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 ECO #: WCR-2023-00221

May 31, 2023

Matthew Roberts
U.S. Army Corps of Engineers
310 Hemsted Drive
Suite 310
Redding, CA 96002-0935

Re: Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson–Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Yuba County Water Agency South Canal Diversion Water Supply and Fish Passage Enhancement Project: Annual Maintenance from 2023-2027

Dear Mr. Roberts:

Thank you for your letter of March 1, 2023, 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 Yuba County Water Agency South Canal Diversion Water Supply and Fish Passage Enhancement Project: Annual Maintenance.

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

This biological opinion (BO) is based on the final biological assessment, received by NMFS on April 10, 2023. Based on the best available scientific and commercial information, the BO concludes that the project is not likely to jeopardize the continued existence of the Federally listed threatened Central Valley spring-run Chinook salmon evolutionarily significant unit, (*Oncorhynchus tshawytscha*), the threatened southern distinct population segment (DPS) of the North American green sturgeon (*Acipenser medirostris*), the threatened California Central Valley steelhead distinct population segment (*O. mykiss*), and is not likely to destroy or adversely modify their designated critical habitats. NMFS has also included an incidental take statement with reasonable and prudent measures and terms and conditions that are necessary and appropriate to avoid, minimize, or monitor incidental take of listed species associated with the project.

This letter also transmits NMFS's review of potential effects of the Proposed Action on EFH for Pacific Coast Salmon, designated under the Magnuson-Stevens Fishery Conservation and Management Act (MSA). This review was pursuant to section 305(b) of the MSA, implementing regulations at 50 CFR 600.920, and agency guidance for use of the ESA consultation process to complete EFH consultation. The document concludes that the project will adversely affect the EFH of Pacific Coast Salmon in the Action Area.

Please contact Ally Bosworth in the NMFS West Coast Region's California Central Valley Office at (916)-358-0117 or via email at Allison.Bosworth@noaa.gov if you have any questions concerning this consultation, or if you require additional information.

Sincerely,

A. Catherine Marcinkevage

Cathy Marcinkevage
Assistant Regional Administrator for
California Central Valley Office

Enclosure

cc: [ARN 151422-2023-SA0009]
Matthew Roberts, U.S. Army Corps of Engineers, Matthew.J.Roberts@usace.army.mil
Maya Bickner, U.S. Army Corps of Engineers, Maya.A.Bickner@usace.army.mil

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

Yuba County Water Agency South Canal Diversion Water Supply and Fish Passage Enhancement Project: Annual Maintenance

NMFS Consultation ECO Number: WCR2023-00221

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?
Central Valley spring-run Chinook Salmon ESU (*Oncorhynchus tshawytscha*)	Threatened	Yes	No	No	NA
California Central Valley steelhead DPS (*O. mykiss*)	Threatened	Yes	No	Yes	No
Southern DPS of North American green sturgeon (*Acipenser medirostris*)	Threatened	Yes	No	No	NA

Fishery Management Plan That Identifies EFH in the Project Area	Does Action Have an Adverse Effect on EFH?	Are EFH Conservation Recommendations Provided?
Pacific Coast Salmon	Yes	No

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

Issued By: A. Catherine Marcinkevage

Cathy Marcinkevage
Assistant Regional Administrator for California Central Valley Office

Date: May 31, 2023

Table Of Contents

Table of Tables

Table of Figures

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 U.S.C. 1531 *et seq*.), as amended, and implementing regulations at 50 CFR part 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 part 600.

We completed pre-dissemination review of this document using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (DQA) (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The document will be available within 2 weeks at the NOAA Library Institutional Repository (https://repository.library.noaa.gov/welcome). A complete record of this consultation is on file at the Sacramento NMFS Office.

1.2. Consultation History

- On August 17, 2018, NMFS concluded formal consultation on channel construction to restore water flow to the South Diversion Canal after high flows in 2017 caused significant levels of sediment accumulation upstream of the canal (NMFS 2018).
- On May 6, 2022, NMFS communicated to U.S. Army Corps of Engineers (USACE) that reinitiation was not warranted to restore flow to the channel this year, but recommended USACE consult on anticipated annual maintenance.
- On March 1, 2023, NMFS received a request for formal consultation from USACE for annual maintenance of the South Diversion Canal.
- On March 14, 2023, NMFS requested clarification regarding the species and critical habitat determinations as the request letter did not match the determinations made in the Biological Assessment (BA).
- On April 10, 2023, NMFS received all requested information, and consultation was initiated.

On July 5, 2022, the U.S. District Court for the Northern District of California issued an order vacating the 2019 regulations that were revised or added to 50 CFR part 402 in 2019 ("2019 Regulations," see 84 FR 44976, August 27, 2019) without making a finding on the merits. On September 21, 2022, the U.S. Court of Appeals for the Ninth Circuit granted a temporary stay of

the district court's July 5 order. On November 14, 2022, the Northern District of California issued an order granting the government's request for voluntary remand without vacating the 2019 regulations. The District Court issued a slightly amended order two days later on November 16, 2022. As a result, the 2019 regulations remain in effect, and we are applying the 2019 regulations here. For purposes of this consultation and in an abundance of caution, we considered whether the substantive analysis and conclusions articulated in the biological opinion and incidental take statement would be any different under the pre-2019 regulations. We have determined that our analysis and conclusions would not be any different.

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 (see 50 CFR 402.02). We considered, under the ESA, whether or not the proposed action would cause any other activities and determined that it would not.

Under the MSA, "Federal action" means any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken by a Federal agency (see 50 CFR 600.910).

The Proposed Action is the issuance of a permit by the USACE for the completion of annual proposed work from 2023 through 2027. The Proposed Action will include: 1) mobilization, 2) constructing temporary access, 3) constructing temporary berms, 4) river alluvium excavation, 5) Spreading excavated river alluvium on adjacent gravel bar, 6) cobble lining and fish refuge, and 7) site clean-up and demobilization.

Background and description of the Yuba South Canal Diversion

Yuba County Water Agency's (YCWA) South Main Canal system supplies surface water diverted from the lower Yuba River to agricultural land in Brophy Water District, South Yuba Water District, Wheatland Water District and Dry Creek Mutual Water Company which together cover a total of about 43,100 acres (67.3 square miles) of southern Yuba County and the surrounding area.

The South Canal Diversion (SCD) was constructed in 1985. It is located in the Yuba River Goldfields on the south bank of the river within the impoundment of Daguerre Point Dam (DPD). This low concrete gravity dam and spillway was constructed by the California Debris Commission in 1910 to help control downstream migration of mine tailings from hydraulic gold mining in the upper Yuba River watershed. The dam is currently owned and operated by USACE.

The SCD is an off-stream diversion on the south bank of the river which diverts a portion of river flow entering the impoundment created by the dam into a side channel which has a rock barrier fish screen separating the side channel from a large head pond. Water diverted from the river flows into the side channel, through the rock barrier and into the head pond, with a portion of flow returning to the river via a short fish bypass channel downstream of the rock barrier. A gated intake structure in the head pond controls flow of screened water from the head pond to a large dredge pond in the Yuba Goldfields called Pond 17 which forms the first reach of the South Canal water conveyance system.

The reservoir impoundment at DPD is hydraulically full of sediment, which has created a dynamic system of braided gravel bars and channels that periodically change in response to the river flow regime. Rapid changes occur during large floods, such as the historic floods of 1997, 2005 and 2017, which erode the banks of the river and entrain sediment in the reservoir into flow over the dam to be replaced by new sediment inflow from upstream. During lower flow years, normal scour and deposition processes progressively modify the topography of the gravel bars and change water flow patterns across the surface of the debris impoundment. Riparian vegetation helps to stabilize riverbanks and gravel bars by providing significant scour protection.

Throughout its 37 years of operation, diversion of river flow to YCWA's intake has required frequent annual in-river diversion channel maintenance work both prior to commencement of irrigation season and after initial diversions have been initiated. The scope of this annual work depends on the extent of changes to the river channels within the impoundment during high flows in the preceding winter.

When the project commenced operation in 1985, the main river channel through the impoundment was located along the north bank of the river, as it is today, so a long entrance channel across the upstream end of the impoundment was required to bring water to YCWA's diversion facility on the south bank. Some 12 years later, the major New Year's Day flood of January 1997 reworked the river shifting the main channel through the impoundment to the south bank which shortened the diversion channel. The main river channel remained on the South Bank through the flood of 2005 up until the winter of 2016/2017. During the record- breaking precipitation that winter, two large floods in early 2017 severely damaged the diversion facility. Extensive emergency repairs were carried out during the summer of 2017.

Geomorphic changes at the upstream end of the impoundment that occurred during the 2017 floods resulted in the main channel switching back to the north bank. The entrance to the south channel became constricted by a shallow cobble riffle, which impaired inflow to the SCD affecting water diversion and reduced anadromous fish passage. In September 2018, after extensive consultation with Federal and State fisheries agencies and USACE, YCWA constructed a new entrance channel to re-establish flow and fish passage in the south channel and restore inflow to its SCD under a suite of permits and approvals, including a California Department of Fish and Wildlife Streambed Alteration Agreement, a Clean Water Act Section 404 permit from USACE, a Clean Water Act Section 401 Water Quality Certification from the Central Valley Regional Water Quality Control Board, and a formal consultation with NMFS (WCR-2018-10454).

In the following winter of 2018/2019, the entrance to the south channel was again blocked by deposition of cobble and gravel. Maintenance work was carried out in July 2019, to clean out the channel and reopen its entrance. In the winters of 2019/2020 and 2020/2021, flows in the river were low due to drought conditions, so no in-river maintenance work was required. During the winter of 2021/2022, the river again blocked the entrance to the south channel creating a water supply emergency. YCWA rapidly developed a plan to reopen the diversion channel by minimizing in-river work, isolating the in-river work area from flowing water with berms and a silt curtain, and implementing a detailed plan to protect listed fishes in the diversion channel and the downstream reach of the south channel. Following expedited consultation with resource agencies and receipt of authorization on May 6, 2022, YCWA immediately commenced

excavation work to reopen the diversion channel and restore flow to the south channel of the river and to YCWA's SCD. This authorization was a one-time allowance with the agreement that YCWA would seek long term maintenance permitting to cover the ongoing sediment removal and maintenance needed.

Proposed Annual Maintenance Activities

The scope of maintenance work required each year depends mainly on the impacts of river erosion and sedimentation processes at the upstream end of the DPD impoundment during the preceding winter and spring.

Due to the short period of time between the end of the winter storms, spring snowmelt runoff , and the beginning of the irrigation season there is very little time to plan, prepare for, and carry out necessary in-river maintenance work. Nevertheless, construction is estimated to occur annually over a period of 5 years. Maintenance work would occur between April 1 through August 31, starting in 2023 and continuing through 2027

Although maintenance would typically only occur a single time each year, if a late storm blocked the entrance to the south channel after maintenance activities were complete, then it is possible that a second maintenance event may be needed. Based on recent experience, the overall duration of maintenance work is expected to fall in the range of 1 to 10 days depending on the severity of flood damage and extent of blockage of YCWA facilities. If a second maintenance event were necessary, the work would last for a shorter duration.

Maintenance equipment would typically include the following:

- Excavator – John Deere 450, Long Reach or similar.
- Bulldozer – Caterpillar D8 or similar.
- Off-road haul trucks – Caterpillar D350 or D400 or similar, 35 – 40-ton capacity.
- Water truck and pump.
- Service truck.
- Pick-up trucks for personnel transport.

The Project would be implemented in the following seven phases:

1. Mobilization.
2. Temporary access ramp installation.
3. Construction of temporary berms.
4. River alluvium excavation.
5. Spreading excavated river alluvium on the adjacent gravel bar.
6. Cobble lining.
7. Site clean-up and demobilization.

Determination of the precise construction methods and selection of construction equipment will be the responsibility of the construction contractor selected by YCWA. Such selection will depend on many factors, such as site conditions, worker safety, construction efficiency, permit requirements and resource availability. Construction scope, methods and materials may be modified to address unforeseen issues or constraints, but will remain within the expected effects as outlined within the BA.

Mobilization

Before initiation of construction activities, the contractor will mobilize personnel and equipment to the project site. The contractor will erect construction signage and re-establish the staging areas that were created during previous maintenance work. Construction of material stockpiles and staging areas are located in upland areas away from the river and were previously cleared of vegetation. As part of the mobilization, the contractor will install and maintain temporary facilities needed to support construction. These facilities will include the following:

- Sanitary facilities.
- Fire control equipment.
- First aid equipment.
- Oil spill containment and cleanup equipment. (Construction equipment, such as off-road haul trucks, will be fueled off-site at the maintenance contractor's yard at the end of Hammonton Road.)
- Pump for filling water truck from the existing off-river head pond.
- Construction warning signs.
- Waste and rubbish containers.
- Measures, such as temporary flagging or fencing, to protect environmental resources.

Temporary Access Route

Access to the gravel bar adjacent to the entrance to the south channel is via a temporary ramp that will extend from the turnaround on the south bank at the upstream end of the SCD facility to the large gravel bar on the South Bank upstream of the facility.

A temporary gravel-covered riprap berm separates the turnaround from the river and acts a safety barrier for traffic. This berm will be removed, and a temporary ramp will be constructed down the south bank to the gravel bar. The contractor will grade off (as-needed) approximately 550 feet of temporary access road on the gravel bar parallel to the entrance channel. From the ramp, the temporary access route will extend along the gravel bar and will utilize existing channel contours such that no placement of outside fill material is required. The overall disturbance area for vehicle traffic will be 0.6 acre. Fugitive dust on gravel roads near the river will be controlled by a water truck.

Fish Avoidance Measures and Temporary Berm Construction

If in-water work is completed between April 1 and June 30, temporary isolation berm(s) will be constructed at the upper end of the work site to prevent water from flowing through the area where active construction is occurring prior to the removal of any accumulated sand and gravel from the south channel (i.e., river alluvium).

River Alluvium Excavation

An excavator will carefully remove accumulated river alluvium, which will be loaded into off-road haul trucks. The trucks will carry the sand and gravel material across the gravel bar on the east side of the channel to an existing fill area located on a flood plain terrace near the south

riverbank. The quantity of alluvium to be excavated annually from the south channel will change depending on runoff conditions, but is expected to range between 500 and 1,500 cubic yards.

When the cleaning of the entrance channel is complete, the isolation berm(s) will be removed and the entrance to the channel will be slowly reopened to allow water to flow via the diversion channel to the SCD.

Spreading Excavated River Alluvium on the Adjacent Gravel Bar

The area of excavation and sediment removal could be up to 1.6 acres, but is likely to be much less, except in years where significant deposition occurs that blocks the entire channel. The quantity of sand and gravel to be excavated annually from the south channel will change depending on runoff conditions, but is expected to range between 500 and 1,500 cubic yards.

All river alluvium excavated from the south channel will be spread on the adjacent gravel bar so as to be re-entrained into the river bedload during future high flow events.

Cobble Lining and Fish Refuge

If needed, cobble lining in the south channel will be repaired using cobble from a small stockpile near the rock barrier. Up to 500 cubic yards of cobble could be used annually to maintain the cobble lining. The three root wad fish refuges on the east bank of the channel will also be cleared of gravel or replaced, if necessary.

Site Clean-up and Demobilization

After all repair and maintenance activities are completed, clean-up activities will include: removal of any trash, debris, and construction materials, equipment, and signage. After completion of the channel maintenance work, the temporary access ramp from the turnaround on the riverbank to the upstream end of the channel will be removed. Straw wattles previously placed on the riverbank for erosion control will be replaced to minimize future erosion. The safety berm that blocks off- road vehicle access from the turnaround to the gravel bar will also be rebuilt upon in-channel work being completed. Restoration of the excavated channel will occur naturally from winter high-flow events and, thus, will not require in-river work to restore contours with heavy construction equipment.

Construction Schedule

Maintenance work would occur annually, as needed, April 1 through August 31 through 2027. Depending on storm events, it is possible that up to two maintenance events would be needed each year. Due to the potential for severe impacts on water supply and agriculture, YCWA proposes to allow work to proceed outside of the typical salmonid work windows as needed. This time period between runoff and the start of irrigation season typically occurs during the month of April through early May.

Any in-water work completed during this period and prior to July 1 would require that a detailed fish avoidance plan be submitted to NMFS for approval no later than ten business days prior to the target date for initiation of any in-water work. The plan will be prepared by the Designated or

Lead Biologist and will include feasible measures to avoid any impacts to the fish species present within the project reach and action area of the lower Yuba River. No work will occur until the fish avoidance plan is approved by NMFS. It is assumed that ten business days is sufficient time for NMFS to review the fish avoidance plan and request any necessary revisions prior to full approval. In-water work completed within the typical NMFS work windows (i.e., between July 1 and August 31) would not require approval of a fish avoidance plan. Maintenance work is expected to fall in the range of 1 to 10 days depending on the severity of flood damage and extent of blockage of YCWA facilities.

Conservation Measures

The following conservation measures listed below will be incorporated into YCWA's project activities to reduce the potential for these activities to affect ESA-listed species or to adversely affect their critical habitats. These conservation measures will also assist in mitigating the potential environmental effects during construction.

CM 1: Timing of In-Water Work

- Any in-water work completed between April 1 and July 1 would require a detailed fish avoidance plan to be submitted to NMFS for approval no later than ten business days prior to the target date for initiation of any in-water work.
- Construction work will occur only during daylight hours, which would leave the night-time hours for fish to migrate past the project site.
- Annual maintenance will be completed as quickly as possible. Each year, the project is expected to be completed within 1 to 10 days.
- All work would be completed by August 31 annually.

CM 2: Worker Training

- All contractors and equipment operators will be given Worker Environmental Awareness Program training to make them aware of the ecological value of the site, including the potential for special status species and their habitats to be present near the Proposed Project site, and educate them on how to best avoid impacting the biota and lower Yuba River. The training will cover all ESA-listed fishes with the potential to occur in the lower Yuba River and their critical habitats.

CM 3: Construction Best Management Practices (BMPs)

- All stockpiling of materials will occur outside waters of the U.S. (WOTUS) in upland areas with limited ruderal vegetation or other potential habitat and the project applicants will confine clearing of vegetation to the minimal areas necessary for the repair activities.
- Staging and temporary and long-term material disposal areas will be located away from any WOTUS.
- Movement of heavy equipment to and from the project site will be restricted to established roadways and haul routes to the extent feasible to minimize habitat disturbance, and equipment will be stored in established staging areas.
- At all times, appropriate types and sufficient quantities of materials will be maintained

on-site to contain any spills or inadvertent releases of materials that could cause a condition of pollution or nuisance if the materials were to reach WOTUS or other waters.

- All feasible measures will be implemented to control erosion and runoff from areas associated with construction activities. All areas of temporary impacts and all other areas of temporary disturbance, which could result in a discharge to WOTUS will be restored. Restoration activities will include use of straw wattles or other erosion control avoidance and minimization measures, and revegetation with only native species.
- Fueling, lubrication, maintenance, storage, and staging of vehicles and equipment will be conducted in a manner that will prevent discharges to any WOTUS.
- If any repair-related contaminants do reach any surface waters, appropriate spill response procedures will be initiated as soon as the incident is discovered. In addition, the State Water Resources Control Board staff contact person identified in the Water Quality Certification will be notified via email and telephone within 24 hours of the occurrence.
- Dust will be controlled utilizing water trucks. YCWA's contractors will use water trucks to patrol, water and condition all haul roads, staging areas, and active material placement locations within the project site as needed.
- Contractors will be required to equip all internal combustion engine equipment with intake and exhaust mufflers that are in good condition and appropriate for the machines.

CM 4: Turbidity Control Measures

- River turbidity levels will be controlled using a permeable turbidity curtain placed in the south channel, downstream of the entrance to the SCD channel. The permeable turbidity curtain will float six inches off of the bottom of the channel to allow for fish passage.
- Flow will be carefully balanced through the rock barrier according to residual seepage in the diversion channel downstream of the work area so that any residual flow is diverted through the rockfill barrier and head pond into the canal system rather travelling downstream over DPD.
- All turbidity control and monitoring requirements included in the CDFW Streambed Alteration Agreement and Central Valley Regional Water Quality Control Board Clean Water Act Section 401 Water Quality Certification will be closely adhered to.
- Continuous monitoring of all in-water work by a qualified biologist.

CM 5: Fish Avoidance Measures

The following fish avoidance measures will only be implemented for work that occurs from April 1 to June 30:

- Prior to any work being conducted, site conditions and fish occupancy surveys will be completed.
- Upstream of the work area will be isolated using blocking nets to prevent fish from entering the work area from upstream.
- Then, successive downstream seine sweeps will be conducted to facilitate fish movement from the immediate work area until no fish occur. Then additional blocking nets would be placed at the downstream end of the work area.
- A temporary berm will be installed at the upstream end of the work area as a means to

prevent flowing water in the work area to the extent possible.

- Upon completion of channel work, gradually remove the upstream berm to permit flows to enter the excavated channel.

Figure 1 shows where fish avoidance measures would be implemented in the river. Importantly, river conditions are expected to differ annually. Fish avoidance measures may be located in different areas within the south channel based on the size and location of the blockage, hence the requirement to prepare an annual avoidance plan for approval if work occurs prior to July 1.

CM 6: Construction Site Clean-up

- Repair materials and debris from all repair work areas will be removed immediately following completion of the project.

Figure 1. Example of where fish avoidance measures were used in 2022 prior to excavations.

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 to adversely modify or destroy their designated critical habitat. Per the requirements of the ESA, Federal action agencies consult with NMFS, and section 7(b)(3) requires that, at the conclusion of consultation, NMFS provide an opinion stating how the agency's actions would affect listed species and their critical habitats. If incidental take is reasonably certain to occur, section 7(b)(4) requires NMFS to provide an ITS that specifies the impact of any incidental taking and includes reasonable and prudent measures (RPMs) and terms and conditions to minimize such impacts.

2.1. Analytical Approach

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

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

The designations of critical habitat for Central Valley (CV) spring-run Chinook salmon Evolutionarily Significant Unit (ESU), California Central Valley(CCV) steelhead Distinct Population Segment (DPS) and Southern DPS green sturgeon uses the term primary constituent element (PCE) or essential features. The 2016 final rule (81 FR 7414; February 11, 2016) that revised the critical habitat regulations (50 CFR 424.12) replaced this term with physical or biological features (PBFs). The shift in terminology does not change the approach used in conducting a "destruction or adverse modification" analysis, which is the same regardless of whether the original designation identified PCEs, PBFs, or essential features. In this biological opinion, we use the term PBF to mean PCE or essential feature, as appropriate for the specific critical habitat.

The ESA Section 7 implementing regulations define effects of the action using the term "consequences" (50 CFR 402.02). As explained in the preamble to the final rule revising the definition and adding this term (84 FR 44976, 44977; August 27, 2019), that revision 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 critical 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 is likely to 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" for the jeopardy analysis. The opinion also examines the condition of critical habitat throughout the designated area, evaluates the conservation value of the various watersheds and coastal and marine environments that make up the designated area, and discusses the function of the PBFs that are essential for the conservation of the species.

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

Species	Listing Classification and Federal Register Notice	Status Summary
Central Valley spring-run Chinook salmon ESU	Threatened, 70 FR 37160; June 28, 2005	According to the NMFS 5-year species status review (NMFS 2016b), the status of the CV spring-run Chinook salmon ESU, until 2015, has improved since the 2010 5-year species status review. The improved status is due to extensive restoration, and increases in spatial structure with historically extirpated populations (Battle and Clear creeks) trending in the positive direction. Recent declines of many of the dependent populations, high pre-spawn and egg mortality during the 2012 to 2016 drought, uncertain juvenile survival during the drought are likely increasing the ESU's extinction risk. Monitoring data showed sharp declines in adult returns from 2014 through 2018 (CDFW 2018).
California Central Valley steelhead DPS	Threatened, 71 FR 834; January 5, 2006	According to the NMFS 5-year species status review (NMFS 2016a), the status of CCV steelhead appears to have remained unchanged since the 2011 status review that concluded that the DPS was in danger of becoming endangered. Most natural-origin CCV populations are very small, are not monitored, and may lack the resiliency to persist for protracted periods if subjected to additional stressors, particularly widespread stressors such as climate change. The genetic diversity of CCV steelhead has likely been impacted by low population sizes and high numbers of hatchery fish relative to natural-origin fish. The life-history diversity of the DPS is mostly unknown, as very few studies have been published on traits such as age structure, size at age, or growth rates in CCV steelhead.
Southern DPS of North American green sturgeon	Threatened, 71 FR 17757; April 7, 2006	According to the NMFS 5-year species status review (NMFS 2015) and the 2018 final recovery plan (NMFS 2018b), some threats to the species have recently been eliminated, such as take from commercial fisheries and removal of some passage barriers. Also, several habitat restoration actions have occurred in the Sacramento River Basin, and spawning was documented on the Feather River. However, the species viability continues to face a moderate risk of extinction because many threats have not been addressed, and the majority of spawning occurs in a single reach of the main stem Sacramento River. Current threats include poaching and habitat degradation. A recent method has been developed to estimate the annual spawning run and population size in the upper Sacramento River so species can be evaluated relative to recovery criteria (Mora *et al.* 2018).

Table 2. Description of critical habitat, Listing, and Status Summary.

Critical Habitat	Designation Date and Federal Register Notice	Status Summary
Central Valley spring-run Chinook salmon ESU	September 2, 2005; 70 FR 52488	Critical habitat for CV spring-run Chinook salmon includes stream reaches of the Feather, Yuba and American rivers, Big Chico, Butte, Deer, Mill, Battle, Antelope, and Clear creeks, the Sacramento River, as well as portions of the northern Delta. Critical habitat includes the stream channels in the designated stream reaches and the lateral extent as defined by the ordinary high-water line. In areas where the ordinary high-water line has not been defined, the lateral extent will be defined by the bankfull elevation. PBFs considered essential to the conservation of the species include: Spawning habitat; freshwater rearing habitat; freshwater migration corridors; and estuarine areas. Although the current conditions of PBFs for CV spring-run Chinook salmon critical habitat in the Central Valley are significantly limited and degraded, the habitat remaining is considered highly valuable.
California Central Valley steelhead DPS	September 2, 2005; 70 FR 52488	Critical habitat for CCV steelhead includes stream reaches of the Feather, Yuba and American rivers, Big Chico, Butte, Deer, Mill, Battle, Antelope, and Clear creeks, the Sacramento River, as well as portions of the northern Delta. Critical habitat includes the stream channels in the designated stream reaches and the lateral extent as defined by the ordinary high-water line. In areas where the ordinary high-water line has not been defined, the lateral extent will be defined by the bankfull elevation. PBFs considered essential to the conservation of the species include: Spawning habitat; freshwater rearing habitat; freshwater migration corridors; and estuarine areas. Although the current conditions of PBFs for CCV steelhead critical habitat in the Central Valley are significantly limited and degraded, the habitat remaining is considered highly valuable.

Critical Habitat	Designation Date and Federal Register Notice	Status Summary
Southern DPS of North American green sturgeon	October 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. Critical habitat in 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 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. In addition, PBFs include migratory corridor, water quality, and food resources in nearshore coastal marine areas. Although the current conditions of PBFs for sDPS green sturgeon critical habitat in the Central Valley are significantly limited and degraded, the habitat remaining is considered highly valuable.

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).

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 spawn primarily in the tributaries to the Sacramento River. 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 sDPS 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 project location is located at latitude 39°12'37.57"N, longitude 121°26'24.89"W, on the south bank of the lower Yuba River; approximately 1,500 feet upstream of DPD, and approximately 12 miles northeast of Marysville, in Yuba County, California. The action area includes the lower Yuba River from DPD upstream approximately 1,500 feet to the upstream extent of the annual maintenance area. The action area also includes the SCD facility, which is located on the south bank of the lower Yuba River, approximately 1,000 feet upstream of DPD.

The action area encompasses approximately 6 acres. The work area covers approximately 3 acres of the gravel bar upstream of the SCD. The action area also includes areas downstream of DPD where activities may result in increased turbidity. With the minimization measures proposed, effects of the action are expected to extend approximately 1,500 feet downstream of DPD.

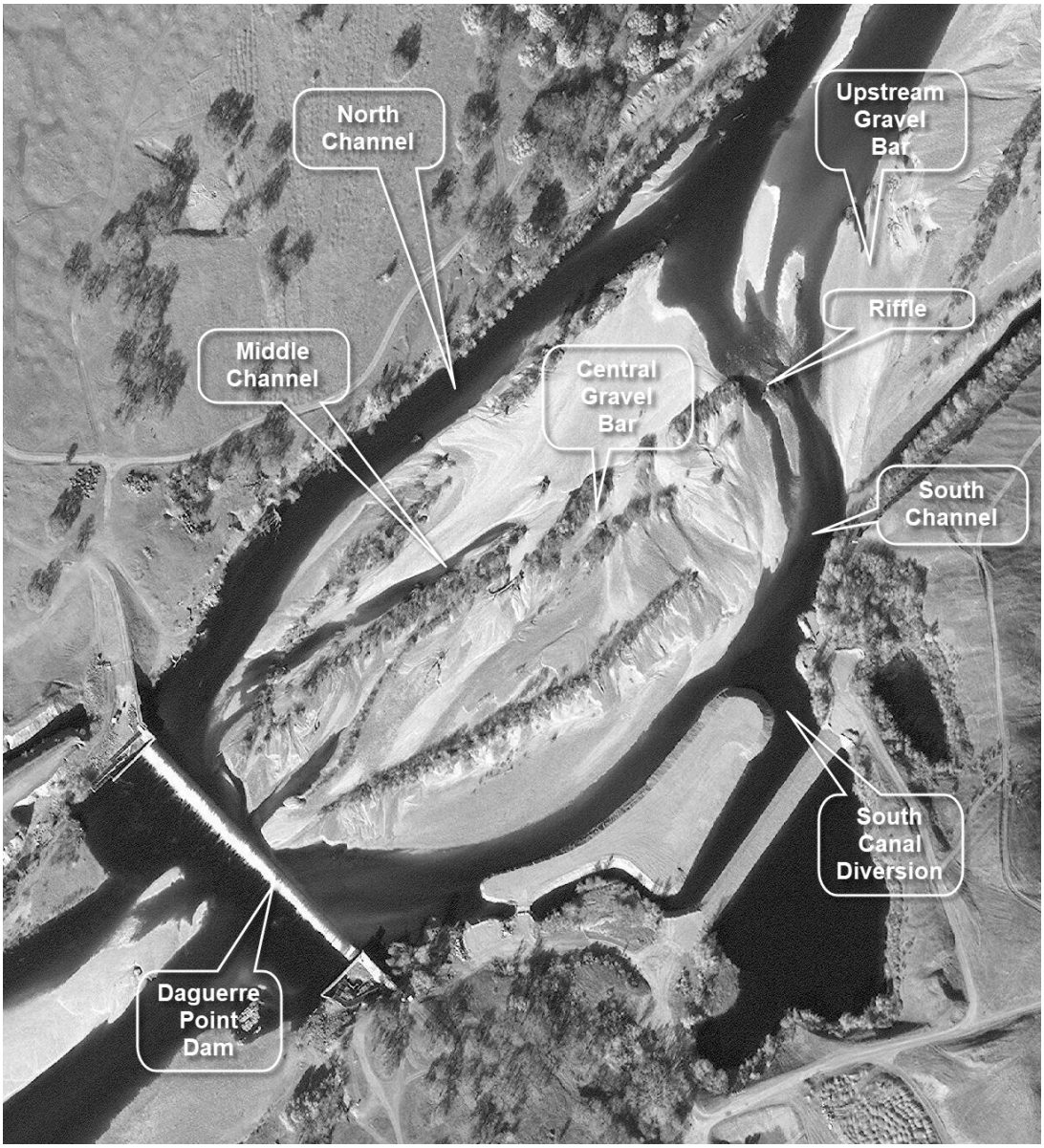

Figure 2. Aerial view of the Project site in 2017 (YCWA 2022).

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).

The NMFS Salmonid Recovery Plan identifies loss of juvenile rearing habitat in the form of lost natural river morphology and function, and lost riparian habitat and in-stream cover as a "very high stressor" affecting the viability of salmon and steelhead in the Central Valley (NMFS 2014).

The 2018 NMFS Green Sturgeon Recovery Plan identified Non-point source sediment as a "high stressor" affecting the viability of green sturgeon in the Yuba River.

The Recovery Plans also establish a strategic approach to recovery, which identifies critical recovery actions for the Central Valley, as well as watershed- and site-specific recovery actions. Watershed-specific recovery actions address threats occurring in each of the rivers or creeks that currently support spawning populations of the CV spring-run, CCV steelhead , or green sturgeon. Site-specific recovery actions address threats to these species occurring within a watershed (*e.g.*, Yuba River [YUR]).

The Yuba River below Englebright Dam is within the Northern Sierra Nevada Diversity groups for CV spring-run and CCV steelhead, both species populations within the lower Yuba are classified as "Core 2" populations. Core 2 populations meet, or have the potential to meet, the biological recovery standard for moderate risk of extinction (NMFS 2014). Core 2 watersheds have lower potential to support viable populations, due to lower abundance, or amount and quality of habitat. These populations provide increased life history diversity to the ESU/DPS and are likely to provide a buffering effect against local catastrophic occurrences that could affect other nearby populations, especially in geographic areas where the number of Core 1 populations is lowest.

The recovery actions within the lower Yuba River are highly targeted at improving spawning and rearing habitat of salmonid species, and providing passage over DPD for green sturgeon. The Yuba River above Englebright Dam is recognized as the primary re-introduction priority within the Northern Sierra Nevada Diversity Group for both CCV steelhead and CV spring-run. The proposed action has not incorporated any recovery actions for any of the 3 species present within the Action Area.

Historical Usage of the Lower Yuba River

The lower Yuba River has undergone significant morphological and ecological changes over the past 150 years, due to a sequence of anthropogenic disturbances, beginning with the discovery of gold in California in 1848. Most relevant of these changes:

- ***vast influx of hydraulic mining sediment* -** It is estimated that from 1849 – 1909, the Yuba River received roughly 685 million cubic yards of sediment, more than the Upper Feather, Bear, and American rivers combined (Gilbert 1917). This influx caused such

severe aggradation of the Yuba River that by 1868 the channel bed had risen 20 ft and was higher than the streets of Marysville (Ayres Associates 1997). Flooding in Marysville in 1875 prompted the prohibition of in-stream disposal of hydraulic mining sediments.

- ***shifting and confinement of the river's course -*** In the early 1900s, the California Debris Commission sanctioned the re-alignment of the lower Yuba River to the north of the historic alignment and the construction of large linear "training walls" consisting of steeply mounded tailings piles in the center and along both banks of the straightened river corridor. The training walls were piled to substantial heights above the 100-yr flood elevation and with dramatically varying top widths of up to 500 ft (AECOM 2015). The makeshift training walls were intended to laterally confine the river to allow for additional widespread dredging operations (gold mining) of the naturally occurring and hydraulic mining derived sediments deposited in the valley.

- ***river regulation and coarse sediment control -*** In 1906, DPD was constructed as a partial sediment barrier and base-level control point. Englebright Dam was constructed in 1941, and was designed to keep upstream hydraulic mining debris out of the river (YCWA 2017). In 1971, New Bullards Bar was raised to control mining debris and generate power (Pasternack 2009). As a result, the influx of sediment and the major flood events have both been significantly altered, affecting the hydrologic regime and the movement of sediment in the system. Large woody debris passes over the dam, but is often greatly weathered or simplified from residence time in the reservoirs upstream and through passage over the dam (i.e., canopy and rootwad removed). This most likely reduces the ability of key pieces to lock in place within the channel.

- ***recent and ongoing aggregate mining -*** Widespread processing of the remaining Goldfield sediments continues today through surface and dredge mining for the production of aggregate and other construction materials. Uncertainties related to physical parcel boundaries and contentious mining interests/claims have influenced the development of an irregular moonscape characterized by long, linear, gravel/cobble mounds, steep ravines, isolated ponds, and loss of fine sediment required for riparian vegetation establishment. Dredger ponds support invasive predatory fish and other species that compete for resources with juvenile salmonids. The ponds can reconnect during high flows, allowing the movement of invasive species into the main river channel.

Regional Setting

The Action Area is located in a rural setting on the lower Yuba River. Features within and adjacent to the Action Area include the SCD facility and associated canal system, DPD, Hallwood-Cordua Diversion facility, USACE training levees, and the Yuba Goldfields. The Yuba Goldfields, which were formed by dredging activities associated with hydraulic mining and include significant quantities of irregular gravel and cobble mounds interspersed with ponds, are located to the south of the project site. Several unpaved access roads lead to the site via access though the Yuba Goldfields. The Hallwood-Cordua water diversion facility is located directly across from the SCD, also upstream of DPD. Areas to the north of the project site consist

primarily of grazing lands. DPD is located to the west of the project site. The lower Yuba River and USACE training levees are located to east of the project site.

Lower Yuba River Habitat

The south channel of the lower Yuba River, where work activities will occur, consists of run and riffle habitats. The middle and north channels within the Action Area are composed primarily of run habitat. Substrate in the 447-foot-long reach of the lower Yuba River where excavation will occur consists of gravel, cobble, and fines in varying percentages.

Riparian vegetation within the Action Area occurs adjacent to the south channel of the lower Yuba River. Species include sandbar and arroyo willows (*Salix interior* and *Salix lasiolapis*), white alders (*Alnus rhombifolia*), Fremont's cottonwoods (*Populus fremontii* subsp. *fremontii*), dense blackberry (*Rubus ursinus*), and wild grape (*Vitis californica*). Trees that are located directly adjacent to the channel provide partial shade cover and other services to the lower Yuba River, however, riparian vegetation only occurs sporadically.

Hydrology

The lower Yuba River flows 24 miles from Englebright Dam to its confluence with the Feather River, located southwest of Marysville, and conveys flows from the approximately 1,340-square-mile watershed (Sacramento River Watershed Program 2015). The YCWA SCD canal is located just upstream from DPD. Flows at this point in the river are regulated by upstream releases from Englebright Reservoir and New Bullards Bar Reservoir. These reservoir operations are typically controlled by flood control releases and releases to meet the Lower Yuba River Accord flow requirements (Yuba Accord Monitoring and Evaluation Program 2013). New Bullards Bar Reservoir is the principal storage facility of the Yuba River Development Project and is operated by YCWA for water supply and flood control purposes. Englebright Reservoir is located downstream of New Bullards Bar Reservoir. It traps mining debris, attenuates power peaking releases from New Colgate Powerhouse, and provides recreation opportunities. A portion of New Bullards Bar Reservoir storage capacity, 170,000 acre-feet, normally must be held empty from September 15 through May 31 for flood control operations.

Water Quality

The lower Yuba River provides water for several beneficial uses designated in the Central Valley Basin Plan, including: irrigation and stock watering, power supply, contact and non-contact recreation, warm and cold freshwater habitat, warm and cold migration, warm and cold spawning habitat, and wildlife habitat (Central Valley RWQCB 2016).

The Yuba River watershed contains a significant amount of sediments with mercury, as a result of historic hydraulic mining. Mercury is present in the bottoms of rivers and reservoirs and is transported by erosion processes and can be converted into methylmercury. As methylmercury accumulates in the food chain, it becomes concentrated, so that, in larger predatory fish (e.g., trout and bass), concentrations have the potential to exceed levels of concern for human consumption. The lower Yuba River is CWA Section 303(d)-listed for impairments associated with mercury (SWRCB 2011).

Water temperatures are important water quality parameters for all life stages of anadromous fish species. Water temperatures in the lower Yuba River are influenced by the amounts and temperatures of water released from New Bullards Bar Reservoir to Englebright Reservoir, releases from the Narrows 1 and 2 Powerhouses, bypasses and spills from Englebright Dam, operations under the Yuba Accord Fisheries Agreement, and natural mechanisms associated with river geometry and climatic conditions (Yuba Accord Monitoring and Evaluation Program 2013). Temperatures in the lower Yuba River during summer and fall months are generally 1 to 5°F colder than they were under historical conditions. Although there are times of the year (in November through March) when water temperatures are slightly warmer than they were under historical conditions, suitable thermal regimes for all thermally sensitive species life-stages normally occur in the lower Yuba River (Yuba Accord Monitoring and Evaluation Program 2013).

CV Spring-run Chinook Salmon, sDPS Green Sturgeon, and CCV Steelhead and their Critical Habitat in the Action Area

All life stages of CV spring-run Chinook salmon, sDPS green sturgeon, and CCV steelhead utilize the lower Yuba River. Uses include adult immigration and holding, spawning, embryo incubation, fry and juvenile rearing, and juvenile and smolt emigration. The direct work area contains migration habitat, juvenile rearing habitat, and potential spawning habitat for CV spring-run Chinook Salmon and CCV steelhead.

sDPS green sturgeon are currently only able to utilize areas of the Yuba River below DPD, which is considered a total barrier for the species. In 2018, spawning of sDPS green sturgeon was documented for the first time in the Yuba River in the plunge pool just below DPD (Beccio 2018). Adults and juveniles have been detected in the Lower Yuba River during all times of the year (Table 3).

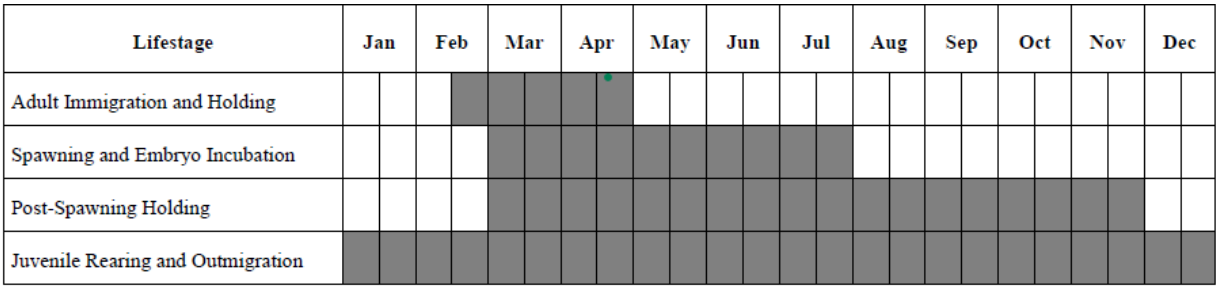

Figure 3. Life stage-specific periodicities for sDPS green sturgeon in the lower Yuba River (YCWA 2022).

Global Climate Change

By contrast to the conditions for other Central Valley floor rivers, climate change may not have as much of an impact on salmonids in the lower Yuba River downstream of Englebright Reservoir (YCWA 2010b). Presently, the lower Yuba River is one of the few Central Valley tributaries that consistently has suitable water temperatures for salmonids throughout the year. Lower Yuba River water temperatures generally remain below 58°F year-round at the Smartsville Gage (downstream of Englebright Dam), and below 60°F year-round at DPD (YCWA *et al.* 2007). At Marysville, water temperatures generally remain below 60°F from

October through May, and below 65°F from June through September (YCWA *et al*. 2007). However, in dry years temperatures may become warmer than the optimum range for salmonids.

According to (YCWA 2010a), because of specific physical and hydrologic factors, the lower Yuba River is expected to continue to provide the most suitable water temperature conditions for anadromous salmonids of all Central Valley floor rivers, even if there are long-term climate changes. This is because New Bullards Bar Reservoir is a deep, steep-sloped reservoir with ample cold-water pool reserves. Throughout the period of operations of New Bullards Bar Reservoir (1969 through present), which encompasses the most extreme critically dry year on record (1977), the cold-water pool in New Bullards Bar Reservoir never was depleted. Since 1993, cold water pool availability in New Bullards Bar Reservoir has been sufficient to accommodate year-round utilization of the reservoir's lower level outlets to provide cold water to the lower Yuba River. Even if climate conditions change, New Bullards Bar Reservoir is likely to have a very substantial cold water pool each year that will continue to be available to provide sustained, relatively cold flows of water into the lower Yuba River during the late spring, summer and fall of each year (YCWA 2010a).

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 (see 50 CFR 402.02). 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 the factors set forth in 50 CFR 402.17(a) and (b).

The potential for the Proposed Action to adversely affect ESA-listed fish species and their critical habitats can be classified into two general categories: 1) temporary construction-related effects, which will occur only during active construction and 2) permanent effects, which result from longer-term existence of the conditions resulting from the Proposed Action. Potential construction-related effects include effects on fish migration and water quality, and direct injury or mortality to fish.

2.5.1. Effects to ESA-listed Fish Species

Work is expected to be performed annually between April 1 and August 31, 2027. This window avoids the primary spawning windows of adult CCV steelhead and adult CV spring-run Chinook, and primary immigration window for CCV steelhead and CV spring-run smolts. The Action Area consists of riffles and runs, therefore likely does not serve as holding habitat for adult CCV steelhead or CV spring-run. Thus, holding adults are not expected to be impacted by project construction. Juvenile CV spring-run and CCV steelhead may be present in the Action Area during work, and thus may be impacted by the Proposed Action.

Incubating CV spring-run salmon eggs are unlikely to be present during the Proposed Action, as the construction window avoids the incubation period. If work needs to occur during the early stages of the spring (April 1- June 30) there is a higher chance of encountering CCV steelhead

redds or rearing juveniles. The minimization measures proposed for this timeframe include a fish avoidance plan approved by NMFS, fisheries surveys prior to work to ensure no redds are within the work area, and ensure that fish are avoided to the maximum extent possible.

Water Quality: Increased Suspended Sediment and Turbidity during and after Construction

Elevated turbidity and suspended sediment levels will occur in the south channel of the Action Area and downstream of the construction activities while in-water work is occurring. These construction activities generally include construction of a temporary access road onto the gravel bar and in the lower Yuba River, excavation of river alluvium, placement of cobble within the excavated channel, and if necessary, restoration of temporary components and removal of temporary fill.

The substrate in the Action Area is composed mostly of gravel, cobbles, and fine materials. The area of disturbance to the streambed could be up to 1.6 acres for each repair, though it is expected to be less in most years. Excavation of river alluvium will require use of a long-arm excavator operating from the temporary access road to remove the materials from the river channel, which will cause sediment resuspension and increase downstream turbidity within the south channel of the Action Area. The suspended sediments could contain remnant sources of mercury, copper, or other contaminants known to be in the Yuba River. The resuspension could result in a temporary release of these contaminants into the water column. Proposed BMPs are expected to minimize the potential for runoff, soil, and other construction debris to enter the lower Yuba River, and turbidity control measures would reduce potential downstream transport of suspend sediment-associated contaminants. Nevertheless, these activities could cause construction materials, including soil and other particulates to enter into the lower Yuba River during the maintenance work.

The degree of sediment resuspension associated with any of the components of the Proposed Action is determined by multiple factors including sediment properties, water depth, velocity, impediments and operational factors. Due to the location of the temporary access road construction, the vast majority of the suspended sediment and turbidity generated from in-river construction will flow into the south channel and then into the SCD facility and ultimately into the YCWA canal system. Thus, most of the construction generated suspended sediment and turbidity will not occur in the middle or north channels, and much of this turbidity will not exit the Action Area, but rather will be transported with diversions through the SCD. Turbidity plumes are expected to affect a limited portion of the channel width. Any increase in turbidity associated with in-stream work is likely to be brief and not extend past DPD.

High concentrations of suspended sediment can have both short- and long-term effects on salmonids. The severity of these effects depends on the sediment concentration, duration of exposure, and sensitivity of the affected life stage. Temporary spikes in suspended sediment may result in behavioral avoidance of the site by fish; several studies have documented active avoidance of turbid areas by juvenile and adult salmonids (Bisson and Bilby 1982, Lloyd 1987, Servizi and Martens 1992, Sigler et al. 1984). Individual fish that encounter increased turbidity or sediment concentrations will likely move away from affected areas into suitable surrounding habitat. For those fish that do not or cannot avoid the turbid water, exposure is expected to be

brief (*i.e.*, minutes to hours) and is not likely to cause injury or death from reduced growth or physiological stress.

Sedimentation is known to have lethal and sublethal effects to incubating salmonid and sturgeon eggs by decreasing dissolved oxygen transport. Sediment also blocks micropores on the surface of incubating salmonid eggs, inhibiting oxygen transport and creates an additional oxygen demand through the chemical and biological oxidation of organic material (Kemp et al. 2011, Greig et al. 2005, Suttle et al. 2004). Proposed water quality monitoring, including measurements of turbidity will be performed on a regular basis during construction to track the response of water quality to construction activities, and to ensure all Federal and state water quality requirements are met. Nonetheless, increased suspended sediment and turbidity will occur in the south channel during in-river construction (e.g., excavation of alluvium and removal of temporary fill).

CCV steelhead and sDPS green sturgeon eggs may be present within the Action Area. The BMPs proposed for turbidity, water quality, as well as the biological monitoring included, are expected to reduce the likelihood of adverse impacts to incubating CCV steelhead eggs and sDPS green sturgeon eggs. With all measures in place, turbidity effects are not expected to extend more than 1,500 feet below DPD, which is identified as a passage barrier to green sturgeon. When water is flowing over DPD, higher velocities and increased mixing would not allow the settling of suspended sediments it instead usually causes scour of any accumulated sediment. As such, any sediment that did extend past DPD would be expected to remain suspended in the water column until reaching an area of slower velocity (such as the riffle habitat just downstream of the plunge pool) or dispersing enough to equal background turbidity levels within the 1,500-foot extent below DPD, if not sooner. As green sturgeon spawn in deep holding pools (NMFS 2018), it would be expected that any suspended sediment that passes over DPD would be unlikely to reach the bottom of the pool there where they spawn, which is usually no less than 8 feet deep during their spawning season. Due to these reasons, no adverse effects to green sturgeon eggs present downstream of DPD are expected. CCV steelhead have been previously documented spawning in the work area, though it has not been used since the high flows in 2017/2018. As they could be in the immediate work area, any excess turbidity would be substantially closer to incubating eggs, and therefore more likely to reach an exposure level that would cause injury or death. Due to the timing of some early season work and the potential need to complete work several times over the 5-year timeframe of this proposed work, it is expected that a small number of CCV steelhead eggs and rearing juveniles would be harmed annually from increased suspended sediment.

Water Quality: Contaminants Entering the River from Construction Equipment

Because all construction activities associated with the Proposed Action will involve the use of heavy equipment, accidental chemical spills could occur. Since these construction activities will require heavy equipment to operate near the edge of and in the river channel, there is potential for inadvertent spills of fuels and other hazardous materials to enter the lower Yuba River. Accidental spills and leakage from construction equipment may include fuel, lubricants, hydraulic fluids and coolants. An accidental spill or inadvertent discharge of contaminants into the lower Yuba River associated with project activities could harm CV spring-run, sDPS green sturgeon, or CCV steelhead. The potential magnitudes of biological effects to ESA-listed fishes

resulting from accidental or unintentional contaminant spills would depend on several factors, including the proximity to the water body, the type, amount, concentration, and solubility of the contaminant, and the timing and duration of the discharge. Rand (1995) stated that the most common sublethal endpoints in aquatic organisms are behavioral (e.g., swimming, feeding, attraction-avoidance, and predator-prey interactions), physiological (e.g., growth, reproduction, and development), biochemical (e.g., blood enzyme and ion levels), and histological changes. Contaminants entering the lower Yuba River in sufficient amounts could affect survival and growth rates of ESA-listed fish using the waterbody and other aquatic organisms including prey sources. Petroleum products can cause oily films to form on the water surface that can reduce dissolved oxygen (DO) levels available to aquatic organisms. The severity of the effects would depend on species and life stage sensitivity, duration of exposure, condition or health of individuals (including nutritional status), and physical or chemical properties of the water (including temperature and DO). Potential effects could range from no effect to mortality.

The Proposed Action will also be conducted in accordance with the requirements of Clean Water Act Section 401 Water Quality Certification. Avoidance and minimization measures are included in the project description to reduce the potential for the discharge of contaminants into the lower Yuba River. These measures, such as locating staging, fueling, and storage areas away from the lower Yuba River, ensuring equipment uses having containment plans and equipment on site, and ensuring that construction personnel are trained to respond to spills rapidly, are intended to reduce the probability for the release of toxic or hazardous materials to the lower Yuba River, establish measures to contain any accidental spills quickly, and constrain in-river activities to the minimum necessary. With these avoidance and minimization measures in place, accidental spills of equipment-related contaminants into the lower Yuba River are extremely unlikely to occur. In the highly unlikely event of a spill, containment and recovery procedures will be utilized to minimize the volume of contaminant that could enter the lower Yuba River, and length of time the contaminant is in the river. Any incidental "wash-off" of construction equipment-related contaminants that could occur from operating the equipment in the wet would be sufficiently low in volume that concentrations of such contaminants in the river would be well below levels that would impact affect aquatic resources. Due to the above BMPs and the timing of the project, which precludes the occurrence of most life stages, the potential for impacts to CV spring-run, sDPS green sturgeon, or CCV steelhead from contaminants entering the river is considered improbable.

Underwater Noise during Construction

Because in-river construction activities associated with the Proposed Action will involve the use of heavy equipment, construction activities could result in temporary periods of elevated underwater noise levels in the lower Yuba River. These construction activities include construction of a temporary access road onto the gravel bar and in the lower Yuba River, excavation of river alluvium, and removal of temporary fill.

Noise resulting from operating equipment in and adjacent to the river channel could potentially cause disturbance, injury, or mortality to ESA-listed fishes if underwater noise levels were to exceed effect thresholds while fish were present. The type and severity of effects will depend on several factors, including the intensity and characteristics of the sound, the distance of the fish from the source, and the frequency and duration of the noise-generating activities. Multiple

studies have shown responses in the form of behavioral changes in fish due to human produced noise (Wardle et al. 2001, Slotte et al. 2004, Popper and Hastings 2009). Instantaneous behavioral responses may range from slight variations, a mild awareness, to a startle response. Construction will not occur at night, leaving a daily period of approximately 14 hours or more with no noise generated from construction activity. Work is expected to take between 1 and 10 days, and occur when the least amount of fish would be present. Nonetheless, as some life stages of fish are always present within the Yuba River, a small portion of ESA-listed species will be exposed to noise-generating activities during the Proposed Action.

Generally, work will require haul trucks, a bulldozer, and a long-arm excavator. Underwater sound pressures arising from sediment removal will have the potential to adversely affect ESA-listed fishes. The potential effects associated with elevated noise levels may include lethality or injury (e.g., hearing damage, reduced inner ear equilibrium capacity) to fish caused by excessive noise levels. Potential effects also include "noise barriers" created by elevated underwater noise levels, which might prevent or delay adult and juvenile fish from passing the construction site. The amount of underwater noise that will be generated is likely attenuated substantially by the presence of differing depths, velocities, and non-uniform substrates in the Action Area. Any increase in noise levels associated with these activities will be temporary and localized and is not expected to reach levels that would cause adverse effects. Specifically, noise levels will not reach levels that would cause physical injury or lethality, and any behavioral startle or avoidance responses that may occur will be brief. The localized and short-term nature of the increases in noise mean that impacts to salmonids and sturgeon are expected to be minimal and not likely to result in harm, injury, or death of any fish.

Injury and Mortality from Equipment Operation

CV spring-run salmon and CCV steelhead could be injured or killed by contact with construction equipment. Construction activities could result in injury and mortality to fish If an adult CCV steelhead or CV spring-run does pass through the area during construction, it is expected that it will swim away quickly in response. Thus, holding adults are not expected to be impacted by project construction. Incubating CV spring-run eggs are unlikely to be present during the Proposed Action, as the construction window avoids the incubation period. If work needs to occur during the early stages of the spring (April 1- June 30), there is a higher chance of encountering CCV steelhead redds or rearing juveniles. The minimization measures proposed for this timeframe include a fish avoidance plan approved by NMFS, and fisheries surveys prior to work to ensure no redds are within the work area. Juvenile to smolt-sized CCV steelhead and CV spring-run may be present during in-stream construction activities, and thus subject to the above effects.

Due to the underwater noise, turbidity, and flow pattern disruption (i.e., disruption of laminar flow vectors immediately adjacent to the equipment itself), it is expected that the most CV spring-run and CCV steelhead juveniles would leave the Action Area at the start of construction. Although it is anticipated most juveniles will leave the Action Area at the start of construction, it is expected that a small number of juveniles will not escape in time, and then be crushed or otherwise injured, and potentially killed by construction equipment and personnel. NMFS anticipates a small number of CCV steelhead and CV spring-run will be harmed or killed by construction equipment and personnel each year of the project.

Juveniles that migrate away in response to in-stream construction activities may endure short-term stress from being forced to migrate away from their rearing area and needing to locate a new rearing area downstream. Fish may endure some short-term stress from crowding and competition with resident fish for food and habitat. Fish may be subject to increased predation risk while they are locating a new rearing area. However, displaced fish will likely locate to areas upstream or downstream that have suitable habitat and low competition. It is not expected that the temporary displacement of fish or the competition they endure for the short duration of annual in-water work will affect the survival chances of individual fish based on the size of the area that will likely be exposed.

Long-term Impacts from Modified Channel Flows

Excavation of the south channel to alleviate the constriction will allow for additional water to flow into the south channel. Regardless of the total flow in the lower Yuba River, implementation of the Proposed Action will result in an increased proportion of the total flow entering the south channel and a corresponding proportional decrease in the total flow entering the north and middle channels. The increased flow in the south channel is intended to enhance flow to the SCD. Although flows will be reduced in the north and middle channels, the majority of water is expected to continue to flow through the north channel of the Yuba River after implementation of the Proposed Action.

Modeled approximate peak velocities under the Proposed Action range from almost 4 feet per second (ft/s) to just above 5 ft/s. NMFS (2022) identified a range of velocities as suitable for adult Chinook salmon and CCV steelhead passage when these velocities occur in transport channels. Because the excavated channel upon completion of the Proposed Action will not be as confined as a man-made channel, and will have greater hydraulic roughness, these criteria are considered protective of fish passage in the Action Area. Corresponding flow reductions also will occur in the north and middle channels, but are not expected to reduce passage opportunities for adult CV spring-run and CCV steelhead migrating through those channels to spawning areas. The Proposed Action will result in small decreases in flows in the middle and north channel relative to overall flows in the Action Area. As the overall amount of water is not going to be changing, the redistribution of flows and changes in velocity through any of the channels is not expected to negatively affect adult upstream passage. The effect of redistribution of flows to the overall flow regime in the area, is expected to be minor, and will not affect the total amount of water moving through the Action Area. Therefore, the proposed action is not expected to affect passage ability by immigrating adults at any of the modeled inflows.

Additionally, the increased flow in the south channel will improve accessible migratory pathways for out-migrating juveniles, while the corresponding reductions in flows in the north and middle channels are not expected to have a reduction in quality for out-migrating juveniles.

Although the number of juveniles that will pass the SCD under the Proposed Action is unknown, excavation in the south channel will result in this channel functioning as a juvenile migration corridor with greater flows than would occur if the channel was allowed to continue to accumulate sediment. Some additional out-migrating juveniles could enter the diversion channel as a result of the Proposed Action. However, the proposed action is not expected to increase the exposure of fish to the rock gabion fish exclusion structure beyond the level currently occurring

under baseline conditions. While additional flow in the South Channel may bring increased presence of juvenile salmonids, those fish would be expected to mainly stay within the thalwag of the South Channel. While the potential for a small increase in the amount of juvenile fish entering the diversion channel and being exposed to the rock gabion and diversion is possible, it is not expected to change from existing baseline conditions.

Impacts of Vegetation Removal

Riparian habitat, especially the SRA component, is important for rearing and out-migrating juvenile salmon because it provides overhead and in-stream cover from predation and enhances food production. Terrestrial insects and in-stream woody material that fall from riparian plants into the river enhance the aquatic food webs and provide high-value feeding areas for juvenile salmonids. Once in the river channel, the stems, trunks, and branches become very important structural habitat components for aquatic life. Many of the aquatic invertebrates that are primary food sources for juvenile salmon and CCV steelhead live on woody debris. In some cases, the reproductive cycles of macroinvertebrates are tied to in-stream woody material, as their eggs are laid and develop inside fallen logs and are eventually eaten by fishes.

Riparian shade can be critical in preventing diurnal thermal maxima from reaching dangerous levels, thereby extending the usable season for small streams (Maslin et al. 1997). Trees and shrubs growing along river banks providing microclimates of cooler water temperatures during the hot summer months where many fishes will congregate to feed and seek cover. In addition, the roots, branches and other submerged plant materials provide cover for young fishes, as well as nutrients and sources of invertebrates.

Clearing the area to allow construction of a temporary access road to the upstream gravel bar will require clearing, grubbing, and disturbance of up to 550 linear feet, and 0.6 acres total area. Riparian vegetation to be removed includes sandbar and arroyo willows (*Salix interior* and *Salix lasiolapis*), white alders (*Alnus rhombifolia*), Fremont's cottonwoods (*Populus fremontii* subsp. f*remontii*), dense blackberry (*Rubus ursinus*), and wild grape (*Vitis californica*). All vegetation to be removed is separated from the river's edge by approximately 30 to 50 feet of riparian vegetation, and is located above the ordinary high-water mark (OHWM). The vegetation in this area has been cleared previously during channel clearing work in 2018 and 2022, and has not fully reestablished at this point. Although the riparian vegetation to be removed currently provides minimal, if any, habitat value for ESA-listed fish species, the removal will result in delayed beneficial uses for fish. The Proposed Action includes vegetation replanting after all construction activities are completed. Due to how far the removed vegetation is from the river, and the fact that vegetation will be replanted, impacts to all life stages of CV spring-run and CCV steelhead are expected to be minimal and not likely to result in harm, injury, or death of any fish.

Long-term Impacts of Placement of Excavated Alluvium on Upstream Gravel Bar

Placement of river alluvium on the adjacent gravel bar ensures that the material will not lose its function in the lower Yuba River. Specifically, the excavated alluvium is very similar to alluvium on the upstream gravel bar. Therefore, placement of excavated alluvium on the gravel bar will not alter the existing functions of the gravel bar when it is inundated, which currently

occurs annually when total river flows are approximately 3,500 cubic feet per second (at the Smartsville gauge).

Because placement of river alluvium on the upstream gravel bar will occur in dry areas, no additional construction-related effects associated with placement of alluvium on the excavated gravel bar will occur. Therefore, placement of alluvium on the upstream gravel bar will only result in potential effects on CV spring-run and CCV steelhead when the gravel bar is inundated. Due to the relatively small amount of alluvium that will be placed on the gravel bar, placement of excavated alluvium would not alter the inundation frequency or hydraulic characteristics of the gravel bar. Additionally, because the excavated and placed alluvium is very similar in composition to the alluvium in the gravel bar, no changes in function or habitat value will occur. Therefore, impacts to all life stages of CV spring-run and CCV steelhead due to the placement of alluvium is expected to be minimal.

Long-term Impacts of Channel Modification

Prior to the high-flow events in January and February 2017, the south channel was the primary river flow channel upstream of DPD as the north channel was partially blocked by a gravel bar at its upstream end. During the early 2017 high flow events, the north channel constriction was scoured away, allowing more water to flow through the north channel. In addition, the entrance to the south channel became constricted due to extensive deposition of river alluvium. This resulted in a redistribution of flows with most of the flow in the Action Area flowing through the north channel. Spring 2018 high flows events further redistributed some river flows to the middle channel. Excavating river alluvium from the south channel will redistribute the flow among these channels. Although flows will increase in the south channel, relative to current conditions, the majority of water will continue to flow through the north channel. The modification will partially restore the hydraulic flow capacity of the south channel so that flows are more similar to that which existed before the winter 2017 high flows. Channel modifications resulting from excavation of the south channel will be small in scale, relative to the migration and rearing areas of the lower Yuba River generally and Action Area specifically.

Because the Yuba River is a dynamic river, the conditions in the north, middle, and south channels are likely to continue change each year. The changes to the channel by the project are well within the range of natural changes that occur during high flow events. For example, prior to the 2017 high-flow events, there was no riffle at the entrance of the south channel. Following the 2017 high-flow events, a large riffle formed at the top of the south channel. During the spring 2018 high flow events, this riffle was substantially altered. As much as three feet of material was removed from the upper riffle area and deposited in the run, downstream of the riffle. The upper riffle was converted to run habitat. The remaining riffle habitat is substantially smaller than it was prior to the high flows that occurred during spring 2018. This excavation will generally result in alterations of the existing habitat types and in conversion of riffle and run habitat into a single deeper run.

The removal of this riffle habitat and conversion of the run and riffle sequence to single run will likely not alter use of the Action Area by spawning salmonids. Although CCV steelhead were observed spawning in the riffle (RM 12.2) prior to the high flows in spring of 2018, the majority of spawning occurs in the Parks Bar (RM 13.9–18.6)) and Timbuctoo Bend (RM 18.6–22.3)

geomorphic reaches of the lower Yuba River (YCWA 2017). CCV steelhead spawning has not been documented in the area since 2018. Due to the lack of spawning since the channel shifted, and potential low-quality spawning habitat in the area, the proposed relatively minor changes to the channel, and the improvement to immigration through the south channel, impacts to spawning CV spring-run and CCV steelhead are considered minimal and not likely to result in harm, injury, or death of any fish.

Migration habitat for adult CV spring-run and CCV steelhead in the south channel will be improved relative to current conditions. Because both the north and south fish ladders of DPD provide access to the river upstream, restoring and increasing physical connectivity via the south channel could improve adult salmonid access to migration pathways in the lower Yuba River, and could result in increased passage opportunity and use of the south channel and ladder. The alteration of the channel configuration is not expected to cause any impacts to rearing juvenile CCV steelhead or CV spring-run, as it is not expected to alter the configuration in any way that will interfere with juvenile rearing or reduce the quality of the habitat for rearing juveniles.

2.5.2. Effects to Critical Habitat

Adverse Impacts from Construction

The project is expected to result in temporary adverse impacts during construction and maintenance to critical habitat PBFs for CV spring-run Chinook, CCV steelhead, and sDPS green sturgeon. Proposed minimization measures are expected to reduce turbidity to the greatest extend feasible, however, the increases in turbidity and suspended sediment anticipated to occur from in-water construction activities are still expected to temporarily degrade the quality of the habitat PBFs for any fish that may be in the Action Area. The PBFs of juvenile rearing habitat for CV spring-run and CCV steelhead is present in the proposed work area. Any excessive noise or vibrations may temporarily reduce usage of the habitat within the Action Area. Suitable habitat is present adjacent to the worksite either upstream or downstream, and will likely be utilized if machinery noise is present. As the work area will be isolated for only up to 10 days, the temporary loss of that habitat is not expected to strain the adjacent habitats. Therefore, effects from noise, motion, and vibration are expected to be temporary and minimal on critical habitat PBFs.

The proposed work window avoids much of the spawning and juvenile migration timeframes, but there will likely still be some overlap. CV spring-run will be within their migration and holding stages, and will therefore any effects to spawning habitat PBFs will be minor and return to normal function by the time spawning occurs. CCV steelhead are potentially still going to be spawning in April during the earlier portion of the work window. Increased turbidity or in-stream noise could heavily disturb spawning habitat PBFs, and may cause fish to avoid using it for that season. Minimization measures that include fish monitoring prior to any work occurring, should greatly reduce the chances to disturb any areas that are actively being used as spawning habitat. CCV steelhead eggs will still be incubating in redds in the Yuba River potentially into June. As the work area has had documented CCV steelhead spawning in it as recently as 2018 (YCWA 2017), it is possible that it could be used again at any point in the future. Although attempts will be made to minimize any effects to spawning habitat PBFs, the combination of noise, suspended

sediment, and vibrations from in water work over the span of 5 seasons is expected to cause a reduction of the PBFs value to spawning habitat in the action area.

sDPS green sturgeon have been documented utilizing the plunge pool below DPD for spawning. Fish have been observed holding in the pool year-round, but spawning occurs typically April through June (Beccio 2018). The work window will coincide with the sturgeons' use of the spawning pool below DPD. Upstream increases in turbidity have the possibility to carry into the pool below DPD, up to 1,500 feet downstream. High levels of suspended sediment could degrade the PBF's of water quality within the spawning habitat. The minimization measures for turbidity control including temporary berms to isolate work areas, turbidity curtains, and frequent turbidity measurements above and below the work areas, are expected to minimize any increases in suspended sediment in the water column. Any temporary increases in turbidity that reach DPD and pass over the dam would be expected to be diluted more heavily in the mixing flows below the dam crest, and likely be immeasurable from existing baseline turbidity levels in the deeper portion of the pool used for holding and spawning habitat. With all minimization measures in place, effects to critical habitat for green sturgeon are expected to be minimal.

Vegetation removal will be set back from the edge of the river by approximately 50 feet, and will occur above the OHWM. The vegetation in this area has been cleared previously during channel clearing work in 2018 and 2022, and has not fully reestablished. Although the riparian vegetation to be removed currently provides minimal, if any, habitat value for ESA-listed fish species, the removal will result in delayed beneficial uses for fish. The Proposed Action includes vegetation replanting after all construction activities are completed. Due to how far the removed vegetation is from the water, and the fact that vegetation will be replanted, impacts from vegetation removal to the PBFs of juvenile rearing are expected to be minimal.

Contaminants at sufficiently high levels could adversely affect one or more of the PBFs of the designated critical habitats of CV spring-run and CCV steelhead that occur in the Action Area. However, because the potential for a contaminant spill into the river to occur with the minimization measures being implemented is very low, contaminant spills are extremely unlikely to occur. Any incidental "wash-off" of construction equipment-related contaminants that could occur from operating the equipment in the wet would be sufficiently low in volume that concentrations in the river would be well below effect levels to aquatic resources and their habitat features. Therefore, impacts to the PBFs of critical habitat for CV spring-run and CCV steelhead due to contaminants is considered improbable.

Permanent impacts to Channel Flows and Configuration

The Proposed Action will not change the total lower Yuba River flow entering or exiting the Action Area, and will only alter the flow splits among the south, middle, and north channels. The Proposed Action will convert riffle habitat to run habitat to increase flows into the south channel. The highly fluctuant nature of this area of the channel already causes changes between riffle and run habitat in the area during each high flow, as happened to the south channel in the 2017 season. While channel modification will alter the configuration of the existing critical habitat, the flow reductions to the middle and north channels are small enough such that impacts to the PBF's of freshwater migration corridors in these channels is considered very minimal.

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 earlier in the discussion of environmental baseline (Section 2.4).

Water Diversions and Agricultural Practices

Water diversions for irrigated agriculture, municipal and industrial use, and managed wetlands are found along the Yuba River and near the action area. Depending on the size, location, and season of operation, these unscreened diversions entrain and kill many life stages of aquatic species, including juvenile listed anadromous species. For example, as of 1997, 98.5% of the 3,356 diversions included in a CV database were either unscreened or screened insufficiently to prevent fish entrainment (Herren and Kawasaki 2001).

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. Stormwater and irrigation discharges related to both agricultural and urban activities contain numerous pesticides and herbicides that may adversely affect listed salmonid and green sturgeon reproductive success and survival rates (Daughton 2002; Dubrovsky et al. 1998).

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 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 which 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 also is expected to result in increased recreational activities in the region. Among the activities expected to increase in volume and frequency is recreational boating. Boating activities typically result in increased wave action and propeller wash in waterways. This potentially 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 re-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.

Global Climate Change

The world is about 1.3°Fahrenheit warmer today than a century ago, the latest computer models predict that, without drastic cutbacks in emissions of carbon dioxide, and other gases released by the burning of fossil fuels, the average global surface temperature may rise by two or more degrees in the 21st century (IPCC 2001). Much of that increase likely will occur in the oceans, and evidence suggests that the most dramatic changes in ocean temperature are now occurring in the Pacific (Noakes 1998). Using objectively analyzed data Huang and Liu (2000) estimated a warming of about 0.9°F per century in the Northern Pacific Ocean.

Sea levels are expected to rise by 0.5 to 1.0 meters in the northeastern Pacific coasts in the next century, mainly due to warmer ocean temperatures, which lead to thermal expansion much the same way that hot air expands. This will cause increased sedimentation, erosion, coastal flooding, and permanent inundation of low-lying natural ecosystems (*e.g.*, salt marsh, riverine, mud flats) affecting listed salmonid and green sturgeon PBFs. Increased winter precipitation, decreased snow pack, permafrost degradation, and glacier retreat due to warmer temperatures will cause landslides in unstable mountainous regions, and destroy fish and wildlife habitat, including salmon-spawning streams. Glacier reduction could affect the flow and temperature of rivers and streams that depend on glacier water, with negative impacts on fish populations and the habitat that supports them.

Summer droughts along the South Coast and in the interior of the northwest Pacific coastlines will mean decreased stream flow in those areas, decreasing salmonid survival and reducing water supplies in the dry summer season when irrigation and domestic water use are greatest. Global warming may also change the chemical composition of the water that fish inhabit: the amount of oxygen in the water may decline, while pollution, acidity, and salinity levels may increase. This will allow for more invasive species to overtake native fish species and impact predator-prey relationships (Peterson and Kitchell 2001, Stachowicz *et al.* 2002).

In light of the predicted impacts of global warming, the CV has been modeled to have an increase of between +2ºC and +7ºC by 2100 (Dettinger *et al.* 2004, Hayhoe *et al.* 2004, Van Rheenen *et al.* 2004, Stewart 2005), with a drier hydrology predominated by rainfall rather than snowfall. This will alter river runoff patterns and transform the tributaries that feed the CV from a spring and summer snowmelt dominated system to a winter rain dominated system. It can be hypothesized that summer temperatures and flow levels will become unsuitable for salmonid survival in many of the areas they currently use. While the Yuba River currently has suitable temperatures due to the cold-water springs and water stored in New Bullards Bar Reservoir, increases in temperatures lower in the system could limit suitable habitat even further. The cold snowmelt that furnishes the late spring and early summer runoff will be replaced by warmer precipitation runoff. This will truncate the period of time that suitable cold-water conditions exist downstream of existing reservoirs and dams due to the warmer inflow temperatures to the reservoir from rain runoff. Without the necessary cold-water pool developed from melting snow pack filling reservoirs in the spring and early summer, late summer and fall temperatures

downstream of reservoirs, such as Lake Shasta, could potentially rise above thermal tolerances for juvenile and adult salmonids (*i.e.* winter-run Chinook salmon and CCV steelhead) that must hold and/or rear downstream of the dam over the summer and fall periods.

Recreational Fishing

California angling regulations have moved toward restrictions on recreational sport fishing to protect listed fish species. Incidental hooking of Chinook salmon, hook and release mortality of CCV steelhead, and disturbance of redds by wading anglers may continue to cause a threat. No known specific and reasonably certain future state or private activities are expected to occur within the Action Area, other than those ongoing activities already discussed in the existing conditions.

2.7. Integration and Synthesis

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

CCV steelhead, CV spring-run Chinook, and sDPS green sturgeon have experienced significant declines in abundance and available habitat in the California Central Valley relative to historical conditions. The status of the species and critical habitat and environmental baseline sections (2.2 and 2.4) detail the current range-wide status of these ESUs and also the current baseline conditions, as well as the vulnerability of listed species and critical habitat to climate change projections in the California Central Valley and specifically in the Yuba. In light of the predicted impacts of global warming, it has been hypothesized that summer temperatures and flow levels will become unsuitable for salmonid survival in many parts of the Central Valley. However, because of specific physical and hydrologic factors (discussed in section 2.4), the lower Yuba River is expected to continue to provide the most suitable water temperature conditions for anadromous salmonids of all Central Valley floor rivers, even if there are long-term climate changes (YCWA 2010a).

Cumulative effects that may affect the Action Area include angling and State angling regulation changes, agricultural practices, private water contracts, water withdrawals and diversions, adjacent mining activities, and increased population growth resulting in urbanization and development of floodplain habitats.

2.7.1. Summary of Effects of the Proposed Action to Listed Species

The Proposed Action has the potential to affect various life stages of CCV steelhead, CV spring-run Chinook, and sDPS green sturgeon. Juveniles of these species are expected to be injured or killed during construction by construction equipment or personnel. A small number of juvenile CCV steelhead and CV spring-run are expected to be harmed or killed by construction

equipment each year of the project. In water work will likely result and excessive sediment and turbidity pulse events, but BMPs in place are expected to minimize the impact of turbidity such that no adverse impacts will occur. Similarly, impacts due to contamination/pollution are considered improbable due to the applicant's BMPs. The project is expected to cause a temporary decrease in riparian habitat, but the impacts from this vegetation removal are considered minimal as the removed vegetation is located sufficiently far from the river and will be replanted after construction, and therefore not likely to result in harm, injury, or death of any fish. Changes due to the placement of excavated alluvium are expected to be so minor that they are undetectable and effects therefore improbable. Long-term impacts to spawning adult CCV steelhead and CV spring-run are expected to be minor and not result in harm or death, due to the fact that the area will be surveyed to determine no fish are present, and then the work area isolated from the main river channel. Due to the timing of work and the potential need to complete work several times over the 5-year timeframe, it is expected that a small number of CCV steelhead eggs may be harmed or killed from exposure to increased suspended sediment.

2.7.2. Summary of Effects of the Proposed Action to Critical Habitat

The PBFs of spawning habitat, migratory corridor, freshwater rearing, and water quality will be adversely affected in the course of the proposed construction operations due to temporary increases in turbidity, noise, and disturbance associated with construction personnel and equipment. The project is expected to have adverse effects to CCV steelhead spawning habitat due to the combination of noise, suspended sediment, and vibrations from in water work over the span of 5 years. While temporary effects are expected to juvenile rearing habitat, those effects are expected to last for the duration of work, and rearing habitat is expected to return to baseline levels shortly after construction is completed.

2.7.3. Risk to Species at the ESU/DPSs level, and Critical Habitat at the Designation Scale

Based on the analysis of project-related impacts to each analyzed species, we determined that there will be adverse effects to CCV steelhead and CV spring-run within the Lower Yuba River. However, only fishes that are holding adjacent to or migrating past the site will be directly exposed to construction activities. These construction actions will occur during late spring and summer months, when the abundance of individual salmon and steelhead are low and is expected to result in correspondingly low levels of injury or death.

CV spring-run and CCV steelhead on the Lower Yuba are both classified as Core 2 populations within the Northern Sierra Nevada Diversity Group. Spawning of these two species did not historically occur in this segment of river, but have been extirpated from their higher elevation habitats since the construction of Englebright Dam. The Yuba River above Englebright Dam is recognized as the primary re-introduction priority within the Northern Sierra Nevada Diversity Group for both CCV steelhead and CV spring-run, and one of the highest priorities towards their recovery. For both species, their recovery criteria includes 4 viable, independent populations in that diversity group (NMFS 2014). CV spring-run have only 1 viable population in the group currently, and CCV steelhead viability is deemed unknown in nearly every watershed. Both species have a minimum of 3 additional viable populations needed to achieve a level of recovery within the Northern Sierra Nevada Diversity Group. While these populations have high value overall to the ESU/DPS, they are not considered independent, viable populations within the

ESU/DPS at this time. The Proposed Action is a relatively small project that is not expected to impact population numbers of these species within the Yuba River, and therefore it is unlikely that proposed action would delay, or preclude the recovery of these species.

The effects to the critical habitat within the Action Area are expected to only last for the 5-year duration of the work, after which, the area is expected to return to natural function and regain all prior value and PBFs. All adverse effects are expected to be limited to the relatively small area where the work is being done. As there is suitable adjacent habitat both upstream and down of the project, it is anticipated that the temporary degradation of this habitat will not strain the overall availability of habitat within the Lower Yuba River, or within the ESU/DPS of the species overall.

Therefore, the proposed action is not expected to reduce appreciably the likelihood of both the survival and recovery of a listed species, nor appreciably diminish the value of designated critical habitat as a whole 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 the cumulative effects, it is NMFS' biological opinion that the proposed action is not likely to jeopardize the continued existence of CCV steelhead, CV spring-run Chinook salmon, or sDPS green sturgeon 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). "Harass" is further defined by interim guidance as to "create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering." "Incidental take" is defined by regulation as takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant (50 CFR 402.02). Section 7(b)(4) and section 7(o)(2) provide that taking that is incidental to an otherwise lawful agency action is not considered to be prohibited taking under the ESA if that action is performed in compliance with the terms and conditions of this ITS.

2.9.1. Amount or Extent of Take

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

While individual fish are expected to be present in the Action Area at the time of construction, and during seasonal rearing and migration, NMFS cannot, using the best available information, precisely quantify and track the amount or number of individuals that are expected to be incidentally taken (injure, harm, kill, etc.) per species as a result of the proposed action. This is due to the variability and uncertainty 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 as ecological surrogates, those elements of the project that are expected to result in incidental take, that are more predictable and/or measurable, with the ability to monitor those surrogates to determine the extent of take that is occurring.

The most appropriate threshold for incidental take is an ecological surrogate of habitat disturbance within the wetted channel. This disturbance is expected to cause reduction in water quality due to suspended sediment, as well as injury from machinery in the channel. Over the 5-year course of the work, spawning habitat is expected to be temporarily degraded and reduced due to the disturbance of the area up to twice per year.

Quantification of the number of fish exposed to noise, in-water work activities, and reduced water quality are not currently possible with available monitoring data. Observations of individual fish within the river channel during work are not possible due to water clarity and depth. However, all fish passing through or otherwise present in the Action Area during construction activities during the 5-year work period, will be exposed to the disturbed habitat. Thus, the footprint of the in-water work area defines the area in which projected incidental take will occur for this project due to the effects of construction actions and the spawning habitat disturbance associated with the work. NMFS anticipates incidental take will be limited to the 1.6-acre sediment removal area below the OHWM (assumed to occur up to twice per year for 5 years, from 2023 through 2027):

1. Take in the form of harm, injury and death to rearing juvenile CCV steelhead and juvenile CV spring-run Chinook salmon is expected due to direct contact with machinery or personnel in the water. In-water work with machinery and by personnel is expected to result in injury or death to a small number of juvenile fish that are anticipated to be present in the action area where sediment removal is occurring.

2. Take in the form of harm, injury and death to CCV steelhead eggs and rearing juveniles is expected due to increased levels of suspended sediment. In-water work is expected to result in increased turbidity during times when CCV steelhead eggs or newly emerging juvenile are present and unable to relocate themselves, resulting in reduced survival..

3. Take in the form of harm to CCV steelhead is expected due to the temporary loss of spawning habitat from disturbance to the site up to twice per year. In-water work is expected to result in higher levels of fine sediment, elevated noise levels, and overall disturbance that will result in reduced quality spawning habitat while work is occurring. This loss will affect adults through displacement and increased competition, resulting in decreased fitness and spawning success.

Incidental take will be exceeded if the work footprint below the OHWM exceeds 1.6 acres.

2.9.2. Effect of the Take

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

2.9.3. Reasonable and Prudent Measures

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

1. Measures shall be taken by the USACE/YCWA to minimize effects to listed species and their critical habitat.

2. Measures shall be taken by the USACE/YCWA to minimize impacts to riparian vegetation in the Action Area and its effects to critical habitat.

3. USACE/YCWA shall prepare and provide NMFS with a yearly report detailing any known take of listed fish species associated with the project.

2.9.4. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the Federal action agency must comply (or must ensure that any applicant complies) with the following terms and conditions. The USACE 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. A qualified fisheries biological monitor shall be onsite at all times when in-water work is occurring. The biological monitor shall survey the site area prior to work to ensure redds and active spawning sites are avoided. The biological monitor shall also ensure compliance with the fish avoidance plan during the entirety of work.

    b. Fisheries surveys of the site prior to initiating work shall be done within 10 business days of when in-water work begins to ensure proper planning of minimization measures. Fish surveys shall be done again each morning before work commences.

    c. Operation of heavy machinery in the active channel shall be minimized to avoid disturbance of substrates.

d. Turbidity and suspended sediments shall be monitored according to water quality permits. If acceptable limits are exceeded, work shall be suspended until acceptable measured levels are achieved.

e. NMFS shall be notified via email and telephone within 24 hours if any repair related contaminant spill events occur.

2. The following terms and conditions implement Reasonable and Prudent measure 2:

a. Equipment used for the project shall be thoroughly cleaned off-site to remove any invasive plant material or invasive aquatic biota prior to use in the Action Area.

b. Environmentally sensitive areas, sensitive plant species and wetland areas shall be avoided during project activities to the maximum extent practicable. High visibility fencing shall be placed around these areas to minimize disturbance.

c. Soil and excavated material and/or fill material shall be stockpiled in existing clearings when possible.

3. The following terms and conditions implement Reasonable and Prudent measure 3:

a. USACE/YCWA shall submit to NMFS an annual report describing any and all work conducted under the Proposed Action which includes pre-construction fisheries surveys, site conditions, work boundaries, minimization measures used, dates work was completed, as well as site photographs before and after that demonstrate the condition of the channel being cleared.

b. USACE shall submit to NMFS an annual report describing any and all work conducted under the Proposed Action which includes pre-construction fisheries surveys, site conditions, work boundaries, minimization measures used, dates work was completed, site photographs before and after that demonstrate the condition of the channel being cleared, and a description of any known incidental take resulting from the Proposed Action, which includes any observations of injured or dead fish as a result of the Proposed Action. This report shall be filed not later than January 1st each year covering the in-stream construction window from the previous year. The report should be submitted to the following email address (preferred) or physical address:

ccvo.consultationrequests@noaa.gov

Cathy Marcinkevage
California Central Valley Area Office
National Marine Fisheries Service
650 Capitol Mall, Suite 5-100
Sacramento CA 95814
Phone: (916) 930-3600

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) USACE should work cooperatively with other State and Federal agencies, private landowners, governments, and local watershed groups to identify opportunities for cooperative analysis and funding to support salmonid habitat restoration projects in the Yuba River. 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 Yuba County Water Agency South Canal Diversion Water Supply and Fish Passage Enhancement Project: Annual Maintenance.

Under 50 CFR 402.16(a): "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: (1) If the amount or extent of taking specified in the incidental take statement is exceeded; (2) If new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion or written concurrence; or (4) If a new species is listed or critical habitat designated that may be affected by the identified action."

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

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

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

3.1. Essential Fish Habitat Affected by the Project

EFH designated under the Pacific Coast Salmon Fisheries Management Plan (FMP) may be affected by the Proposed Action. Additional species that utilize EFH designated under this FMP within the Action Area include fall-run/late fall-run Chinook salmon. Habitat Areas of Particular Concern (HAPCs) that may be either directly or indirectly adversely affected include **(1)** complex channels and floodplain habitats, **(2)** thermal refugia and **(3)** spawning habitat.

3.2. Adverse Effects on Essential Fish Habitat

Effects to the HAPCs listed in section 3.1 above are discussed in context of effects to critical habitat PBFs as designated under the ESA in section 2.5.2. Effects to ESA-listed critical habitat and EFH HAPCs are appreciably similar, therefore no additional discussion is included. A list of adverse effects to EFH HAPCs is included in this EFH consultation. Affected HAPCs are indicated by number corresponding to the list in section 3.1:

<u>Sedimentation and turbidity</u>

- Reduced habitat complexity **(1)**
- Reduced quality and availability of spawning substrate **(3)**
- Reduced delivery of oxygenated water to incubating eggs **(3)**
- Reduced size and connectivity of spawning patches **(1, 3)**
- Increased scouring **(1, 3)**
- Reduced riffle habitat **(1, 3)**

Removal of riparian vegetation

- Degraded water quality **(1, 3)**
- Reduced shading **(2)**
- Reduction in large woody material recruitment **(1)**
- Reduced shelter from predators **(1)**
- Reduction in aquatic macroinvertebrate production **(1)**

3.3. Essential Fish Habitat Conservation Recommendations

The terms and conditions and conservation recommendations in the preceding BO contain adequate measures to avoid, minimize, or otherwise offset the adverse effects to EFH. Therefore, NMFS has no additional EFH conservation recommendations to provide.

3.4. Supplemental Consultation

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

4. Data Quality Act Documentation and Pre-Dissemination Review

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

4.1. Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended users of this opinion is the USACE. Other interested users could include YCWA. Individual copies of this opinion were provided to the USACE. The document will be available within 2 weeks at the NOAA Library Institutional Repository (https://repository.library.noaa.gov/welcome). The format and naming adhere 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 part 600.

***Best Availab*le 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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