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-2019-00191

August 12, 2019

Cristan Caviel
Associate Environmental Planner
District 4
California Department of Transportation
PO Box 23660, MS 1A
Oakland, California 94623-0660

Re: Endangered Species Act Section 7(a)(2) Biological Opinion, and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response and Fish and Wildlife Coordination Act Recommendations for the State Route 12, 3R, Roadway Rehabilitation Project.

Dear Ms. Caviel:

Thank you for your letter of March 27, 2019, requesting initiation of consultation with the 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 State Route 12, 3R, Roadway Rehabilitation Project. 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 (MSA)(16 U.S.C. 1855(b)) for this action.

Based on the best available scientific and commercial information, the biological opinion concludes that the State Route 12, 3R, Roadway Rehabilitation 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 their designated critical habitats. For the above species, NMFS has included an incidental take statement with reasonable and prudent measures and non-discretionary terms and conditions that are necessary and appropriate to avoid, minimize, or monitor incidental take of listed species associated with the project.

NMFS 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 (NEPA 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,

Maria Rea
Assistant Regional Administrator

Enclosure

cc: To the file 151422-WCR2019-S00514
Robert Blizard, Caltrans D4 Environmental Branch Chief, Robert.Blizard@dot.ca.gov

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Endangered Species Act Section 7(a)(2) Biological Opinion and Fish and Wildlife Coordination Act Recommendations.

State Route 12, 3R, Roadway Rehabilitation Project.

National Marine Fisheries Service Environmental Consultation Organizer Tracking Number: WCRO-*2019-00191*

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

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 By:

Maria Rea
Assistant Regional Administrator

Date: *August 12, 2019*

TABLE OF CONTENTS

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 402.

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

Because the proposed action would modify a stream or other body of water, NMFS also provides recommendations and comments for the purpose of conserving fish and wildlife resources, and enabling the Federal agency to give equal consideration with other project purposes, as required under the Fish and Wildlife Coordination Act (FWCA) (16 U.S.C. 661 et seq.).

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). A complete record of this consultation is on file at NMFS California Central Valley Office in Sacramento, California.

1.2 Consultation History

- On December 20, 2018, NMFS and the California Department of Transportation (Caltrans) met onsite to discuss the State Route 12, 3R, Roadway Rehabilitation Project.

- On March 27, 2019, NMFS received a request for informal consultation from Caltrans for the project.

- On March 28, 2019, NMFS responded to Caltrans and requested clarification on the species determination as the original determination for all species was “not likely to adversely affect” however, formal consultation was requested and take was expected according to the biological assessment (BA).

- On April 3, 2019 Caltrans provided a written response with an amendment, to include a “likely to adversely affect” determination for species.

- On April 9, 2019, NMFS responded to Caltrans with a letter of insufficiency requesting more information about the proposed project design and effects.

- On April 18, 2019, Caltrans provided clarifying information. NMFS initiated consultation.

1.3 Proposed Federal Action

"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).

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).

Under the FWCA, an action occurs whenever the waters of any stream or other body of water are proposed or authorized to be impounded, diverted, the channel deepened, or the stream or other body of water otherwise controlled or modified for any purpose whatever, including navigation and drainage, by any department or agency of the United States, or by any public or private agency under Federal permit or license" (16 USC 662(a)).

Project Description
Caltrans is proposing to rehabilitate State Route (SR) 12 in three segments. Segment Three is the only portion of the project which affects federally-listed species and is therefore the only segment within the action area and discussed for the purpose of this opinion. This segment from Drouin Drive to the Rio Vista Bridge seeks to improve the existing drainage systems to eliminate flooding problems, upgrade guardrail, repair pavement failures, and place vegetation control under guardrails.

Improvements to the hydraulics system would include replacing existing 24 inch and 27 inch reinforced concrete pipes (RCPs) with larger 30 inch RCPs to increase system capacity. In order to upgrade the system to handle a 10-year event per the Highway Design Manual, a new 36-inch system and outfall to the Sacramento River would be built. This outfall would require disturbance of both the roadway, adjacent land, and the adjacent top banks/embankments of the river.

There are two designs to achieve this:

•One: upgrade the existing Caltrans 18 inch double culvert drainage system located approximately 250 feet (ft) north of the existing bridge (Rio Vista Bridge)

•Two: placement of a new outfall at a location 30 ft north and running parallel to the existing bridge

Both designs would be within the same project footprint with construction outside of the riverbanks consisting of saw cutting the existing roadway, excavation of a new trench, placement of culvert sections, and backfill/repaving. The construction process and impacts for each design would be the same; differences in design pertain to location, with design two being closer to the

existing bridge structure. Because the proposed outfall is below the mean higher high water (MHHW) construction along the face of the riverbank, Caltrans would require the contractor to use temporary shoring and best management practices (BMPs) to contain the construction work away from the river waters.

Work would consist of placement of a sheetpile cofferdam, clearing/grubbing, removing existing RSP, placement of temporary BMPs, placement of temporary shoring, placement of the new culvert outfall, backfilling, replacing the existing rock slope protection (RSP) and removing the temporary cofferdam. The RSP removal and replacement area consists of 10 ft on either side of the four-ft culvert and extends 40 ft out to the river, the total area would be approximately 30 ft by 40 ft.

Cofferdam
The cofferdam used for dewatering would be installed using sheetpiles and a vibratory hammer. The area of the cofferdam is estimated to be no greater than 50ft by 50ft (along the shore and out from the MHWM) with 0.05 acre of streambed disturbance/dewatering. The duration of dewatering is expected to be 10-20 working days. Fish would be relocated from the dewatered area according to a fish relocation plan, which would be provided to NMFS for approval prior to construction. Dewatering and fish relocation would be monitored by an approved biologist.

“Interrelated actions” are those that are part of a larger action and depend on the larger action for their justification. “Interdependent actions” are those that have no independent utility apart from the action under consideration (50 CFR 402.02).

1.4 Avoidance and Minimization Measures

The following are BMPs proposed by Caltrans, intended to minimize overall impacts associated with the proposed action.

- In-water work window
  - July 1 to October 15 to minimize adverse effects to fish migration
- Designation of Environmentally Sensitive Areas
  - Environmentally sensitive area fencing would be installed around the project limits along the banks of the Sacramento River to protect riparian vegetation and prevent encroachment of construction personnel into sensitive areas not needed for construction.
- Environmental Education
  - All personnel would attend an environmental education program delivered by a NMFS approved biologist prior to beginning any work on the project site.
- Erosion Control
  - Erosion control measures would be used throughout all phases of operations where sediment runoff from exposed slopes threaten to enter waterways.
  - Soil disturbance areas would be minimized.
  - Silt fences, stabilized construction entrances, and storm drain inlet protection would be used to maintain water quality.
  - Disturbed areas including the river bank would be reseeded.

- Spill Control and Countermeasures
    - A Spill Prevention Control and Countermeasures (SPCC) Plan would be prepared to address the emergency cleanup of any hazardous material and would be available onsite.
    - All equipment would be well maintained and equipment maintenance would be performed offsite.
    - Equipment would be inspected daily for leaks or spills, if encountered the source of the leak would be identified, leaked material cleaned up and the cleaning materials collected and disposed of properly.
    - All hazardous materials would be stored upland in containers designed to provide adequate containment.
- Dewatering Plan
    - Dewatering of the cofferdam as well as fish capture and relocation would be overseen by a NMFS approved, qualified fish biologist who would remain onsite during the entire dewatering process
    - A fish relocation plan would receive approval from NMFS 45 days prior to initiating any in-channel.

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 provides an opinion stating how the agency's actions would affect listed species and their critical habitats. If incidental take is reasonably certain to occur, section 7(b)(4) requires NMFS to provide an ITS that specifies the impact of any incidental taking and includes non-discretionary reasonable and prudent measures (RPMs) and terms and conditions to minimize such impacts.

2.1 Analytical Approach

This opinion includes both a jeopardy analysis and/or an adverse modification analysis. The jeopardy analysis relies upon the regulatory definition of "to jeopardize the continued existence of" a listed species, which is "to engage in an action that 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 for the conservation of a listed species. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features" (81 FR 7214).

The designations of critical habitat for some species uses the term primary constituent element (PCE) or essential features. The new critical habitat regulations (81 FR 7414) replace 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.

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

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

- Describe the environmental baseline in the action area.

- Analyze the effects of the proposed action on both species and their habitat using an "exposure-response-risk" approach.

- Describe any cumulative effects in the action area.

- Integrate and synthesize the above factors by: (1) Reviewing the status of the species and critical habitat; and (2) adding the effects of the action, the environmental baseline, and cumulative effects to assess the risk that the proposed action poses to species and critical habitat.

- Reach a conclusion about whether species are jeopardized or critical habitat is adversely modified.

- If necessary, suggest a RPA 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' current "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 value of the various watersheds and coastal and marine environments that make up the designated area, and discusses the current function of the essential PBFs that help to form that value 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 (*Oncorhynchus tshawytscha*)	Endangered 6/28/2005 70 FR 37160	According to the NMFS 2016, 5-year species status review, the overall status of Sacramento River winter-run Chinook salmon has declined since the 2010 status review, with the single spawning population on the mainstem Sacramento River no longer at a low risk of extinction. New information indicates an increased extinction risk to winter-run Chinook salmon. The larger influence of the hatchery broodstock in addition to the rate of decline in abundance over the past decade has placed the population at a moderate risk of extinction and because there is only one remaining population, the extinction risk for the ESU has increased from moderate risk to high risk of extinction.
Central Valley spring-run Chinook salmon (*O. tshawytscha*)	Threatened 9/2/2005 70 FR 52488	According to the NMFS 2016, 5-year species status review, the status of the CV spring-run Chinook salmon ESU, until 2015, had improved since the 2011, 5-year species status review. The improved status was attributed to restoration, as well as improved ocean and in-river conditions. Recent declines of many of the dependent populations, high pre-spawn and egg mortality during the 2012 to 2015 drought, uncertain juvenile survival during the drought are likely increasing the ESU's extinction risk. Extremely low returns in 2017 and 2018 are concerning.

Species	Listing Classification and Federal Register Notice	Status Summary
California Central Valley Steelhead (*O. mykiss*)	Threatened 9/2/2005 70 FR 52488	According to the NMFS 2016, 5-year species status review, the status of CCV steelhead appears to have changed little since the 2011 status review that concluded that the DPS was in danger of extinction. Most wild CCV populations are very small, are not monitored, and may lack the resiliency to persist for protracted periods if subjected to additional stressors, particularly widespread stressors such as climate change. The genetic diversity of CCV steelhead has likely been impacted by low population sizes and high numbers of hatchery fish relative to wild fish. The life-history diversity of the DPS is mostly unknown, as very few studies have been published on traits such as age structure, size at age, or growth rates in CCV steelhead. Steelhead is likely to become endangered within the foreseeable future through all or a significant portion of its range.
Green sturgeon (*Acipenser medirostris*)	Threatened 8/9/2009 74 FR 52300	According to the NMFS 2015, 5-year species status review, some threats to the species have recently been eliminated, such as take from commercial fisheries and removal of some passage barrier, but the species viability continues to be constrained by factors such as a small population size, lack of multiple populations, and concentration of spawning sites into just a few locations. The species continues to face a moderate risk of extinction.

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

Species	Designation Date and Federal Register Notice	Status Summary
Sacramento River Winter-run Chinook ESU	6/16/1993 58 FR 33212	Designated critical habitat includes the Sacramento River from Keswick Dam (river mile (RM) 302) to Chipps Island (RM 0) at the westward margin of the Sacramento-San Joaquin Delta (Delta); all waters from Chipps Island westward to the Carquinez Bridge, including Honker Bay, Grizzly Bay, Suisun Bay, and the Carquinez Strait; all waters of San Pablo Bay westward of the Carquinez Bridge; and all waters of San Francisco Bay north of the San Francisco-Oakland Bay Bridge from San Pablo Bay to the Golden Gate Bridge. The designation includes the river water, river bottom and adjacent riparian zones used by fry and juveniles for rearing. PBFs considered essential to the conservation of the species include: Access from the Pacific Ocean to spawning areas; availability of clean gravel for spawning substrate; adequate river flows for successful spawning, Incubation of eggs, fry development and emergence, and downstream transport of juveniles; water temperatures at 5.8–14.1°C (42.5–57.5°F) for successful spawning, egg incubation, and fry development; riparian and floodplain habitat that provides for successful juvenile development and survival; and access to downstream areas so that juveniles can migrate from spawning grounds to the San Francisco Bay and the Pacific Ocean. Currently, many of the PBFs of winter-run Chinook salmon critical habitat are degraded and provide limited high quality habitat. Although the current conditions of winter-run Chinook salmon critical habitat are significantly limited and degraded, the spawning habitat, migratory corridors, and rearing habitat that remain are considered to have high intrinsic value for the conservation of the species.
Central Valley Spring-run Chinook salmon ESU	9/2/2005 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. Currently, many of the PBFs of CV spring-run Chinook salmon critical habitat are degraded, and provide limited high quality habitat. Although the current conditions of CV spring-run Chinook salmon critical habitat are significantly degraded, the spawning habitat, migratory corridors, and rearing habitat that remain are considered to have high intrinsic value for the conservation of the species.
California Central Valley Steelhead	9/2/2005 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. Many of the PBFs of CCV steelhead critical habitat are currently degraded and provide limited high quality habitat. Although the current conditions of CCV steelhead critical habitat are significantly degraded, the spawning habitat, migratory corridors, and rearing habitat that remain in the Sacramento/San Joaquin River watersheds and the Delta are considered to have high intrinsic value for the conservation of the species as they are critical to ongoing recovery effort.
Southern Distinct Population Segment (sDPS) of North American Green Sturgeon	8/9/2009, 74 FR 52300	Critical habitat includes the stream channels and waterways in the Delta to the ordinary high water line. Critical habitat also includes the main stem Sacramento River upstream from the I Street Bridge to Keswick Dam, the Feather River upstream to the fish barrier dam adjacent to the Feather River Fish Hatchery, and the Yuba River upstream to Daguerre Dam. Coastal marine areas include waters out to a depth of 60 fathoms, from Monterey Bay in California, to the Strait of Juan de Fuca in Washington. Coastal estuaries designated as critical habitat include San Francisco Bay, Suisun Bay, San Pablo Bay, and the lower Columbia River estuary. Certain coastal bays and estuaries in California (Humboldt Bay), Oregon (Coos Bay, Winchester Bay, Yaquina Bay, and Nehalem Bay), and Washington (Willapa Bay and Grays Harbor) are also included as critical habitat for sDPS green sturgeon. PBFs considered essential to the conservation of the species for freshwater and estuarine habitats include food resources, substrate type or size, water flow, water quality, migration corridor; water depth, sediment quality. Currently, many of the PBFs of sDPS green sturgeon are degraded and provide limited high quality habitat. Although the current conditions of green sturgeon critical habitat are significantly degraded, the spawning habitat, migratory corridors, and rearing habitat that remain in both the Sacramento/San Joaquin River watersheds, the Delta, and nearshore coastal areas are considered to have high intrinsic value for the conservation of the species.

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. CV 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). CV 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 CCV 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 CCV 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 CCV 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.

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 action area is not the same as the project boundary area because the action area must delineate all areas where federally listed populations of salmon, steelhead, and green sturgeon may be affected by the implementation of the action.

This repair would take place on SR 12, a conventional two-lane highway serving as an east-west corridor connecting Napa, Sonoma, and Solano counties and the San Joaquin Valley and Stockton area. This project segment is adjacent to the Rio Vista Bridge, which carries California State Route 12 across the Sacramento River at Rio Vista, California. The action area includes the immediate construction area where the culvert replacement would occur and extends both upstream and downstream 50 ft. The upstream and downstream extent of the action area include effects of in-water construction activities, including sound, habitat disturbance, and increases in turbidity. Within the action area there is 0.2 acre of critical habitat within the Sacramento River.

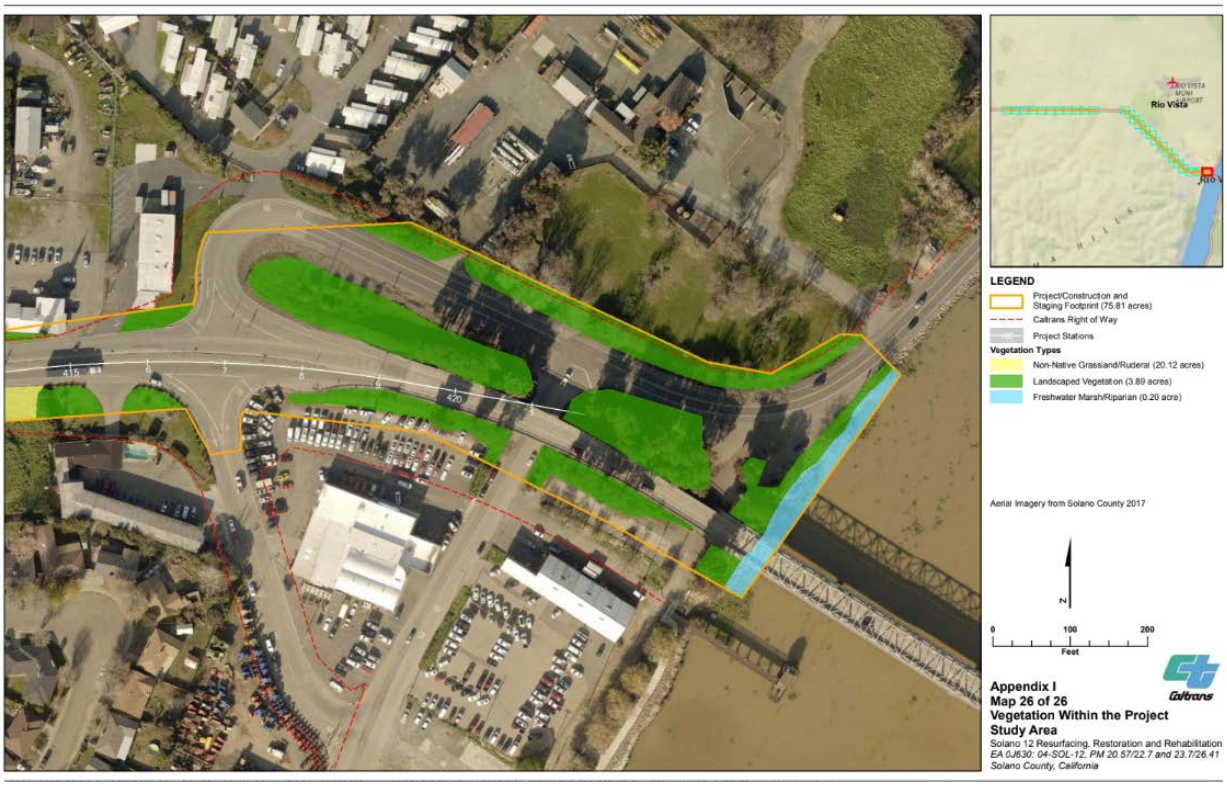

Figure 1: Habitat types within the project footprint. The action area consists of the extent of this footprint as well as upstream and downstream project effects that may occur.

2.4 Environmental Baseline

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 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process (50 CFR 402.02).

The action area encompasses the Sacramento River in the North Delta and associated riverbank and riparian areas adjacent to the repair, this area functions primarily as migration habitat for CCV steelhead, CV spring-run Chinook salmon, Sacramento River winter-run Chinook salmon, and sDPS green sturgeon. The action area is within designated critical habitat for all of the above

listed species. Due to the life history timing of these species, it is possible for one or more of the following life stages to be present within the action area throughout the year: adult migrants, rearing juveniles, or emigrating juveniles.

The Sacramento River has undergone many changes from its historical condition. The magnitude and duration of peak flows during the winter and spring, which affects listed salmonids and sturgeon in the action area, are reduced by water impoundment in upstream reservoirs. Instream flows during the summer and early fall months have increased over historic levels for deliveries of municipal and agricultural water supplies. Overall, water management now reduces natural variability by creating more uniform flows year-round. Current flood control practices require peak flood discharges to be held back and released over a period of weeks to avoid overwhelming the flood control structures downstream of the reservoirs (i.e., levees) and low lying terraces under cultivation (i.e., orchards and row crops) in the natural floodplain along the basins' tributaries. Consequently, managed flows in the main stem of the rivers often truncate the peak of the flood hydrograph and extend the reservoir releases over a protracted period. These actions reduce or eliminate the scouring flows necessary to mobilize sediments and create natural riverine morphological features. Furthermore, the unimpeded river flow is severely reduced by the combined storage capacity of the different reservoirs located throughout the watershed. Very little of the natural hydrologic input is allowed to flow through the reservoirs to the valley floor sections of the tributaries leading to the Delta. Most is either stored or diverted for anthropogenic uses. Point sources and non-point sources of pollution resulting from agricultural discharge and urban and industrial development occur upstream of the action area. Environmental stresses as a result of low water quality can lower reproductive success and may account for low productivity rates in fish. Organic contaminants from agricultural drain water, urban and agricultural runoff from storm events, and high trace element (i.e., heavy metals) concentrations may deleteriously affect early life-stage survival of fish in the Central Valley watersheds (USFWS 1995).

The action area is within designated critical habitat for winter-run Chinook salmon, CV spring-run Chinook salmon, CCV steelhead and green sturgeon. Habitat requirements for Chinook salmon and steelhead are similar. The PBFs of salmonid habitat within the action area include: freshwater rearing habitat and freshwater migration corridors. The essential features of these PBFs include adequate substrate, water quality, water quantity, water temperature, water velocity, shelter, food, riparian vegetation, space, and safe passage conditions. The intended conservation roles of habitat in the action area are to provide appropriate freshwater migration conditions for juveniles and unimpeded freshwater migration conditions for adults. Similarly green sturgeon PBFs within the action area include: food resources, substrate type or size, water flow, water quality, migratory corridor free of passage impediments, depth (holding pools) and sediment quality. Currently, many of the PBFs of sDPS green sturgeon are degraded and provide limited high quality habitat. Additional features that lessen the quality of migratory corridors for juveniles include unscreened or inadequately screened diversions, altered flows in the Delta, and presence of contaminants in sediment. Although the current conditions of listed salmonid and green sturgeon critical habitat are significantly degraded, the spawning habitat, migratory corridors, and rearing habitat that remain in both the Sacramento/San Joaquin River watersheds, the Delta, and nearshore coastal areas are considered to have high intrinsic value for the conservation of the species. The action area is outside of spawning habitat for salmonids and sturgeon.

The action area is located along the Sacramento River within the Delta, which is utilized by all populations of juvenile and adult listed fish in the Sacramento River Basin, as a migratory corridor. The NMFS Recovery Plan for the Evolutionarily Significant Units of Sacramento River winter-run Chinook salmon and Central Valley spring-run Chinook salmon and the Distinct Population Segment of California Central Valley steelhead (Recovery Plan, NMFS 2014), identifies the Delta as being of value to the recovery of listed salmonids. Delta recovery actions include adaptive management to achieve increased through-Delta survival for salmonids originating in the Sacramento River basin. Recovery actions pertaining to these survival objectives focus around managing flows and conducting landscape scale restoration of ecological functions. Although current conditions within the Delta are significantly degraded, this area has high intrinsic value for the recovery of these species, especially because all listed salmonid population groups within the Sacramento River Basin utilize the Delta at varying life stages. The NMFS Recovery Plan for the Southern Distinct Population Segment of North American Green Sturgeon (NMFS 2018) focuses on recovery actions in the Delta as threats to rearing habitat are considered one of the greatest impediments to recovery. Non-point source contaminants are designated a high threat for green sturgeon in the Delta, these contaminants can directly affect fish through reduced fitness or indirectly via reduction of prey base. Continued implementation of BMPs is important to maintain conditions within the Delta, although the current conditions in the Delta are degraded there is high intrinsic value for green sturgeon which utilize the Delta both as rearing juveniles and feeding adults.

2.5 Effects of the Action

Under the ESA, "effects of the action" means the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR 402.02). Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur.

2.5.1 Effects of the Proposed Action to Listed Fish Species

The effects of the proposed action are based on best available life history information and monitoring data on the four species for which ESA designated critical habitat and geographical range occurs in the action area. In-water work would occur July 1 through October 15. Life stages potentially present include adult CV spring-run Chinook salmon, juvenile and adult winter-run Chinook salmon, juvenile and adult CCV steelhead, and juvenile, subadult, and adult sDPS green sturgeon. In this section of the Sacramento River where the proposed action would occur, there are no known spawning areas for salmonids or green sturgeon, so impacts or mortality to eggs are not expected to occur. The following analysis includes potential sources of adverse effects to the species resulting from the proposed action.

Hydroacoustic Impacts
Installation of the cofferdam would involve installation of sheetpiles near the bank of the Sacramento River. When piles are driven into riverbed substrate, sound propagates through the water that can kill, injure, or disturb fish. The most common form of acute injury to fish resulting from pile driving is barotrauma to the fish's swim bladder. When sound propagates through the water, tissues of the swim bladder may become ruptured or torn as the sound wave passes

through the fish and pressure levels rapidly rise and fall, causing the swim bladder to expand and contract. Internal organs adjacent to the swim bladder may be injured as well (Gaspin 1975). Both salmonids and sturgeon have physostomous swim bladders that may become injured in this way. The Fisheries Hydroacoustic Working Group (FHWG 2008) has established threshold sound levels in which acute injury, cumulative injury (sound exposure level (SEL) for fish either ≥2grams (g) or <2g), or behavioral effects (root mean squared (RMS)) may occur. Those levels are 206 dB peak, 187-dBSEL, 183-dBSEL, and 150-dBRMS respectively. The degree to which an individual fish exposed to underwater sound will be affected is dependent on a number of variables, such as the species of fish, size of the fish, presence of a swim bladder, sound pressure intensity and frequency, shape of the sound wave (rise time), depth of the water around the pile, and the bottom substrate composition and texture. Responses can vary from a startle response to immediate mortality. Acute injury or death may occur to any sized fish if they are within range of the source of sound to the extent that the sound exceeds a threshold of 206-dBPEAK at any given time. Acute injury may also occur as a result of cumulative exposure to sound pressure if fish are exposed to levels exceeding 187-dBSEL (for fish ≥2g) and 183-dBSEL (for fish <2g). Behavioral effects may occur if sound levels exceed the established threshold of 150-dBRMS. These behavioral changes may have deleterious effects to growth and survival of exposed fish. Sound waves below 150-dBRMS are considered to be "effective quiet" and are not considered to be harmful to fish. Behavioral effects can include disruptions in feeding behavior, predatory avoidance behavior, and migratory behavior; impacting overall fitness of a species. "Agitation" is indicated by a change in swimming behavior, such as detected by Shin (1995) with salmonids, or "alarm" detected by McCauley (2003). Additionally, Popper (1997) observed a "startle" response indicated by a quick burst in swimming following pile strikes.

Sheetpile installation for the cofferdam would be achieved using a vibratory hammer. Vibratory drivers vibrate the pile into the sediment by use of a vertically oscillating head placed on top of the pile. The vibratory action causes the sediment immediately surrounding the pile to liquefy allowing the pile to sink into the sediment. Vibratory hammers generally produce less sound than impact hammers and reduce potential for adverse effects to fish. In some cases, installation of sheet piles in a river has resulted in sound pressure levels that were not measurable above background levels (Caltrans 2015). Impacts to listed fish is anticipated to be minimal because of the use of vibratory installation of sheet piles, and would be limited to behavioral changes, and not expected to result in reduced fitness.

Dewatering and Fish Relocation

Following installation of the cofferdam, the dewatering plan would be implemented for 10-20 working days. Dimensions of the cofferdam would not exceed 50 ft along the shore and 50ft out into the river from the MWHM. During the dewatering process a fish relocation plan would be followed including monitoring by a NMFS approved biologist. Fish would first be captured and handled to be removed from the area to be dewatered. Some incidental injury or mortality may occur during this process as fish experience abrasion from handling, exposure to air, and close proximity to one another as they are relocated downstream. Caltrans would provide a fish capture/relocation plan to NMFS for approval 45 days prior to the start of construction. Any fish captured from the cofferdam area would be relocated to the main channel immediately downstream of construction. Installation of the cofferdam may entrap juvenile winter-run Chinook salmon, CV spring-run Chinook salmon, CCV steelhead, and green sturgeon. The in-

water work window limits fish presence, and the footprint of the cofferdam would be small proportional to the river, which allows fish to avoid the work area. Additionally, the cofferdam installation process would likely startle fish near the construction site and cause many to leave the immediate area of work to adjacent similar habitat. Numbers of each species isolated, captured and relocated are expected to be small, and a small proportion of those fish isolated are expected to avoid the capture/relation process, and die during dewatering.

Increased Sedimentation and Turbidity
Increased sedimentation and turbidity may occur during cofferdam installation and construction activities within the active channel. Installation/removal of temporary sheet piles and removal/replacement of RSP would disturb the substrate possibly resulting in increased turbidity and sedimentation.

Juvenile and adult winter-run Chinook salmon and CCV steelhead, and adult CV spring-run Chinook salmon are known to use the action area as a migration corridor and for rearing during the proposed in-water work window and are therefore expected to be present during construction activities. Increased sedimentation and turbidity could have direct and indirect adverse effects to adult fish though gill fouling, reduced foraging ability and reduced predator avoidance (Kemp et al. 2011). Juvenile salmonids are unlikely to avoid increased levels of turbidity below a level of 70 nephelometric turbidity units (NTU) (Bash et al. 2001). As a result, they may be at greater risk to turbidity and sediment-related effects than adults. One effect of increased turbidity that has important implications for juvenile salmonids is that predator avoidance behavior has been shown to decrease (Gregory 1993). Growth and survival amidst increased sediment and turbidity levels have also been shown to decrease resulting from reduced prey detection and availability. Physical injury is also possible due to increased activity, aggression, and gill fouling (Suttle et al. 2004, Kemp et al. 2011). Less information is available on the abundance and distribution at various life stages of sDPS green sturgeon. However, based on the best available information on their life history, individuals at the juvenile, sub-adult, and adult life stages could be present in the action area. Large increases in turbidity as well as sedimentation events have the potential to cause toxins to be resuspended and become available for uptake by fish via gill filaments which may cause acute injury by gill fouling in sDPS green sturgeon (Chapman et al 2019).

Due to the size of the Sacramento River, any increase in turbidity associated with proposed instream work is likely to be brief and localized, attenuating downstream as suspended sediment settles out of the water column. Potential direct and indirect effects of increased sedimentation and turbidity would be minimized through implementation of proposed BMPs. All in water work would be conducted between July 1 and October 15 to minimize exposure to fish. To prevent the potential discharge of turbid water into the Sacramento River that may result from temporary de-watering activities, water removed from the de-watered areas will be filtered and/or treated in a manner to ensure conformance with the water quality requirements of the approved 401 permit, issued by the Central Valley RWQCB, prior to being discharged into the aforementioned receiving waters. There is still some potential for impact to adult and juvenile fish due to temporary, localized plumes of turbidity during these processes. However, BMP actions will minimize the extent of adverse effects associated with the proposed action and impacts to listed fish are expected to be minimal.
Contaminants and Pollution-related Effects

The proposed action would involve heavy construction equipment and activities that could impair water quality if a spill were to occur. Potential sources of pollutants include petroleum products such as fuel, hydraulic fluid, and petroleum-based lubricants. BMPs, and an SPCC will be in place, and avoidance and minimization techniques would be implemented, minimizing the probability of pollutant incursion into the Sacramento River. However, unlike sedimentation and turbidity-related effects, potential pollution-related effects have the potential to be persistent in the action area and may affect multiple species and life stages if they were to occur.

High concentrations of contaminants can cause direct and indirect effects to fish. Direct effects include mortality from exposure or increased susceptibility to disease that reduces the overall health and survival of the exposed fish. The severity of these effects depends on the contaminant, the concentration, duration of exposure, and sensitivity of the affected life stage. A potential indirect effect of contamination is reduced prey availability; invertebrate prey survival could be reduced following exposure, therefore making food less available for fish. Fish consuming infected prey may also absorb toxins directly.

For listed species, potential direct and indirect effects of reduced water quality during Project construction will be minimized with proposed BMPs including measures to control non-storm water management and waste management practices. Equipment will be in good working order and free of dripping or leaking fluids. Any necessary equipment washing will be conducted where water is prevented from flowing into the drainage conveyance systems and receiving waters. An emergency response plan will also be put into place including strict onsite handling procedures to prevent construction and maintenance materials from entering the river, procedures related to refueling, operating, storing, and staging construction equipment, as well as preventing and responding to spills. BMPs will be in place for spill containment measures. Returning turbid water to the river will be prevented by filtering discharge with a filter bag, diverting to a settling tank and treatment of the water consistent with the requirements of the waste discharge permit issued by the Central Valley RWQCB. With these BMPs in place, impacts to adult or juvenile winter-run Chinook salmon, CV spring-run Chinook salmon, CCV steelhead or green sturgeon from contaminants are not expected to occur.

2.5.2 Effects of the Proposed Action to Critical Habitat

Critical habitat has been designated for winter-run Chinook salmon, CV spring-run Chinook salmon, CCV steelhead and sDPS green sturgeon. The overarching PBFs of salmonid habitat within the action area include: freshwater rearing habitat and freshwater migration corridors. For green sturgeon, PBFs include: food resources, substrate type or size, water flow, water quality, migratory corridor free of passage impediments, depth (holding pools) and sediment quality.

Migratory corridor PBFs for salmonids and sturgeon are expected to be affected by the proposed action. In-stream work is expected to temporarily affect a 50ftlength of critical habitat, with an instream footprint of a maximum of 0.2 acres of critical habitat.

Turbidity and Sedimentation
There is potential for degradation of migratory and rearing 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 winter-run Chinook salmon, CV spring-run Chinook salmon, CCV steelhead, and green sturgeon. Sedimentation has the potential to reduce benthic invertebrate density and result in the loss of physical habitat. Therefore, the following PBFs for salmonids and sturgeon could potentially be impacted by turbidity and sedimentation: food resources, water quality, rearing, migratory corridor, and sediment quality. BMPs and minimization and avoidance measures will be implemented during construction to minimize project-disturbed soil on land from entering the water. Because of the large size and relatively high flows in the Sacramento River, the majority of the disturbed soil is expected to disperse downstream, and will not accumulate in one area. Potential adverse effects to critical habitat PBFs for the species addressed in this opinion resulting from turbidity and sedimentation are not expected to occur at a scale in which habitat will be permanently impacted or reduce the value of critical habitat. With the minimization and avoidance measures included in the proposed action, and consideration of flows that are likely to occur in the Sacramento River during construction activities, turbidity and sedimentation are expected to result in minor effects to PBFs of designated critical habitat for ESA listed anadromous fish species in the action area.

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). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

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

2.6.1 Agricultural Practices

Agricultural practices in the action area may adversely affect riparian and wetland habitats through upland modifications of the watershed that lead to increased siltation or reductions in water flow. 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 then 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 salmonid and sDPS green sturgeon reproductive success and survival rates (Dubrovsky et al. 1998, Daughton 2003).

2.6.2 Increases in 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 will 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, will not require Federal permits, and thus will not undergo review through the ESA section 7 consultation process with NMFS.

Increased urbanization is also 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 will 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 suspending contaminated sediments and degrading areas of submerged vegetation. This in turn will reduce habitat quality for the invertebrate forage base required for the survival of juvenile salmonids and green sturgeon 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

Cumulative effects include non-Federal RSP projects. Depending on the scope of the action, some non-Federal rock revetment projects carried out by state or local agencies do not require Federal permits. These types of actions and illegal placement of RSP occur within the Sacramento River watershed. Most of the levees have roads on top of the levees, which are either maintained by the county, reclamation district, owner, or by the state. Landowners may utilize roads at the top of the levees to access part of their agricultural land. The effects of such actions result in continued fragmentation of existing high-quality habitat, and conversion of complex nearshore aquatic to simplified habitats that affect salmonids in ways similar to the adverse effects associated with this project.

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 diminishes the value of designated or proposed critical habitat for the conservation of the species.

In our *Rangewide Status of the Species* section, NMFS summarized the current likelihood of extinction of each of the listed species. We described the factors that have led to the current

listing of each species under the ESA and across their ranges. These factors include past and present human activities and climatological trends and ocean conditions that have been identified as influential to the survival and recovery of the listed species. Beyond the continuation of the human activities affecting the species, we also expect that ocean condition cycles and climatic shifts will continue to have both positive and negative effects on the species' ability to survive and recover. The *Environmental Baseline* section reviewed the status of the species and the factors that are affecting their survival and recovery in the action area. The *Effects of the Action* section reviewed the exposure of the species and critical habitat to the proposed action. NMFS then evaluated the likely responses of individuals, populations, and impacts to critical habitat. The *Cumulative Effects* section described future activities within the action area that are reasonably certain to have a continued effect on listed fish.

In order to estimate the risk to CCV steelhead, CV spring-run Chinook salmon, winter-run Chinook salmon, and green sturgeon as a result of the proposed action, NMFS uses a hierarchical approach. The condition of the ESU or DPS is summarized from the *Status of the Species* section of this opinion. We then consider how the status of populations in the action area are affected by the proposed action, as described in the *Environmental Baseline* section. Effects on individuals are summarized, and the consequence of those effects is applied to establish risk to the diversity group, ESU, or DPS.

Status of the Species and Environmental Baseline
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), and 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. Although many of the PBFs of winter-run Chinook salmon critical habitat are currently degraded and provide limited high quality habitat. However, the spawning habitat, migratory corridors, and rearing habitat that remain are considered to have high intrinsic value for the conservation of the species.

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 poor returns in 2016, 2017, 2018, there is concern that these CV spring-run Chinook salmon strongholds will deteriorate into high extinction risk based on the population size or rate of decline criteria (NMFS 2016b). Although many of the PBFs of CV spring-run Chinook salmon critical habitat are currently degraded and provide limited high quality habitat, the spawning habitat, migratory corridors, and rearing habitat that remain are considered to have high intrinsic value for the conservation of the species.

The status of the CCV steelhead DPS appears to have remained unchanged since the 2016 status review and the DPS is likely to become endangered within the near future throughout all or a significant portion of its range (NMFS 2016a). Many of the PBFs of CCV steelhead critical habitat are degraded and provide limited high quality habitat. However, the spawning habitat, migratory corridors, and rearing habitat that remain in the Sacramento watershed are considered

to have high intrinsic value for the conservation of the species, as they are critical to ongoing recovery efforts.

The viability of sDPS green sturgeon is constrained by factors such as a small population size, lack of multiple populations, and concentration of spawning sites into just a few locations. The risk of extinction is believed to be moderate (NMFS 2015). Currently, many of the PBFs of sDPS green sturgeon are degraded and provide limited high quality habitat. Factors that lessen the quality of migratory corridors for juveniles include unscreened or inadequately screened diversions, altered flows in the Delta, and presence of contaminants in sediment. Critical habitat PBFs of spawning habitat, migratory corridors, and rearing habitat that remain are considered to have high intrinsic value for the conservation of the species.

The evidence presented in the *Environmental Baseline* section indicates that past and present activities within the Sacramento River basin have caused significant habitat loss, degradation, and fragmentation. This has significantly reduced the quality and quantity of the remaining PBFs within action area of the Sacramento River for the populations of CCV steelhead, winter-run and CV spring-run Chinook salmon, and sDPS green sturgeon that utilize this area. Alterations in the flow regimes of the Sacramento River system, removal of riparian vegetation and shallow water habitat, reduced habitat complexity, construction of armored levees for flood protection, and the influx of contaminants from agricultural and urban discharges have also substantially reduced the functionality of the waterways.

Cumulative Effects
Water diversions, increased urbanization, and rock revetment and levee projects are reasonably expected to continue in the future in the action area. The effects of these actions result in the continued degradation, simplification, and fragmentation of the riparian and freshwater habitat. Some of these actions, particularly those that are situated away from waterbodies, will not require Federal permits, and thus will not undergo review through the ESA section 7 consultation process with NMFS.

Summary of the Effects of the Proposed Action
Fish will be harassed, injured, or killed during completion of the proposed action through various pathways. Direct effects from Project activities could result in negative effects through behavioral responses, or prey items killed from sediment or pollutant buildup. Any spills or leaks of toxic substances from construction equipment could cause direct or indirect effects to fish that risk mortality or reduces the overall health and survival of exposed fish. A dewatering and relocation plan involves capturing fish and physically handling and relocating them, which risks injury and death. Construction-related increases in sedimentation and siltation above background level could potentially affect fish species and their habitat reducing survival of juveniles or interfering with feeding, migrating, and rearing activities. Avoidance and mitigation measures, as well as BMPs, have been put in place to minimize any negative effects to listed species.
Critical habitat has been designated in the action area for winter-run Chinook salmon, CV spring-run Chinook salmon, CCV steelhead, and sDPS green sturgeon. PBFs affected for each species are described in section 2.5.2. The proposed action will not have permanent effects to the above mentioned PBFs. Temporary habitat effects such as turbidity are expected to be minimal

and localized with no permanent effects on PBFs. Displacement and replacement of RSP will continue impacts to approximately a 30ft by 40ft area of the river.

Effects to the ESUs/DPSs
According to the most recent status reviews, winter-run Chinook salmon are at risk of extinction, and CV spring-run Chinook salmon, CCV steelhead, and sDPS green sturgeon are at risk of becoming endangered, due to past and present activities causing habitat loss, degradation and fragmentation. Because the project location is on the Sacramento River within the Delta, it serves as a migratory corridor for all populations of listed salmonids and sturgeon in the Sacramento River Basin as they move between the ocean and riverine habitat. The proposed project is expected to impact a small proportion of multiple populations and life stages of listed fish. 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, any effects of interrelated and interdependent activities, and cumulative effects, it is NMFS' opinion that the proposed action is not likely to jeopardize the continued existence of the Sacramento River winter-run Chinook salmon ESU, the CV spring-run Chinook salmon ESU, the CCV steelhead DPS, and the sDPS of green sturgeon, or destroy or adversely modify their respective designated critical habitat.

2.9 Incidental Take Statement

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

2.9.1 Amount or Extent of Take

In the opinion, NMFS determined that incidental take is reasonably certain to occur as follows: NMFS anticipates that adult CV spring-run Chinook salmon, juvenile and adult winter-run Chinook salmon, juvenile and adult CCV steelhead, and juvenile, subadult, and adult sDPS green sturgeon will be killed, injured, harassed, or harmed as a result of project implementation due to expected presence in the action area during the scheduled in-water work window. Take is expected to occur in the form of injury, death, and harm resulting from dewatering activities[NA1]. Additionally, take is expected as a result of replacing RSP in critical habitat. RSP is expected to reduce the primary productivity of the effected habitat and increase the number of predatory fishes and their ability to prey resulting in injury, death and harm to listed species.

It is not practical to quantify or track the amount or number of individuals that are expected to be incidentally taken per species as a result of the proposed action due to the variability associated with the response of listed species to the effects of the proposed action, the varying population size of each species, annual variations in the timing of spawning and migration, individual habitat use within the action area, and difficulty in observing injured or dead fish.

However, it is possible to estimate the extent of incidental take by designating 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 is an ecological surrogate of temporary habitat disturbance expected to occur during dewatering activities and replacement of RSP.

Dewatering, capture, and handling result in fish behavioral modifications or stranding leading to harm or death. Placement of RSP results in increased predation and decreased habitat productivity leading to harm or death. NMFS anticipates incidental take will be limited to the following forms:

1) Take in the form of capture, injury and death to CV spring-run Chinook salmon, winter-run Chinook salmon, CCV steelhead, and sDPS green sturgeon due to handling or stranding during the dewatering of 2,500 square ft (50ft by 50ft), or about 0.05 acre of river habitat. This habitat disruption will affect the behavior of listed fish resulting in displacement and increased predation, decreased feeding, and increased competition, which will result in decreased survival, reduced growth and reduced fitness, respectively. Fewer than 10 percent captured are expected to die in the process of dewatering.
2) Take in the form of harm to CV spring-run Chinook salmon, winter-run Chinook salmon, CCV steelhead, and sDPS green sturgeon from continued loss and degradation of riparian and river channel habitat causing injury and death from habitat modifications that reduce the quality and quantity of rearing habitat by creating habitat conditions that increase the likelihood of predation associated with maintaining the 30 ft by 40 ft area of RSP.

If the 50ft by 50ft (0.05 acre) dewatering area designated as the ecological surrogate is exceeded by more than 10 percent, and if the amount of replaced RSP exceeds the 30 ft by 40 ft area, the anticipated incidental take levels described are also exceeded, triggering the need to reinitiate consultation.

2.9.2 Effect of the Take

In the 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" (RPMs) are nondiscretionary measures that are necessary or appropriate to minimize the impact of the amount or extent of incidental take (50 CFR 402.02).

1. Fish relocation operations shall be conducted according to the specifications provided to NMFS, and the NMFS-approved supervising biologist(s) shall oversee all aspects of dewatering and fish handling operations.
2. Measures shall be taken to minimize continued habitat impacts from replacement of RSP.
3. Caltrans shall monitor construction and dewatering design and process, and report on any incidence of take to NMFS within 24 hours.

2.9.4 Terms and Conditions

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

RPM 1: Fish relocation operations shall be conducted according to the specifications provided to NMFS and the NMFS-approved supervising biologist(s) that shall oversee all aspects of dewatering and fish handling operations.

a. All aspects of fish relocation operations shall be supervised by at least one NMFS-approved biologist who shall be on site throughout each phase of the capture/relocation operation.

b. A written plan for a fish relocation operation specific to this project shall be provided to NMFS for approval 45 days prior to implementation of the project. The plan shall be thoroughly understood by all individuals that are to be involved and operations shall be conducted in strict accordance with the written plan.

RPM 2: Measures shall be taken to minimize continued habitat impacts from replacement of RSP.

a. Caltrans shall limit the amount of RSP used for instream protection to the minimum amount needed for erosion and scour protection. Engineering plans

shall be provided to the contractors that clearly show the amount of RSP to be placed.

RPM 3: Caltrans shall monitor construction and dewatering design and process, and report on any incidence of take to NMFS within 24 hours.

a. Caltrans shall monitor the design of the cofferdam and dewatering operation as well as RSP removal and replacement to ensure the habitat disturbance does not exceed the proposed area. If this area is exceeded Caltrans shall contact NMFS within 24 hours.
b. Caltrans shall record the date, number, and specific location of all listed fish that are relocated from the cofferdam in addition to any direct mortality observed during in-water work and relocation. If a listed species is observed, injured, or killed by project activities, Caltrans shall contact NMFS within 24 hours, notification shall include species identification, the number of fish, and a description of the action that resulted in take.

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 consider using alternative methods to traditional RSP for bridge projects and incorporating geotextiles for bank erosion control and prevention. Bioengineered products are available on the market and can be used to protect areas against erosive forces along shorelines and is an alternative to using RSP. Implementation of RSP alternatives in design considerations is consistent with agency requirements set forth in section 7(a)(1).
(2) 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 priority recovery actions for salmonid and sturgeon, including habitat restoration projects within the Sacramento River Basin. Implementation of future restoration projects is consistent with agency requirements set forth in section 7(a)(1).

2.11 Reinitiation of Consultation

This concludes formal consultation for the State Route 12, 3R, Roadway Rehabilitation Project.

As 50 CFR 402.16 states, reinitiation of formal consultation is required 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 agency action is subsequently

modified in a manner that causes an effect on the listed species or critical habitat that was not considered in this 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. The MSA (section 3) defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." 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) also requires NMFS to recommend measures that can be taken by the Action Agency to conserve EFH.

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

3.1 Essential Fish Habitat Affected by the Project

EFH designated under the Pacific Coast Salmon Fisheries Management Plan may be affected by the proposed action.

Species included in the EFH designation under this FMP within the action area include fall-run/late fall-run Chinook salmon, threatened CV spring-run Chinook salmon and endangered winter-run Chinook salmon.

3.2 Adverse Effects on Essential Fish Habitat

Consistent with the ESA portion of this document which determined that aspects of the proposed action will result in impacts to pacific coast salmonids and critical habitat, we conclude that aspects of the proposed action would also adversely affect EFH for these species. The habitat areas of particular concern (HAPCs) that may be either directly or indirectly adversely affected include, (1) complex channels and floodplain habitats, and (2) thermal refugia. We conclude that the following adverse effects related to EFH HAPCs (1) and (2) above are reasonably certain to occur within the action area:

<u>Sedimentation and Turbidity</u>

- Reduced habitat complexity (1)
- Degraded water quality (1,2)
- Reduction in aquatic macroinvertebrate production (1)

Dewatering of cofferdams

- Degraded water quality (1,2)
- Temporary loss of habitat (1,2)

3.3 Essential Fish Habitat Conservation Recommendations

The following conservation recommendations are necessary to avoid, mitigate, or offset the impact of the project on EFH:

1. Caltrans should incorporate willow starts into the RSP placement as a means of hybrid streambank revetment to minimize loss of shade.
2. Caltrans should use a soil-rock mixture to facilitate re-vegetation in areas where RSP is placed above the water. A ratio of rock to soil of 70:30 is recommended. We suggest the addition of soil on the top of the soil-rock mixture to emulate natural streambank conditions.
3. Where practicable Caltrans should revegetate areas adjacent to the stream with native trees such as Valley Oak and Cottonwood.

Fully implementing these EFH conservation recommendations would protect, by avoiding or minimizing the adverse effects described in section 3.2, above, approximately 0.2 acres of designated EFH for Pacific Coast salmon.

3.4 Statutory Response Requirement

As required by section 305(b)(4)(B) of the MSA, Caltrans must provide a detailed response in writing to NMFS within 30 days after receiving an EFH Conservation Recommendation. Such a response must be provided at least 10 days prior to final approval of the action if the response is inconsistent with any of NMFS' EFH Conservation Recommendations unless NMFS and the Federal agency have agreed to use alternative time frames for the Federal agency response. The response must include a description of 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. FISH AND WILDLIFE COORDINATION ACT

The purpose of the FWCA is to ensure that wildlife conservation receives equal consideration, and is coordinated with other aspects of water resources development (16 USC 661). The FWCA establishes a consultation requirement for Federal agencies that undertake any action to modify any stream or other body of water for any purpose, including navigation and drainage (16 USC 662(a)), regarding the impacts of their actions on fish and wildlife, and measures to mitigate those impacts. Consistent with this consultation requirement, NMFS provides recommendations and comments to Federal action agencies for the purpose of conserving fish and wildlife resources, and providing equal consideration for these resources. NMFS' recommendations are provided to conserve wildlife resources by preventing loss of and damage to such resources. The FWCA allows the opportunity to provide recommendations for the conservation of all species and habitats within NMFS' authority, not just those currently managed under the ESA and MSA.

The following recommendations apply to the proposed action:

(1) Caltrans should post interpretive signs within the action area to help educate visitors about the ecological and cultural value of anadromous listed fish species and critical habitat in the Sacramento River.

The Action Agency must give these recommendations equal consideration with the other aspects of the proposed action so as to meet the purpose of the FWCA.

This concludes the FWCA portion of this consultation.

5. 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.

5.1 Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended users of this opinion is Caltrans. Other interested users could include the City of Rio Vista, Oregon and Washington Departments of Transportation, U.S. Federal Highway Administration, U.S. Fish and Wildlife Service, and CDFW. Individual copies of this opinion were provided to the Caltrans. The format and naming adheres to conventional standards for style.

5.2 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.

5.3 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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