



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

Refer to NMFS No: WCRO-2020-02014

June 30, 2021

Ms. Lantenna Hungate
USDA Rural Development
430 G Street, AGCY 4169
Davis, California 95616-4169

Electronic transmittal only

Re: Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the North Delta Water Recovery Project

Dear Ms. Hungate:

Thank you for your July 20, 2020, letter requesting initiation of informal 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.) on its proposed funding to the Maine Prairie Water District (District) in support of the North Delta Water Recovery project (Project). This consultation was conducted in accordance with the 2019 revised regulations that implement section 7 of the ESA (50 CFR 402, 84 FR 45016).

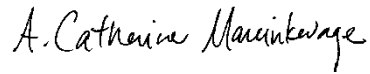
Thank you, also, for your request for consultation pursuant to the essential fish habitat (EFH) provisions in Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1855(b)) for this action. However, after reviewing the proposed action, we concluded that the Project would not adversely affect EFH. Therefore, we are hereby concluding EFH consultation.

This biological opinion is based on the final biological assessment and other related environmental permitting documents prepared in support of the Project, and on the best available scientific and commercial information. NMFS determined that the Project is not likely to adversely affect the federally listed as endangered Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*) evolutionarily significant unit (ESU) or the threatened Central Valley spring-run Chinook salmon ESU (*O. tshawytscha*). In addition, NMFS concluded that the Project is not likely to jeopardize the continued existence of the threatened California Central Valley steelhead distinct population segment (DPS) (*O. mykiss*) or the threatened southern DPS of the North American green sturgeon (*Acipenser medirostris*). Because none of the listed species designated critical habitats occur in the action area, consultation on critical habitat is not warranted. NMFS has included an incidental take statement with reasonable and prudent measures and nondiscretionary terms and conditions that are necessary and appropriate to avoid, minimize, or monitor incidental take of listed species associated with the Project.



Please contact Douglas Hampton at our California Central Valley Office in Sacramento, California, by telephone at (916) 930-3610, or by email at douglas.hampton@noaa.gov, if you have any questions concerning this consultation or if you require additional information.

Sincerely,



Cathy Marcinkevage
Assistant Regional Administrator
California Central Valley Office

Enclosure

cc: To the file 151422-WCR2020-SA00031

Electronic copy only:

Lisa Butler, Assistant State Environmental Coordinator, USDA Rural Development,
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**Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion and Magnuson-Stevens
 Fishery Conservation and Management Act Essential Fish Habitat Response**

North Delta Water Recovery Project

NMFS Consultation Number: WCRO-2020-02014

Action Agency: U.S. Department of Agriculture, Rural Development

Affected Species and NMFS' Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species?	Is Action Likely To Jeopardize the Species?
Sacramento River winter-run Chinook salmon (<i>Oncorhynchus tshawytscha</i>)	Endangered	No	NA
Central Valley spring-run Chinook salmon (<i>O. tshawytscha</i>)	Threatened	No	NA
California Central Valley Steelhead (<i>O. mykiss</i>)	Threatened	Yes	No
Southern Distinct Population Segment of North American Green Sturgeon (<i>Acipenser medirostris</i>)	Threatened	Yes	No

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

Issued By: *A. Catherine Marcinkevage*
 Cathy Marcinkevage
 Assistant Regional Administrator for the California Central Valley Office

Date: June 30, 2021



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1. INTRODUCTION

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

1.1. Background

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

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

1.2. Consultation History

On February 25, 2019, NMFS received a letter from the U.S. Army Corps of Engineers (Corps) requesting the initiation of formal consultation in support of the issuance of a Department of the Army permit for the proposed Pump Station 2 project.

On April 22, 2019, NMFS received an email from the Corps withdrawing the Pump Station 2 project from consultation due to a changing project description.

On July 20, 2020, NMFS received a letter from the U.S. Department of Agriculture Rural Development (USDA-RD) requesting the initiation of informal consultation on its proposed funding to the Maine Prairie Water District (District) in support of the proposed North Delta Water Recovery project (Project) which was formerly called the Pump Station 2 project. Consultation on the current project description, and this biological opinion, will fulfill the Corps' requirements for ESA consultation as USDA-RD has assumed the lead federal agency role pursuant to the regulations governing interagency consultations (50 CFR §402.07).

On July 31, 2020, NMFS replied via email to USDA-RD with a request for additional information in order to initiate consultation under the ESA, as described in the regulations governing interagency consultations (50 CFR §402.14(c)).

On August 19, 2020, NMFS received a letter from USDA-RD with responses to the request for additional information, including supplemental supporting documentation pursuant to state and county permits for the Project.

On October 1, 2020, NMFS replied via email to USDA-RD with a determination that the information provided was still insufficient to initiate consultation, and that a more detailed project description would be necessary in order to initiate formal consultation under the ESA, as some level of incidental take was likely to occur.

On December 21, 2020, NMFS received an email from the consulting firm Summers Engineering with a draft revised Biological Assessment (BA) for the Project with associated appendices A through F attached. NMFS reviewed the revised project description in the draft BA and determined it contained sufficient information to initiate formal consultation under the ESA.

On April 9, 2021, NMFS received an email from Summers Engineering with the final draft of the revised BA, along with additional supporting information, attached.

On April 20, 2021, NMFS sent an email to USDA-RD requesting a 30-day extension of the regulatory timeline to complete the ESA consultation and deliver a final biological opinion.

On April 20, 2021, NMFS received an email reply from USDA-RD approving of the request for a 30-day extension to the regulatory timeline for completing the ESA consultation.

On June 4, 2021, NMFS sent an email to USDA-RD requesting an additional extension of the regulatory timeline until June 30, 2021, in order to complete the ESA consultation and deliver a final biological opinion.

On June 7, 2021, NMFS received an email reply from USDA-RD approving of the request for a second extension of the regulatory timeline for completing the ESA consultation to June 30, 2021.

1.3. Proposed Federal Action

Under the ESA, “action” means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies (50 CFR 402.02). The USDA-RD proposes to provide funding to the Maine Prairie Water District (District) in support of the proposed North Delta Water Recovery project (Project). The Project entails the construction of a new intake and pump station on Ulati Creek, approximately 10 miles east of the town of Vacaville and nine miles south of the town of Dixon in Solano County, California (Figure 1).



Figure 1. Proposed Project Location

The proposed Project includes the construction of a new intake structure to bring supplemental surface water supplies to the District and the local Putah Creek Groundwater Basin in Solano County through existing agreements with the Solano Irrigation District and the North Delta Water Agency, as prescribed per the details of the Contract Between The State Of California Department Of Water Resources And The North Delta Water Agency For The Assurance Of A Dependable Water Supply Of Suitable Quality, signed and executed on January 28, 1981 (CDWR 1981). The new intake structure will be constructed immediately south of the Brown Road crossing of Ulatis Creek, including two state-of-the-art positive barrier fish screens placed near the center of Ulatis Creek, a pump station on the east bank of Ulatis Creek, an electrical control panel across the levee northeast of Brown Road and Ulatis Creek from the pump station, and a buried 36- to 42-inch diameter pipeline. The buried pipeline would extend from the new pump station to the east side of the levee road on the east bank of Ulatis Creek, then continuing northwards for approximately one and a half miles adjacent to, and along the same alignment of, an existing access/maintenance road, before finally discharging into an existing irrigation distribution canal that extends northwards for an additional half mile to an existing irrigation canal running east along the south side of Maine Prairie Road. The new pump station would include one pump with a capacity of up to 40 cubic feet per second (cfs), a smaller precast concrete pump structure, and a smaller rectangular concrete fish screen sump structure at the channel invert with two removable fish screens on top.

The construction footprint of the fish screens intake structure, the pump station structure and conveyance pipes on the bank and below the invert of Ulatis Creek would result in approximately 975 square feet (sf) of permanent impacts and 13,800 sf of temporary disturbances over a distance of approximately 115 linear feet. Concrete for the fish screens and intake would either be precast or poured in place while the construction area is isolated from Ulatis creek by temporary cofferdams.

All construction is proposed to occur in a single season, during the summer of 2022. Once constructed, the pump station would be operated annually between April 1 and October 15. Construction of the new pump station is anticipated to require approximately 50 days, and the pipeline installation is expected to take an additional 45 to 60 days. As part of the Project, applicable Best Management Practice (BMPs) measures will be implemented to avoid or minimize potential impacts to the aquatic environment. The work area in the bed of the channel surrounding the intake structure will be isolated from the active creek channel through the deployment of sand bags, fiber mats, and two temporary cofferdams prior to construction in order to minimize the spread of re-suspended sediments in the water column. The cofferdams consist of inflatable bladders deployed upstream and downstream of the work area with a 30-inch diameter bypass pipe capable of passing 10-15 cfs through both bladders, thereby preserving the ability to maintain a continuity of typical baseline flows in the creek, which are estimated to be approximately 10.5 cfs during the irrigation season and summer months when construction is scheduled to occur. During installation of the downstream cofferdam, an open area at the downstream end of the site will remain open, allowing fish the opportunity to move out of the area that will subsequently be dewatered. Before completely closing off the cofferdam, the area within the enclosure will be swept through several times using a beach seine to either catch and relocate or herd any fish out of the interior of the cofferdammed area. After the area within the cofferdam enclosure has been swept through several times, the final section of the downstream cofferdam will be placed to seal off the site from the surrounding channel. Any fish still trapped within the interior of the cofferdammed area following closure will then be collected using beach seines and dip nets and released into Ulatis Creek downstream of the construction site. The interior of the cofferdammed area will be sampled using the seines and nets until three consecutive samples produce no additional fish, which will serve as the criteria that the fish relocation effort has been successfully completed. All fish collected during the fish relocation effort will be placed into 5-gallon buckets, identified to species, and lifestage noted prior to release. Following identification, the collected fish will be transported as soon as possible to a location downstream of the construction site in Ulatis Creek for immediate release. The fish collection effort will be scheduled to occur during low tide to reduce water depths at the site. Following cofferdam construction, dewatering, and implementation of the fish relocation plan, all in-channel construction activities, including earth moving activities (i.e., dredging, excavation, and grading) within the banks of Ulatis Creek, will be confined to the dewatered area within the cofferdam. Sand bags will be distributed around the outside of the dewatered work area as necessary to minimize seepage, mud formation, and turbidity issues. Water pumped from within the cofferdammed area will be discharged to a settling pond or a small gravel filter sump equipped with a small submersible pump in the adjacent upland agricultural field to the northeast, and not allowed to re-enter the channel of Ulatis Creek until sediment has settled out and the turbidity of the waters being conveyed are lower than the existing background conditions

in Ulatis Creek. In addition, in-water construction activities will adhere to Central Valley Regional Water Quality Control Board turbidity objectives for the Sacramento and San Joaquin River basins that stipulate where natural turbidity is between 5 and 50 nephelometric turbidity units (NTUs), turbidity levels may not be elevated by 20 percent above ambient conditions; where ambient conditions are between 50 and 100 NTUs, conditions may not be increased by more than 10 NTUs; and where natural turbidity is greater than 100 NTUs, increases will not exceed 10 percent above ambient conditions (CVRWQCB 2018). The pump used for dewatering the cofferdammed area will be equipped with a fish screen that meets or exceeds the current NMFS and California Department of Fish and Wildlife fish screen approach velocity design criteria for excluding sensitive life stages and protected species from entrainment.

Following the installation of the cofferdams and subsequent dewatering of the work area, a bypass pipe will be installed through the cofferdams so that flows in Ulatis Creek will be able to continue unimpaired by construction activities. Pump in-flow tubes or hoses associated with the temporary bypass pipe will also be screened to exclude fish and macroinvertebrates that may otherwise be entrained or harmed in the process. Any fish and amphibians collected from within the cofferdams during dewatering would be returned to Ulatis Creek following the protocols described in the Ulatis Creek Fish Rescue and Relocation Plan, prepared and submitted by the District as Appendix E to the BA in support of the proposed Project (MPWD 2020). Once the work area is dewatered, excavation and construction work for placement of the intake structure, fish screens, pipeline and sump pump structure will occur. Once the intake structure, fish screens, inlet pipeline and pump station are constructed, the Ulatis Creek topography disturbed during construction would be returned to pre-construction contours. Finally, following the completion of all in-channel construction activities, the cofferdams, bypass pipe, sand bags, and any remaining barriers to flow will be removed in a manner that would allow in-channel flow in Ulatis Creek to resume with the least amount of disturbance to the natural substrate. All in-channel work, including cofferdam installation, dewatering, excavation, grading, and intake installation within the banks of Ulatis Creek, will occur between July 1 and October 1, thereby limiting the potential co-occurrence of construction activities with the presence of listed anadromous fish species in an effort to minimize their exposure to the associated effects of construction.

We considered, under the ESA, whether or not the proposed action would cause any other activities and determined that it would result in reduction of tailwater flows from Ulatis Creek into Cache and Haas sloughs downstream from the action area, which would continue to diminish the value of the baseline habitat conditions for the conservation of ESA listed species in the waters of the North Delta, generally.

Under MSA, Federal action means any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken by a Federal Agency (50 CFR 600.910).]

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

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

The USDA-RD determined the proposed action is not likely to adversely affect Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, or the designated critical habitats of Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, CCV steelhead, or sDPS green sturgeon.

NMFS has determined that because none of the designated critical habitats occur in the action area, consultation on critical habitat is not warranted.

NMFS' concurrence for effects to Sacramento River winter-run Chinook salmon a Central Valley spring-run Chinook salmon are documented in the "Not Likely to Adversely Affect" Determinations section (Section 2.12).

2.1. Analytical Approach

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

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

The designations of critical habitat for all of the listed species considered in this biological opinion use the term primary constituent element (PCE) or essential features. The 2016 critical habitat regulations (50 CFR 424.12) replaced this term with physical or biological features (PBFs). The shift in terminology does not change the approach used in conducting a "destruction

or adverse modification” analysis, which is the same regardless of whether the original designation identified PCEs, PBFs, or essential features. In this biological opinion, we use the term PBF to mean PCE or essential feature, as appropriate for the specific critical habitat.

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

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

- Evaluate the rangewide status of the species and critical habitat expected to be adversely affected by the proposed action.
- Evaluate the environmental baseline of the species and critical habitat.
- Evaluate the effects of the proposed action on species and their habitat using an exposure-response approach.
- Evaluate cumulative effects.
- In the integration and synthesis, add the effects of the action and cumulative effects to the environmental baseline, and, in light of the status of the species and critical habitat, analyze whether the proposed action is likely to: (1) directly or indirectly reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species, or (2) directly or indirectly result in an alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species.
- If necessary, suggest a reasonable and prudent alternative to the proposed action.

2.2. Rangewide Status of the Species

This opinion examines the status of each species that would be adversely affected by the proposed action. The status is determined by the level of extinction risk that the listed species face, based on parameters considered in documents such as recovery plans, status reviews, and listing decisions. This informs the description of the species’ likelihood of both survival and recovery. The species status section also helps to inform the description of the species’ “reproduction, numbers, or distribution” as described in 50 CFR 402.02. This opinion considers the potential effects of the proposed Project to the California Central Valley (CCV) steelhead distinct population segment (DPS) (*Oncorhynchus mykiss*), and the Southern DPS (sDPS) of North American green sturgeon (*Acipenser medirostris*). The current status of the above listed species are summarized in Table 1, below.

Table 1. Description of species, current Endangered Species Act (ESA) listing classifications, and summary of species status.

Species	Listing Classification and Federal Register Notice	Status Summary
California Central Valley steelhead DPS	Threatened, 71 FR 834; January 5, 2006	According to the most recent NMFS 5-year species status review (NMFS 2016), the status of CCV steelhead appears to have remained unchanged since the 2011 status review that concluded that the DPS was in danger of becoming endangered. Most natural-origin CCV populations are very small, are not monitored, and may lack the resiliency to persist for protracted periods if subjected to additional stressors, particularly widespread stressors such as climate change. The genetic diversity of CCV steelhead has likely been impacted by low population sizes and high numbers of hatchery fish relative to natural-origin fish. The life-history diversity of the DPS is mostly unknown, as very few studies have been published on traits such as age structure, size at age, or growth rates in CCV steelhead.
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 2018), 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 <i>et al.</i> 2017).

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 CCV steelhead by reducing access to the vast majority of their historic spawning and rearing habitat, particularly since juvenile steelhead need to rear in the stream for one to two summers prior to emigration as smolts. In the Central Valley, summer and fall temperatures below the dams in many streams already exceed the recommended temperatures for optimal growth of juvenile steelhead, which range from 14°C to 19°C (57°F to 66°F).

The Anderson Cottonwood Irrigation District (ACID) Dam is considered the upriver extent of sDPS green sturgeon passage in the Sacramento River. The upriver extent of sDPS green sturgeon spawning, however, is approximately 19 miles downriver of the ACID Dam where water temperature is warmer than at the ACID Dam during late spring and summer. Thus, if water temperatures increase with climate change, temperatures adjacent to the ACID Dam may remain within tolerable levels for the embryonic and larval life stages of sDPS 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. While there is uncertainty associated with projections, which increases over time, the direction of change is relatively certain (McClure 2011).

2.3. Action Area

“Action area” means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). The action area for the Project includes all areas immediately impacted by construction, including the installation and removal of the temporary cofferdams, and all areas potentially affected by the future operation of the diversion, including downstream habitat that is hydrologically connected to and influenced by the construction and operation of the Project. Construction of the Project will impact the area from Maine Prairie Road where it crosses Ulatis Creek, southward along the alignment of the pipeline to the proposed location of the new intake structure south of Brown Road where it crosses Ulatis Creek, and continuing approximately 50 linear feet downstream of the construction area in Ulatis Creek (Figure 2). A majority of the impacts from construction of the Project, particularly in connection with the installation of the buried pipeline, will occur on dry land, sufficiently away from the channel on the landside of the levee in order to prevent adverse ecological impacts to the aquatic habitat in Ulatis Creek and areas downstream. For the purposes of this consultation, our analysis focused on the impacts with the potential to adversely affect aquatic habitat, which is more narrowly constrained to the immediate area associated with the

construction of the new intake structure and the dewatering necessary to complete it. This area begins just south of the Brown Road crossing of Ulatis Creek and extends downstream in Ulatis Creek for approximately 50 linear feet.

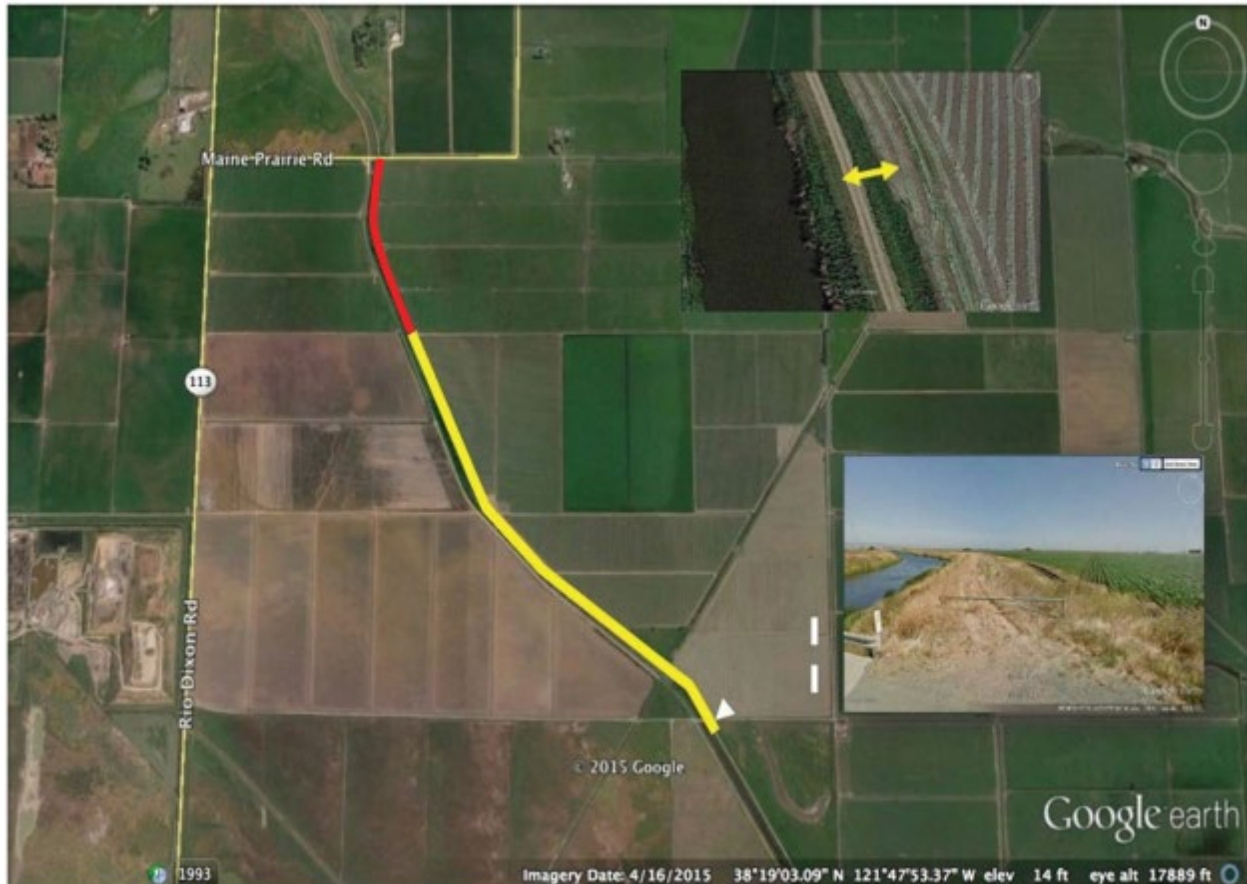


Figure 2. Aerial view of action area (yellow and red combined) showing locations of the new intake structure (white triangle marker), buried pipeline alignment (in yellow), and conveyance ditch (in red).

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).

Generally speaking, the network of interconnected waterways, channels, and sloughs that make up the Cache Slough complex, including Ulatis Creek and its downstream waters within the action area, are heavily channelized and leveed and bordered primarily by agricultural, industrial, and municipal land uses, although much of the surrounding landscape is also being considered or secured for several current and planned tidal habitat restoration projects. Cache Slough and the waters of the north Delta are characterized primarily by slow moving deep water which is tidally influenced and predominantly depositional in nature. The waters of Ulatis Creek flowing into Cache Slough during the irrigation season vary considerably and are largely composed of tailwater effluent and irrigation return flows. As a baseline condition, Reclamation District 2068 pumping operations in Haas Slough upstream from the confluence of Ulatis Creek and Cache Slough occasionally cause flows from Ulatis Creek entering Cache Slough to be pulled upstream away from the Sacramento River, resulting in diminished tailwater flows entering the Delta during the summer months. The waters of the north Delta are hydrologically influenced by the confluence of the Sacramento and San Joaquin rivers downstream, and generally exhibit lower water clarity and habitat diversity relative to the upper reaches of either river.

The action area is upstream from and hydrologically connected to the waters of the north Delta which are considered an important rearing and migratory corridor for all ESA-listed anadromous fish species. Juvenile sDPS green sturgeon utilize the waters of the Delta for rearing habitat for a period of up to 3 years as they acclimate to higher concentrations of salinity prior to ocean entry. As such, they have the potential to be present in the action area during every month of the year, and would therefore also have the potential to be exposed to the effects of the Project. Adult CCV steelhead begin to migrate into the watersheds of the Central Valley during the late summer or early fall months (i.e., September through November), particularly when early winter rains create increased flows in the system. NMFS does not expect them to be present in the action area in any significant numbers, however, until the months of December through February, which is the peak of their spawning migration. Juvenile CCV steelhead emigration from the tributaries in the Sacramento and San Joaquin river basins to the ocean occurs from February through May, with peak presence in the Delta occurring in March or April. Therefore, conducting in-water construction activities from July 1 through October 1 should avoid impacts to the majority of outmigrating juvenile steelhead smolts. There are larger steelhead smolts that migrate at other times of the year, including the fall and early winter period, that may be exposed to the consequences of the Project during their passage through the action area, albeit in very small numbers. As with adults, however, NMFS expects the most likely period for them to be present is during the month of December.

Baseline effects from activities such as continued municipal, industrial, and agricultural practices, bank and levee stabilization projects, and both commercial shipping traffic and recreational boating and fishing will continue to negatively affect the federally listed species in the action area. Runoff from municipal, industrial, and agricultural activities may contain contaminants such as pesticides, sediments, and nutrients that may affect listed species through lethal and sublethal impacts. Levee construction and bank protection can reduce floodplain connectivity, change substrate size, and decrease riparian habitat and shaded riverine aquatic cover. However, NMFS expects the species and their designated critical habitats to improve with the implementation of both ongoing and planned habitat restoration efforts incorporating and advancing progress on recovery actions identified in NMFS (2014, 2018).

2.5. Effects of the Action

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

Disturbances to the substrate on the channel bottom during installation and removal of the cofferdams will temporarily put sediments into suspension in the water column, resulting in increased turbidity locally that may extend for a distance of up to 50 feet downstream from the Project area. The action area is tidally influenced and typically exhibits relatively high concentrations of suspended sediments as a natural background condition, although short-term increases in turbidity and suspended sediment concentrations in the water column from in-water construction disturbances may nevertheless disrupt feeding activities of fish or result in their temporary displacement from preferred habitats. Numerous studies show that suspended sediment and turbidity levels moderately elevated above natural background values can result in non-lethal detrimental effects to salmonids, such as decreasing reproductive success, reducing feeding success and growth, causing avoidance of rearing habitats, and disrupting migration cues (Bash et al. 2001). NMFS expects turbidity to affect CCV steelhead in much the same way that it affects the other salmonids used in these studies because of similar physiological and life history requirements between species. The disturbance of the channel banks and bottom of Ulatis Creek during installation and removal of the cofferdams will temporarily increase suspended sediments locally, which will produce turbidity plumes that will extend downstream from the construction activity for a distance of approximately 50 linear feet. The duration of turbidity plumes resulting from in-water construction-related to the installation and removal of the cofferdams is expected to last throughout the time the disturbance is occurring and for several hours after the work has ceased each day, including during the early evening hours, before gradually dissipating and returning to natural background levels. Following installation of the temporary cofferdams, no additional impacts stemming from in-water construction activities are anticipated to occur until the pump station and other facilities have been completed and the cofferdams are ultimately removed.

Both migrating and rearing fish are expected to move through the immediate vicinity of ongoing construction activities, and most fish will actively avoid these elevated turbidity plumes, rather than hold position or remain there for more than a few hours or days. Adherence to erosion control measures and BMPs (e.g., the use of silt fences, straw bales, and straw wattles, and pumping water from the cofferdammed area to an adjacent agricultural field and allowing sediment to settle out before being returned to the channel) will minimize the amount of suspended sediment generated by construction activities, as well as the potential for post-construction turbidity changes should precipitation events occur after construction has been completed. In addition, some turbidity may also be helpful in reducing predation by shielding individual fish from visual predators in a turbid field (Gregory and Levings 1998).

However, although CCV steelhead are highly migratory and capable of moving freely throughout the action area, and the exposure is expected to be brief (i.e., minutes to hours), NMFS expects that some fish will not or cannot avoid the sudden short-term increases in turbidity. The turbidity plumes would likely injure fish by temporarily disrupting normal behaviors that are essential to their growth and survival, such as feeding, sheltering, and migrating. Disrupting these behaviors increases the likelihood that individual fish will face increased competition for food and space, and experience reduced growth rates or possibly weight loss resulting in harm to individuals and increased risk to the affected species. Turbidity increases may also affect the sheltering abilities of some fish and may decrease their likelihood of survival by increasing their susceptibility to predation. Once fish migrate past the turbid water, normal feeding and migration behaviors are expected to resume.

Fish removal from within the enclosed cofferdam area during dewatering is additionally expected to adversely affect listed fish species as a result of capture and handling related stress stemming from being captured in seines and dip nets, handled for identification, and transported to the downstream release site, consistent with the previously described fish relocation plan, which may cause physical injury or increase susceptibility to predation or disease. The capturing and handling of fish causes them stress, though they typically recover fairly rapidly from the process and, therefore, the overall effects of the handling are generally short-lived. The primary contributing factors to stress and death from handling are excessive doses of anesthetic, differences in water temperatures (between the original habitat and the container in which the fish are held), dissolved oxygen conditions, the amount of time that fish are held out of the water, and physical trauma (Kelsch and Shields 1996). Stress on salmonids increases rapidly from handling if the water temperature exceeds 18°C (64°F) or dissolved oxygen is below saturation. Fish that are transferred to holding tanks can experience trauma if care is not taken during the transfer process. In addition, when fish are handled to obtain measurements and other data, it is not uncommon for fish to be dropped on the ground by the handlers because the fish are not sedated enough or properly restrained, potentially resulting in additional injuries as a result of handling. An injured fish is more susceptible to predation as well as developing diseases, which can lead to delayed mortality. Some of the injuries which can lead to disease are the loss of mucus, loss of scales, damage to integument and internal damage (Stickney 1983, Kelsch and Shields 1996). In addition to the risks associated with handling in general, all fish handled may be exposed to additional risks specific to the various methods of capture and gear types deployed.

Following the closure of the cofferdams the construction area will be dewatered, and any fish remaining within the enclosed area will be subjected to capture and handling associated with the implementation of the fish rescue and relocation plan prepared and submitted in conjunction with the Project. Potential impacts are expected to be minimized by following established sampling protocols identified in the fish rescue and relocation plan.

The effects of other activities includes the annual operation of the new intake structure during the irrigation season, which will have the consequence of contributing to reduced tailwater flows entering the Delta during the summer months. Continued reduction of tailwater flows entering Cache Slough is not expected to result in the incidental take of any listed fish or their designated

critical habitat, but will diminish the value of the habitat to the conservation of the species through increased competition for, and decreasing availability of, an already limited prey base.

2.6. Cumulative Effects

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

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

Non-Federal actions that occur in the action area include ongoing agricultural activities and increased urbanization. Agricultural practices throughout the region may negatively affect riparian and wetland habitats. Stormwater and irrigation discharges related to both agricultural and urban activities contain numerous pesticides and herbicides that may negatively affect salmonid and sturgeon reproductive success and survival rates (Dubrovsky et al. 1998, Daughton 2003).

Increases in urbanization and housing developments can impact habitat by altering watershed characteristics, and changing both water use and stormwater runoff patterns. Increased anthropogenic 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 is also expected to result in a correlative expansion of increased recreational opportunities across the region. Among the activities expected to increase in both volume and frequency is recreational boating, which typically results in greater increased wave action and propeller wash in waterways. These activities will potentially degrade riparian and wetland habitat by eroding channel banks and mid-channel islands, thereby causing an increase in siltation and turbidity in hydrologically connected waters. Wakes and propeller wash also disturb benthic sediments and, thereby, potentially re-suspend contaminated sediments and further degrading areas of submerged vegetation. This disturbance, in turn, would reduce habitat quality for the invertebrate forage base required for the survival of juvenile salmonids and sDPS green sturgeon entering and moving through the action area. Expanded recreational boat operation is also expected to result in elevated concentrations of contaminants from the operation of gasoline and diesel powered engines on watercraft entering the streams and waterways of the north Delta, including the action area.

2.7. Integration and Synthesis

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

The Project is scheduled to occur during a period of time that conforms with the recommended in-water work window for the Sacramento-San Joaquin River Delta, which extends from July 1 through October 31 each year, in a reach of the river where there is no spawning habitat for any of the listed anadromous fish species. Despite being upstream from and hydrologically connected to the major migratory corridor for CCV steelhead and sDPS green sturgeon, the numbers of individuals from those populations present at the time of construction are expected to be very low, and impacts to those individuals are not likely to translate into population level effects. Other activities that are interrelated to the operation of the proposed Project will additionally have the consequence of reducing prey availability and increasing competition for limited food resources in the action area and hydrologically connected waters downstream over the long term. Specifically, a few CCV steelhead adults and juveniles are expected to be present in the action area during the in-water work window when it overlaps with the rising and falling limbs of their migration and emigration seasons, respectively, as do juvenile sDPS green sturgeon, which are present year round in the waters of the Delta. In addition, the action area represents a very small proportion of the adjacent habitat available for fish to disperse into, and the effects from the action are expected to dissipate rapidly within the context of the larger surrounding habitat as well. Therefore, the exposure of listed fish species to sudden short-term increases in turbidity in the action area as a result of in-water construction activities are expected to be temporary, resulting in behavioral responses and injury to a very few individual adult and juvenile CCV steelhead and juvenile sDPS green sturgeon utilizing the action area for a period of approximately 50 days during the period from July 1 through October 1 in a single construction season during the summer of 2022.

In addition, implementation of the fish rescue and relocation plan has the potential to result in the capture and handling of individual CCV steelhead and sDPS green sturgeon if they are present in the Project area during installation of the cofferdams and become stranded within the isolated construction area prior to dewatering. These fish are expected to be harmed or harassed either as a result of capture, handling and processing, or from increased vulnerability to predation immediately following release. The number of individuals actually injured or killed is expected to be small compared to the sizes of the respective populations however, and adverse population level impacts are not anticipated, largely due to the fact that exposure to the short-term effects of capture and handling as a result of implementing the proposed fish rescue and relocation plan will be temporary, confined to individuals present in the immediate area following cofferdam

closure, and minimized through adherence to the fish handling protocols identified in the fish rescue and relocation plan.

2.8. Conclusion

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

2.9. Incidental Take Statement

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

2.9.1. Amount or Extent of Take

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

NMFS anticipates incidental take of CCV steelhead and sDPS green sturgeon in the action area is reasonably certain to occur as a result of the proposed Project. Incidental take associated with the Project is expected to be in the form of harm, harassment, or mortality of adult and juvenile CCV steelhead and juvenile sDPS green sturgeon. Fish will be captured, handled, and processed during implementation of the fish rescue and relocation plan during dewatering activities following closure of the cofferdams, or exposed to sudden short-term increases in turbidity in the action area as a result of in-water construction activities.

NMFS has determined that no more than three individual juvenile or adult CCV steelhead and five juvenile sDPS green sturgeon are expected to be captured during implementation of the fish relocation plan associated with dewatering 3,600 square feet (0.08 acre) within the cofferdammed area, none of which are expected to result in a mortality as a result of handling related stress.

Using the best available information, NMFS cannot specifically quantify the anticipated amount of incidental take of individual CCV steelhead and sDPS green sturgeon occurring as a result of temporary habitat degradation related to construction activities due to the variability and uncertainty associated with the response of listed species to the effects of the action, uncertainty with regard to the varying population size of the two DPSs, annual variations in the timing of migration and emigration, and individual habitat use within the action area. However, it is possible to designate ecological surrogates for the extent of incidental take, characterized by both the amount of habitat permanently lost due to the footprint of the new structure in the channel, and the amount of habitat temporarily lost due to construction. Another surrogate to approximate the extent of incidental take that occurs during construction is reflected by the amount and duration of disturbances to the habitat in the aquatic environment downstream from the construction area (e.g. sudden sharp increases in the concentration of suspended sediments resulting in turbidity fields or plumes) relative to environmental background conditions during cofferdam installation and removal. Therefore, the extent of incidental take for effects to fish during construction is limited to the following short-term elevated concentrations of suspended sediment extending for a longitudinal distance up to 50 feet downstream from the construction site.

- up to 20 percent above ambient background conditions when turbidity is between 5 and 50 NTUs,
- up to 10 NTUs above ambient background conditions when turbidity is between 50 and 100 NTUs, or
- up to 10 percent above ambient background conditions when turbidity is higher than 100 NTUs.

In addition, an ecological surrogate for incidental take associated with the construction and long-term operation of the Project can be expressed by the areal extent of the impacts to a portion of the habitat for the listed species under consideration. In this instance, completion of the Project is expected to result in a total permanent loss of 975 square feet (0.02 acre) of the channel bottom of Ulatris Creek downstream from the Brown Road crossing to accommodate the footprint of the new intake structure following construction, and a temporary disturbance of up to 13,800 square feet (0.31 acre) of the channel banks and bottom of Ulatris Creek downstream from the Brown Road crossing for a period of not more than 50 days between July 1 and October 1, 2022. This permanent and temporary loss of habitat both deprives individual fish from access to a portion of their range, and additionally contributes to the furtherance of the gradual decline of baseline habitat conditions for ESA listed anadromous fish species in the action area, resulting in increased competition for diminished food resources, ultimately leading to reduced growth, overall fitness, and survival.

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.

2.9.3. Reasonable and Prudent Measures

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

NMFS has determined that the following reasonable and prudent measure (RPM) is necessary and appropriate to minimize take of CCV steelhead and sDPS green sturgeon resulting from construction of the proposed Project.

1. Measures shall be taken to minimize, monitor, and report the amount or extent of incidental take that occurs in connection with implementation of the proposed Project.

2.9.4. Terms and Conditions

The terms and conditions described below are non-discretionary, and the USDA-RD, or any applicant must comply with them in order to implement the RPM (50 CFR 402.14). The USDA-RD, 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 RPM 1:
 - a. USDA-RD, the Maine Prairie Water District, or their contractors shall monitor water quality by measuring turbidity 50 feet downstream from the active construction site at a depth approximately two thirds of the total water depth. Turbidity measurements shall be taken twice daily during construction activities, and compiled in a report of activities and turbidity monitoring data by December 31, 2022. If the previously identified and relevant threshold is exceeded, the monitoring equipment should be inspected and a second measurement taken to confirm the exceedance. If the exceedance is confirmed to persist after a second measurement, construction activity shall be immediately halted for a minimum of one hour, or until conditions subside and turbidity levels return to a level that is compliant with the standards as described above in the *Amount or Extent of Take* section (2.9.1), whichever is longer. If the relevant thresholds are exceeded a second time in the same construction day, activities should be halted for the remainder of that day.
 - b. During implementation of the fish rescue and relocation plan, USDA-RD, the Maine Prairie Water District, or their contractors shall monitor water temperatures during fish transport and temper fish to the receiving water prior to release if the temperatures of tank and receiving waters differ by more than 10° F (5.5° C) in order to reduce stress from handling and transport.
 - c. Any CCV steelhead or sDPS green sturgeon found dead or injured within the action area during construction shall be reported within 48 hours to NMFS via e-mail or by phone:

Attention: Cathy Marcinkevage, Assistant Regional Administrator
NMFS California Central Valley Office
E-mail: ccvo.consultationrequests@noaa.gov
Phone: (916) 930-3600

A follow-up written notification shall also be submitted within 30 days to NMFS which includes the date, time, and location that the carcass or injured specimen was found, a color photograph, the cause of injury or death, if known, and the name and affiliation of the person who found the specimen. Written notification shall be submitted to:

Cathy Marcinkevage, Assistant Regional Administrator
California Central Valley Office
National Marine Fisheries Service
650 Capitol Mall, Suite 5-100
Sacramento, California 95814

Any dead specimen(s) should be placed in a cooler with ice, then sent to:

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

2.10. Conservation Recommendations

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

1. USDA-RD and the District should support and promote aquatic and riparian habitat restoration in the Sacramento and San Joaquin river basins for listed aquatic species. Practices that avoid or minimize negative impacts to listed species should be encouraged.
2. USDA-RD and the District should continue to work cooperatively with other State and Federal agencies, private landowners, governments, and local watershed groups to identify opportunities for cooperative analysis and funding to support salmonid habitat restoration projects.

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

2.11. Reinitiation of Consultation

This concludes formal consultation for the North Delta Water Recovery Project.

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

2.12. “Not Likely to Adversely Affect” Determinations

Exposure of both Sacramento River winter-run Chinook salmon and Central Valley spring-run Chinook salmon to the consequences of the Project is expected to be entirely avoided largely because in-water work will occur during the summer and fall months when these species are typically not present in the action area. A brief discussion of the likelihood of exposure of listed fish by time of year, species, and life stage follows.

For Sacramento River winter-run Chinook salmon, the proposed in-water work window for construction of the cofferdam in Ulatis Creek (July 1 through October 1) should preclude most, if not all, instances of exposure to the consequences of the Project. Adult Sacramento River winter-run Chinook salmon may begin to enter the hydrologically connected waters downstream of the action area in November, but are most likely to be migrating through the Delta in December, when they would have access to the action area. Similarly, juveniles may be present in the north Delta as early as November and December, especially if significant rainfall events occur to trigger their outmigration behavior, and would have access to the action area. Juvenile winter-run emigration typically peaks in December, although it generally continues through March, and has been documented to extend through May in some years (Snider and Titus 2000).

Similarly, Central Valley spring-run Chinook salmon are not expected to be present in the action area during the proposed July 1 through October 1 in-water work window, and are expected to completely avoid exposure to the consequences of the Project. Adult spring-run Chinook salmon typically migrate through the Delta from January through May, and would have access to the action area during that time frame. Juvenile spring-run Chinook salmon emigrate through the Delta from November through May, with peak occurrence primarily in December, but also exhibiting a second peak from March through April in most years, and would similarly have access to the action area during those times of the year. Yearling fish may appear in the Delta and hydrologically connected waters of the action area as early as late October, but are not likely to occur in any substantial numbers until after February when the bulk of yearling and young-of-year spring-run Chinook salmon begin to enter the Delta.

Based on the timing of Sacramento River winter-run Chinook salmon or Central Valley spring-run Chinook salmon movements in and through the waters of the Delta, as described above, NMFS has determined that the proposed Project is not likely to adversely affect Sacramento River winter-run Chinook salmon or Central Valley spring-run Chinook salmon. NMFS reached these conclusions based on the timing of the in-water work associated with the construction of the cofferdam being limited to the period from July 1 through October 1, during the time of year when Chinook salmon are not expected to be present in the action area.

3. 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.

3.1. Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended users of this opinion are the U.S. Department of Agriculture Rural Development Program (USDA-RD). Other interested users could include the Maine Prairie Water District or the U.S. Army Corps of Engineers. Individual copies of this opinion were provided to the USDA-RD. The document will be available within two weeks at the NOAA Library Institutional Repository [<https://repository.library.noaa.gov/welcome>]. The format and naming adheres to conventional standards for style.

3.2. 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.

3.3. Objectivity

Information Product Category: Natural Resource Plan

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

Best Available Information: This consultation and supporting documents use the best available information, as referenced in the References section. The analyses in this opinion 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 reviewed in accordance with West Coast Region ESA quality control and assurance processes.

4. REFERENCES

- Bash, J., C. Berman, and S. Bolton. 2001. Effects of Turbidity and Suspended Solids on Salmonids. University of Washington Water Center. Seattle, Washington.
- California Department of Water Resources. 1981. Contract Between The State Of California Department Of Water Resources And The North Delta Water Agency For The Assurance Of A Dependable Water Supply Of Suitable Quality. 8 pages.
- Central Valley Regional Water Quality Control Board. 2018. The Water Quality Control Plan for the California Regional Water Quality Control Board Central Valley Region, Fifth Edition; The Sacramento River Basin and San Joaquin River Basin. May, 2018. 201 pp.
- Cohen, S. J., K. A. Miller, A. F. Hamlet, and W. Avis. 2000. Climate Change and Resource Management in the Columbia River Basin. *Water International* 25(2):253-272.
- Daughton, C. G. 2003. Cradle-to-Cradle Stewardship of Drugs for Minimizing Their Environmental Disposition While Promoting Human Health. Ii. Drug Disposal, Waste Reduction, and Future Directions. *Environmental Health Perspectives* 111(5):775-785.
- Dettinger, M. D. and D. R. Cayan. 1995. Large-Scale Atmospheric Forcing of Recent Trends toward Early Snowmelt Runoff in California. *Journal of Climate* 8(3):606-623.
- Dubrovsky, N. M., D. L. Knifong, P. D. Dileanis, L. R. Brown, J. T. May, V. Connor, and C. N. Alpers. 1998. Water Quality in the Sacramento River Basin. U.S. Geological Survey Circular 1215. United States Geological Survey.
- Gregory, R. S. and C. D. Levings. 1998. Turbidity Reduces Predation on Migrating Juvenile Pacific Salmon. *Transactions of the American Fisheries Society* 127(2):275-285.
- Kelsch, S. W., and B. Shields. 1996. Care and handling of sampled organisms. Pages 121-156 in B. R. Murphy and D. W. Willis, editors. *Fisheries Techniques*, 2nd edition. American Fisheries Society. Bethesda, Maryland. 732 pages.
- Maine Prairie Water District. 2020. Ulatis Creek Fish Rescue and Relocation Plan, Maine Prairie Water District Pump Station 2 Project, North Delta Water Recovery Project. 4 pages.
- McClure, M. M. 2011. Status Review Update for Pacific Salmon and Steelhead Listed under the Endangered Species Act: Pacific Northwest. NOAA Tech. Memo. NMFS-NWFSC-113. 281 pp.
- Mora, E. A., R. D. Battleson, S. T. Lindley, M. J. Thomas, R. Bellmer, L. J. Zarri, A. P. Klimley. 2017. Estimating the Annual Spawning Run Size and Population Size of the Southern Distinct Population Segment of Green Sturgeon. *Transactions of the American Fisheries Society* 147:195-203.

- National Marine Fisheries Service. 2014. Recovery Plan for the Evolutionarily Significant Units of Sacramento River Winter-Run Chinook Salmon and Central Valley Spring-Run Chinook Salmon and the Distinct Population Segment of California Central Valley Steelhead. California Central Valley Area Office. 428 pp.
- National Marine Fisheries Service. 2015. 5-Year Summary and Evaluation: Southern Distinct Population Segment of the North American Green Sturgeon. U.S. Department of Commerce, National Marine Fisheries Service, West Coast Region, California Central Valley Office, Sacramento, California. 42 pp.
- National Marine Fisheries Service. 2016. Central Valley Recovery Domain 5-Year Review: Summary and Evaluation of California Central Valley Steelhead Distinct Population Segment. U.S. Department of Commerce, National Marine Fisheries Service, West Coast Region, California Central Valley Office, Sacramento, California. 44 pp.
- National Marine Fisheries Service. 2018. Recovery Plan for the Southern Distinct Population Segment of North American Green Sturgeon (*Acipenser medirostris*). U.S. Department of Commerce, National Marine Fisheries Service, West Coast Region, California Central Valley Office, Sacramento, California. 95 pp.
- Snider, B. and R. G. Titus. 2000. Timing, Composition and Abundance of Juvenile Anadromous Salmonid Emigration in the Sacramento River near Knights Landing October 1998 – September 1999. California Department of Fish and Game, Stream Evaluation Program Technical Report No. 00-6.
- Stickney, R. R. 1983. Care and handling of live fish. Pages 85-94 in L. A. Nielsen and D. L. Johnson, editors. Fisheries Techniques. American Fisheries Society. Bethesda, Maryland. 468 pages.
- Thompson, L. C., M. I. Escobar, C. M. Mosser, D. R. Purkey, D. Yates, and P. B. Moyle. 2011. Water Management Adaptations to Prevent Loss of Spring-Run Chinook Salmon in California under Climate Change. Journal of Water Resources Planning and Management: 138:465-478.
- United States Bureau of Reclamation. 2019. Reinitiation of Consultation on the Coordinated Long-Term Operation of the Central Valley Project and State Water Project; Final Biological Assessment. October, 2019.
- Wade, A. A., T. J. Beechie, E. Fleishman, N. J. Mantua, H. Wu, J. S. Kimball, D. M. Stoms, and J. A. Stanford. 2013. Steelhead Vulnerability to Climate Change in the Pacific Northwest. Journal of Applied Ecology 50:1093-1104.
- Williams, J. G. 2006. Central Valley Salmon: A Perspective on Chinook and Steelhead in the Central Valley of California. San Francisco Estuary and Watershed Science 4:416.

Yates, D., H. Galbraith, D. Purkey, A. Huber-Lee, J. Sieber, J. West, S. Herrod-Julius, and B. Joyce. 2008. Climate Warming, Water Storage, and Chinook Salmon in California's Sacramento Valley. *Climatic Change* 91(3-4):335-350.