UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
777 Sonoma Avenue, Room 325
Santa Rosa, California 95404-4731

August 19, 2021 **Refer to NMFS No:** WCRO-2021-00655

Sahrye Cohen
North Branch Chief, Regulatory Division
U.S. Department of the Army
Corps of Engineers, San Francisco District
450 Golden Gate Avenue
San Francisco, California 94102

Re: Corrected Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Russian River Summer Crossing at Asti, in Sonoma County, California

Dear Ms. Cohen:

On March 3, 2021, NOAA's National Marine Fisheries Service (NMFS) received your request initiating consultation pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 et seq.) for the Russian River Summer Crossing at Asti (file numbers SPN-2009-020609 & SPN-2020-272520). This consultation was conducted in accordance with the 2019 revised regulations that implement section 7 of the ESA (50 CFR 402, 84 FR 45016). Also, your request included 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.

NMFS transmitted the Biological Opinion (BO) for the proposed action to the U.S. Department of the Army Corps of Engineers (Corps) on May 20, 2021. Since the transmittal of the BO, NMFS has been made aware that the inclusion of Central California Coast (CCC) coho salmon in the BO may be incorrect. NMFS has reviewed the BO and based on the following information has determined that issuing a corrected BO for this project is warranted. Below, we describe why this corrected BO includes a determination of may affect not likely to adversely affect for CCC coho salmon and their designated critical habitat. This determination was made because CCC coho habitat does not occur in the action area or areas of the upper Russian River and the species has not been present in the upper basin for decades.

After reviewing the best available information, NMFS has determined that issuing a corrected BO including a revised incidental take statement for the Russian River Summer Crossing at Asti BO (WCR-2021-00655) is appropriate. Therefore, this corrected BO document replaces the BO transmitted in the May 20, 2021, and does not trigger Section 7 consultation reinitiation set forth in 50 CFR 402.16(a). The corrected BO shall serve as the Section 7 interagency consultation for the construction of the summer crossing at Asti by the Sonoma County Department of

Transportation and Public Works (DTPW) on the mainstem Russian River under a Corps 404 permit from 2021 through 2031.

The enclosed corrected BO is based on our review of the Corps biological assessment for the issuance of a one-year extension and a 10- year Section 404 permit to the Sonoma County DTPWs proposed project. The biological opinion describes NMFS' analysis of potential effects on endangered Central California Coast (CCC) coho salmon, threatened Central California Coast (CCC) steelhead (*Oncorhynchus mykiss*), threatened Coastal California (CC) Chinook salmon (*Oncorhynchus tshawytscha*) and designated critical habitat for these species in accordance with section 7 of the ESA. In the enclosed biological opinion, NMFS concludes the project is not likely to jeopardize the continued existence of CCC steelhead, or CC Chinook salmon and is not likely to adversely modify critical habitat for these species. However, NMFS anticipates that take of CCC steelhead and CC Chinook salmon may occur. An incidental take statement, which applies to this project with non-discretionary terms and conditions, is included with the enclosed opinion. As described above, we conclude that the proposed project may affect but is not likely to adversely affect CCC coho and critical habitat.

NMFS has reviewed the proposed project for potential effects on EFH and determined that the proposed project would adversely affect EFH for Pacific Coast Salmon, which are managed under the Pacific Coast Salmon Fishery Management Plan. While the proposed action will result in adverse effects to EFH, the proposed project contains measures to minimize, mitigate, or otherwise offset the adverse effects; thus, no EFH Conservation Recommendations are included in this opinion.

Please contact Thomas Daugherty, North Central Coast Office in Santa Rosa, California at (707) 468-4057, or via email at Tom.Daugherty@noaa.gov if you have any questions concerning this section 7 and EFH consultation, or if you require additional information.

Sincerely,

Alecia Van Atta
Assistant Regional Administrator
California Coastal Office

Enclosure

cc: Jayme Ohlhaver, USACE, Jayme.a.ohlhaver@usace.army.mil
Jackson Ford, Sonoma County PRMD, Jackson.Ford@sonoma-county.org
Copy to E-File: ARN# 151422WCR2021SR00058

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

Russian River Summer Crossing at Asti

NMFS Consultation Number: WCRO-2021-00655
Action Agency: U.S. Department of the Army Corps of Engineers

Affected Species and NMFS' Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species?	Is Action Likely to Jeopardize the Species?	Is Action Likely to Adversely Affect Critical Habitat?	Is Action Likely to Destroy or Adversely Modify Critical Habitat?
California Coastal Chinook salmon (*Oncorhynchus tshawytscha*)	Threatened	Yes	No	Yes	No
Central California Coast steelhead (*O. mykiss*)	Threatened	Yes	No	Yes	No
Central California Coast coho salmon (*O. kisutch*)	Endangered	No	No	No	No

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

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

Issued By:

Alecia Van Atta
Assistant Regional Administrator
California Coastal Office

Date: August 19, 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

NOAA's 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.), and implementing regulations at 50 CFR 402, as amended.

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

We completed pre-dissemination review of this document using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (DQA) (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The document will be available within two weeks at the NOAA Library Institutional Repository [https://repository.library.noaa.gov/welcome]. A complete record of this consultation is on file at the NMFS Santa Rosa California office (ARN# 151422WCR2021SR00058).

1.2. Consultation History

A biological opinion (BO) was previously issued by NFMS on June 11, 2003 for the Asti Summer Crossing (File Number 151422SWR02SR8299). The Corps requested re-initiation of formal Section 7 on April 7, 2006 for reclassification of CCC coho salmon from threatened to endangered and re-designation of CCC steelhead and Chinook salmon critical habitat. An amended biological opinion (BO) was issued on May 30, 2006. On March 18, 2008, the Corps requested re-initiation of consultation for a one-year time extension for the BO, which was issued on June 2, 2008 for (NMFS File Number 151422SWR08SR00132). On June 9, 2009, the Corps requested initiation of formal consultation for a ten-year Clean Water Act Section 404 permit for the summer crossing at Asti. NMFS issued a BO on June 3, 2009 (WCR 2009-02609) and the 404 permit (Corps SPN-2009/02609N) was issued on June 15, 2009.

On January 21, 2020, the Corps extended the permit upon request from the County of Sonoma until December 31, 2020. Sonoma County met with NMFS at the Asti site on April 27, 2020 to discuss proposed timing and construction methods for 2020, and agreed to the general approach via email on May 2, 2020. The Corps issued a 404 permit Letter of Modification on May 19, 2020 (Corps SPN-2009-020609N) for the Asti summer crossing permitting the seasonal road crossing to be installed early, on May 26, 2020.

Coordination and pre-consultation with NMFS and the Corps for a new Clean Water Act Section 404 permit and biological opinion was ongoing during 2020; including site visits, phone calls and emails, and has primarily been focused on timing of construction and removal of summer the crossing and construction methods. On March 4, 2021, NMFS received an initiation package from the Corps requesting formal consultation for the proposed summer crossing on the Russian River at Asti which included the BA and cover letter. NMFS reviewed the BA for sufficiency and accepted the initiation package on March 17, 2021 for formal interagency section 7 consultation.

On May 5, 2021, the Corps notified NMFS that the issuance of the California State Water Resources Control Board Clean Water Act section 401 water quality certification would not be completed in the time necessary for the Corps to issue their Section 404 permit to Sonoma County DTPW before the target installation date of June 15, 2021.

On May 6, 2021, the Corps officially amended their Section 7 consultation request with NMFS to include a one-year extension of their 2009 Section 404 permit along with the 2021 permit request. Therefore, NMFS has extended the duration of the time period considered in this opinion for an additional year. The proposed installation and removal of the summer crossing at Asti for 2021 (Corps SPN-2009-020609N) will be covered under this biological opinion along with the new 404 permit (Corps SPN-2020-272520N) for years 2022 through 2031.

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). Federal action means any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken by a Federal Agency (50 CFR 600.910). Under MSA, Federal action means any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken by a Federal Agency (50 CFR 600.910).] We considered, under the ESA, whether or not the proposed action would cause any other activities and determined that it would not cause additional effects beyond those that are from the action as described below.

1.3.1 Project Description

The Corps proposes to authorize Section 404 permits for the Sonoma County DTPW to continue the annual installation and removal of a temporary summer road crossing at Asti, near Cloverdale, California. The County of Sonoma has installed and removed summer crossings over the Russian River annually since the 1800's including the summer crossing located near Asti, at Washington School Road (Asti Summer Crossing). Purposes for the summer road crossing are to provide an alternate exit route from the east side of the Russian River during fire season for residents, campers and tourists, provide faster emergency service access, and to provide shorter and quicker access for local residents, tourists and recreational users. The crossing generally consists of a temporary bridge that spans the low-flow channel of the Russian River and a gravel road that is annually constructed over the remainder of the channel to meet up with the

temporary bridge. For most of the past twenty years, the river at this location had one distinct flowing channel on the east side of the river and the summer crossing included installation of one temporary bridge and construction of a gravel roadway from the bridge to the west, connecting to Washington School Road. In recent years (2019 & 2020), alternate approaches to constructing the crossing have been necessary due to the low flow channel migrating from the east side of the river, to the west. Alternate approach plans included the use of a second bridge (2019) and culverts under the roadway (2020). The Corps permits (Corps File Numbers 2009-020609, 2020-272520) will authorize the project under the Clean Water Act (CWA), Section 404, to permit the actions described below, under section 7 of the ESA. The proposed dates for annual installation and removal are 15 June (May 15 with approval), and November 15 each year.

Under the Corps permit, the Sonoma County DTPW will install and remove the bridge and gravel roadway. The crossing consists of a temporary bridge that spans the summer low-flow channel on the east side of the Russian River on existing permanent concrete abutments, Bailey bridge(s) (as needed) to span flows that may have deviated from the historical low-flow channel, and a gravel road that is constructed over the remainder of the channel to meet up with the bridge(s).

For most of the past twenty years, the river at this location had one distinct low-flow channel on the east side of the river and the summer crossing typically includes installation of one temporary bridge on permanent piers and construction of a gravel roadway from the bridge to the west. However, in recent year's winter high flows have shifted the low-flow channel entirely or partially to the west, outside of the permanent bridge abutments, requiring alternate crossing configurations to be installed. Given the channel dynamics at this location, one of the following crossing scenarios would be installed based on the low-flow channel location each season:

1. East Bridge Scenario (One Bridge),
2. Center Bridge Scenario (Two Bridges),
3. East Bridge with Culverts under Constructed Roadway Scenario (One Bridge),
4. West Bridge Scenario (Two Bridges),
5. Three Bridge Scenario.

In all five scenarios, the 60-foot-long temporary bridge on the east side of the river and a gravel roadbed would be installed with up to 6,900 cubic yards of gravel. For the eastern temporary bridge, a crane situated on the adjacent bank is used to install two 30-foot-long deck panels on three permanent concrete abutments and piers. The constructed roadbed would be a maximum of 510 feet in length, 24 to 26 feet in width with 2:1 side slopes, and 6-8 feet in height above the bar. The roadway is constructed with bulldozers pushing stockpiled material from previous years (stored on Washington School Road, outside of the channel) and by skimming river deposited gravel from the top layer of downstream gravel bars. While most of the roadbed is constructed in the dry riverbed, the eastern low flow channel may need to be narrowed to by pushing screened and washed (or imported) gravel into the flowing water of the river until the gravel for the road meets the westerly abutment of the bridge. This area of flowing water that is filled is up to approximately 15 to 70 feet in width (0.08 acre). By building the road, the low flow channel is restricted to the 60-foot distance of the temporary bridge.

Due to the wide braided channel in the Asti reach of the Russian River, the County may be required to stabilize the gravel bar that provides the gravel base structure of the temporary roadway for access to the temporary bridge. The armoring may include armoring the gravel bar with large redwood rootwads to shunt flow from the gravel bar toward the existing main thalweg to prevent further scour of the bar. The County also proposes to stabilize the bar by improving sediment deposition with installation of willow fascines across the northern edge of the gravel bar. Willows used for the fascines would be sourced on-site. Based on river conditions following winter high flows, the County would submit formal plan to NFMS and the USACE for review via permit amendment prior to implementation.

In the late fall, the deck panels are removed and the roadbed is graded out to approximate the pre-construction contour and condition of the exposed bar. Gravel discharged into the low-flow channel is partially removed to an elevation of two feet above the water surface to minimize turbidity and downstream sedimentation.

Proposed work would result in the temporary discharge of up to approximately 4,250 cubic yards of gravel fill (and 1-ton cement blocks if more than one bridge is required) in 0.6 acres (26,050 square feet) of other waters of the U.S. annually. Additionally, construction activities would cause temporary disturbance to approximately 2.5 acres of dry river channel below the plane of ordinary high water (OHW) and would utilize up to 6,900 cubic yards of gravel skimmed from within the river channel.

1.3.2 Avoidance and Minimization Measures (AMMs)

- Installation and Removal Dates: The dates for installation and removal are proposed from June 15 to November 15 to minimize potential impacts to migrating salmonids. The County proposes to petition the Corps and NMFS for an extension of the removal date in the event that the California Department of Forestry official fire season is extended or the fire hazard is severe. An earlier installation date of May 15 may also be petitioned for NMFS and the Corps' approval based on low river flow levels and fire season hazards.

- Monitor of River Stage Procedures: The work period in the channel and adjacent riparian areas will be limited to periods of low flow when the site is not in danger of becoming inundated by high flow events. The river stage forecast will be monitored to insure that equipment is removed from the site prior to becoming inundated. If the river stage forecast indicates that the crossing may become inundated, the bridge deck and roadway will be removed at least 48-hours before the forecast indicate the crossing will become inundated.

- Qualified Biological Monitor: A Qualified biological Monitor will be on-site daily to monitor the installation and removal of the summer crossing.

- Use of Clean Gravel to Construct the Road Base: Clean, river-run gravel will be imported to construct the roadway base where the road comes into contact with flowing water. Imported clean gravel will be piled to an elevation at last two feet above the water surface elevation.

• Use of on-site Gravel to Construct Roadway: Only on-site gravel will be used for construction of the roadway (above the road base) leading to the bridge abutment. Gravel will be obtained from the dry gravel bars or stockpiles placed outside of Corps OHW jurisdiction. The gravel used for the road base will be left in place at the end of the season. No gravel will be removed from flowing water.

• Gravel Skimming Site Buffers: Where gravel fill material is skimmed from gravel bars, a minimum of ten-foot buffer area will be maintained between the water's edge and the skimming sites.

• Limitations on Construction Equipment in Flowing Water: Equipment or construction occurring in the flowing water of the Russian River will be limited as much as possible. Pushing clean imported river run gravel into flowing or standing water to narrow wetted channel to allow the road to the meet the bridge pier may be necessary. Also moving construction equipment or machines to install a Bailey bridge or culverts under the roadway will require some work in the active channel. Construction equipment in flowing water will be limited to the least amount necessary and fish avoidance measures will be implemented.

• Fish Avoidance Procedures: Where gravel must be pushed into the flowing or standing water, or equipment must be "walked" thru the flowing water to move from the west to the east side of the river channel, the area will be thoroughly walked and swept with seine or block nets to cause a disturbance and insure no salmonids are affected adversely. This action will frighten away any fish that may be in small areas where the gravel will be pushed next to the bridge pier or where equipment will traverse. A qualified fisheries biologist will perform fish avoidance procedures.

• Gravel Skimming Grading Procedures: Areas where gravel is skimmed and used for approaches and roadway construction will be graded to slope toward the low flow channel. Immediately after installation and following removal, these areas will be left free of holes and depressions that may trap fish.

• Turbidity Monitoring: Turbidity sampling will be implemented when gravel is disturbed in the wetted channel during construction of the roadway base. Work will be stopped, and the work area will be allowed to "rest" for a minimum of 10 minutes if gravel entering the river causes a plume of turbidity above background levels. Work will resume after the stream reaches original background turbidity levels.

• Gravel Pushing Procedures: Where gravel must be pushed into the flowing or standing water to build the approach to the bridge pier, the gravel will be pushed from the upstream end toward the downstream end. This process of pushing gravel into the flowing or standing water will be at a slow rate. This process will be done in such a way that no ponded areas that could entrap fish are created.

• Gravel Bar Stability: In order to stabilize the bar the County may include armoring the gravel bar with large redwood rootwads to shunt flow from the gravel bar toward the existing main thalweg to prevent further scour of the bar. In addition, the County install willow fascines

across the northern edge of the gravel bar to improve sediment deposition and stabilize the bar. Willows used for the fascines would be sourced on-site. Based on river conditions following winter high flows, the County would submit a formal plan to NMFS and the Corps for review and approval prior to implementation.

- Stockpiling: At the end of the season, compactable road fill will be stockpiled outside of OHW and river channel.

- Motorized Vehicle Storage Procedures: No motorized vehicles will be left within the river channel (top of bank to top of bank) overnight.

- Vegetation Removal Procedures: Although vegetation removal or disturbance is not expected, vegetation that cannot be avoided will be pruned, where possible, in lieu of cutting the main stem. If necessary, removal of any tree will require that the tree be cut above grade to facilitate re-growth and only the minimum amount of vegetation will be removed that is necessary to construct the project.

- Erosion Control: Best Management Practices (BMPs) will be implemented to avoid and minimize erosion from stockpiles and other construction activities, including covering stockpiles, hydromulch, and wattles, among other BMPs.

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

The ESA establishes a national program for conserving threatened and endangered species of fish, wildlife, plants, and the habitat upon which they depend. As required by section 7(a)(2) of the ESA, each Federal agency must ensure that its actions are not likely to jeopardize the continued existence of endangered or threatened species, or adversely modify or destroy their designated critical habitat. Per the requirements of the ESA, Federal action agencies consult with NMFS and section 7(b)(3) requires that, at the conclusion of consultation, NMFS provide an opinion stating how the agency's actions would affect listed species and their critical habitats. If incidental take is reasonably certain to occur, section 7(b)(4) requires NMFS to provide an ITS that specifies the impact of any incidental taking and includes non-discretionary 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 relies on the definition of "destruction or adverse modification," which "means a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species" (50 CFR 402.02).

The designation(s) of critical habitat for (species) use(s) 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, 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.

To conduct the assessment presented in this opinion, NMFS examined an extensive amount of information from a variety of sources. Detailed background information on the biology and status of the listed species and critical habitat has been published in a number of documents including peer reviewed scientific journals, primary reference materials, and governmental and non-governmental reports. For information that has been taken directly from published, citable documents, those citations have been reference in the text and listed at the end of this document.

Additional information regarding the potential effects of the proposed activities on the listed species, their anticipated response to these actions, and the environmental consequences of the actions was formulated from the aforementioned resources, and the following:

- Sonoma County. 2020. (BA) – Biological Assessment Russian River Summer Crossing at Asti. Prepared for: Department of the Army, San Francisco District, U.S. Army Corps of Engineers. November 2020. 23 pp.
- NMFS 2009 – Biological Opinion for the ten-year Clean Water Act section 404 Permit for the Annual Installation and Removal of a Summer Road Crossing in the Russian River at Asti, Sonoma County, National Marine Fisheries Service, Southwest Region. June 3, 2009.
- NMFS 2012 - Final Recovery Plan for Central California Coast coho salmon Evolutionarily Significant Unit. Southwest Region, Santa Rosa, California. September 2012.
- NMFS 2016a - 5-Year Review: Summary and Evaluation of California Coastal Chinook Salmon and Northern California Steelhead. National Marine Fisheries Service, West Coast Region. April. 61pp.
- NMFS 2016b - Final Coastal Multispecies Recovery Plan: CC Chinook Salmon, Northern California Steelhead, and CCC Steelhead. West Coast Region, Santa Rosa CA. October 2016.

The issues NMFS is obliged to address in this opinion are wide-ranging, complex, and often not directly referenced in scientific literature. We base many of our conclusions on explicit assumptions informed by the available evidence. By this, we mean to make a reasonable effort to compile the best scientific and commercial empirical evidence related to the analysis and to then apply general and specific information on salmonid biology from the published literature to make inferences and establish our conclusions. In some cases, we have used the results of recent project specific studies or analyses conducted in the action area. In other situations, only more general local data are available on species presence or absence, and habitat condition. Where necessary, we have used this information and combined it with more general information from the scientific literature to infer salmonid response to the proposed action. In several instances, we make reasonable inferences that rely mainly on information in the scientific literature, because local data are not available.

2.2. Rangewide Status of the Species and Critical Habitat

This opinion examines the status of each species that would be adversely affected by the proposed action. The status is determined by the level of extinction risk that the listed species face, based on parameters considered in documents such as recovery plans, status reviews, and listing decisions. This informs the description of the species' likelihood of both survival and recovery. The species status section also helps to inform the description of the species' "reproduction, numbers, or distribution" as described in 50 CFR 402.02. The opinion also examines the condition of critical habitat throughout the designated area, evaluates the conservation value of the various watersheds and coastal and marine environments that make up the designated area, and discusses the function of the PBFs that are essential for the conservation of the species.

This biological opinion analyzes the effects of the action on the following listed Salmonids and their critical habitat.

Threatened CC Chinook salmon (*O. tshawytscha*) ESU
Listing determination (70 FR 37160; June 28, 2005)
Critical habitat designation (70 FR 52488; September 2, 2005);

Threatened CCC steelhead (*O. mykiss*) Distinct Population Segment (DPS)
Listing determination (71 FR 834; January 5, 2006)
Critical habitat designation (70 FR 52488; September 2, 2005).

2.2.1 Species Description and Life History

Chinook Salmon

Chinook salmon return to freshwater to spawn when they are three to eight years old (Healey 1991). Some Chinook salmon return from the ocean to spawn one or more years before they reach full adult size, and are referred to as jacks (males) and jills (females). Chinook salmon runs are designated based on adult migration timing; however, distinct runs also differ in the degree of maturation at the time of river entry, thermal regime and flow characteristics of their spawning site, and actual time of spawning (Myers et al. 1998). Both winter-run and spring-run Chinook salmon tend to enter freshwater as immature fish, migrate far upriver, and delay spawning for weeks or months. For comparison, fall-run Chinook salmon enter freshwater at an advanced stage of maturity, move rapidly to their spawning areas on the mainstem or lower tributaries of rivers, and spawn within a few days or weeks of freshwater entry (Healey 1991).

Fall-run CC Chinook salmon migrate upstream during June through November, with peak migration periods occurring in September and October. Spawning occurs from late September through December, with peaks in late October. Adequate instream flows and cool water temperatures are more critical for the survival of spring-run Chinook salmon (compared to fall-run or winter-run Chinook salmon) due to over-summering by adults and/or juveniles. Chinook salmon generally spawn in gravel beds that are located at the tails of holding pools (Bjornn and Reiser 1991). Adult female Chinook salmon prepare redds in stream areas with suitable gravel composition, water depth, and velocity. Optimal spawning temperatures range between 42° to 57° F. Redds vary widely in size and location within the river. Preferred spawning substrate is clean, loose gravel, mostly sized between 1 and 10 cm, with no more than 5 percent fine sediment. Gravels are unsuitable when they have been cemented with clay or fine particles or when sediments settle out onto redds, reducing inter-gravel percolation (Leidy and Leidy 1984). Minimum inter-gravel percolation rate depends on flow rate, water depth, and water quality. The percolation rate must be adequate to maintain oxygen delivery to the eggs and remove metabolic wastes. Chinook salmon require a strong, constant level of subsurface flow; as a result, suitable spawning habitat is more limited in most rivers than superficial observation would suggest. After depositing eggs in redds, most adult female Chinook salmon guard the redd from 4 to 25

days before dying.

Chinook salmon eggs incubate for 90 to 150 days, depending on water temperature. Successful incubation depends on several factors including dissolved oxygen levels, temperature, substrate size, amount of fine sediment, and water velocity. Maximum survival of incubating eggs and pre-emergent fry occurs at water temperatures between 42° and 56° F with a preferred temperature of 52° F. CC Chinook salmon fry emerge from redds during December through mid-April (Leidy and Leidy 1984).

After emergence, Chinook salmon fry seek out areas behind fallen trees, back eddies, undercut banks, and other areas of bank cover (Everest and Chapman 1972). As they grow larger, their habitat preferences change. Juveniles move away from stream margins and begin to use deeper water areas with slightly faster water velocities, but continue to use available cover to minimize predation risk and reduce energy expenditure. Fish size appears to be beneficially correlated with water velocity and depth (Chapman and Bjornn 1969, Everest and Chapman 1972). Optimal temperatures for both Chinook salmon fry and fingerlings range from 54° to 57° F, with maximum growth rates at 55° F (Boles 1988). Chinook salmon feed on small terrestrial and aquatic insects and aquatic crustaceans. Cover, in the form of rocks, submerged aquatic vegetation, logs, riparian vegetation, and undercut banks provide food, shade, and protect juveniles from predation. CC Chinook salmon will rear in freshwater for a few months and outmigrate from April through July (Myers et al. 1998).

Steelhead

Steelhead are anadromous forms of O. mykiss, spending some time in both freshwater and saltwater. Steelhead young usually rear in freshwater for one to three years before migrating to the ocean as smolts, but rearing periods of up to seven years have been reported. Migration to the ocean usually occurs in the spring. Steelhead may remain in the ocean for one to five years (two to three years is most common) before returning to their natal streams to spawn (Busby et al. 1996). The distribution of steelhead in the ocean is not well known. Coded wire tag recoveries indicate that most steelhead tend to migrate north and south along the continental shelf (Barnhart 1986).

Steelhead can be divided into two reproductive ecotypes, based upon their state of sexual maturity at the time of river entry and the duration of their spawning migration: stream maturing and ocean maturing. Stream maturing steelhead enter fresh water in a sexually immature condition and require several months to mature and spawn, whereas ocean maturing steelhead enter fresh water with well-developed gonads and spawn shortly after river entry. These two reproductive ecotypes are more commonly referred to by their season of freshwater entry (i.e., summer [stream maturing] and winter [ocean maturing] steelhead). The timing of upstream migration of winter steelhead is correlated with higher flow events, such as freshets or sandbar breaches. Adult summer steelhead migrate upstream from March through September. In contrast to other species of Oncorhynchus, steelhead may spawn more than one season before dying (iteroparity); although one-time spawners represent the majority.

Because rearing juvenile steelhead reside in freshwater all year, adequate flow and temperature are important to the population at all times [California Department of Fish and Game (CDFG) 1997]. Outmigration appears to be more closely associated with size than age. In Waddell Creek, Shapovalov and Taft (1954) found steelhead juveniles migrating downstream at all times of the year, with the largest numbers of young-of-year and age 1+ steelhead moving downstream during spring and summer. Smolts can range from 5.5 to 8 inches in length. Steelhead outmigration timing is similar to coho salmon (CDFG 2002).

Survival to emergence of steelhead embryos is inversely related to the proportion of fine sediment in the spawning gravels. However, steelhead are slightly more tolerant than other salmonids, with significantly reduced survival when fine materials of less than 0.25 inches in diameter comprise 20 to 25 percent of the substrate. Fry typically emerge from the gravel two to three weeks after hatching (Barnhart 1986).

Upon emerging from the gravel, fry rear in edgewater habitats and move gradually into pools and riffles, as they grow larger. Older fry establish territories, which they defend. Cover is an important habitat component for juvenile steelhead, both as a velocity refuge and as a means of avoiding predation (Meehan and Bjornn 1991). Steelhead, however, tend to use riffles and other habitats not strongly associated with cover during summer rearing more than other salmonids. Young steelhead feed on a wide variety of aquatic and terrestrial insects, and emerging fry are sometimes preyed upon by older juveniles. In winter, juvenile steelhead become less active and hide in available cover, including gravel or woody debris.

Water temperature can influence the metabolic rate, distribution, abundance, and swimming ability of rearing juvenile steelhead (Barnhart 1986, Bjornn and Reiser 1991, Myrick and Cech 2005). Optimal temperatures for steelhead growth range between 50° and 68° F (Hokanson et al. 1977, Wurtsbaugh and Davis 1977, Myrick and Cech 2005). Variability in the diurnal water temperature range is also important for the survivability and growth of salmonids (Busby et al. 1996).

Suspended sediment concentrations, or turbidity, also can influence the distribution and growth of steelhead (Bell 1973, Sigler et al. 1984, Newcombe and Jensen 1996). Bell (1973) found suspended sediment loads of less than 25 milligrams per liter (mg/L) were typically suitable for rearing juvenile steelhead.

2.2.2 Status of Species and Critical Habitat

In this biological opinion, NMFS assesses four population viability parameters to help us understand the status of each species and their ability to survive and recover. These population viability parameters are abundance, population growth rate, spatial structure, and diversity (McElhaney et al. 2000). While there is insufficient information to evaluate these population viability parameters in a thorough quantitative sense, NMFS has used existing information, including the Coastal Multispecies Recovery Plan (NMFS 2015), to determine the general condition of each population and factors responsible for the current status of each DPS or ESU.

We use these population viability parameters as surrogates for numbers, reproduction, and distribution, the criteria found within the regulatory definition of jeopardy (50 CFR 402.20). For example, the first three parameters are used as surrogates for numbers, reproduction, and distribution. We relate the fourth parameter, diversity, to all three regulatory criteria. Numbers, reproduction, and distribution are all affected when genetic or life history variability is lost or constrained resulting in reduced population resilience to environmental variation at local or landscape-level scales.

Chinook Salmon

The CC Chinook salmon ESU was historically comprised of approximately 32 Chinook salmon populations (Bjorkstedt et al. 2005). Many of these populations (14) were independent, or potentially independent, meaning they have a high likelihood of surviving for 100 years absent anthropogenic impacts. The remaining populations were likely more dependent upon immigration from nearby independent populations than dependent populations of other salmonids (Bjorkstedt et al. 2005).

Data on CC Chinook abundance, both historical and current, is sparse and of varying quality (Bjorkstedt et al. 2005). Estimates of absolute abundance are not available for populations in this ESU (Myers et al. 1998). In 1965, CDFG (1965) estimated escapement for this ESU at over 76,000. Most were in the Eel River (55,500), with smaller populations in Redwood Creek (5,000), Mad River (5,000), Mattole River (5,000), Russian River (500) and several smaller streams in Humboldt County (Myers et al. 1998). More recent information from Sonoma Water monitoring at their Mirabel fish ladder from 2000 to 2014 suggests moderate to good abundance of Russian River Chinook salmon with 1,113 to 6,696 adult fish reported (Martini-Lamb and Manning 2015).

CC Chinook salmon populations remain widely distributed throughout much of the ESU. Notable exceptions include the area between the Navarro River and Russian River and the area between the Mattole and Ten Mile River populations (Lost Coast area). The lack of Chinook salmon populations both north and south of the Russian River (the Russian River is at the southern end of the species' range) makes it one of the most isolated populations in the ESU. Myers et al. (1998) reports no viable populations of Chinook salmon south of San Francisco, California.

Because of their prized status in the sport and commercial fishing industries, CC Chinook salmon have been the subject of many artificial production efforts, including out-of-basin and out-of-ESU stock transfers (Bjorkstedt et al. 2005). It is, therefore, likely that CC Chinook salmon genetic diversity has been adversely affected despite the relatively wide population distribution within the ESU. An apparent loss of the spring-run Chinook life history in the Eel River Basin and elsewhere in the ESU also indicates risks to the diversity of the ESU.

Data from the 2009 adult CC Chinook salmon return counts and estimates indicated a further decline in returning adults across the range of CC Chinook salmon on the coast of California (Jahn, NMFS, personal communication 2010). Ocean conditions are suspected as the principal

short-term cause because of the wide geographic range of declines (SWFSC 2008). However, the number of adult CC Chinook salmon returns in the Russian River Watershed increased substantially in 2010/2011 compared to 2008/09 and 2009/10 returns. Increases in adult Chinook salmon returns during 2010/2011 have been observed in the Central Valley populations as well.

The most recent status review summary by Seghesio and Wilson (2016) reports that the new information available since the last status review (Williams et al. 2011) does not appear to suggest there has been a change in extinction risk for this ESU. Williams et al. (2011) found that the loss of representation from one diversity stratum, the loss of the spring-run history type in two diversity substrata, and the diminished connectivity between populations in the northern and southern half of the ESU pose a concern regarding viability for this ESU. Based on consideration of this updated information, Williams et al. (2011) concluded the extinction risk of the CC Chinook salmon ESU has not changed since the last status review which affirmed no change to the determination that the CC Chinook salmon ESU is a threatened species, as previously listed (NMFS 2011), 76 FR 50447). NMFS' previous status review (Williams et al. 2011) discussed the fact that populations that lie between the lower boundary of the Central Valley Fall Chinook salmon ESU (Carquinez Straits) and the southern boundary of CC Chinook salmon ESU (Russian River) were not included in either ESU, despite the fact that Chinook salmon had been reported in several basins. Available genetic evidence indicated fish from the Guadalupe and Napa rivers in San Francisco and San Pablo Bays had close affinity with Central Valley Fall Chinook salmon (Garza et al., unpublished data B; Garza and Pearse 2008a, as cited in Williams et al. 2011), and it was recommended that fish from these two watersheds be included in the Central Valley Fall Chinook ESU. Evidence for fish in Lagunitas Creek was equivocal, with 17 samples assigned almost equally between CC Chinook salmon and Central Valley Fall Chinook salmon. The biological review team in 2011 from SWFSC tentatively concluded that Lagunitas Creek Chinook salmon should be considered part of the CC Chinook salmon ESU pending additional data (Williams et al. 2011). NMFS subsequently indicated that a boundary change was under consideration (76 FR 50447); however, no action has been taken to date. Currently there is no new genetic information that helps resolve this issue (Seghesio and Wilson 2016). This most recent status review of this CC Chinook salmon suggest that spatial gaps between extant populations along the Mendocino coast are not as extensive as previously believed (Seghesio and Wilson 2016). As stated above, this information has not changed the determination that the extinction risk for this ESU remains as threatened (Seghesio and Wilson 2016).

The NMFS's recovery plan (NMFS 2015) for the CC Chinook salmon ESU identified the major threats to recovery. These major threats include channel modification, roads, logging and timber harvesting; water diversions and impoundments; and severe weather. The impacts of these major threats are described in the effects to critical habitat section. New threats to Chinook salmon populations identified since the last status review include poor ocean conditions, drought, and marijuana cultivation (Seghesio and Wilson 2016).

Steelhead

Historically, approximately 70 populations of steelhead existed in the CCC steelhead DPS (Spence et al. 2008). Many of these populations (about 37) were independent, or potentially independent, meaning they had a high likelihood of surviving for 100 years absent anthropogenic impacts (Bjorkstedt et al. 2005). The remaining populations were dependent upon immigration from nearby CCC steelhead DPS populations to ensure their viability (McElhaney et al. 2000, Bjorkstedt et al. 2005).

While historical and present data on abundance are limited, CCC steelhead numbers are substantially reduced from historical levels. A total of 94,000 adult steelhead were estimated to spawn in the rivers of this DPS in the mid-1960's, including 50,000 fish in the Russian River – the largest population within the DPS (Busby et al. 1996). Near the end of the 20th century, McEwan (2001) estimated that the wild steelhead population in the Russian River watershed was between 1,700 and 7,000 fish. Abundance estimates for smaller coastal streams in the DPS indicate low but stable levels, with recent estimates for several streams (Lagunitas, Waddell, Scott, San Vicente, Soquel, and Aptos creeks) of individual run sizes of 500 fish or less (62 FR 43937).

Some loss of genetic diversity has been documented and attributed to previous among-basin transfers of stock and local hatchery production in interior populations in the Russian River (Bjorkstedt et al. 2005). In San Francisco Bay streams, reduced population sizes and habitat fragmentation has likely also led to loss of genetic diversity in these populations. For more detailed information on trends in CCC steelhead abundance, see: Busby et al. 1996, NMFS 1996, Good et al. 2005, and Spence et al. 2008.

CCC steelhead have experienced serious declines in abundance and long-term population trends suggest an adverse growth rate. This indicates the DPSs may not be viable in the long term. DPS populations that historically provided enough steelhead immigrants to support dependent populations may no longer be able to do so, placing dependent populations at increased risk of extirpation. However, because CCC steelhead have maintained a wide distribution throughout the DPS, roughly approximating the known historical distribution, CCC steelhead likely possess a resilience that is likely to slow their decline relative to other salmonid DPSs or ESUs in worse condition. The 2005 status review concluded that steelhead in the CCC steelhead DPS remain "likely to become endangered in the foreseeable future" (Good et al. 2005), a conclusion that was consistent with a previous assessment (Busby et al. 1996) and supported by the most recent NMFS Technical Recovery Team work (Spence et al. 2008). On January 5, 2006, NMFS issued a final determination that the CCC steelhead DPS is a threatened species, as previously listed (71 FR 834).

A status review by Williams et al. (2011) concluded that steelhead in the CCC steelhead DPS remain "likely to become endangered in the foreseeable future" (Williams et al. 2011), which affirmed no change to the determination that the CCC steelhead DPS is a threatened species, as previously listed (NMFS 2011c, 76 FR 76386).

The most recent status review by NMFS (Howe 2016) found that the scarcity of information on steelhead abundance in the CCC DPS continues to make it difficult to assess whether conditions have changed appreciably since the previous status review of Williams et al. (2011), which concluded that the population was likely to become endangered in the foreseeable future. In the North Coastal and Interior strata, steelhead still appear to occur in the majority of watersheds, though in the Russian River basin, the ratio of hatchery fish to natural origin fish returning to spawn remain largely unknown and continues to be a source of concern. New information from 3 years of CMP implementation in the Santa Cruz Mountain stratum indicates that population sizes are perhaps higher than previously thought. However, the downward trend in the Scott Creek population, which has the most robust estimates of abundance, is a source of concern. The status of populations in the two San Francisco Bay diversity strata remains highly uncertain, and it is likely that many populations where historical habitat is now inaccessible due to dams and other passage barriers are at high risk of extinction (Howe 2016).

The NMFS's recovery plan (NMFS 2015) for the CCC steelhead DPS identified the major threats to recovery. These major threats include channel modification, residential and commercial development; roads, and water diversions and impoundments. The impacts of these major threats are described in the effects to critical habitat section.

2.2.3 Critical Habitat

In designating critical habitat, NMFS considers, among other things, the following requirements of the species: 1) space for individual and population growth, and for normal behavior; 2) food, water, air, light, minerals, or other nutritional or physiological requirements; 3) cover or shelter; 4) sites for breeding, reproduction, or rearing offspring; and, generally; and 5) habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of this species (50 CFR 424.12(b)). In addition to these factors, NMFS also focuses on physical and biological features, or PBFs, and/or essential habitat types within the designated area that are essential to conserving the species and that may require special management considerations or protection.

PBFs for CCC steelhead and CC Chinook salmon critical habitat, and their associated essential features within freshwater include:

1. freshwater spawning sites with water quantity and quality conditions and substrate supporting spawning, incubation and larval development;
2. freshwater rearing sites with:
    a. water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility;
    b. water quality and forage supporting juvenile development; and
    c. natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks;
3. freshwater migration corridors free of obstruction and excessive predation with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks

supporting juvenile and adult mobility and survival.

Generally for CC Chinook salmon and CCC steelhead critical habitat the following essential habitat types were identified: 1) juvenile summer and winter rearing areas; 2) juvenile migration corridors; 3) areas for growth and development to adulthood; 4) adult migration corridors; and 5) spawning areas. Within these areas, essential features of critical habitat include adequate: 1) substrate, 2) water quality, 3) water quantity, 4) water temperature, 5) water velocity, 6) cover/shelter, 7) food, 8) riparian vegetation, 9) space, and 10) safe passage conditions (64 FR 24029).

The condition of critical habitat, specifically its ability to provide for their conservation, has been degraded from conditions known to support viable salmonid populations. NMFS has determined that currently depressed population conditions are, in part, the result of the following human-induced factors affecting critical habitat: logging, agriculture, mining, urbanization, stream channelization, dams, wetland loss, and water withdrawals (including unscreened diversions for irrigation). Impacts of concern include altered stream bank and channel morphology, elevated water temperature, lost spawning and rearing habitat, habitat fragmentation, impaired gravel and wood recruitment from upstream sources, degraded water quality, lost riparian vegetation, and increased erosion into streams from upland areas (Weitkamp et al. 1995; Busby et al. 1996; 64 FR 24049; 70 FR 37160; 70 FR 52488). Diversion and storage of river and stream flow has dramatically altered the natural hydrologic cycle in many of the streams within the ESU. Altered flow regimes can delay or preclude migration, dewater aquatic habitat, and strand fish in disconnected pools, while unscreened diversions can entrain juvenile fish.

2.2.4 Additional Threats to Salmonids and Critical Habitat

Global climate change presents an additional potential threat to salmonids and their critical habitats. Impacts from global climate change are already occurring in California. For example, average annual air temperatures, heat extremes, and sea level have all increased in California over the last century (Kadir et al. 2013). Snow melt from the Sierra Nevada Mountains has declined (Kadir et al. 2013). However, total annual precipitation amounts have shown no discernable change (Kadir et al. 2013). Listed salmonids may have already experienced some detrimental impacts from climate change. NMFS believes the impacts on listed salmonids to date are likely fairly minor because natural, and local, climate factors likely still drive most of the climatic conditions steelhead experience, and many of these factors have much less influence on steelhead abundance and distribution than human disturbance across the landscape.

The threat to listed salmonids from global climate change will increase in the future. Modeling of climate change impacts in California suggests that average summer air temperatures are expected to continue to increase (Lindley et al. 2007; Moser et al. 2012). Heat waves are expected to occur more often, and heat wave temperatures are likely to be higher (Hayhoe et al. 2004, Moser et al. 2012; Kadir et al. 2013). Total precipitation in California may decline; critically dry years may increase (Lindley et al. 2007; Schneider 2007; Moser et al. 2012). Wildfires are expected to increase in frequency and magnitude (Westerling et al. 2011, Moser et al. 2012).

For Northern California, most models project heavier and warmer precipitation. Extreme wet and dry periods are projected, increasing the risk of both flooding and droughts (OEHHA 2018). Estimates show that snowmelt contribution to runoff in the Sacramento/San Joaquin Delta may decrease by about 20 percent per decade over the next century (Cloern et al. 2011). Many of these changes are likely to further degrade listed salmonid habitat by, for example, reducing stream flows during the summer and raising summer water temperatures. Estuaries may also experience changes detrimental to salmonids. Estuarine productivity is likely to change based on changes in freshwater flows, nutrient cycling, and sediment amounts (Scavia et al. 2002, Ruggiero et al. 2010). In marine environments, ecosystems and habitats important to juvenile and adult salmonids are likely to experience changes in temperatures, circulation, water chemistry, and food supplies (Brewer and Barry 2008; Feely 2004; Osgood 2008; Turley 2008; Abdul-Aziz et al. 2011; Doney et al. 2012). The projections described above are for the mid to late 21st Century. In shorter time frames, climate conditions not caused by the human addition of carbon dioxide to the atmosphere are more likely to predominate (Cox and Stephenson 2007).

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 this project is the area that will be directly and indirectly impacted by the proposed installation and removal of the Asti summer road crossing. This includes the bank to bank width of the Russian River at the Asti summer road crossing site, extending upstream approximately 500 feet and two miles downstream. The action area is extended two miles downstream based on observations made by a NMFS biologist during the installation of similar crossings (Jahn, NMFS, personal observation, May 2002). Based on NMFS assessment from past site visits, turbidity associated with the project may extend downstream up to two miles during installation. This is a conservative estimate because it is based on observations made during installation at similar crossing where the material used for the roadway had a high percentage of fine sand size sediment. The action area is extended upstream approximately 500 feet due to the potential disturbances caused by the heavy equipment and disturbances to the wetted channel, which may cause fish to move upstream.

The action area is within the Alexander Valley reach of the Russian River and is located at river mile 58. The Russian River channel at the project site is approximately 570 feet top of bank to top of bank with gravel bars in the channel. The land use around the project site is a combination of rural residential and vineyards, and there is an instream gravel mining operation upstream to the north of the site. The upland areas immediately to the east side of the river are predominately foothill oak woodland, chaparral and north coast forest used as rangeland, with numerous five acre parcel newer home developments scattered across the foothills.

The action area is within the Alexander Valley reach of the Russian River, which is located in the middle of the Russian River Basin. A large percentage of Russian River Chinook salmon smolts and adults migrate through the action area, with spawning occurring within the action

area in the late fall and early winter. Russian River steelhead adults, smolts and juveniles also migrate through, spawn, or rear in the action area.

2.4. Environmental Baseline

The "environmental baseline" refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultations, and the impact of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline (50 CFR 402.02).

2.4.1 Status of Listed Species and Critical Habitat in the Action Area

Salmonid abundance and trends within the action area are dependent upon multiple factors that affect salmonid populations within the Russian River Basin. In the Russian River Basin, extensive habitat degradation and decreased carrying capacity, a long history of artificial propagation with the use of non-native stocks, and recent droughts and poor ocean conditions are among explanations for the current low abundance of salmonids (Weitkamp et al. 1995). Logging, agriculture and mining activities, urbanization, stream channelization, dams, wetland loss, water withdrawals and unscreened diversions for irrigation have contributed to the decline of salmonids within the Russian River Basin. These land use activities have altered streambank and channel morphology, stream temperatures, spawning and rearing habitats, connectivity of habitats, and recruitment of large organic debris and spawning gravels.

Historically, the Russian River contained four anadromous salmonid species: Chinook salmon, coho salmon, pink salmon (*Oncorhynchus gorbuscha*), and steelhead (Moyle 1976). As with other river basins on the west coast, the Russian River has seen salmonid populations plummet (Nehlsen et al. 1991). The combined anadromous fish returns originally numbered in the tens of thousands, but since the settlement of the Russian River in the 1850's, fish resources have suffered (SEC 1996). The impacts identified above are directly or indirectly responsible for the current status of Russian River salmonids. Comprehensive surveys have never been conducted in the Russian River Basin to allow quantification of the historic decline of salmonids or to accurately track recent population trends (SEC 1996). Surrogates for abundance have been used, but are of limited accuracy and were based primarily on anecdotal information or habitat quality. Therefore, uncertainty as to the status of these species remain.

Chinook Salmon

The Russian River is the southernmost extent of the range for CC Chinook salmon ESU (64 FR 50394). The biological review team that reported on the status of the species felt these southern populations represented a considerable portion of the genetic and ecological diversity within the

ESU (Myers et al. 1998). They also concluded that the California Coastal ESU is likely to become at risk for extinction in the foreseeable future (Myers et al.1998).

Steiner Environmental Consulting (SEC) (1996) reported that there were no Chinook salmon population estimates until the 1960's, and by that time the returns appeared strongly associated with periods of sustained hatchery supplementation. Estimated Chinook salmon escapement was 1,000 in 1966 (CDFG 1966 as cited in SEC1996) and 500 in 1982 (Corps 1982). SEC (1996) reported that despite heavy planting in Dry Creek during the 1980's, a viable Chinook salmon run was not established. Returns to Warm Springs Dam from 1980 to 1996 ranged between zero and 304, with the biggest count in 1988. Hatchery supplementation was finally terminated in 1996.

Since 2000, the Sonoma County Water Agency (SCWA) has conducted annual counts of CC Chinook salmon moving past the Mirabel Dam water diversion facility located approximately 36 miles downstream from the proposed project. Between 2000 and 2013, the average number of adult Chinook salmon counted at Mirabel Dam was 3,283 fish, and in 2012, 6,697 adult Chinook salmon were counted at the station which was the highest total counted to date (NMFS 2016a). No data was obtained for 2014 and 2015. Between 2016 and 2019, the average number of adult Chinook salmon counted was 1320. In 2019, 909 adult Chinook salmon were counted, the lowest total since counting began (SCWA, 2020). These data suggest a decrease in adult escapement in the past 20 years.

Genetic diversity is an important measure of viability as well. Genetic analysis of Russian River Chinook salmon suggests they are not closely related to either the nearby Eel River or Central Valley Chinook salmon, and likely evolved as part of a diverse group of native coastal populations (Hedgecock 2002). A history of hatchery stocking, however, has likely had some effect on genetic diversity (Bjorkstedt et al. 2006, Chase et al. 2007).

The Russian River is the largest watershed in the CC Chinook Central Coastal Diversity Stratum and likely has the largest population. This population is also at the southern extent of the species range. Its extinction would therefore constitute a substantial range restriction, the loss of the largest population in the stratum, and probably the loss of a unique genetic component of the ESU. For these reasons, the survival and recovery of the Russian River population of CC Chinook is critical to the conservation of the ESU as a whole.

Steelhead

Russian River steelhead runs once ranked as the third largest in California behind the Klamath and Sacramento rivers. The Russian River was renowned as one of the world's finest steelhead rivers during the 1930's and on through the 1950's (SEC 1996). SEC (1996) reported historic Russian River catch estimates for steelhead: l 5,000 for the 1936 sport catch, and 25,000 for the 1956/57 sport catch. These estimates are based on best professional judgment by a CDFG employee and, for the latter estimate, a sportswriter. Other estimates include one of 57,000 steelhead made in 1957 (SEC 1996). Assuming the characterization of the Russian River as the third largest steelhead stream in California in the mid-20th Century is reasonable; the estimates above are likely roughly accurate, indicating tens of thousands of steelhead inhabited the Russian

River in the early and mid-20th Century. Since the mid-20th Century, Russian River steelhead populations have declined. Estimates based on best professional judgment infer a wild run of 1,750- 7,000 fish near the end of the 20th Century (Busby 1996). Hatchery returns averaged 6,760 fish for the period 1992/93 to 2006/07, and ranged from 2,200 to 11,828 fish. The available information suggests that recent basin-wide abundance of wild steelhead has declined considerably from historic levels. A limited catch-and-release/hatchery sport fishery still offers a fishing season for hatchery steelhead in the Russian River.

The main factors responsible for the declines in species abundance are water diversions, dams, and other habitat alterations. For example, the construction of Coyote Valley Darn blocked access to the East Fork of the Russian River and its tributaries. These areas contained some of the best spawning and rearing areas in the basin (SEC 1996).

Reproduction of the Russian River steelhead population is primarily dependent on tributary spawning outside the action area. Steelhead also spawn and rear in the mainstem, but in very low numbers. Degraded rearing habitat and low densities indicate the mainstem within the action area is not currently capable of supporting large numbers of rearing juvenile steelhead. The mainstem throughout the action area and downstream has moderate to low quality summer rearing habitat due to elevated stream temperatures, but is used by outmigrating smolts on their way to the Pacific Ocean.

While the steelhead population has declined dramatically in the Russian River over the past several decades, its current numbers, distribution, and diverse use of habitat will likely provide much stronger resistance to environmental and anthropogenic perturbation when compared to Chinook salmon. However, no information exists that demonstrates that the decline in the Russian River steelhead or the population has stabilized.

Hatchery practices have also affected natural steelhead populations within the action area. Since the1870's, millions of hatchery-reared salmonids have been released into the Russian River Basin. The combination of planting out-of-basin stocks, hatchery selecting processes, and interbreeding have led to a decrease in salmonid genetic diversity and loss of local adaptations (SEC 1996). There are two fish production facilities in operation within the Russian River Basin: Don Clausen Fish Hatchery (operational in 1980) and Coyote Valley Fish Facility. Both facilities are owned by the Corps and operated under contract by the California Department of Fish and Wildlife. The Coyote Valley Fish Facility, located upstream of the action area primarily produces and releases steelhead which have the potential to effect naturally produced steelhead within the action area.

2.4.2 Salmonid Critical Habitat within the Action Area

Salmonid habitat quality in the Russian River and within the action area are primarily related to water quality and quantity, availability of clean spawning gravel and spawning areas, and access to important spawning and rearing areas. Much of the mainstem Russian River channel and riparian habitats have been degraded by the effects of urbanization and agricultural development. Urbanization and agriculture have degraded designated salmonid critical habitat through stream channelization, floodplain drainage, and damage to riparian vegetation (Botkin et al. 1995).

The functioning of salmonid habitat within the mainstem Russian River has also been compromised by changes in flow, sediment routing and temperature resulting from dams and diversions since 1922 with the completion of Scott Dam on the upper Eel River. The overall change in the natural flow regime in the mainstem continues to impact summer salmonid rearing conditions and survival (SEC1996).

Lake Mendocino, upstream of the action area, provides cool water to the upper reach of the river between Ukiah and Hopland. Below Cloverdale and within the action area, the Russian River warms to temperatures stressful to salmonids. According to SEC (1996) pool stratification in the mainstem Russian River is impacted by summer releases from Coyote Valley which is located upstream of the action area. Summer releases are 15-20 times the amount of pre-regulated flows in the mainstem Russian River with flows generally exceeding 125 cfs resulting in marginal quality summer rearing habitat. Increased flows in the Russian River have created habitat conditions more favorable to introduced and native warmwater fish species such as Sacramento pikeminnow, bluegill, largemouth bass, smallmouth bass and striped bass. Thus channel simplification and increased summer flow has decreased the value of salmonid rearing habitat within the action area. However, as a result of the Biological Opinion issued by NMFS (September 24, 2008) the SCWA is now petitioning the State Water Resources Control Board to reduce summer releases from Coyote Dam, and future years will likely see reduced summer flow in the upper Russian River.

Habitat conditions within the action area are generally poor and are not anticipated to improve in the immediate future. Salmonid rearing habitat in this area of the mainstem Russian River below Cloverdale is marginal; primarily due to elevated stream temperatures, fine sediment loading and the abundance of warm-water predator fish species. Overwinter and outmigration habitat conditions are also poor because the main stem channel lacks habitat complexity and velocity refuge and carries an un-naturally high fine sediment load (Ritter and Brown 1971, CDFG 2002).

Given that streamflow and temperatures for salmonids the action area is currently stressed during the hot summer months, we also rely on information from section 2.2.4 with respect to the broader climatic variables influencing the current condition of habitat in the action area. Variables such as air temperature, wind patterns, and precipitation are likely influencing localized environmental conditions, such as water temperature, stream flow, and food availability. These local environmental conditions can affect the biology of listed species and the functioning of critical habitat and its value for conservation. The combination of climate change effects and effects of past and current human activities on local environmental conditions further reduce the current condition of available habitat for salmonids in the Russian River.

2.4.3 Previous Section 7 Consultations in the Action Area

With respect to the specific proposed project, a previous Section 7 consultation has been in place for the Asti Summer crossing since 2003, and a 10-year BO was issued by NMFS in June of 2009.

2.5. Effects of the Action

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

2.5.1 Effects of Installation and Crossing Removal

The annual construction of summer crossing may adversely affect the Chinook salmon and steelhead and their critical habitat. The Sonoma County DTPW has proposed five possible bridge configuration over the permit period. The following effects analysis considers the various construction scenarios due to the potential changes in river channel alignment. Potential direct effects of the project could include mortality of juvenile fish when gravel is pushed into the flowing river and if it is necessary for construction equipment to be "walked" thru the flowing waters. Salmonids may be also displaced and then subject to increased predation during project activities. Increases in turbidity and noise from construction equipment may result in behavior modifications that result in short-term behavioral changes of individual fish, reduced feeding and greater intra and/or inter-species competition within the action area.

Indirect effects associated with the project include potential runoff from the road approaches to the crossing and from dust palliatives used for dust control on the road surface of the crossing. Indirect effects from scraping gravel bars has the potential to impact salmonid habitat physical or biological features (PBFs).

Construction timing is designed to avoid most salmonid lifestages that utilize the action area. The work window of June 15 (with approval May 15) to November 15 each year is expected to avoid effects to redds (nest sites), juveniles and spawning adult fish. During the construction of the crossing in late spring, there is the potential for juvenile Chinook salmon and steelhead to be in the action area. In addition to the work window, AMMs have been proposed by the applicant to minimize or avoid adverse effects of construction to ESA listed salmonids, designated critical habitat and EFH for species of salmon.

Operation of Heavy Equipment and Placement of Gravel

The placement of gravel into the flowing water of the Russian River with heavy equipment has the potential to harm or kill individual salmon and/or steelhead that occupy the area and seek refuge in the substrate interstices in response to the disturbance. Cover is an important habitat component for juvenile salmonids and smolts, both as velocity refuge and as a means of avoiding predation (Shirvell 1990; Meehan and Bjornn 1991; Moyle 2002). Salmonid juveniles will balance their use of cover and foraging habitats based on their competing needs for energy acquisition and safety (Bradford and Higgins 2001). Critical forms of cover include submerged vegetation, woody debris, and the interstitial spaces of stream bed gravel substrate (Raleigh et al.

1984). Steelhead juveniles will respond to threats of predation, including overhead motions, by huddling together and/or fleeing to nearby cover (Bugert and Bjornn 1991). Few young-of-the-year are found more than one meter from cover (Raleigh el al. 1984). Juvenile steelhead, pai1icularly the younger, smaller individuals, have a notably docile response to disturbance; they rely on nearby substrate particles (i.e. gravel) for cover more so than other salmonids (Chapman and Bjornn 1969; Wesche 1974; Everest and Chapman 1972). Larger juvenile salmonids and smolts are less prone to crushing; they will likely flee the area because the substrate size is not large enough to provide cover for them. However, these juveniles and smolts could flee into areas of higher predator concentration or lower quality instream habitat.

Given the likely behavioral response of young-of-the-year salmonids to heavy equipment and gravel placement in the wetted channel, smaller juvenile salmonids may be injured or killed as they seek cover in the substrate gravel. Larger juvenile salmonids, including smolts, may be forced out of their rearing or holding areas to either downstream or upstream of the crossing to lower quality instream habitat and may suffer an increased risk of predation and increased competition for food resources. It is anticipated that the placement of gravel into the wetted river channel could disturb, displace, injure or kill a small number of juvenile salmonids and smolts in the vicinity of the project area. Due to the timing of installation, NMFS expects low densities of juvenile salmonids and smolts to be present within the small area to be filled, and therefore minimal mortality is anticipated to result from placing gravel into the flowing water. Additionally, a qualified fisheries biologist will use passive (sweeps with block-netting) and active methods (electrofishing will only be used in the event the river must be re-routed, and a longer stretch of river will be dewatered) to remove all salmonids from any wetted areas prior to being filled with gravel to create the roadway.

Effects of Fish Relocation

The proposed action calls for the clearing by herding and or active removal and relocation of all fish present in the immediate area prior to the installation of gravel, or for one of the various crossings that may be constructed. This fish relocation strategy will may have some negative effect on relocated individuals, and potentially on juveniles rearing in areas where relocated fish are released.

Any fish collecting or relocation gear, whether be passive (Hubert 1983) or active (Hayes 1983) has some associated risk to the fish, including stress, disease transmission, injury, or death. Based on NMFS prior experience with current relocation techniques and protocols to be used to conduct the fish clearing and /or relocation, unintentional mortality of listed juvenile salmonids expected from capture and handling procedures is not likely to exceed 3 percent of the fish subjected to harassment or handling, and can be reduced to near one percent or less with increased skill and experience of the operator. The long-term effects of clearing fish from an area or of handling, on both juveniles and adult salmonids are not well understood. Although chronic or post effects may occur if fish are injured, NMFS assumes that most impacts from fish clearing by herding and active relocation methods occur at the time of operation.

The areas to be filled with gravel each year will vary depending on the construction scenario that is needed for that season. The area needed to be filled will depend on channel conditions

following each winter's storm events. Because channel conditions are expected to vary somewhat after winter storms during the life of the Corps' permit, we cannot precisely determine how much backwater area of the river will need to be filled each year and cleared of fish prior to the gravel installation each year. Therefore, in order to avoid underestimating the impact, we will assume that not more than 100 lineal feet where gravel will be installed each year. Past observations by NMFS have indicated no juvenile salmonids are present in the shallow areas that will be filled by gravel placement.

The herding or placement of relocated fish into nearby habitats that are already occupied by juvenile steelhead may result in some displacement of those steelhead into less desirable habitats. This may increase their risk of predation, and may cause them to experience greater stress from increased competition, less suitable stream temperatures, less cover or other factors. However, once the stream crossings have been installed, displaced individuals may relocate to the stream crossing area. Therefore, no lasting adverse effects such as reduced feeding, or loss of rearing space is likely to reduce the survival chances of individual fish.

Effects of Increased Turbidity

The onsite gravel in the lower Russian River has a high sediment composition, making it likely to cause high levels of turbidity within the river during in-water construction. High levels of turbidity can reduce salmonid feeding efficiency, decrease food availability by smothering and killing aquatic organisms that salmonids feed on, reduce dissolved oxygen in the water column, result in reduced respiratory functions, and reduce tolerance to diseases and cause fish mortality.

Research with salmonids has shown that high turbidity concentrations can: reduce feeding efficiency, decrease food availability, reduce dissolved oxygen in the water column, result in reduced respiratory functions, reduce tolerance to diseases and can also cause fish mortality (Berg and Northcote 1985; Gregory and Northcote 1993; Velagic 1995; Waters 1995). Mortality of very young coho salmon and steelhead fry due to increased turbidity has been reported by Sigler et al. (1984). Even small pulses of forbid water will cause salmonids to disperse from established territories (Waters 1995), which can displace fish into less suitable habitat and/or increase competition, thus reducing fitness of individual fish, which along with increasing predation risks, decrease chances of survival.

To decrease the impacts of turbidity associated with project construction in flowing water, only imported, clean, river-run gravel will be used for base construction of the summer crossing. The clean gravel will be used to a height of at least two feet above water level to ensure water is only in contact with the clean gravel. Turbidity will be monitored when gravel is placed in flowing water to build the road base. Monitoring from previous years show that the turbidity peaks and falls back within a normal range after two to six hours, or less of installation (Sonoma County 2020). Turbidity monitoring by a Sonoma County downstream of the crossing prior to, during, and after the input of gavel into the flowing water in June of 2019. NTU levels rose from 6NTUs to 30 NTUs immediately upon placing gravel into the channel. However, the levels dropped below initial baseline to 6 NTU 30 minutes later.

Based on the effects described above, it is anticipated that salmonid smolts and rearing juvenile salmonids downstream of the crossing may be affected by a short-term increase in turbidity caused during the placement of gravel into flowing or standing water, or when a new channel is connected above a channel to be abandoned. This pulse of turbidity may cause fish to move downstream or upstream of the crossing to avoid the turbidity. The short-term pulse of increased turbidity is not anticipated to reach lethal levels. The pulse of increased turbidity may result in juvenile salmonids and smolts temporarily vacating preferred habitat areas and/or temporarily reducing their feeding efficiency. These behavioral modifications will likely result in less fitness of individual fish due to occupation of less suitable habitat, reduced feeding, and potentially greater intra and interspecific competition, which, along with increased predation risks, will result in a minor reduction in survival rates. Due to the timing of the installation, only very low numbers of juvenile salmonids and smolts are anticipated to be affected.

Removal of the Summer Crossing

The removal date of November 1 has the potential to affect adult CC Chinook salmon and rearing juvenile steelhead that are within the action area. Monitoring by SCWA at the seasonal Mirabel Dam downstream of the action area has indicated that adult Chinook salmon migration begins in mid-August and increases in October with a peak of migration usually occurring in November (S. Chase, et al. 2007).

The action area is within the Alexander Valley reach of the Russian River. The Alexander Valley reach supports some of the highest observed densities of Chinook salmon spawning in the Russian River (D. Halligan, Natural Resource Management Corporation, pers. comm., 2002). Therefore, it is anticipated that in some years large numbers of adult Chinook salmon may be within the action area during the removal of the crossing. Juvenile and adult steelhead may also be within the action area during the removal of the crossing.

In the event that the official CDF fire season is extended after November 1, the Corps permit will allow the crossing to remain until November 15 if the County petitions NMFS and the Corps for an extension. The extension would be expected to occur due to dry conditions and the lack of rain. Since adult Chinook salmon migration and spawning activity is mostly correlated with increased flows as a result of rain, only a small number of additional adult Chinook salmon would be anticipated to be present compared to November 1 during a dry year. According to PRMD, extensions of the CDF fire season after November 1 are rare, but do occasionally occur (J. Ford, County of Sonoma PRMD, pers. comm., April 2021).

Removal of the crossing will not require any instream work. Gravel that is within the low flow channel will be primarily removed to an elevation of two feet above the water surface to minimize turbidity. High winter flows will disperse the remaining gravel downstream for future spawning gravel. During gravel removal, minimal amounts of gravel may unintentionally fall into the water. The amount of gravel that does fall into the water during removal is anticipated to cause a localized temporary increase in turbidity near the crossing, and it is not anticipated to crush any fish. However, the behavior of rearing steelhead and adult Chinook salmon may be temporarily modified by the increase in turbidity and by the noise and vibrations of the heavy equipment used during gravel removal and associated grading activities (discussed below).

This may cause fish to move downstream or upstream of the crossing to avoid the turbidity and noise. Since removal will only affect the immediate area at each crossing, the effects to salmonids are anticipated to be minor and short-term and are unlikely to result in permanent reduction in the fitness of individual fish or reduced reproductive success.

During removal of the crossing, a small portion of the gravel is stockpiled for the next year and the remainder is redistributed to the areas where the gravel was initially skimmed during installation. The gravel roadway outside of the flowing water but within the active channel will be graded out with a large bulldozer to approximate the pre-construction contour. The remaining gravel will then be redistributed throughout the areas where it was initially skimmed and will be regraded to a smooth grade similar to the contours of the adjacent gravel bars. These areas will be graded to slope toward the low flow channel and will be left free of holes and depressions that may trap fish upon increases in flow. A minimum ten-foot buffer area will be maintained between the redistribution sites and the wetted channel. This will decrease noise and vibration disturbances caused by the heavy equipment.

Turbidity from the disturbed areas is likely to be minimal due to the fact that gravel is redistributed on the dry gravel bars prior to increased flows and the grain sizes of the fine particles are mostly sand sized and greater; rather than the silt and clay particles associated with turbid conditions. What is generated would be difficult to distinguish from the existing turbidity of floodwaters during storm events. Post project turbidity generated from the removal of the crossing is not expect to result in adverse effects to salmonids during winter storm events when project gravel areas are inundated with flood waters.

Toxic Chemicals

Heavy construction equipment will be utilized during both the installation and removal of the crossing. Oils and similar substances from construction equipment can contain a wide variety of hydrocarbons, some of which evaporate rapidly while others sorb to sediments and may persist for long periods of time. These polynuclear aromatic hydrocarbons (PAHs) can prove harmful to benthic communities (EPA 1993) which are a salmonid food source. In a study conducted by Pitt et al. 1995 (reviewed in EPA 1999), 50 percent of samples from parking areas were found to be highly or moderately toxic, 67 percent of samples from streets were found to be moderately toxic and 34 percent of samples from landscaped areas were found to be highly or moderately toxic.

Some of the identified chronic toxicity effects to benthic inve1iebrates in the study are decreased growth and respiration rates. Construction equipment utilized for the proposed action has the potential to leak toxic chemicals, including metals and petroleum hydrocarbons, into the riverbed and banks. Fluid leaking from construction equipment can also contain metals, which do not degrade in the environment. Some metals (e.g., mercury, cadmium, lead, chromium) bioaccumulate in aquatic organisms inhabiting metals contaminated environments. Some of the sub-lethal effects that metals can cause in salmonids include immobilization and impaired locomotion, reduced growth. reduced reproduction, elevated oxygen consumption, genetic damage, impaired metabolism, alteration of gill tissue structure, tumors and lesions,

developmental abnormalities, behavior changes (avoidance), immunosuppression (decreased resistance to bacterial infection), and impairment of olfactory and brain functions (Eisler 2000).

During installation and removal, equipment refueling, fluid leakage and maintenance activities within the river channel pose some risk of contamination and potential take. To minimize this risk, it is proposed that no motorized equipment will be left within the river channel (top of bank to top of bank) overnight unless absorbent material is placed under the equipment to contain any leaking fluids. However, this does not completely minimize all the risks. Fluid leakage can occur during operation, refueling and during maintenance activities. There is a potential for leakage of toxic chemicals to occur during installation and removal of the crossing that may have the potential to affect salmonids. Most of the work would occur at least ten feet from the wetted channel, which reduces the chance that toxic chemicals would be released in the flowing water. If there is a leak, NMFS anticipates that it can be contained prior to entering the flowing water, making it unlikely that salmonids will be adversely affected. Additionally, roadway materials which may have come into contact with contaminants through the summer season (leakage from automobiles, for example) will be removed from the channel when the upper portion of the roadway is removed before winter rains occur, preventing their contact with the flowing waters of the Russian River.

Although the proposed project addresses the potential run-off from the construction of the new bridge, post construction storm water AMMs were not proposed as part of the project to address water quality concerns associated with road projects as detailed by numerous sources such as the California State Water Resources Control Board (CSWRCB). The CSWRCB has issued a storm water permit for Caltrans, which includes background information from a recent publication that identifies a degradation product of tires as the causal factor in salmonid mortalities at concentrations of less than a part per billion (Tian et al., 2020). This contaminant is widely used by multiple tire manufacturers and the tire shreds that produce it have been found to be ubiquitous where both rural and urban roadways drain into waterways (Sutton et al., 2019). Previous published work first focused on identifying the issue and determining the cause of observed mortalities of adult coho salmon in the wild (Scholz et al., 2011) and then showed mortality to juvenile coho salmon in laboratory settings (Chow et al., 2019). More recent examinations of juvenile steelhead and Chinook salmon by NMFS Northwest Fisheries Science Center and partners also indicates mortality of up to 40% for steelhead and up to 10% for Chinook (Tian et al., 2020). The presence of steelhead will likely coincide with the rainy season that may bring them into contact with contaminants from the bridge and roadway. Therefore, run-off from road approaches to the summer crossing are likely to deliver tire shreds to Russian River, which may result in adverse effects to salmonids within the action area. Mortality of salmonids is expected to be low due to proper drainage of road approaches that will be implemented by Sonoma County DTPW during removal of the crossing (J. Ford, Sonoma County PRMD, personal communication, April 2021).

2.5.2 Critical Habitat Effects

The action area is designated critical habitat for CC Chinook and CCC steelhead. In general, PBFs of critical habitat for both steelhead and salmon found within the action area include sites for migration, spawning, and rearing (see section 2.4). Effects of the Project on designated

critical habitat include temporary disturbance to the streambed and gravel bar areas, temporary increases in turbidity and minor alteration of flow from dewatering.

Regarding effects to critical habitat from project site dewatering, for the same reasons described above for juvenile salmonids, adverse effects to salmonid critical habitat PBFs are expected to be temporary, insignificant, and will recover relatively quickly once the construction of the summer crossing is complete. Similarly, for reasons described above for juvenile salmonids, turbidity levels from suspended sediment are expected temporary and have minor effects to the value of critical habitat in the action area. Based on the size of the area to be dewatered for the instream construction activities, their will a reduction in available wetted habitat during specific project construction activities (gravel placement and in-water equipment work) which may require a few days to complete depending on the requested start date, which could be as early as May 15, with resource agency agreement. Stream area where in-water work or gravel placement take place will make salmonid critical habitat unavailable during construction periods. The action area has low suitability during most years due to unfavorable stream temperatures, but is a migration area for salmonid juveniles and limited rearing during the installation of the crossing in late May or early June. Construction methods and minimization measures will ensure that the majority of flowing portion of the Russian River is unaffected and available for salmonids to migrate and survive during the summer crossing placement and removal.

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).

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 CCC steelhead DPS is at a moderate risk of extinction. As with other salmonid species, steelhead populations have declined significantly. There is substantial fragmentation in their distribution associated with the intense urbanization pressures in and around the San Francisco bay area. However, the CCC steelhead have maintained higher numbers relative to other salmonids, and continue to utilize a wider range of habitat conditions. Their populations in coastal watersheds are widespread and fairly abundant. These conditions suggest steelhead may have a greater resilience to pertubation than other salmonids.

The CC Chinook salmon ESU is at a moderate risk of extinction. While CC Chinook salmon have suffered substantial reductions in abundance and face many challenges to their successful reproduction, they have maintained a wide distribution and have had some positive return rates in recent years. This suggests that the threat of extinction for this species remains present; however, it is not imminent. Although the annual installation and removal of the summer crossing at Asti will likely have some adverse effect on rearing habitats for Chinook salmon, these effects will probably be minor because each year, proposed activities will affect only a small portion (less than 2 miles) of the 94-mile long main stem Russian River. This 94-mile segment effectively supports rearing habitat for juvenile Chinook salmon along its entire length and spawning along the approximately 58-mile segment upstream from Healdsburg.

The majority of production for upper Russian River populations of Chinook salmon and steelhead occurs upstream of the action. All salmonid adults and smolts must pass through the action area from the upper Russian River when migrating to or from the ocean. The majority of these fish migrate through the action area outside of the May 15 to November 15 summer crossing installation, use, and removal period. However, the timing of the projects will overlap with late outmigrating juvenile salmonids in some years, and will overlap with the beginning of upstream adult Chinook salmon migration. The majority of adult fish that may experience behavioral modifications from the crossing removal during the fall are expected to be adult Chinook salmon.

Low numbers of juvenile steelhead and salmon smolts (migrating downstream) may be present in the action area during the project installation (May 15 to June 15). Therefore, Chinook salmon adults and smolts and juvenile steelhead and smolts are expected to be affected by the proposed action. A small number of rearing steelhead fry or juveniles may be affected by fish relocation activities, when gravel is pushed into standing or flowing water, or heavy equipment is used in the wetted channel during the installation of the summer crossing. The majority of juvenile fish affected are expected to be young-of-the-year steelhead, which may be injured during fish relocation or crushed while taking refuge in the interstices of the substrate. In addition, juveniles and smolts may experience reduced feeding rates, occupation of less suitable habitat, and potentially greater intra and/or inter-species competition for a short period (hours during a few days) during the installation of the crossing. These effects are not expected to reduce fitness of individual fish, but may potentially increase predation risks, resulting in a minor reduction in survival rates.

Habitat changes resulting from this project is limited to a small area (.08 acres of wetted, and 2.5 acres of dry channel) in relation to the size of the mainstem Russian River channel. Based on

habitat conditions within the action area, proposed timing of the project, and proposed AMMs, the effects of the project are not likely to appreciably reduce the numbers, distribution or reproduction of CC Chinook salmon or CCC steelhead and are not likely to diminish the value of designated critical habitat for these species in the Russian River. Thus, appreciable reductions in the likelihood of survival and recovery of these populations, or the ESU/DPS, are not expected and the value of designated critical habitat is not likely to be diminished.

2.8. Conclusion

After reviewing and analyzing the current status of the listed species and critical habitat, the environmental baseline within the action area, the effects of the proposed action, the effects of other activities caused by the proposed action, and cumulative effects, it is NMFS' biological opinion that the proposed action is not likely to jeopardize the continued existence of CCC steelhead and is not likely to destroy or adversely modify its designated critical habitat.

After reviewing and analyzing the current status of the listed species and critical habitat, the environmental baseline within the action area, the effects of the proposed action, the effects of other activities caused by the proposed action, and cumulative effects, it is NMFS' biological opinion that the proposed action is not likely to jeopardize the continued existence of CC Chinook and is not likely to destroy or adversely modify its designated critical habitat.

2.9. Incidental Take Statement

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

2.9.1. Amount or Extent of Take

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

The annual installation and removal of the summer crossing over the Russian River at Asti by the Sonoma County DTPW, as permitted by the Corps for a total of 11 years is expected to result in incidental take of federally threatened CC Chinook and CCC steelhead. A small number of these salmonids may be herded with block-nets, collected and relocated or crushed when gravel is put

into the flowing water of the Russian River, or may become stranded in areas that get dewatered. These activities could result in injury or minimal mortality of a low number of Chinook salmon smolts, steelhead smolts, and rearing juvenile steelhead. Adult and juvenile salmonids in the action area may be displaced and suffer an increased risk of predation, and may experience behavioral modifications caused by the increase in turbidity and by the noise and vibrations of the heavy equipment used during installation and removal of each crossing. These behavioral modifications will likely result in less fitness of individual fish due to occupation of less suitable habitat, reduced feeding, and potentially greater intra and/or inter-species competition which, along with increased predation risks which may result in a minor reduction in survival rates.

The number of Chinook salmon and steelhead that may he incidentally taken during project activities is expected to be a low number of individual salmonids, but cannot be accurately quantified because (1) the number of fish that may be present is likely low in number but is unknown; (2) the precise number of fish that may be herded, crushed, or stranded, although small, is unknown; and (3) the number of fish that may be displaced or undergo other behavioral modifications due to the temporary turbidity plume is likely low, but unknown. In instances where NMFS cannot precisely determine the number of listed salmonids incidentally taken, surrogates such as the extent of habitat affected or modified by the proposed action are used.

Therefore, incidental take is limited to minimal mortality and harm associated with the installation of the Asti summer crossing. During the June 15 (May 15 with agency approval) installation of the crossing, all salmonids present in the action area may be harassed or harmed by project activities. Incidental take which results in mortality is limited to the juvenile Chinook salmon and steelhead which may take refuge in the interstitial spaces of the substrate in area where gravel will be pushed into standing or flowing water, or in the area where heavy equipment is operated in flowing water. Small numbers of juvenile fish may also be injured or killed during herding, collecting or relocation activities. NMFS expects that no more than 3 percent of juvenile Chinook salmon and steelhead within the dewatered dewatering areas to be injured, harmed, or killed during fish relocation and dewatering activities. If more than 3 percent of the total number juvenile salmonids captured are harmed or killed, incidental take will have been exceeded.

Incidental take from a temporary turbidity plume which results in behavioral modifications is limited to juvenile salmonids occupying habitat 2 miles downstream during the period of installation, which may result in a minor reduction in survival rates. For adult Chinook salmon, minor harassment is expected during removal of the crossing, no harm or lethal take is anticipated. Incidental take will be exceeded if the project AMMs are not implemented as proposed to reduce turbidity or these effects persist downstream from the project beyond 2 miles.

In addition, low numbers of CC Chinook and CCC steelhead within the action area may be incidentally taken due to stormwater run-off delivered to the Russian River from the road approaches to the summer crossing. Mortalities associated with stormwater runoff are unquantifiable, but are expected to be extremely low due to measures implement by the applicant to divert run-off to vegetated areas outside of the active channel of the river.

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

NMFS believes the following reasonable and prudent measures are necessary and appropriate to minimize take of CC Chinook salmon and CCC steelhead:

1. Measures shall be taken to minimize the amount or extent of incidental take resulting from the installation and removal of the summer crossing.

2. Implement measures to reduce direct delivery of contaminants from fuel leaks or run-off from road approaches from being delivered into the river.

3. Ensure completion of a monitoring and reporting program to confirm that the take exemption for the proposed action is not exceeded, and that the terms and conditions in this ITS are effective in minimizing incidental take.

2.9.4. Terms and Conditions

The terms and conditions described below are non-discretionary, and the Corps and the Sonoma County DTPW must comply with them in order to implement the RPMs (50 CFR 402.14). The Corps and the Sonoma County DTPW 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.

The following terms and conditions implement reasonable and prudent measure 1:

1. The applicant shall retain a qualified biologist with expertise in the areas of salmonid and steelhead biology, behavior, habitat relationships; and biological monitoring. The applicant shall ensure that all fisheries biologists working on this project be qualified to monitor fish presence and behavior in a manner which minimizes all potential risks to ESA-listed Chinook salmon and steelhead.

2. The fisheries biologist shall monitor the construction site during placement and removal of the summer crossing to ensure that any adverse effects to Chinook salmon and steelhead are minimized. The biologist shall be on-site during all construction events to

ensure that all ESA-listed fish are avoided to the maximum extent practicable and any use of seining or block-nets is in accordance with BMPs developed to minimize potential harmful effects or mortality.

The following terms and conditions implement reasonable and prudent measure 2:

1. Construction equipment used within the river channel will be checked each day prior to work within the river channel (top of bank to top of bank) and, if necessary, action will be taken to prevent fluid leaks. If leaks occur during work in the channel, the County or their contractors will contain the spill and removed the affected soils.

2. Only non-petroleum based dust palliatives will be used during the summer crossing installation and removal.

3. The Sonoma County DTPW must implement measures to minimize road-generated run-off to the Russian River by diverting road surface flow to vegetated areas between the road and the stream channel.

The following terms and conditions implement reasonable and prudent measure 3:

1. In order to monitor the impact of incidental take, the Corps or the County of Sonoma must notify the NMFS Santa Rosa Office by letter or email within 30 days after project completion and describe in detail any incidental take that occurred during the project. This shall include the species taken, date taken, type of take (injury or mortality), number taken, and fork length of any mortalities.

2. The applicant will prepare an implementation monitoring report for the first three years following the project and submit to NMFS annually by January 1. The monitoring report should include the following:

    a) Project identification;
    b) Permittee name, permit number, and project name;
    c) Corps and County contact persons;
    d) Start and end dates of installation and removal activities;
    e) Summary of habitat conditions – Include photos (including both riverbanks, upstream and downstream views, and the bridge crossing itself) of the project site before, during and after installation and removal activities;
    f) Results of downstream turbidity monitoring before, during and after installation and removal activities.

2.10. Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Specifically, conservation recommendations are suggestions regarding

discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02).

1. The Corps and/or the Sonoma County DTPW are encouraged to explore alternatives that would reduce or alleviate the need to place fill material in the flowing waters of the Russian River annually.
2. The Corps and/or the Sonoma County DTPW should engage NMFS in early consultation and prepare a Biological Assessment in a timely manner towards the end of the permit period covered under this biological opinion project to avoid extension requests.

2.11. Reinitiation of Consultation

This concludes formal consultation for Russian River Summer Crossing at Asti, in Sonoma County, California. 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

NMFS has determined the proposed action may affect but is not likely to adversely affect CCC coho salmon or their critical habitat. This determination was made pursuant to Section 7(a)(2) of the ESA implementing regulations at 50 CFR Part 402.

The applicable standard to find that a Proposed Action is "not likely to adversely affect" ESA listed species or critical habitat is that all of the effects of the action are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous beneficial effects without any adverse effects on the species. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are extremely unlikely to occur.

CCC coho salmon critical habitat was designated throughout the accessible reaches in the Russian River watershed, including the upper Russian River and its tributaries in 1999 (64 FR 24049). The following essential habitat types have been identified coho salmon: 1) juvenile summer and winter rearing areas; 2) juvenile migration corridors; 3) areas for growth and development; 4) adult migration corridors; and 5) spawning areas. Within these habitat types, the

physical and biological features (PBFs[1]) of coho salmon critical habitat include adequate: 1) substrate, 2) water quality, 3) water quantity, 4) water temperature, 5) water velocity, 6) cover/shelter, 7) food, 8) riparian vegetation, 9) space, and 10) safe passage conditions (64 FR 24029).

Since this designation of critical habitat, additional information has shown that the upper Russian River does not meet the habitat requirements for coho salmon summer rearing. Due to coho salmon sensitivity to warm stream temperatures, the NMFS Southwest Fisheries Science Center (Bjorkstedt et al. 2005) reported that they are unlikely to inhabit areas of the upper Russian River watershed north of Healdsburg, California. Information from Bjorkstedt et al. (2005) was the basis for the NMFS Coho Salmon Recovery Plan (NMFS 2012) to omit potential habitat upstream of the mainstem Russian River at Healdsburg in the habitat area expected to contribute to recovery of Russian River coho salmon. Within the action area, the PBFs for CCC coho salmon include migration and adult spawning, and winter rearing habitat, which are in moderate condition (NMFS 2008). PBFs in the action area for CCC coho salmon juvenile summer rearing, and growth and development are unsuitable due to high summertime water temperatures conditions (NMFS 2008).

With regard to species presence and potential effects to coho salmon individuals, we have determined that the proposed project is not likely to adversely affect coho salmon. We base this on the fact that the upper Russian River population of coho salmon was historically sporadic and that coho have not been present in the upper basin for decades (CDFG 2002). Furthermore, the upper Russian River coho salmon population is described in Bjorkstedt (2005) as almost entirely dependent on immigrants from much lower in the basin, and that tributaries in the upper basin frequently were too warm or dry for coho salmon, and thus did not offer reliably favorable conditions for completion of the coho salmon life cycle. Given that there is an extremely low potential for coho salmon to be in the upper basin, we expect effects on CCC coho salmon to be discountable, Therefore, NMFS concurs that the effects of the proposed action are not likely to adversely affect CCC coho salmon because the species is extremely unlikely likely to be in the action area during the construction and removal of the summer crossing on the mainstem Russian River. The effects on CCC coho salmon habitat are minor and temporary. For example, turbidity caused by the proposed action will be relatively minor and will quickly return to background levels once the crossing is installed or removed. Given the natural occurrence of high water temperatures resulting in limited conservation value in the action area for CCC coho salmon, these effects are expected to be insignificant.

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

[1] The designation of critical habitat for CCC coho salmon uses the term PCE or essential features. The new critical habitat regulations (81 FR 7414) replace this term with PBFs. This shift in terminology does not change the approach used in conducting our analysis, whether the original designation identified primary constituent elements, physical or biological features, 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.

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

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

3.1. Essential Fish Habitat Affected by the Project

Pacific coast salmon EFH may be adversely affected by the proposed action. Specific habitats identified in the PFMC (2014) for pacific coast salmon include habitat areas of particular concern (HAPCs), identified as: 1) complex channels and floodplain habitats; 2) thermal refugia; and 3) spawning habitat. HAPCs for Chinook salmon include all waters, substrates, and associated biological communities falling within critical habitat areas described above in the accompanying biological opinion for the project located on the mainstem of the Russian River. Although there is spawning habitat within the project location, it is primarily used as a migration corridor for adult and juvenile Chinook salmon during the winter and spring months.

3.2. Adverse Effects on Essential Fish Habitat

The potential adverse effects of the Project on EFH have been described in the preceding biological opinion and include disturbance of the channel bed and banks, temporary loss of wetted habitat, and increased turbidity in wetted habitat. Therefore, the effects of the project on ESA-listed species are anticipated to be the same as the effects to EFH in the action area.

3.3. Essential Fish Habitat Conservation Recommendations

Section 305(b)(4)(A) of the MSA authorizes NMFS to provide EFH Conservation Recommendations that will minimize adverse effects of an activity on EFH. Although temporary adverse effects are anticipated as a result of the project activities, the proposed minimization and avoidance measures, and BMPs in the accompanying biological opinion are sufficient to avoid, minimize, and/or mitigate for the anticipated effects. Therefore, no additional EFH Conservation Recommendations are necessary at this time that would otherwise offset the adverse effects to EFH.

3.4. Statutory Response Requirement

The Corps 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 Corps and the Sonoma County DTPW and individual copies of this opinion were provided to these agencies. The format and naming adheres to conventional standards for style.

4.2. Integrity

This consultation was completed on a computer system managed by NMFS in accordance with relevant information technology security policies and standards set out in Appendix III, 'Security of Automated Information Resources,' Office of Management and Budget Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

4.3. Objectivity

Information Product Category: Natural Resource Plan

Standards: This consultation and supporting documents are clear, concise, complete, and unbiased; and were developed using commonly accepted scientific research methods. They adhere to published standards including the NMFS ESA Consultation Handbook, ESA

regulations, 50 CFR 402.01 et seq., and the MSA implementing regulations regarding EFH, 50 CFR 600.

Best Available Information: This consultation and supporting documents use the best available information, as referenced in the References section. The analyses in this opinion and EFH consultation contain more background on information sources and quality.

Referencing: All supporting materials, information, data and analyses are properly referenced, consistent with standard scientific referencing style.

Review Process: This consultation was drafted by NMFS staff with training in ESA and MSA, and reviewed in accordance with West Coast Region ESA quality control and assurance processes.

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