB threshold for injury is expected to be up to 10 meters from the pile. Impacts to fish within this range includes injury or death. Due to the timing of the activity, actual numbers for each species is expected to be low.
3) Take in the form of harm to listed fish from loss and degradation of river channel habitat leading to injury and death by creating habitat conditions that decrease productivity and prey availability and increase predation associated with the riparian removal, dredging, and new bridge components. The total spatial footprint of the bridge over the waters of the American River is 1.0 acre. The total area of permanent in-water structure is 0.334 acres. The total area of permanent riparian vegetation removal is 0.319 acres. And the total dredging area is 4.70 acres.

If the total acreage of dewatering areas for the project exceeds 0.263 acres by more than 10 percent, then anticipated take levels described are also exceeded, triggering the need to reinitiate consultation. The exceedances allow for flexibility in on-the-ground-project changes that might be necessary. Such exceedances within 10 percent are expected to result in minor additional impacts, which remain consistent with the effects analyzed in this opinion. If monitoring indicates that sound levels greater than 206 dB peak, 187 dB or 183 dB cumulative SEL, or 150 dB RMS extend beyond the above described expected distances for pile size and attenuation type, work should stop and NMFS should be contacted within 24 hours, to determine if incidental take has been exceeded, or if sound levels can be reduced. If the above-described areas for spatial footprint of the bridge, permanent in-water structure, riparian removal, or dredging area are exceeded, the anticipated incidental take level described would be exceeded, 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, is 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 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 the contractor, to reduce mortality of listed species requiring capture/relocation in association with dewatering activities.
2) Measures shall be taken by Caltrans, or the contractor, to reduce underwater sound impacts related to pile driving.

3) Measures shall be taken by Caltrans, or the contractor, to reduce the extent of degradation and alteration to the habitats in the action area as a result of both the overwater and in-water structure placement, riparian removal, and dredging, related to both short- and long-term effects of this Project, as discussed in this opinion.
4) Measures shall be taken by Caltrans, or the contractor, to prepare and provide NMFS with a plan and a report describing how listed species in the action area would be protected and/or monitored and to document the observed effects of the action on listed species and critical habitat.

2.9.4. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the Federal action agency must comply (or must ensure that any applicant complies) with the following terms and conditions. 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. Only fish biologists trained in salmonid capture and relocation shall remove and relocate fish during dewatering activities.
    b. A fish relocation plan shall be submitted to NMFS for approval 30 days prior to commencing activities.
2) The following terms and conditions implement reasonable and prudent measure 2:
    a. A soft start method (initially driving the pile with low hammer energy and increasing hammer energy as necessary) shall be used at the beginning of each pile-driving day to allow fish to leave the work area before strikes become lethal.
    b. During the in-water work window of June 1– October 15, the daily work schedule shall be limited to between one hour after sunrise to one hour before sunset, to avoid peak fish migration times and to allow for cumulative SEL impacts to reset daily.
    c. Underwater sound monitoring shall be conducted during impact pile driving to ensure incidental take limits are not exceeded according to the ecological surrogates assigned.
        i. No more than 206 dB peak beyond a 10-meter radius from each pile driving with an impact hammer.
        ii. No more than 183 dB and 187 dB SEL cumulative beyond 293 meters from the construction site boundary per day.
        iii. No more that 150dB RMS beyond 2,154 meters from the construction site boundary.
3) The following terms and conditions implement reasonable and prudent measure 3:
    a. The removal of existing vegetation shall be minimized.
    b. During dredge operations the cutterhead shall be operated in close proximity to the bottom of the water column to minimize entrainment of fish.
4) The following terms and conditions implement reasonable and prudent measure 4:

a. Caltrans, or its applicant, shall provide a report of Project activities to NMFS by December 31 of each year that construction takes place
b. The report shall include a summary description of in-water construction activities, incidental take avoidance and minimization measures taken, and any observed take incidents, including number and species captured and relocated during dewatering.
c. Updates and reports required by these terms and conditions shall be submitted to:

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Assistant Regional Director
Central Valley Office
National Marine Fisheries Service
650 Capitol Mall, Suite 5-100
Sacramento CA 95814
Email: Cathy.Marcinkevage@noaa.gov
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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 continue to 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 and sturgeon habitat restoration projects.

2.11. Reinitiation of Consultation

This concludes formal consultation for the State Route 51 Capital City Bridge Deck Replacement 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.

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

The geographic extent of salmon freshwater EFH is described as all water bodies currently or historically occupied by PFMC managed salmon within the USGS 4th field hydrologic units identified by the fishery management plan (PFMC 2014). This designation includes the American River for all runs of Chinook salmon that historically and currently use these watersheds (winter-run, spring-run, fall-run, and late fall-run). The Pacific Coast salmon fishery management plan also identifies Habitat Areas of Particular Concern (HAPCs): complex channel and floodplain habitat, spawning habitat, thermal refugia, estuaries, and submerged aquatic vegetation, of which the HAPC for complex channel and floodplain habitat is expected to be either directly or indirectly adversely affected by the proposed action.

3.2. Adverse Effects on Essential Fish Habitat

Effects to Pacific Coast salmon HAPCs for complex channel and floodplain habitat are discussed in the context of effects to critical habitat PBFs as designated under the ESA and described in section 2.5.2. A list of adverse effects to EFH HAPCs is included in this EFH consultation. The effects are expected to be similar to the impacts affecting critical habitat and include the following: sediment and turbidity, in-channel disturbance from pile driving, and permanent habitat loss/modification.

Sediment and turbidity

- Degraded water quality

- Reduction/change in aquatic macroinvertebrate production

In-channel disturbance from pile driving
- Channel disturbance and noise pollution from pile-driving activity and associated piles

Permanent habitat loss/modification
- Reduced shelter from predators
- Reduction/change in aquatic macroinvertebrate production
- Reduced habitat complexity

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 revegetate areas adjacent to the channel with native plant species.
2) Caltrans should recommend to contractors to use biodegradable lubricants and hydraulic fluid in construction machinery. The use of petroleum alternatives can greatly reduce the risk of contaminants from directly or indirectly entering the aquatic ecosystem.

Fully implementing these EFH conservation recommendations would protect, by avoiding or minimizing the adverse effects described in section 3.2, above, 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 timeframes 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 Sacramento Area Water Forum, USFWS, California Department of Fish and Wildlife. Individual copies of this opinion were provided to Caltrans. The document will be available within two weeks at the NOAA Library Institutional Repository [https://repository.library.noaa.gov/welcome]. 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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