



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-2021-00089

June 21, 2021

Zachary Simmons
Senior Project Manager
Special Projects Branch
U.S. Army Corps of Engineers
1325 J Street
Sacramento, California 95814

Re: Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Upper Mormon Slough Erosion and Flood Control Project (SPK-2017-00529)

Dear Mr. Simmons:

Thank you for your letter of January 11, 2021, requesting initiation of consultation with NOAA's National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 et seq.) for the Upper Mormon Slough Erosion and Flood Control 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 (MSA, 16 U.S.C. 1855(b)) for this action. Enclosed we provide NMFS's review of the potential effects of the proposed action on EFH for Pacific Coast Salmon in the project section, as designated under the MSA. The document concludes that the project will adversely affect the EFH of Pacific Coast Salmon in the action area and has included EFH Conservation Recommendations.

As required by section 305(b)(4)(B) of the MSA, the U.S. Army Corps of Engineers (Corps) 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 Corps have agreed to use alternative time frames for the Corps' 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 Corps 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

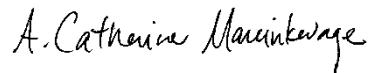


measures needed to avoid, minimize, mitigate, or offset such effects (50 CFR 600.920(k)(1)). In your response to the EFH portion of this consultation, we ask that you clearly identify the number of Conservation Recommendations accepted.

Based on the best available scientific and commercial information, the biological opinion concludes that the proposed project is not likely to jeopardize the continued existence of the federally listed threatened California Central Valley steelhead distinct population segment (*Oncorhynchus mykiss*) and is not likely to destroy or adversely modify their designated critical habitat. 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.

Please contact Monica Gutierrez at (916) 930-3657, or via email at Monica.Gutierrez@noaa.gov, if you have any questions concerning this consultation, or if you require additional information.

Sincerely,



Cathy Marcinkevage
Assistant Regional Administrator for
California Central Valley Office

Enclosure

cc: Copy to File No: 151422-WCR2021-SA00050



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

Upper Mormon Slough Erosion and Flood Control Project

NMFS Consultation Number: *WCRO-2021-00089*

Action Agency: U.S Army Corps of Engineers

Affected Species and NMFS' Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species?	Is Action Likely To Jeopardize the Species?	Is Action Likely to Adversely Affect Critical Habitat?	Is Action Likely To Destroy or Adversely Modify Critical Habitat?
California Central Valley steelhead Distinct Population Segment (<i>Oncorhynchus mykiss</i>)	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: *A. Catharine Marcinkevage*
 Cathy Marcinkevage
 Assistant Regional Administrator for California Central Valley Office

Date: June 21, 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 402, as amended.

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

We completed pre-dissemination review of this document using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (DQA) (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The 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 the NMFS California Central Valley Office.

1.2. Consultation History

On January 11, 2021, NMFS received the U.S. Army Corps of Engineers (Corps') request to initiate formal consultation on the Upper Mormon Slough Erosion and Flood Control project.

On January 21, 2021, NMFS requested via email and phone call, more information from FISHBIO (the applicant's consultant) and the Corps clarifying the project description.

On March 12, 2021, NMFS received information from FISHBIO regarding project acreage.

On April 27, 2021, received additional information via email regarding a more detailed construction plan of the project description, from the consultant and applicant. Upon confirming additional information was sufficient, consultation was initiated.

1.3. Proposed Federal Action

Under the ESA, "action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies (50 CFR 402.02). Under MSA, Federal action means any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken by a Federal Agency (50 CFR 600.910). We considered, under the ESA, whether or not the proposed action would cause any other activities and determined that it would not.

Project Background

The Corps is the lead Federal action agency for this project. The San Joaquin County Public Works is the permit applicant seeking authorization from the Corps to repair erosion along Mormon Slough. Repair work is being completed by the San Joaquin County Department of Public Works with funding and support from the California Department of Water Resources' (DWR) Division of Flood Management under its Flood System Repair Program (FSRP). The repairs will be designed in accordance with DWR's Rural Levee Repair Guidelines (DWR 2014). As part of Stockton East Water District's agricultural water delivery operations, flashboard dams are installed at twelve locations throughout Mormon Slough, beginning April 15, and being removed from the river by November 1.

Project Location

The Proposed Project area is in the eastern portion of San Joaquin County, approximately four miles east/northeast of the town of Linden, and 15 miles east/northeast of the City of Stockton. Mormon Slough runs parallel to State Route 26 in the Proposed Project Site (Figure 1). The repair area extends downstream from the Escalon-Bellota Bridge to a small regulating dam on Mormon Slough.

Project Purpose

The purpose of the proposed project is to stabilize Mormon Slough's channel alignment and preserve the general uniformity of the banks in order to preserve channel function and to reduce the potential for further lateral migration of the channel. Currently, the channel is eroding toward State Route 26 on its northern bank and toward neighboring structures and orchards on its southern bank. Field observations show that erosion and undermining of the existing slopes is leading to incremental collapse and/or over-steepening of the slopes, which is considered the most prevalent mode of failure of the system to be addressed by the repair design.

Construction Activities

The Proposed Project would consist of repairs to the north and south banks of a segment of Upper Mormon Slough in San Joaquin County, California. Repair length would consist of 3,290 linear feet on the north bank and 1,425 linear feet on the south bank. Mormon Slough accepts flow from the Calaveras River at Bellota (river mile 5.6) and carries it to the Stockton Diverting Canal (river mile 24), which returns the flow to the Calaveras River. The Calaveras River eventually flows into the San Joaquin River (river mile 0), approximately 20 miles downstream of the project. The proposed project activities include excavating material in the channel and then repairing the channel slope with a variety of materials including soil-filled rock slope protection (RSP), a coarse filter bed, and launch rock. Repairs include above (0.55 acres) and below (2.91 acres) the ordinary high water mark). The RSP would consist of varying size, soil, gravel, and textile fabric above the ordinary high water mark to prevent downward migration of soil. To promote growth of vegetation, the RSP voids would be filled with agricultural soil and seeded with grasses. Approximately, 8,800 cubic yards of rock will be added to the north bank and 4,050 cubic yards of rock will be add to south bank (both below the ordinary high water mark).

Access to the work area on the north side of Mormon Slough and the staging area would be from three locations along Highway 26. Access to the work area on the south side of Mormon Slough would be from Escalon-Bellota Road, either along the service road (which doubles as an agriculture access road in this area located at the Escalon-Bellota Bridge), or from a farm driveway located 1,100 feet south of the Bridge. Compromised material from the channel and banks would be loaded into dump trucks and disposed off-site or reused as soil-filled RSP/backfill.

The repair work would be accomplished using excavators or similar equipment. Work would begin by developing access to the site through use of ramps or gated access roads by clearing vegetation or other obstructions to allow access. Following development of access, an excavator located above the waterway would place launch rock and soil filled RSP above the ordinary high water mark and launch rock below the ordinary high water mark. Any ramps or access routes would be restored to pre-project condition following completion of construction with any excess compromised material either used in restoration activities or removed from the site. Once the repairs are deemed satisfactory, as approved by San Joaquin County, equipment would be removed, and native grasses and willows replanted as appropriate (at a 3:1 ratio).

Excavation prior to placement of RSP would generally be limited to removal of loose surface debris from past slope failures, minor grading to produce relatively smooth surfaces to prepare for RSP, or to key the repairs into the existing slopes.

After grading, workers would install a coarse sand or gravel filter bed that will seal cracks or openings in the base soil. A base of launch rock would be installed at the lower edge of the filter, and RSP would be laid over the filter bed. The riprap size recommendations differ throughout the channel with a gravel filter and launchable toe (FISHBIO 2020).

Conservation Measures

Construction is proposed for summer months, between mid-June and mid-October when the channel is disconnected and avoids the presence of anadromous fish species. The planned timing of erosion repair activities will provide an appropriate window in which to work while providing adequate protection for aquatic organisms. The presence of species of concern is expected to be minimal, if at all, during the summer months when repair activities are scheduled to take place. This is due to a lack of overlap between the project window and adult and juvenile migration timing, operations of flashboard dams downstream of the project area precluding upstream migration of adult salmonids to the project area during the entire work window, and an absence of spawning habitat in the project area.

Fine sediments may be incidentally introduced to the river as a result of project activities, but their effect should be negligible as salmonids are not expected to be present in or directly downstream of the project area. Best management practices utilized during construction will be implemented to intercept and capture sediment prior to entering the waterway, as well as erosion control measures along the perimeter of all work areas. A proposed turbidity standard will be implemented for turbidity (measured in nephelometric turbidity units (NTUs)) and will not exceed 20% above natural background turbidity (Bash et al. 2001). If levels are exceeded, the applicant will notify the Central Valley Regional Water Quality Control Board.

Upon completion of construction activity, the project proponent will ensure all equipment and excess materials would be transported off site using the same routes used for setup. Bank slopes will be seeded to promote re-vegetation and minimize soil erosion. Any damage caused from construction activities to the levee road or surrounding areas would be repaired. The staging area would then be cleaned of any rubbish and all parts of the work area would be left in its original condition. In addition, to promote growth of vegetation, the RSP voids would be filled with agricultural soil and seeded with grasses.

Habitat Mitigation

The project would result in impacts to approximately 0.55 acres above the ordinary high water mark and 2.91 acres below the ordinary high water mark. The applicant proposes to participate in the San Joaquin County Habitat Conservation Plan (HCP). This HCP includes measures that will to preserve, enhance, and manage natural lands in San Joaquin County, including riparian areas. The proposed project will permanently modify 3.46 acres of California Central Valley (CCV) steelhead critical habitat. This habitat includes riparian vegetation that will be removed to accommodate the RSP and launch rock. Mitigation will be a 3:1 ratio to be incorporated to offset the riparian impacts.

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 incidental take statement (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 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 designation of critical habitat for CCV steelhead uses 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 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 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.

The descriptions of the status of species and conditions of the designated critical habitat in this opinion are a synopsis of the detailed information available on NMFS’ West Coast Regional website.

The following federally listed species Distinct Population Segment (DPS) and designated critical habitat occur in the action area and may be affected by the proposed action (Table 1):

Table 1. Listing for federally listed species.

Species	Scientific Name	Original Listing Status	Current Listing Status	Critical Habitat Designated
California Central Valley steelhead DPS	<i>Oncorhynchus mykiss</i>	3/19/1998 63 FR 13347 Threatened	1/5/2006 71 FR 834 Threatened	9/2/2005 70 FR 52488

2.2.1. Species Listing and Critical Habitat Designation History

2.2.1.1. CCV Steelhead

The federally listed as threatened CCV steelhead DPS and its designated critical habitat occur in the action area and may be affected by the proposed action. Detailed information regarding DPS listing and critical habitat designation history, designated critical habitat, DPS life history, and viable salmonid population (VSP) parameters can be found in the most recent 5-year status review (NMFS 2016).

Table 2. Description of species, current Endangered Species Act (ESA) listing classifications, and summary of species status.

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 2016), 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.

2.2.1.1.1 Critical habitat and PBFs for CCV steelhead

Table 3. Description of CCV steelhead critical habitat, Listing, and Status Summary.

Critical Habitat	Designation Date and Federal Register Notice	Description
California Central Valley steelhead DPS	September 2, 2005; 70 FR 52488	<p>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.</p> <p>PBFs considered essential to the conservation of the species include: Spawning habitat; freshwater rearing habitat; freshwater migration corridors; and estuarine areas.</p> <p>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.</p>

2.2.1.2 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).

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).

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 proposed project site is bounded on its north side by Highway 26, and an agricultural access road on its south side controlled by San Joaquin County (County) Flood Control and Water Conservation District (District) and the County. Land use in the area is predominantly agricultural, typified by large orchards surrounding the proposed project site, with State Route 26 in the north. The eastern end of the project site is the Escalon-Bellota Bridge, which is approximately 1,400 feet downstream of the confluence of the Calaveras River and Mormon Slough, where water originating from New Hogan Dam flows into the Slough passing over the Bellota Weir.

The action area is an approximately 25-acre site located on both banks of a 0.73-mile segment of Mormon Slough, 4 miles northeast of the town of Linden, in San Joaquin County, California (Figure 1). The proposed action would consist of repairing the north and south banks of the upper segment of Mormon Slough near the Escalon-Bellota Bridge. Mormon Slough receives flow downstream from the Calaveras River, which is connected at Bellota. Mormon Slough then flows into the Stockton Diverting Canal, which returns the flow to the Calaveras River downstream.

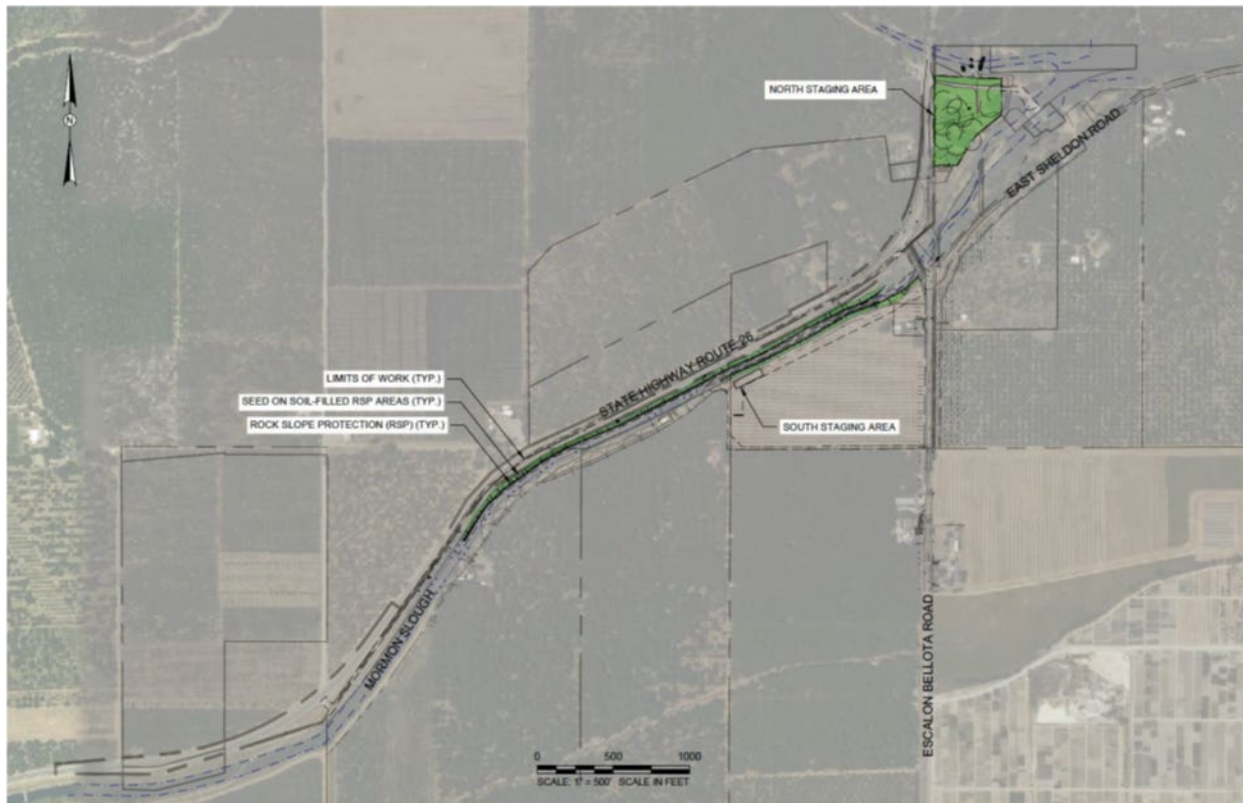


Figure 1. Aerial map of the project site

The action area includes waters (3,290 linear feet on the north bank and 1,425 linear feet on the south bank) of the Mormon Slough (part of the Calaveras River watershed) and includes impacts 300 feet downstream of proposed in-water construction areas resulting in increased turbidity during construction, and degraded migratory corridor. This area represents the potential area of impacts from the proposed project.

The action area is designated critical habitat for CCV steelhead.

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 and Critical Habitat in the Action Area

The federally listed anadromous species that use and occupy the action area are migrating adult and juvenile CCV steelhead. The action area is within designated critical habitat for CCV steelhead. The Calaveras River and Mormon Slough is the primary migration corridor for both adult and juvenile CCV steelhead life stages. CCV steelhead spawning and rearing habitats are located upstream above Bellota Weir and outside of the action area. The Calaveras River steelhead is considered a Core 1 population in the NMFS Chinook Salmon and CCV Steelhead 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 (NMFS Recovery Plan) (NMFS 2014), which means this watershed possesses the known ability or potential to support a viable population. For a population to be considered viable, it must meet the criteria for low extinction risk for Central Valley salmonids (Lindley et al. 2007).

2.4.1.1 CCV steelhead

The life history strategies of steelhead are extremely variable between individuals, and it is important to take into account that CCV steelhead are iteroparous (i.e., can spawn more than once in their lifetime) (Busby et al. 1996), and therefore may be expected to emigrate back down the system after spawning. As such, the determination of the presence or absence of CCV steelhead in the Delta accounted for both upstream and downstream migrating adult steelhead (kelts).

Adult CCV steelhead enter freshwater in August (Moyle 2002) and peak migration of adults moving upriver occurs in August through September (Hallock et al. 1957). Specifically for the Calaveras River watershed, adults enter the action area after mid-October to November 1st (depending on the water year) due to flashboard dam operations. Adult anadromous steelhead enter freshwater streams between August and November. Juveniles begin to emerge from late winter to summer and will then spend between one and three years in freshwater before emigrating in the spring (Williams 2006). Outmigrating juveniles would have to pass through the action area during their emigration to the mainstem San Joaquin River and to the ocean. Over-summer snorkel surveys conducted by FISHBIO in 2019 estimated an abundance of 7,392 individual *O. mykiss* representing all life stages in the upper reaches of the Calaveras River between New Hogan Dam and the Bellota Diversion Facility. While this number does not represent the number of anadromous steelhead, it does indicate that the Calaveras River has a robust and resilient *O. mykiss* population (resident or anadromous), rebounding from a 2017 estimate of abundance of only 1,177 individuals coming off of the 2012-2016 drought (FISHBIO 2020).

The proposed action construction period in Mormon Slough is from mid-June through mid-October. As part of Stockton East Water District's agricultural water delivery operations, flashboard dams are installed at twelve locations throughout Mormon Slough, which blocks fish passage, beginning April 15 and removed from the river by November 1st of each year.

2.4.1.1.1. CCV steelhead critical habitat

The PBFs for CCV steelhead critical habitat in the action area include freshwater rearing and freshwater migration corridors. This section of CCV steelhead critical habitat serves as a migration corridor for all of the adults and juveniles of the Calaveras River basin.

During the summer months, migration habitat is of poor quality due to unsuitable water temperatures and low and disconnected flows. The current migratory habitat in the action area for adults and juveniles is degraded

Even though the habitat has been substantially altered and its quality diminished through years of human actions, its value remains high for the conservation of the Calaveras population of CCV steelhead. As such, the action area serves as the primary migration corridor for juvenile and adult CCV steelhead. Adults must pass through the action area to swim upstream passed Bellota Weir in order to reach their spawning grounds in the upper reaches of the Calaveras River. Juveniles must pass through the action area to migrate downstream towards the San Joaquin River. Therefore, it is of key importance to the long-term viability of the CCV steelhead population to maintain a functional migratory corridor through the action area to sustain the Southern Sierra Nevada Diversity Group, and provide the necessary spatial diversity to aid in recovery.

2.4.2. Factors Affecting Listed Species and Critical Habitat in the Calaveras River

The action area encompasses a small portion of the area utilized by the CCV steelhead DPS. Many of the factors affecting these species in the action area are considered the same as throughout their range, as discussed in section 2.2 (*Rangewide Status of the Species and Critical Habitat*) and section 2.4 (*Environmental Baseline*) of this opinion. Specifically, levee armoring and channelization, alteration of river flows and timing, reduction of riparian corridors and associated shaded riverine aquatic (SRA) vegetation and the introduction of point and non-point contaminants. Other factors that impact listed species and critical habitat specific to the action area are discussed below. Mormon Slough was created in 1910 by the Corps to convey flood waters to avoid flooding in the City of Stockton. Mormon Slough is a wide channel with steep banks and little to no vegetation. The project site features degraded rip-rap on the north bank adjacent to State Route 26 and an almost vertical wall of loose soils on the south bank through much of the project area. Substrates in the project area consists of mixed gravel and sand/silt with the main channel running close to the south bank during most of the year at low stream flow. Emergent vegetation is featured in channel though it consists of sandbar willow (*Salix exigua*) on dry areas near the low flow channel. Shaded riparian habitat is limited throughout the project area.

Key stressors that were identified in the NMFS Recovery Plan (2014) for CCV steelhead and critical habitat in the Calaveras River are listed below. However, these factors also affect the other listed and non-listed salmonids that may migrate, spawn, and rear in the Calaveras River basin.

- Fish passage impediments/barriers at Mormon Slough, the Old Calaveras River channel, Bellota Weir, and other locations affecting adult immigration and holding, and juvenile rearing and outmigration.

- Flow conditions (i.e., low flows) affecting passage, attraction and migratory cues for adult immigration and holding.
- Water quality conditions (i.e. urban and agricultural runoff) in the Calaveras River affecting adult immigration and holding.
- Water temperatures affecting juvenile rearing and outmigration.
- Flow dependent habitat availability affecting juvenile rearing and outmigration.

2.4.2.1. Fish Passage Barriers

Diversion Facilities

In addition to the Bellota Weir and Headworks Facility, SEWD owns and/or operates 28 flashboard dams, two earthen dams, and one headgate dam. Twelve removable flashboard dams are located along Mormon Slough and Stockton Diverting Canal.

In addition, a total of 194 small, privately owned diversions have been identified within the District’s Calaveras River service areas using SEWD data, and 53 additional diversions may exist according to CDFW (CDFG 2006) data. Of the 194 “known” diversions, 52 are in Mormon Slough,. These agricultural diversions are small pumped diversions that are individually owned and operated by agricultural customers of SEWD above and below Bellota.

Baseline impacts on juvenile salmonids from diversion facilities include: entrainment into unscreened diversions and subsequent death; migration delays or blockage, and associated thermal stress, increased susceptibility to predation, or stranding and subsequent death. Impacts to adult salmonids from diversion facilities include: migration delays or blockage and subsequent thermal stress, stranding, or death.

2.4.2.2. Flow Conditions

The Corps operates New Hogan Dam releases during the flood control season, which is approximately from mid-October through mid-April. During the winter and spring months, the impoundment of water in New Hogan Reservoir for flood control and conservation storage has resulted in changes to the natural hydrograph. As with other impoundments in the Central Valley, the magnitude and duration of peak flow events have been reduced, which affects the ability of adult and juvenile salmonids to migrate as often and as quickly as under historical flow conditions.

Due to the extreme flashiness of the rain-driven system, the Corps needs to maintain a relatively large flood encroachment space throughout much of the flood control season, so precipitation events during December through March often trigger the need for flood control releases. Although late-season precipitation may occur, it generally is not of sufficient magnitude to allow the reservoir to fill anywhere close to capacity. Therefore, the reservoir generally is less than 70% percent capacity by the time the irrigation season begins as a result of the Corps’ flood management activities. Subsequent irrigation releases by the District throughout the summer further reduce the reservoir storage level and water supply that is available for fisheries.

Critical habitat for CCV steelhead is affected by flow modifications that alter the hydrologic regime, thereby altering or eliminating functional flows (Yarnell et al. 2015). Elimination of the magnitude, duration, and frequency of flood flows may cause spawning gravel to become embedded with fine materials, reducing its effectiveness for spawning. Recruitment of gravels from areas upstream of New Hogan Dam is no longer able to occur and gravel replenishment in areas below the dam has been eliminated. Low magnitude flood flows in fall and winter severely limit upstream migration of adult fish from the San Joaquin River.

During the remainder of the year, SEWD operates releases from New Hogan Dam for municipal and irrigation purposes. During the irrigation season, SEWD releases an average of about 150 cfs, which provides relatively high, stable flows between New Hogan Dam and Bellota for diversions at the Bellota Diversion Facility, Old Calaveras River Headworks Facility, and Bellota Weir slide gates. During the non-irrigation season, reservoir releases made for municipal and irrigation purposes ensure that some flows are provided to at least Bellota; however, flows do not continue downstream of Bellota during the non-irrigation season until freshet events or flood control releases occur.

Baseline impacts to the listed and non-listed salmonids, and critical habitat, from an altered flow regime and reduced flows include: migration delays or inaccessibility to habitat, thermal stress, decreased quantity and quality of habitat for various life stages, riparian habitat alteration, and stream channel alteration.

2.4.2.3. Water Quality

The majority of land use in the Calaveras River basin is agricultural and urban, and therefore NMFS expects run-off from these land use practices to enter the stream and impact the listed species and critical habitat. The State Water Resources Control Board's (SWRCB) Clean Water Act Section 303(d) List/305(b) Report (SWRCB 2016) describes the status of known pollutants for stream reaches in the Calaveras River basin below New Hogan Dam. Based on information in the SWRCB (2016) report, water quality in the Calaveras River watershed around the confluence with the San Joaquin River, and within the city of Stockton, is degraded. Upstream of the city of Stockton, most of the water quality samples for the SWRCB report were taken in 2008 or earlier. Thus, the current status of pollutants (i.e. within the last 10 years) is unknown, and it is further unknown what level of impact the current baseline water quality in the Calaveras River basin may have on all life stages of the listed species and critical habitat.

Given the extent of land uses within the Calaveras River basin, and the evidence that water quality is degraded around the mouth of the Calaveras River (the migration route all life stages of the listed species must take), NMFS estimates that the baseline water quality conditions in the Calaveras River system, are degraded, which could have a negative impact on both adult and juvenile salmonids.

2.4.2.4. Physical Habitat Modification

The most significant, historical modification to physical habitat, other than passage barriers, is the re-routing of the Calaveras River through Mormon Slough and the Stockton Diverting Canal.

The aptly named, Old Calaveras River channel, is now primarily used for water conveyance for irrigation purposes. The channel is not considered an optimal, or even desirable, migratory route or rearing area for salmonids, especially given the lack of consistent flows and numerous instream structures and passage barriers.

Mormon Slough/Stockton Diverting Canal (which is considered reach 6) (RM 24 to RM 5.6) comprises a wide channel with steep contoured banks and little to no cover. This section of channel has 12 flashboard dam foundations where flashboards are installed during the irrigation season and 63 small privately-owned diversions, which may be operated during the irrigation season. In addition, there are two low-flow road crossings and multiple bridges and railroad trestles.

Potter Creek, a tributary channel to Mormon Slough, receives water deliveries from the Calaveras River during the irrigation season for use in adjacent farmland. During the winter, Potter Creek receives natural surface runoff from within its own watershed, and then empties into Mormon Slough and substantially increases flows below Bellota during runoff events. The channel has three flashboard dam foundations where flashboards are installed during the irrigation season and 16 small privately-owned diversions, which may be operated during the irrigation season. In addition, there are two low-flow road crossings and one small, earthen dam.

Overall, the modifications to physical habitat have reduced the quantity and quality of habitat for all life stages of listed and non-listed salmonids in the Calaveras River basin.

2.4.2.5. Water Temperatures

EPA recommended water temperatures for “core” rearing (<16°C; 61°F) are generally met between New Hogan and Shelton Road under typical fall/winter base flow. In the spring and summer, water temperatures generally are within the “core” rearing range at New Hogan and Jenny Lind and are generally within the “non-core” rearing range at Gotelli and Shelton Road. Water temperatures that are above the recommended criteria in the Calaveras River are highly correlated with high ambient air temperatures occurring in spring and summer, specifically below Bellota.

In addition, and as mentioned in section 2.2.1.2 of this opinion, global climate change would lead to increased summer air and water temperatures, which would negatively impact salmonids, especially juvenile *O. mykiss* that over-summer prior to out-migrating.

2.4.3. NMFS Salmon and Steelhead Recovery Plan Recovery Action Recommendations

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

2.4.3.1. CCV Steelhead DPS

The NMFS Recovery Plan (NMFS 2014) strategy for CCV steelhead lists the Calaveras River as a Core 1 population (meaning this watershed possesses the known ability or potential to support a viable population. For a population to be considered viable, it must meet the criteria for low extinction risk for Central Valley salmonids (Lindley et al. 2007)). The San Joaquin River's eastside tributaries downstream of large dams (Stanislaus, Tuolumne, and Merced rivers) are identified as Core 2 populations (meaning these watersheds have the potential to support viable populations, due to lower abundance, or amount and quality of habitat), and as candidates to reach viable population status if reintroduced upstream of the dams, and lists the San Joaquin River, below Friant Dam, as a candidate to reach viable population status.

2.5. Effects of the Action

Under the ESA, "effects of the action" are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (see 50 CFR 402.17). In our analysis, which describes the effects of the proposed action, we considered 50 CFR 402.17(a) and (b).

The following is an analysis of the potential effects to listed fish species that may occur as a result of implementing the proposed action in Mormon Slough. The expected effects of the proposed action include impacts due to: (1) permanent placement of riprap and (2) habitat loss/modification.

2.5.1. Effects to species

2.5.1.1 Habitat loss/modification

Due to the District's agricultural water delivery operations, flashboard dams would be installed by April 15, which would preclude any anadromous fish from entering the action area through November 1. Therefore, any immediate impacts as a result of construction activities (i.e., placement of riprap and channel reconstruction activities crushing fish) are not expected to occur. However, there could be impacts to CCV steelhead later in time when fish return and migrate through the area post-construction. The action area would be modified due to channel reconstruction and permanent placement of riprap which would preclude any further riparian vegetation growth. Therefore, there would be reduced survival/growth in the action area as sufficient riparian cover would be absent and exposure to predation would increase. The action area currently does not provide suitable aquatic riparian habitat, but the modification of the channel and placement of riprap would continue this degraded state and preclude in its footprint any potential for future riparian vegetation to grow that would provide shelter and resting areas for migrating juveniles. In addition, increased riprap placement could alter sediment transport and hydraulics in the channel that in turn can change the flow and velocity of the channel, impacting migrating fish through the area (Fischenich 2003; Bigham 2020).

The intent of riprap is to stabilize stream channels and limit natural fluvial processes. The reduction of erosion and consequent deposition cycle, naturally inherent to all alluvial channels, eliminates a channel's ability to maintain bedforms for salmonid habitat and impairs the ability for a stream to be maintained in a dynamic steady state. This alteration of the aquatic ecosystem has diverse deleterious effects on aquatic communities, ranging from carbon cycling to altering salmonid population structures and fish assemblages (Schmetterling et al. 2001). Riprap does not provide the intricate habitat requirements for multiple age classes or species similar to natural banks, or banks that include instream woody material (Peters et al. 1998). The proposed project would result in impacts to approximately 3.46 acres above and below the ordinary high water mark.

Therefore, adverse effects resulting from permanent habitat loss/modification to CCV steelhead are expected to occur.

2.5.2. Project Effects on CCV steelhead Critical Habitat

The project is expected to adversely impact several PBFs of critical habitat for CCV steelhead (freshwater rearing habitat and freshwater migration corridors).

The proposed project is expected to cause short- and long-term, and permanent effects on critical habitat for CCV steelhead. Potential project effects include temporary water quality degradation from localized increases in turbidity and suspended sediment, permanent habitat loss/modification of critical habitat, and in-channel disturbance from placement of riprap. Long-term effects on designated critical habitat are expected to result in potential decrease in freshwater rearing habitat due to increased predation in the action area.

Emergent vegetation is present though it consists of sandbar willow (*Salix exigua*) on dry areas in Mormon Slough. Although the action area is degraded, adult and juvenile CCV steelhead use the area as a primary migratory corridor to and from the spawning and rearing reaches of the Calaveras River. The placement of permanent riprap would continue this degraded state, and prevent improvements to provide more suitable habitat for listed species. In addition, riprap is expected to decrease the quality of migratory habitat PBFs for CCV steelhead, as warm-water predatory species (such as bass) would be likely to occupy this habitat post-construction.

The proposed project will occupy 3,290 linear feet on the north bank and 1,425 linear feet on the southern bank of Mormon Slough which is part of CCV steelhead critical habitat. The applicant, San Joaquin County Public Works, will buy into the San Joaquin County Habitat Conservation Plan (over \$200,000) to mitigate for the proposed project. Under the HCP, the funds will be used to preserve, enhance, and manage natural lands in the San Joaquin County, including riparian areas.

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 and their designated critical habitat for CCV steelhead. 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 which are situated away from waterbodies, would not require Federal permits, and thus would not undergo review through the ESA section 7 consultation process with NMFS.

Increased urbanization also is expected to result in increased recreational activities in the region.

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 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.

In our *Rangewide Status of the Species* section, NMFS summarized the current likelihood of extinction of CCV steelhead. 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 and cumulative effects. NMFS then evaluated the likely responses of individuals, populations, and critical habitat. This *Integration and Synthesis* section will consider all of these factors to determine the proposed action's influence on the likelihood of both the survival and recovery of the listed species and on the value of designated critical habitats.

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

2.7.1. Status of the CCV Steelhead DPS and its 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. Therefore, we concluded that CCV steelhead should remain listed as threatened, as the DPS is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Further, there is still a general lack of data on the status of wild steelhead populations. There are some encouraging signs, as several hatcheries in the Central Valley (such as Mokelumne River), have experienced increased returns of steelhead over the last few years. There has also been a slight increase in the percentage of wild steelhead in salvage at the south Delta fish facilities, and the percent of wild fish in those data remains much higher than at Chipps Island. Although there have been recent restoration efforts in the San Joaquin River tributaries, CCV steelhead populations in the San Joaquin River Basin continue to show an overall very low abundance, and fluctuating return rates. The NMFS Recovery Plan (NMFS 2014) strategy for CCV steelhead lists the Calaveras

River as Core 1 population (meaning this watershed possesses the known ability or potential to support a viable population). For a population to be considered viable, it must meet the criteria for low extinction risk for Central Valley salmonids (Lindley et al. 2007). The Plan also lists the San Joaquin River's eastside tributaries (Stanislaus, Tuolumne, and Merced rivers) as Core 2 populations (meaning these watersheds have the potential to support viable populations, due to lower abundance, or amount and quality of habitat) downstream of major dams, and as candidates to reach viable population status if reintroduced upstream of the dams, and lists the San Joaquin River, below Friant Dam, as a candidate to reach viable population status. The action area serves as a migratory corridor to and from the mainstem of the San Joaquin River.

2.7.2. Status of the Environmental Baseline and Cumulative Effects in the action area

The action area is a primary migratory corridor and is an essential piece of the recovery strategy (NMFS 2014), which includes providing upstream and downstream fish passage for all life stages of the Calaveras CCV steelhead population. Mormon Slough, although degraded due to its wide channel with steep banks and little to no vegetation, is an important migratory corridor for the recovery of these species.

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.

The placement of the riprap and channel reconstruction would result in impacts to approximately 3.46 acres of habitat. The habitat found in this portion of the watershed is heavily modified to be used as a flood flow diversion and an irrigation water conveyance channel since the early 20th century, and offers little quality habitat for listed fish. The action area consists of degraded riprap on the north bank adjacent to State Route 26 and an almost vertical wall of loose soils on the south bank through much of the action area. Substrates in the action area consists of mixed gravel and sand/silt with the main channel running close to the southern bank during most of the year at low stream flow.

2.7.3. Summary of Project Effects on listed species

1) Habitat loss/modification

Construction activities would occur during the summer months, when the fish have migrated out of the action area and would be blocked by flash dams and high water temperatures. Therefore, during construction, listed fish are not expected to be present, however, there will be continued degradation of habitat that is expected to impact listed CCV steelhead when fish migrate through the area post construction. CCV steelhead are expected to experience decreased survival due to predation increases, as well as decreased feeding/growth due to degraded riparian habitat.

2.7.4. Summary of Project Effects on CCV steelhead critical habitat

Within the action area, the relevant PBFs of the designated critical habitats for listed CCV steelhead are migratory corridors and rearing habitat. Based on the effects of the proposed project described previously in this opinion, the impacts to the designated critical habitat diminish the value of the designated critical habitat for CCV steelhead. The quality of the current conditions of the PBFs in the action area are degraded compared to historical conditions (pre-levees and dams). The habitat does not provide the functionality of the values necessary for the long-term survival and recovery of the species. In particular, riprapping and channel modifications 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 and bathymetry diversity). Perpetuating the banks with armored riprap would continue to degrade the status of the designated critical habitat into the foreseeable future.

Permanent impacts only represent a small loss in the scope of the available habitat for the CCV steelhead in the southern Sierra Nevada diversity group. The applicant will buy into the San Joaquin County HCP that will help to preserve, enhance, and manage natural lands in San Joaquin County, including riparian areas. In addition, some measures such as incorporating soil mixture and grass seed within the rip rap, will help to alleviate predator hot spots.

2.7.5. Risk to the DPS

NMFS finds that the placement of riprap and channel excavation of Mormon Slough is unlikely to substantially affect the Calaveras population of CCV steelhead. Steelhead will not be present during the timing of construction due to the water operations and disconnection of flow in the system. However, adults and juveniles would be impacted post-construction when migrating through the action area, as the channel modifications and riprap placement would preclude any riparian vegetation from growing and could attract predators which would degrade the action area overtime. However, as there is higher quality habitat available upstream of the action area and other areas of the San Joaquin River basin, it is not expected that the placement of riprap and channel modifications to Mormon Slough will have any demonstrable effect on other populations of CCV steelhead in the DPS. Furthermore, the low impact of the proposed project to the CCV steelhead population in the Calaveras River watershed and San Joaquin River basin over the foreseeable future will not substantially affect the larger CCV steelhead population and will not negatively affect its viability.

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

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' opinion that the proposed action is not likely to jeopardize the continued existence of CCV steelhead or destroy or adversely modify their 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

NMFS cannot, using the best available information, quantify and track the amount or number of individuals that are expected to be incidentally taken because of the variability and uncertainty associated with the population sizes of the species, annual variation in the timing of migration, and variability regarding individual habitat use of the action area. However, it is possible to express the extent of incidental take in terms of ecological surrogates for those elements of the proposed action that are expected to result in incidental take.

These ecological surrogates are measureable, and the Corps or Applicant can monitor the ecological surrogates to determine whether the level of anticipated incidental take described in this incidental take statement is exceeded.

In the opinion, NMFS determined that incidental take in the form of harm is reasonably certain to occur as follows: reduced survival/growth.

2.9.1.1. Incidental take associated with impacts to listed species post-construction and habitat modification

NMFS expects that during CCV steelhead migration period (November through April), there would be post-construction impact effects as a result to modifications migratory corridor. There will be continued degradation of habitat that is expected to impact listed CCV steelhead when fish migrate through the area post-construction. CCV steelhead are expected to experience decreased survival due to predation increases, as well as decreased feeding/growth due to degraded riparian

habitat from placement of riprap. NMFS expects that these species and life stages to be present during the migration period:

- Adult CCV steelhead
- Juvenile CCV steelhead

The most appropriate threshold for incidental take consisting of habitat modification and impacts to fish migrating through the action area would be reduced survival/growth as riparian cover would be absent and exposure to predation would increase in the action area. The placement of riprap is expected to result in an increase in predation and prey on juvenile listed steelhead when migrating through the action area. The action area currently does not provide suitable aquatic riparian habitat, but the modification of the channel and placement of riprap would preclude in its footprint any potential for future riparian vegetation to grow that would provide shelter and resting areas for migrating juveniles. In addition, increase in riprap placement could change the flow and velocity of the channel, which could impact adults migrating through the area. The surrogate for effects to listed species post-construction is the square-footage of habitat and timing of when listed are present in the action area. The proposed project would result in permanent impacts to approximately 3.46 acres of habitat. Exceeding the square-footage of altered habitat will be considered as exceeding the expected incidental take levels for fish migrating through the action area.

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) Measures shall be taken by the Corps, or its applicant, to minimize impacts of degradation and alteration to the habitats in the action area as a result of riprap placement, related to both short-term and long-term effects of this project, as discussed in this opinion.
- 2) Measures shall be taken by the Corps, or its applicant, to minimize impacts to existing vegetation.
- 3) Measures shall be taken by the Corp, or its applicant, to monitor incidental take impacts.

2.9.4. Terms and Conditions

The terms and conditions described below are non-discretionary, and the Corps or any applicant must comply with them in order to implement the RPMs (50 CFR 402.14). The Corps 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. Following the placement of riprap on the banks and channel at the extent described in the project Biological Assessment, voids created by the riprap boulders shall be filled by smaller diameter rocks/gravel when below the ordinary high water mark to avoid supporting piscivorous predator ambush habitat. After the first storm and snowmelt season following placement of this smaller gravel, the area shall be examined to ensure the smaller gravel was not scoured out and effectively removed. If it is found to be removed, the Corps or its applicant shall develop a plan for maintenance of this BMP over time so that this adverse effect can be reduced and controlled.
2. The following terms and conditions implement reasonable and prudent measure 2:
 - a. The Corps or the applicant shall minimize the removal of existing riparian vegetation to the maximum extent practicable, and where appropriate.
3. The following terms and conditions implement reasonable and prudent measure 3:
 - a. Provide NMFS with a draft of the plan for review, and implement the plan after receiving NMFS' agreement.

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) The Corps should continue supporting and promoting aquatic and riparian habitat restoration within the Calaveras River, San Joaquin River, and other watersheds, especially those with listed aquatic species. Practices that avoid or minimize adverse effects to listed species should be encouraged.
- 2) The Corps 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 habitat restoration projects.

- 3) The Corps should use all of their authorities, to the maximum extent feasible to implement high priority actions in the NMFS Central Valley Salmon and Steelhead Recovery Plan. High priority actions related to flood management include setting levees back from river banks, increasing the amount and extent of riparian vegetation along the Calaveras River.

In order for NMFS to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, NMFS requests notification of the implementation of any conservation recommendations.

2.11. Reinitiation of Consultation

This concludes formal consultation for the Upper Mormon Slough and Erosion Control 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 opinion, or (4) a new species is listed or critical habitat designated that may be affected by the action.

3. MAGNUSON-STEVENSON 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 the Corps 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 Lower San Joaquin River (HUC 18040002) for all runs of Chinook salmon that historically and currently use these watersheds (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. Because of the extensive urbanization that has occurred in the California Central Valley over the last 100 years, the lower Calaveras River has been channelized and is currently degraded habitat for complex channel and floodplain HAPC.

3.2. Adverse Effects on Essential Fish Habitat

Effects to the HAPC 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 this EFH HAPC is included in this EFH consultation, which are expected to be similar to the impacts affecting critical habitat, including permanent habitat loss/modification.

Permanent habitat loss/modification

- Permanent habitat loss due to placement of riprap
- Reduced shelter from predators
- Reduction/change in aquatic macroinvertebrate production
- Reduced habitat complexity
- Reduced water quality (flow and hydrology) due to placement of riprap

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.

The following are EFH conservation recommendations for the proposed project:

To address the adverse effects of permanent habitat loss/modification:

Implement BO Section 2.9.4 Term and Condition 1.

Fully implementing these EFH conservation recommendations would protect, by avoiding or minimizing the adverse effects described in section 3.2, above, approximately 3.46 acres of designated EFH for Pacific Coast salmon.

3.4. Statutory Response Requirements

As required by section 305(b)(4)(B) of the MSA, Corps must provide a detailed response in writing to NMFS within 30 days after receiving an EFH Conservation Recommendation. Such a response must be provided at least 10 days prior to final approval of the action if the response is inconsistent with any of NMFS' EFH Conservation Recommendations unless NMFS and the Federal agency have agreed to use alternative time frames for the Federal agency response. The response must include a description of the measures proposed by the agency for avoiding, minimizing, mitigating, or otherwise offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the Conservation Recommendations, the Federal agency must explain its reasons for not following the recommendations, including the scientific justification for any disagreements with NMFS over the anticipated effects of the action and the measures needed to avoid, minimize, mitigate, or offset such effects (50 CFR 600.920(k)(1)).

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

3.5. Supplemental Consultation

The Corps must reinstate 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 users of this opinion are the Corps. Other interested users could include SJAFCA and the Central Valley Flood Protection Board. Individual copies of this opinion were provided to the Corps. 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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