Appendix F National Marine Fisheries Service Biological Opinion

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

October 16, 2020 **Refer to NMFS No:** WCRO-2020-02509

Darrell Cardiff
Senior Planner, Local Assistance
California Department of Transportation, District 1
P.O. Box 3700
Eureka, California 95502-3700

Re: Endangered Species Act Section 7(a)(2) Biological Opinion, and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Honeydew Bridge Replacement Project (BRLS-5904 (024))

Dear Mr. Cardiff:

Thank you for your letter of September 1, 2020, requesting consultation with NOAA's National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 et seq.) for the Honeydew Bridge Replacement Project, California Department of Transportation (Caltrans[1]) Local Assistance reference BRLS-5904 (024). This consultation was conducted in accordance with the 2019 revised regulations that implement section 7 of the ESA (50 CFR 402, 84 FR 45016).

NMFS also reviewed the likely effects of the proposed action on essential fish habitat (EFH), pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1855(b)), and concluded that the action would adversely affect the EFH of Pacific Coast Salmon. Therefore, we have included the results of that review in Section 3 of this document.

Based on the best scientific and commercial information available, NMFS concludes that the action, as proposed, is not likely to jeopardize the continued existence of the California Coastal (CC) Chinook salmon Evolutionarily Significant Unit (ESU) or the Northern California (NC) steelhead Distinct Population Segment (DPS). The action is also not likely to destroy or adversely modify designated critical habitat for the CC Chinook salmon ESU or the NC steelhead DPS. NMFS expects the proposed action would result in incidental take of NC steelhead and CC Chinook salmon. However, we do not expect the action to result in adverse impacts to individual SONCC coho salmon or their critical habitat. An incidental take statement is included with the enclosed biological opinion. The incidental take statement includes non-

[1] Pursuant to 23 USC 327, and through a series of Memorandum of Understandings beginning June 7, 2007, the Federal Highway Administration (FHWA) assigned and Caltrans assumed responsibility for compliance with Section 7 of the federal Endangered Species Act (ESA) and the Magnuson-Stevens Fishery Conservation and Management Act (MSA) for federally-funded transportation projects in California. Therefore, Caltrans is considered the federal action agency for consultations with NMFS for federally funded projects involving FHWA. Caltrans proposes to administer federal funds for the implementation of the proposed action and is, therefore, considered the federal action agency for this consultation.

discretionary reasonable and prudent measures and terms and conditions that are expected to further reduce anticipated incidental take of CC Chinook salmon and NC steelhead.

In addition, we would like to express our gratitude for the significant efforts made by you and the applicant, Humboldt County, to reduce potential impacts of the project based on our technical assistance. Please contact Mike Kelly at (707) 825-1622, Northern California Office, Arcata, or via email at Mike.Kelly@noaa.gov if you have any questions concerning this section 7 consultation, or if you require additional information.

Sincerely,

Alecia Van Atta
Assistant Regional Administrator
California Coastal Office

Enclosure

cc: w/enclosure:
Christa Unger, Caltrans Local Assistance, District 1, Eureka, CA
Jennifer Olson, California Department of Fish and Wildlife, Eureka, CA
NMFS ARN# 151422WCR2020AR00188

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

Honeydew Bridge Replacement Project,
Humboldt County, California

NMFS Consultation Number: WCRO-2020-02509
Action Agency: California Department of Transportation

Affected Species and NMFS' Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species or Critical Habitat?	Is Action Likely to Jeopardize the Species?	Is Action Likely to Destroy or Adversely Modify Critical Habitat?
Southern Oregon/North California Coast (SONCC) coho salmon (*Oncorhynchus kisutch*)	Threatened	No	No	No
California Coastal (CC) Chinook salmon (*O. tshawytscha*)	Threatened	Yes	No	No
Northern California (NC) steelhead (*O. mykiss*)	Threatened	Yes	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 Coast Salmon FMP	Yes	Yes

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

Issued By:

Alecia Van Atta
Assistant Regional Administrator
California Coastal Office

Date: October 16, 2020

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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 USC 1531 et seq.), and implementing regulations at 50 CFR 402, as amended.

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

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

1.2. Consultation History

On May 2, 2017 NMFS staff participated in an interagency field site review to discuss the project and resource protection issues.

On May 10, 2018, the California Department of Transportation (Caltrans) submitted a Biological Assessment (BA) and a request to initiate formal consultation.

On May 16, 2018, NMFS provided comments on the BA and notified Caltrans that it contained insufficient information to allow formal consultation to proceed. At this time, NMFS also requested that Caltrans and Humboldt County consider less impactful construction methods.

On June 27, 2018, NMFS attended a second interagency field review to discuss the project as it related to requested BA information needs.

On July 9, 2018, NMFS provided a letter to Caltrans to close out the consultation request due to 45 days elapsing without Caltrans providing the requested information.

On May 7, 2020, Humboldt County, NMFS, Caltrans, and consultant staff met via phone conference to review alternative project construction approaches to minimize impacts.

On May 20, 2020, NMFS provided Humboldt County's design consultant information to help them design the river diversion.

On August 21, 2020, Humboldt County provided a new draft BA for NMFS' review.

On August 24, 2020, NMFS provided comments on the new draft BA, and recommended that Caltrans request initiation of consultation once comments were addressed.

On September 1, 2020, Caltrans requested initiation of formal section 7 consultation. However, the BA contained what appeared to be an illogical conclusion regarding impacts to critical habitat for SONCC coho salmon. Later that day Caltrans provided an updated request letter that clarified that the conclusion should be that SONCC coho critical habitat was not likely to be adversely affected.

On September 2, 2020, NMFS notified Caltrans that we had initiated formal consultation.

On September 9, 2020, NMFS requested information on the quantity of new impervious surface that would be created by the new bridge approaches. Caltrans provided this information on September 14, 2020.

On September 10, 2020, NMFS requested more information about the type of bridge deck and drainage from the deck. Humboldt County provided this information via email on September 14 and 15, 2020.

1.3. Proposed Federal Action

Under the ESA, "action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies (50 CFR 402.02).

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

We considered, under the ESA, whether or not the proposed action would cause any other activities and determined that it would not.

The proposed action consists of replacing an existing single lane bridge with a new two-span bridge over the Mattole River near the community of Honeydew, in Humboldt County, California as described in detail in Caltrans' BA (Caltrans 2020). Project elements that may affect salmonids or critical habitat, and accompanying measures to minimize impacts, are summarized below, while the remaining project description is incorporated by reference to Caltrans' BA. In the following descriptions, "Caltrans" refers to Caltrans, Humboldt County (the applicant), and their contractor(s).

Caltrans proposes to conduct activities below the ordinary high water mark (OHWM) of the Mattole River between June 15 and October 15 in both years of construction.

1.3.1 Construction Staging and Access

Caltrans will create temporary staging areas along Wilder Ridge Road just southeast of the intersection with Mattole Road; along the south bank gravel bar near and beneath the existing bridge; along the detour road near its intersection with Mattole Road; and at the north Mattole Road bridge approach. Some amount of grading will be required, particularly at the river bar location.

A detour route, as described in section 1.3.2, will serve the dual purpose of public detour and construction access. Additional temporary access road surface will be graded on the gravel bar for contractor access to work areas.

Caltrans will also create gravel work pads partly in the wetted channel using washed gravel of suitable size for spawning salmon. (Some or all of this rock may be contoured and left in the channel after construction to augment course sediment.) For the north bank gravel pad, Caltrans estimates that 15 cubic yards of gravel would be placed below the OHWM elevation. For the Pier 2 gravel pad, Caltrans estimates that about 350 cubic yards of gravel would be placed below the OHWM elevation over an approximate length of 160 feet along the river. A portion of the Pier 2 gravel pad will likely be placed into water, with the area of the in-water portion depending on the river level and wetted channel location. No heavy equipment access into the water is required for pad construction. Caltrans proposes to use containment techniques to minimize turbidity, and they will relocate fish from the affected area. Qualified biologists will be employed to monitor pad construction and conduct fish relocation. The contractor will prepare stream diversion and fish relocation plans, and Caltrans will provide these plans to NMFS for review of consistency with the anticipated effects to fish and habitat that are analyzed in this Biological Opinion.

Access areas and roads will result in temporary loss of approximately 0.18 acre of various herbaceous species, two willows of 9.0 and 6.8-inch diameter at breast height (DBH), and three cottonwoods of 12.4 to 18.4 DBH. These areas will be replanted with appropriate species. (Additional vegetation will be removed permanently in the area of the north-end bridge approach, as described below.)

1.3.2 Detour Construction

Caltrans will build the new bridge on the existing alignment, which requires construction of a temporary detour bridge approximately 1600 feet downstream of the existing bridge. A single span prefabricated bridge will cross the river from a temporary gravel approach road at the south riverbank to a temporary gravel approach on the north bank connecting to Burrell Road. The gravel approach will be retained on the river side by the installation of temporary sheet piles vibrated into place. Caltrans anticipates that pre-cast concrete dead man anchors and tie-back rods will be used to provide additional lateral support for the upper section of the sheet piles. The temporary detour bridge will be about 100 feet long and about 18 feet wide, with supporting cast-in-place concrete spread footings on the gravel approach behind the sheet pile retaining system. The river opening between the sheet pile roadway approaches will be about 77 feet wide. This design would accommodate a maximum flow conveyance of 8,900 cubic feet per second

(cfs) at a flow velocity of eight feet per second. This width will also allow unimpeded upstream migration for all life stages of salmonids during normal summer base flows.

The north bank gravel approach road will require approximately 200 cubic yards of gravel below the OHWM elevation over an approximate length of 50 feet along the river. The south bank gravel approach road will require about 670 cubic yards of gravel below the OHWM elevation over an approximate length of 70 feet along the river. Portions of the gravel approaches to the detour bridge will be constructed in water using the same techniques and protections described in section 1.3.1 for the in-water portions of the gravel work pads. The river diversion and fish relocation plans would also address detour bridge construction.

The temporary detour bridge will be needed for both construction seasons. At the end of the first construction season the temporary detour bridge, concrete spread footing, approach fills, and shoring system would be removed. In the second construction season, the gravel approach fills, retaining system, cast-in-place concrete spread footings, and single span prefabricated bridge would be re-installed. At the end of the second construction season the entire temporary bridge, cast-in-place concrete spread footings, gravel fills, and retaining system would be removed.

Within the river floodway, the gravel detour approach roads would likely consist of washed gravel topped with 12 inches of aggregate base with geotextile fabric placed in between to prevent crushed rock from mixing with rounded gravels.

Alternatively, approaches and abutments for the detour bridge may be constructed by excavating and grading the existing gravel bar and compacting local gravels using heavy equipment and water. Or if deemed necessary to strengthen the detour road base, river run gravel fill over geotextile fabric, with an aggregate base topping would be used. Water for fill compaction and dust control will be extracted from a pit excavated to ground water in the gravel bar on site at least 50-feet away from the wetted river channel.

1.3.3 Old Bridge Demolition

The existing bridge will be removed during the second season once the gravel pads are constructed and the detour is in place. Timber decking and railings on the bridge will first be removed. Then cranes placed on each side of the river will sequentially hoist the two steel truss spans and place them on the south bank gravel bar to be dismantled. The existing reinforced concrete Pier 2 will be demolished using a percussion hammer (hoe-ram), typically mounted on a large excavator. The pier will be removed to at least three feet below the existing grade. Abutment 3 and Abutment 1 will then be demolished and removed to at least three feet below the existing grade. All demolition materials will be contained to minimize the possibility of material entering the river channel. Additionally, hydroacoustic monitoring will be conducted during demolition of Pier 2, and demolition will cease if injurious sound energy levels are approached.

1.3.4 New Bridge Construction

The new bridge will be a two-span composite welded steel plate girder bridge with a cast-in-place concrete deck located on the existing alignment with an overall length of 375 feet. The new

bridge would carry two lanes of traffic, with each lane 11 feet wide plus a 3-foot shoulder, for a total clear width of 28 feet. The bridge is designed to drain via sheet flow over the edges rather than draining to the ends or via scuppers. Therefore, water will drain to the river channel similarly to the present bridge.

Abutment 1 (north bridge abutment) will consist of a foundation of thirteen 10-inch steel H-piles impact driven about 45-feet deep, or two 60-inch cast-in-drilled-hole (CIDH) piles. Pier 2 (the central bridge pier) will be on a foundation consisting of two 84-inch diameter CIDH piles. Abutment 3 (south bridge abutment) will be built on a foundation consisting of two 60-inch CIDH piles. If steel H-piles are required to be impact driven at Abutment 1, hydroacoustic monitoring will take place to ensure that injurious sound energy levels are not exceeded.

The bridge superstructure support consists of segments of steel girder supported by the single pier and the two abutments. An additional gravel work pad to support a crane will be constructed on the north bank above OHWM. This pad will be contained behind temporary gabion walls. A temporary shoring tower constructed on the river bar will be used to help support the steel girders during placement by a large crane. No piles will be necessary for the shoring tower or falsework supports. The bridge deck will then be constructed on top of the girders using techniques to contain any materials that might fall.

Installation of temporary sheet piles may be required for shoring the construction areas surrounding the central pier and the Abutment 3 foundations. Vibratory pile driving will be used for installing shoring sheet piles surrounding these features. Drilling fluids and slurries for the CIDH pile installation will be contained to prevent contamination of surface water and groundwater and will be properly disposed of outside of the riverbed and banks in accordance with typical Standard Specifications, which will be supported by a contractor-provided material handling and disposal plan.

Adequate dewatering at the Pier 2 location during construction would be achieved by means of diking/diversion of water and sump pumping from a cofferdammed excavation. Caltrans will provide temporary water pollution control measures, including, but not limited to, dikes, infiltration basins, and ditches, which may become necessary because of the construction process. In all cases, water pumped from excavations will be handled so as not to reach river water.

New rock slope protection (RSP), 1/4- to 1/2-ton method B, will be installed. The locations and extents of RSP have not yet been designed. It is anticipated that RSP will be placed by an excavator with a bucket/thumb attachment that would pick and place/fit together the RSP. The addition of RSP would be in locations to supplement existing RSP, mostly near the new bridge abutments outside of the active river channel. None of the RSP would be placed below the OHWM elevation.

The new bridge approaches will be paved and cover a larger area than the existing approaches. This will create approximately 0.2 acre of new impervious surface with approximately half of that area on each end of the bridge. Additionally, the approach on the north end of the bridge will

permanently displace 46 live alder trees varying from 6.0 to 16.5-inch DBH, and seven dead alder trees of 7.2 to 10.5-inch DBH.

1.3.5 Monitoring

During impact pile driving (if required) and demolition activities (hoe-ram operations), hydroacoustic monitoring would ensure that pile driving stops in a given day before sound levels reach the cumulative injury thresholds at the predicted attenuation distances. However, Caltrans' hydroacoustic analysis predicts that injury thresholds are unlikely to be reached. A qualified biologist will monitor all in-stream construction activities to ensure adherence to all environmental permit conditions and avoidance and minimization measures.

1.3.6 Conservation Measures and Best Management Practices

Water pollution control scheduling and methods will be specified in the contractor's Storm Water Pollution Prevention Plan (SWPPP) and Environmental Commitments Record for the proposed action. Specific methods are indicated in Caltrans' Construction Site Best Management Practices (BMP) Manual (Caltrans 2017). Caltrans' BA provides details on specific measures. Most of these measures are standard practices that have proven efficacy and are familiar to NMFS' staff. Please refer to Caltrans' BA and the above-referenced manuals for details.

1.3.7 Aquatic Species Relocation

In order to protect salmonids from impacts that could occur due to construction of the in-water gravel work pads and temporary bridge approaches, fish may be relocated if any remain in these enclosures. Caltrans will construct the enclosures for these fills incrementally, which often causes salmonids to volitionally leave the enclosed area likely due to the creation of a zone of still shallow water (Mike Kelly, NMFS, personal observations, 2006, 2009, 2011). To facilitate this, the enclosures will be constructed up to the point that a gap is available for fish to escape through, and any remaining fish would be herded out using a small beach seine. Given the simplicity of the habitat, these removal efforts should be fully effective. However, some fish may be captured and relocated in any remain in the completed enclosure. All fish relocation work will be conducted by qualified biologists hired by the contractor. Caltrans will prepare an Aquatic Species Relocation Plan for NMFS' review prior to project implementation. Methods may include seining gear, electrofishing gear, and dip nets. Electrofishing for salmonids would comply with Guidelines for Electrofishing Waters Containing Salmonids Listed under the Endangered Species Act (NMFS 2000), and any seining or other capture and removal techniques would adhere to the California Salmonid Stream Habitat Restoration Manual (Flosi et al. 2010).

1.3.8 Other Activities Caused by the Proposed Action

We considered whether or not the proposed action would cause any other activities and determined that it would not. The new bridge will serve the same function as the current bridge without inducing additional traffic or facilitating use by types of vehicles unable to use the current bridge.

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.

Caltrans determined the proposed action is not likely to adversely affect SONCC coho salmon or its critical habitat. Our concurrence is documented in the "Not Likely to Adversely Affect" Determinations section (Section 2.13).

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 or destroy or adversely modify critical habitat:

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

2.2. Rangewide Status of the Species and Critical Habitat

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

2.2.1 Species Description and General Life History

CC Chinook Salmon: The CC Chinook salmon ESU are typically fall spawners, returning to bays and estuaries before entering their natal streams in the early fall. The adults tend to spawn in the mainstem or larger tributaries of rivers. As with the other anadromous salmon, the eggs are deposited in redds for incubation. When the 0+ age fish emerge from the gravel in the spring, they typically migrate to saltwater shortly after emergence. Prey resources during out-migration are critical to Chinook salmon survival as they grow and move out to the open ocean.

NC Steelhead: Steelhead exhibit the most complex suite of life history strategies of any salmonid species. They have both anadromous and resident freshwater life histories that can be expressed by individuals in the same watershed. The anadromous fish generally return to freshwater to spawn as 4- or 5-year-old adults. Unlike other Pacific salmon, steelhead can survive spawning and return to the ocean to return to spawn in a future year. It is rare for steelhead to survive more than two spawning cycles. Steelhead typically spawn between December and May. Like other Pacific salmon, the steelhead female deposits her eggs in a redd for incubation. The 0+ age fish

emerge from the gravel to begin their freshwater life stage and can rear in their natal stream for 1 to 4 years before migrating to the ocean.

Steelhead rear in freshwater for an extended period before migrating to saltwater. As such, they enter the estuary at mean size of about 170 to 180 mm or 6.5 to 7.0 inches, and are, therefore, more oriented to deeper water channels in contrast to Chinook salmon that typically enter the estuary as 0+ fish. The CDFW data indicate that steelhead smolts generally migrate downstream toward the estuary between March 1 and July 1 each year, although they have been observed as late as September (Ricker et al. 2014). The peak of the outmigration timing varies from year to year within this range, and generally falls between early April and mid-May.

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 productivity, 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 2016), 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).

Status of CC Chinook Salmon

CC Chinook Salmon Abundance and Productivity: Low abundance, generally negative trends in abundance, reduced distribution, and profound uncertainty as to risk related to the relative lack of population monitoring in California have contributed to NMFS' concern that CC Chinook salmon are at risk of becoming endangered in the foreseeable future throughout all or a significant portion of their range. Where monitoring has occurred, Good et al. (2005) found that historical and current information indicates that CC Chinook salmon populations are depressed. Uncertainty about abundance and natural productivity, and reduced distribution are among the risks facing this ESU. Concerns regarding the lack of population-level estimates of abundance, the loss of populations from one diversity stratum, as well poor ocean survival contributed to the conclusion that CC Chinook salmon are "likely to become endangered" in the foreseeable future (Good et al. 2005, Williams et al. 2011, Williams et al. 2016).

CC Chinook Salmon Spatial Structure and Diversity: 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. (2016) concluded the extinction risk of the CC Chinook salmon ESU has not changed since the last status review. The genetic and life history diversity of populations of CC Chinook salmon is likely very low and is inadequate to contribute to a viable ESU, given the significant reductions in abundance and distribution.

Status of NC Steelhead

NC Steelhead Abundance and Productivity: With few exceptions, NC steelhead are present wherever streams are accessible to anadromous fish and have sufficient flows. The most recent status review by Williams et al. (2016) reports that available information for winter-run and summer-run populations of NC steelhead do not suggest an appreciable increase or decrease in extinction risk since publication of the last viability assessment (Williams et al. 2011). Williams et al. (2016) found that population abundance was very low relative to historical estimates, and recent trends are downwards in most stocks.

NC Steelhead Spatial Structure and Diversity: NC steelhead remain broadly distributed throughout their range, with the exception of habitat upstream of dams on both the Mad River and Eel River, which has reduced the extent of available habitat. Extant summer-run steelhead populations exist in Redwood Creek and the Mad, Eel (Middle Fork) and Mattole Rivers. The abundance of summer-run steelhead was considered "very low" in 1996 (Good et al. 2005), indicating that an important component of life history diversity in this DPS is at risk. Hatchery practices in this DPS have exposed the wild population to genetic introgression and the potential for deleterious interactions between native stock and introduced steelhead. However, abundance and productivity in this DPS are of most concern, relative to NC steelhead spatial structure and diversity (Williams et al. 2011).

Status of Critical Habitats

The condition of CC Chinook salmon and NC steelhead 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: overfishing, artificial propagation, 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, 64 FR 24049, 70 FR 37160). Diversion and storage of river and stream flow has dramatically altered the natural hydrologic cycle in many of the streams within the ESU's and DPS. 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 Factors Responsible for the Decline of Species and Degradation of Critical Habitats

The factors that caused declines include hatchery practices, ocean conditions, habitat loss due to dam building, degradation of freshwater habitats due to a variety of agricultural and forestry practices, water diversions, urbanization, over-fishing, mining, climate change, and severe flood events exacerbated by land use practices (Good et al. 2005, Williams et al. 2016). Sedimentation and loss of spawning gravels associated with poor forestry practices and road building are particularly chronic problems that can reduce the productivity of salmonid populations. From 2014 through 2016, the drought in California reduced stream flows and increased temperatures, further exacerbating stress and disease. Ocean conditions have been unfavorable in recent years

(2014 to present) due to the El Nino in 2015 and 2016. Reduced flows can cause increases in water temperature, resulting in increased heat stress to fish and thermal barriers to migration.

One factor affecting the range wide status and aquatic habitat at large is climate change. Information since these species were listed suggests that the earth's climate is warming, and that this change could significantly impact ocean and freshwater habitat conditions, which affect survival of all three species of listed salmonids subject to this consultation. In the coming years, climate change will influence the ability to recover some salmon species in most or all of their watersheds. Steelhead are particularly vulnerable to climate change due to their need for year-round cool water temperatures (Moyle 2002). Through effects on air temperatures and stream flows, climate change is expected to increase water temperatures. Climate change effects on stream temperatures within Northern California are already apparent. For example, in the Klamath River, Bartholow (2005) observed a 0.5°C per decade increase in water temperature since the early 1960's, and model simulations predict a further increase of 1-2°C over the next 50 years (Perry et al. 2011).

In coastal and estuarine ecosystems, the threats from climate change largely come in the form of sea level rise and the loss of coastal wetlands. Sea levels will likely rise exponentially over the next 100 years, with possibly a 50-80 cm rise by the end of the 21st century (IPCC 2014). This rise in sea level will alter the habitat in estuaries and either provide increased opportunity for feeding and growth or in some cases will lead to the loss of estuarine habitat and a decreased potential for estuarine rearing. Marine ecosystems face an entirely unique set of stressors related to global climate change, all of which may have deleterious impacts on growth and survival while at sea. In general, the effects of changing climate on marine ecosystems are not well understood given the high degree of complexity and the overlapping climatic shifts that are already in place (e.g., El Niño, La Niña, Pacific Decadal Oscillation) and will interact with global climate changes in unknown and unpredictable ways. Overall, climate change is believed to represent a growing threat, and will challenge the resilience of salmonids in Northern California.

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 boundary for this proposed action encompasses approximately 32 acres, including all areas to be used for site access, construction activities, and equipment and materials storage and staging. The action area includes sufficient distances upstream and downstream along the mainstem Mattole River channel to account for potential construction related impacts to aquatic organisms from alteration of water quality, construction noise and other disturbances. The length of river channel included in the action area, extending from 450 feet upstream of the new bridge alignment to 450 feet downstream of the temporary detour bridge, was based on highly conservative estimates of the potential hydroacoustic behavior impact distances associated with limited pile-driving and percussive concrete demolition, and potential for construction-related effects on water quality. Caltrans' BA includes a map that delineates 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).

In the action area, the threat to CC Chinook salmon and NC steelhead from climate change is likely to include a continued increase in average summer air temperatures; more extreme heat waves; and an increased frequency of drought (Lindley et al. 2007). In future years and decades, many of these changes are likely to further degrade habitat throughout the watershed by, for example, reducing streamflow during the summer and raising summer water temperatures. Many of these impacts will likely occur in the action area via reduced flows and higher water temperatures.

2.4.1 Status of Listed Species and Habitat in the Action Area

Chinook Salmon

Chinook salmon occurring in the action area belong to the Mattole River population of CC Chinook salmon, which is within the North Coastal Diversity Stratum. The spawner abundance target is 4,000 adults. Based on the number of live fish and redds seen on spawning grounds during recent surveys conducted by the Mattole Salmon Group (MSG), the spawning population likely numbers in the hundreds. However, the population is likely above its depensation threshold (NMFS 2016), which can be thought of as the number of spawners needed for survival of the population.

The spawning distribution of Chinook salmon is concentrated primarily in the Mattole River headwaters and upper river tributaries based on redd surveys conducted between 1994 and 2017 by MSG. Chinook salmon appear to spawn with some consistency throughout the middle mainstem Mattole River, including small numbers in the vicinity of the action area. Spawning in the action area is likely limited to years when lower fall and winter flow conditions exclude them from upper tributaries (MSG 2011; MSG 2018a). Based on their fall and winter run timing, no adult Chinook salmon are expected in the action area during the construction season.

The majority of juvenile Chinook salmon migrate to sea during the spring. Prior to downstream migration, juvenile Chinook salmon have been observed rearing in the mainstem and larger tributaries (Bajer 2011). During the summer when the river becomes disconnected from the sea, small numbers of juvenile Chinook salmon have been observed in large pool habitats in the upper mainstem river (Mattole River and Range Partnership 2009), which may also include the action area. Outmigrant trapping data at river kilometer 6.3 in the lower mainstem Mattole River was conducted from April into July, until 2011, with gear deployment and removal contingent on

a river flow of 300 to 400 cfs, and closure of river mouth, respectively. The most recent population estimates of juvenile Chinook salmon, those from 2009, 2010, and 2011, were 123,874, 170,823, and 461,832, respectively (Piscitelli 2012). Because Chinook salmon primarily spawn upstream of the action area, most or all outmigrating juveniles pass through the action area.

The life stage of Chinook salmon that could be present in the action area is the pre-smolt stage. The key limiting stresses for this life stage are shelter, floodplain connectivity, water quality (turbidity), low flows and diversions, estuary condition, and water temperature (NMFS 2016). The river channel in the action area is dominated by a homogeneous pool with little habitat complexity and cover, and which is likely to be very warm in the summer, nearing upper thermal limits for juvenile salmonid rearing. No large wood accumulations presently occur in the action area, but willows and trees along the north riverbank, along with the large rip-rap boulders, do provide a small amount of shelter and shade.

Because the action area is on the mainstem Mattole River, water quantity may not be as limiting as it is in smaller tributaries. However, the flow in the action area may be reduced relative to natural levels, so some loss of habitat and higher daytime temperatures could result from lower flows. The action area is also in a confined reach with high banks on both sides. Therefore, the floodplain is restricted to the adjacent gravel bars and riparian vegetation at the base of the slopes on either side of the channel, so it does not appear that floodplain connection is limiting in the action area. Turbidity in the action area is likely not a habitat issue during the summer months due to the seasonality of rainfall.

The potential for juvenile Chinook salmon to occur in the action area during the summer months was further evaluated using MSG snorkel survey data within approximately 10 river miles of the action area. Data for July and August 2006 to 2017, showed fewer than ten juvenile Chinook salmon in total within 10 river miles of the action area, with mean pool counts of 1 to 2 per pool, where they occurred. These data suggest that a very small number of juvenile Chinook salmon could occur in the action area during the proposed in-water work window, and Caltrans estimates no more than five juvenile Chinook salmon may be present during each of the two construction seasons. NMFS agrees that their presence in low numbers may be possible, especially early in the construction season when water temperatures may still be tolerable, and we believe that the estimate of five juveniles per year is a reasonable conservative estimate.

Steelhead

Steelhead occurring in the action area belong to the Mattole River population of NC steelhead, which is within the North Coastal Diversity Stratum. The population occurs in two distinct runs: a winter-run, which enters the river between November and April, with a spawner abundance target of 10,700 adults; and a summer-run, which enters the river between May and October, with an effective population size of about 500 individuals (NMFS 2016).

There are no comprehensive survey results of winter-run steelhead abundance available for the Mattole River. However, steelhead redds are counted during surveys focused on coho salmon. Based on the number of live fish and redds seen on spawning grounds during recent surveys

conducted by MSG, the spawning population of winter-run steelhead likely averages around 1000 adults (NMFS 2016).

Additionally, steelhead in the Mattole River display the half-pounder life history. Half-pounders are immature steelhead that reside in fresh water for a portion of their life cycle before returning to the sea. Half-pounders are regularly observed during summer snorkel surveys conducted by the MSG, but in low numbers in the vicinity of the action area.

Critical habitat for all three life stages that may be present during the summer construction period is limited in the same basic ways as is described above for Chinook salmon. Additionally, for the adult and half-pounder life stages, the lack of cover and shallow depth of the pool may limit its usefulness as holding habitat, though some fish may still utilize it for this purpose.

The potential for juvenile steelhead to occur in the action area during the proposed in-water work window was evaluated using summer (July-August) snorkel survey observations within approximately 10 river miles of the project area. Data from 2000 to 2017 suggest juvenile steelhead are present and relatively abundant in every reach of the Mattole River, with average densities ranging from about 25 to 60 juvenile steelhead (ages 0 and 1+ combined) (MSG 2015; MSG 2018b). A mean of 61.7 young-of-year (YOY) steelhead per pool was reported for the 2015 summer snorkel data in a reach just downstream of the action area (MSG 2015).

Based on these summer snorkel survey results and the condition of habitat in the action area, Caltrans estimates that up to two adult summer-run, four half-pounder, and 50 juvenile steelhead may be present in the action area during each of the two construction seasons. NMFS agrees that this is a reasonable estimate.

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).

1.1 2.5.1 Fish Relocation and In-stream Structures

As described in section 1.3.1 and 1.3.2, Caltrans proposes to construct work pads and detour bridge approaches that are likely to encroach into the wetted channel. Gravel fill and containment structures are likely to encroach into useable habitat for juvenile steelhead and Chinook salmon, but will avoid the deeper pool area that may be used by adult steelhead and half-pounders, and the fills are positioned to avoid areas on the downstream side of riffle crests where upwelling of cool water can create important summer rearing habitat for juvenile salmonids. Therefore, only juvenile salmonids would be relocated during construction of these in-stream structures, and the structures are located in areas that are likely to contain fewer salmonids than other locations in the action area.

In the absence of fish relocation, juvenile salmonids would be exposed to physical injury from construction equipment and placement of fill and containment structures. This exposure would likely kill them. However, while fish relocation substantially avoids impacts from construction, fish relocation activities themselves can injure or even kill fish. The amount of unintentional injury or mortality attributable to fish removal varies widely depending on the method used, ambient conditions, and the expertise and experience of the field crew. Fish collecting gear, whether passive or active poses some risk to individuals, including stress, disease transmission, injury, or death (Hayes et al. 1996). In addition, relocated fish may have to compete with other fish for available resources such as food and habitat, and the growth rate of fish can be slowed when population density is high (Ward et al. 2007). However, the areas to be filled are extremely small relative to equivalent habitat in the action area, and the fills will be located outside of the most functional habitat. Therefore, the number of fish requiring relocation is likely minimized.

Based on the results of various studies of salmonid seasonal occupancy and densities, consideration of the quality and quantity of adjacent habitat (see *Environmental Baseline* section), and the techniques proposed to herd fish out of partially constructed enclosures, NMFS expects that no more than two juvenile Chinook salmon, and 10 juvenile steelhead would be captured and relocated to adjacent habitat in each of the two construction seasons.

Mortality of Relocated Fish

Data on fish relocation efforts from water diversion activities since 2004 shows most average mortality rates are below three percent for salmonids. Given the measures that would be implemented to avoid and minimize impacts to fish during relocation efforts, NMFS expected no more than three percent of all relocated fish would be subject to potential injury or mortality.

If we apply the three percent minimum mortality rate to the predicted number of juvenile CC Chinook and NC steelhead that we expect to be captured and relocated, we would expect less than one of each to be injured or killed in total for both construction seasons. However, analyzing population impacts based on fractions of fish is not logical, so we conservatively estimate that one juvenile of each species could be killed or injured in each construction season.

2.5.2 Noise and Visual Disturbance

Vibratory Pile Driving

Caltrans will use vibratory pile driving for all sheet piles used to contain and stabilize fill for temporary bridge approaches and for the cofferdam around Pier 2. Compared to impact pile driving, vibratory pile driving generally produces more continuous, lower energy sounds below the thresholds associated with injury. There are currently no established noise thresholds associated with continuous sound waves, and vibratory methods are generally considered effective measures for avoiding or minimizing the risk of injury to fish from pile driving noise. Vibratory installation may cause behavioral reactions in rearing juveniles and holding half-pounder and adult steelhead. Juvenile salmonids may move away from the vibrations or become habituated (Mike Kelly, personal observations 2006, 2009, 2011). Half-pounders and adults may leave the adjacent pool to seek similar holding habitat up- or downstream of the action area. However, these behavioral impacts are unlikely to reduce an individual salmonid's survival and fitness.

Impact Noise and Hydroacoustic Effects
Caltrans' BA evaluated potential underwater noise levels generated by planned construction activities, and determined that impact pile installation is unlikely to exceed currently adopted hydroacoustic noise thresholds that may cause injury to fish. Based on analyses provided in Caltrans' BA and confirmed by NMFS, single strike noise levels that are known to cause injury to fish (>206 dB re: 1 µPa) would not occur at any distance from the piles. Therefore, listed salmonids would not be exposed to single strike injurious noise levels.

Sound energy levels above 150 dB (re: 1 µPa) can accumulate to cause barotrauma in exposed fish. This cumulative sound exposure level is abbreviated as cSEL. Based on accepted standards of the Fisheries Hydroacoustic Working Group (2008), fish under two grams may suffer barotrauma at a cSEL of 183 dB, and fish over two grams may experience barotrauma at a cSEL of 187 dB. However, levels below these thresholds do not continue to accumulate if fish are not re-exposed within 12 hours.

Caltrans (2020, Appendix F) presented the calculations used to determine the distances from the piles over which injury may be possible. However, the calculation did not provide a sound energy level (SEL) that would allow direct calculation of cSEL distances (because the example monitoring data they used did not provide an SEL reading), though they intuit that cSEL levels of 183 dB would not reach the wetted channel. So, NMFS used the established method (SEL equals peak pressure minus 25 dB if direct measurement is unavailable (Caltrans 2015)) to predict SEL levels based on peak levels monitored at the sample location to confirm Caltrans' results. This calculation resulted in predicted distances of three to five meters from the piles, which confirms that injurious cSEL levels would not extend into water, which is approximately 20 meters from the water. Therefore, NMFS agrees that real time monitoring will ensure that exposure of salmonids to injurious sound levels in the Mattole River during impact pile driving will not occur.

Elevated cSEL's could also be produced during demolition of the old Pier 2 using a percussive hammer (hoe-ram). Distances of potential barotrauma are difficult to predict during hoe-ram use because the total number of blows, and the number of blows over 150 dB, cannot be accurately anticipated. Caltrans concludes that injurious sound levels are unlikely to be reached given that the demolition will take place in a dewatered cofferdam away from the water's edge. However, Caltrans proposes hydroacoustic monitoring during Pier 2 demolition to confirm avoidance of injurious levels of sound pressure, and activity will cease before injurious cumulative cSEL's are reached in a given day. Therefore, NMFS agrees that real time monitoring will ensure that exposure of salmonids to injurious sound levels in the Mattole River during Pier 2 demolition will not occur.

Additionally, juvenile salmonids could be exposed to underwater noise levels exceeding the behavior thresholds (150dB) without reaching the injurious cSEL threshold. Caltrans' analysis predicts that exposure to 150 dB sound levels would occur over a radius of 80 feet from the piles.

Temporary behavioral changes that fish may exhibit in response to pile driving noise include startling, altering behavioral displays, avoidance, displacement, and reduced feeding success.

Observations of juvenile steelhead exposed to pile driving noise above the 150 dB behavioral threshold at the Mad River Bridges Highway 101 project indicate that the juvenile salmonids quickly habituate to the noise and resume normal surface-feeding behavior within a few minutes of the fist pile strikes (Mike Kelly, NMFS, personal observations 2009, 2011). Therefore, NMFS believes that periodic behavioral changes caused by sub-injurious sound exposure will not result in decreased fitness or survival of individual juvenile salmonids. Similar to the predicted reaction by half-pounders and adult steelhead to vibratory pile driving described above, NMFS believes that behavioral changes will not result in a decrease in fitness or survival of individual adult or half-pounder steelhead.

2.5.3 Water Quality

Pollutants from construction operations, or from the mobilization of sediment both during and after construction, have the potential to impact water quality within the action area.

Turbidity and Sedimentation

Short term increases in suspended sedimant and turbidity are anticipated during construction and removal of the work pads and the detour bridge abutments. Additionally, there is likely to be an increase in suspended sediments and turbidity throughout the action area during the first rainfall of the season as disturbed sediments mobilize and adjust.

Increases in suspended sediment or turbidity can affect water quality, which in turn can affect fish health and behavior. Salmonids typically avoid areas of higher suspended sediment, which means they displace themselves from their preferred habitat in order to seek areas with less suspended sediment. Fish unable to avoid suspended sediment can experience negative effects from exposure.

Research has shown that length of exposure to total suspended solids (TSS) plays a more dominant role than TSS concentration (Anderson et al. 1996). Long term exposure to elevated TSS conditions may cause an endocrine stress response (elevated plasma cortisol, glucose, and hematocrits), suggesting an increased physiological burden that could influence growth, fecundity, and longevity (Redding et al. 1987). Therefore, when considering the effects of TSS on listed fish, it is important to consider the frequency and the duration of the exposure, not just the TSS concentration (Newcombe and Jensen 1996).

Construction of the work pads and detour bridge abutments, and their removal at the end of each construction season, are the activities that could generate harmful turbidity. However, Caltrans proposes to use techniques and materials, as described in section 1.3, that are proven to minimize turbidity to insignificant levels and durations. Therefore, NMFS considers the potential amounts and duration of turbidity generated by the proposed Project to be unlikely to reduce the fitness of listed salmonids in the action area.

The first rains of the season will likely produce turbidity of short duration and low concentration, and will occur when the most vulnerable life stages are not present. Additionally, through project design and implementation of standard wet-weather BMPs, as described in detail in Caltrans' BA and Manual of Construction Site Best Management Practices (Caltrans 2017), levels of

suspended sediment and turbidity during rain events are likely to be controlled sufficiently to avoid exposing salmonids to injurious durations and concentrations. Therefore, NMFS considers the potential amounts and duration of turbidity generated during rain events to be unlikely to reduce the fitness of listed salmonids in the action area.

Pollutants Associated with Stormwater Runoff and Spills
Contaminants generated by traffic, pavement materials, and airborne particles that settle may be carried by stormwater runoff into receiving waters. Stormwater runoff can introduce metals (e.g., copper, zinc, cadmium, lead and nickel) into waterways, where aquatic species can be affected. Copper and zinc are of particular concern due to their effect on salmonids at low concentrations. Dissolved copper and zinc in stormwater road runoff are difficult to remove, and have known negative effects on salmonids and other fishes (Sandahl et al. 2007).

The new bridge is designed to drain via sheet flow to the edges – similar to how the present bridge drains. However, the project will not increase the amount of traffic in the action area, and potential delivery of traffic-related contaminants is expected to remain similar to pre-project levels, which are unlikely to be harmful to fish due to the very low traffic volumes. Existing levels of roadway-type contaminant levels in the action area are unknown, but are likely to be well below harm thresholds in this rural watershed. Additionally, any rainwater that may contain contaminants would be immediately and significantly diluted upon entrainment into the flowing river. Therefore, NMFS does not expect reductions in fitness of individual listed salmonids residing in the action area due to toxic materials in stormwater runoff.

Accidental spills from construction equipment pose a significant risk to water quality, particularly for construction activities in or near watercourses, and at the onset of the rainy season when the first flush could trigger the discharge of spilled materials. However, in-stream activities would be suspended and all construction areas stabilized cleaned prior to the onset of the rainy season. Furthermore, the proposed minimization measures are expected to prevent chemical contamination during construction. Given the proven minimization measures and BMPs proposed, NMFS expects the likelihood of an accidental spill of contaminants reaching a waterway at a level that would harm fish to be improbable.

2.5.4 Effects to Critical Habitat

Streambanks and Streambed
Abutments for the new bridge will occupy areas well above the OHWM, so the new abutments and RSP will not impact streambank critical habitat, with the exception of riparian vegetation, as described below.

Covering of potential instream habitat with work pads and detour bridge abutments may create a temporary reduction in available habitat; however, as described in Section 2.5.1, the in-stream fills are relatively small and will be located away from the most functional habitat in the action area. Also, the fill will not persist beyond the first flows that move bedload, and if gravel is left behind after the structures are removed, it may provide a beneficial augmentation of course sediment in the action area. Therefore, NMFS believes that any impacts to the streambed habitat

due to temporary gravel fills will have inconsequential impacts to critical habitat in the action area.

Additionally, the new mid-channel pier will occupy a similar footprint to the existing pier, so any existing impact to streambed habitat will persist into the future. However, this footprint is extremely small relative the available streambed in the action area, and satellite images going back to 2004 show the pier out of the water during base flow periods. This position relative to the wetted low-flow channel seems likely to persist given that the pier is positioned on the inside bar of a ~90-degree confined bend. These same satellite images do not show any obvious hydraulic or geomorphic influence by the pier on the channel. Therefore, we expect the pier's continued displacement of streambed, and any hydraulic impacts, to be inconsequential to the value of critical habitat in the action area.

Impervious Surface
As a result of the project, there would be an estimated 0.2-acre increase in impervious surface, with approximately half that total at each of the two bridge approaches. New impervious surface has the potential to cause an increase in peak flow and higher runoff volumes that can lead to channel scouring and bank erosion which, in turn, can increase sediment and turbidity in receiving waters. It can also lead to decreased storage capacity and outflow efficiency, thereby negatively affecting floodplain processes that are important for salmonids. However, due to the relatively small amount of new impervious surface in a watershed that is almost entirely within forest and agricultural landscape, NMFS believes that no changes in peak flow or runoff volume would occur that could produce a meaningfully measurable impact to salmonid habitat.

Riparian Habitat
Approximately 0.18 acre of temporary riparian loss would occur to various herbaceous species, two willows of 9.0 and 6.8-inch diameter at breast height (DBH), and three cottonwoods of 12.4 to 18.4 DBH. These trees and vegetation will be replanted.

The new approach on the north end of the bridge will permanently displace 46 live alder trees varying from 6.0 to 16.5-inch DBH, and seven dead alder trees of 7.2 to 10.5-inch DBH. No conifers will be removed.

NMFS expects that the loss of these trees will have minimal impact on the functional values of existing riparian habitat given the small scale of the impact relative to the remaining trees in the action area. Additionally, none of the permanently removed trees provide overhanging cover and likely provide little to no shade to the channel. Plentiful vegetative cover will remain in the action area, and no measurable increase in water temperature or reduction in the amount of terrestrial food input into the river is anticipated. And because no conifers will be removed, there will be no impacts to the primary source of future large woody debris contributions to the river channel. Therefore, impacts to riparian vegetation are not expected to result in any fitness consequences to individual listed salmonids in the action area.

2.5.5 Combined Effects

The potential exists for simultaneous construction-related impacts to have a synergistic effect that is greater or different than each stressor acting alone. Simultaneous project impacts may include visual impacts from workers and equipment working near or over the watercourses at the same time when fish may be exposed to noise and vibration from construction equipment or pile driving activities. Fish may also be exposed to noise and/or visual disturbances during minor increases in turbidity when the work pads and detour bridge abutments are placed and removed. Most potential project impacts would not occur simultaneously due to logistics of bridge construction that require one phase of the project to be completed prior to starting another. Because combined effects are either unlikely or of very low intensity, NMFS does not expect any reductions in listed salmonid fitness from any combined effects of individual construction elements.

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.

NMFS expects ongoing adverse effects on critical habitat and individual listed salmonids in the action area due private water withdrawals from shallow wells or directly from tributary streams (NMFS 2016) that may lower the mainstem summer base flow. Lower summer base flows reduce available rearing habitat for juvenile salmonids and holding habitat for summer-run steelhead, and may contribute to higher daytime water temperatures due to lower volume of water available to moderate daily temperature swings. State and local groups are making focused efforts to reduce the impacts of private water withdrawals, but the related impacts are likely to persist into the near future before measurable benefits accrue.

Other ongoing adverse effects include abnormally high fine sediment and low volumes of large woody debris. These impacts are mainly related to historic timber harvest and timber roads. However, restoration efforts focused on road stabilization and recruitment of large wood are ongoing and are expected to improve habitat conditions in the action area over time.

Additionally, 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 versus 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.

NMFS has developed a Viable Salmonid Population (VSP) concept that includes the parameters of population abundance, population growth rate, population spatial structure, and population diversity for defining a viable population which is an independent Pacific salmonid population that has a negligible risk of extinction due to threats from demographic variation, local environmental variation, and genetic diversity changes over a 100-year time period. An ESU or DPS is typically made up of multiple independent populations. Therefore, NMFS must assess whether changes to VSP parameters of the independent populations affected by a proposed action results in a reduction in the numbers, reproduction, or distribution of the ESU or DPS as a whole.

2.7.1 Summary of Baseline, Status of the Species, and Cumulative Effects

We describe critical habitat for CC Chinook salmon and NC steelhead at the ESU/DPS scale as mostly degraded in section 2.2.2. Although there are exceptions, the majority of streams and rivers in these ESUs/DPS have impaired habitat. Additionally, critical habitat in the ESUs often lacks the ability to establish essential features due to ongoing and past human activities. While habitat generally remains degraded across the ESUs/DPS, restorative actions have likely improved the conservation value of critical habitat throughout the range of these ESUs/DPS.

CC Chinook in the action area belong to the Mattole River Population of the North Coastal Diversity Stratum. This population is likely above the depensation threshold and has a low risk of extinction (NMFS 2016).

Winter- and summer-run NC steelhead in the action area belong to the Mattole River Population of the Northern Coastal Diversity Stratum. This population is likely above the depensation threshold and has a low risk of extinction (NMFS 2016).

The cumulative effects of those state and private activities that occur in the Mattole River watershed, as discussed in the environmental baseline section, may continue to impair, but not preclude the recovery of, critical habitat in the action area. NMFS expects that ongoing improvements in legacy effects of poor timber harvest practices and agricultural development will result in improved habitat conditions for CC Chinook salmon and NC steelhead. Focused recovery actions as identified in the Recovery Plan (NMFS 2016) are expected to further improve habitat in the Mattole River. Additionally, due to the negligible nature of the proposed action's long-term impacts, NMFS does not expect the proposed action to exacerbate the effects of climate change on salmonids or their critical habitat in the action area.

2.7.2 Summary of Effects to Individual Salmonids

NMFS anticipates miniscule effects to CC Chinook salmon and NC steelhead and their critical habitats from expected levels of chemical contamination, temporary and permanent loss of riparian vegetation, disturbance of streambanks and the streambed due to construction access, increased sediment and turbidity during various activities and due to exposure to sound during

impact pile driving. However, adverse effects are likely due to capture, handling, and relocation efforts intended to protect fish from potential exposure to in-water work activity. NMFS predicts that handling of juvenile Chinook salmon and steelhead during relocation efforts could result in mortality of no more than one of each species during each of two construction seasons.

The loss of two juvenile NC steelhead and CC Chinook salmon individuals from either one or two cohorts is not expected to affect future adult returns in any cohort for either species. The loss of juveniles represents a miniscule percentage of the overall number of individuals in the population. The overall number of individuals in the population will likely provide a compensatory effect. Other areas of the Mattole River watershed are expected to continue to contribute to the population during the time period when some juveniles in the action area may be harmed or killed as a result of this proposed project. Therefore, NMFS does not expect any appreciable effects on VSP parameters, and, thus, the proposed action is not expected to reduce the survival and recovery of the NC steelhead DPS or the CC Chinook salmon ESU, and the project is unlikely to appreciably diminish the value of designated critical habitat for the conservation of the species.

2.7.3 Summary of Effects to Critical Habitat

NMFS has determined that the effects to critical habitat from the proposed action are limited to short-term effects on the streambed substrate, minor turbidity events, and inconsequential short-term and permanent effects of riparian vegetation loss. The new bridge will fully span the channel and 100-year floodplain. The proposed action would perpetuate any habitat impacts of the mid-channel pier by replacing it in kind. However, the pier occupies a miniscule portion of habitat and appears to have an inconsequential impact on the hydrology of the action area. The results of our analysis indicate that negative effects on critical habitat would be temporary or negligible. Therefore, changes to critical habitat due to the project are unlikely to appreciably reduce the likelihood of survival and recovery of the CC Chinook salmon ESU or the NC steelhead DPS.

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 CC Chinook salmon or NC steelhead or destroy or adversely modify their designated critical habitat.

2.9. Incidental Take Statement

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

prohibited taking under the ESA if that action is performed in compliance with the terms and conditions of this ITS.

2.9.1. Amount or Extent of Take

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

Take of juvenile Chinook salmon and steelhead may occur in the form of capture during fish relocation. NMFS expects that no more than two juvenile Chinook salmon, and 10 juvenile steelhead would be captured and relocated to adjacent habitat in each of the two construction seasons. Of these, no more than three percent of all relocated fish would be subject to potential injury or mortality, so we conservatively estimate that one juvenile of each species could be killed or injured in each construction season.

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 NC steelhead:

1. Undertake measures to ensure that harm and mortality to threatened Chinook salmon and steelhead resulting from fish relocation activities are low.
2. Ensure construction methods, minimization measures, and monitoring are properly implemented during construction.
3. Prepare and submit a post-construction report regarding the effects of fish relocation and construction activities.

2.9.4. Terms and Conditions

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

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

    a. Qualified biologists with expertise in the areas of anadromous salmonid biology shall conduct fish relocation activities associated with construction. Caltrans will ensure that all biologists working on the project are qualified to conduct fish

relocation in a manner which minimizes all potential risks to salmonids.

b. Salmonids shall be handled with extreme care and kept in water to the maximum extent possible during rescue activities. All captured fish must be kept in cool, shaded, and aerated water protected from excessive noise, jostling, or overcrowding or potential predators any time they are not in the stream, and fish will not be removed from this water except when released. Captured salmonids will be relocated as soon as possible to an instream location in which suitable habitat conditions are present to allow for adequate survival for transported fish and fish already present. Fish will be distributed between multiple areas if biologists judge that overcrowding may occur in a single area.

c. If any salmonids are found dead or injured, the biologist will contact NMFS biologist Mike Kelly by phone immediately at (707) 825-1622. The purpose of the contact is to review the activities resulting in the take and to determine if additional protective measures are required. All salmonid mortalities will be retained, placed in an appropriately-sized sealable plastic bag, labeled with the date and location, fork length, and be frozen as soon as possible. Frozen samples will be retained by the biologist until specific instructions are provided by NMFS. The biologist may not transfer biological samples to anyone other than the NMFS Northern California Office in Arcata, California without obtaining prior written approval from the South Coast Branch Chief. Any such transfer will be subject to such conditions as NMFS deems appropriate.

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

   a. Caltrans shall allow any NMFS employee(s) or any other person(s) designated by NMFS, to accompany field personnel to visit the project site during activities described in this opinion.

   b. Caltrans shall contact NMFS within 24 hours of meeting or exceeding take of listed species prior to project completion. Notify Mike Kelly by phone at 707-825-1622. This contact acts to review the activities resulting in take and to determine if additional protective measures are required.

   c. Caltrans shall make available to NMFS data from the hydroacoustic monitoring on a real-time basis (i.e., daily monitoring data should be accessible to NMFS upon request).

3. The following term and condition implements reasonable and prudent measure 3:

   a. Caltrans shall provide a written report to NMFS by January 15 of the year following construction of the project. The report shall be sent to NMFS via email to Mike.Kelly@noaa.gov or via mail to Mike Kelly at 1655 Heindon Road, Arcata, CA 95521. The reports shall contain, at a minimum, the following information:

      Construction related activities -- The report will include the dates construction began and was completed; a discussion of any unanticipated

effects or unanticipated levels of effects on salmonids, a description of any and all measures taken to minimize those unanticipated effects, and a statement as to whether or not any unanticipated effects had any effect on ESA-listed fish; the number of salmonids (by ESU and DPS) killed or injured during Project construction; and photographs taken before, during, and after the activity from photo reference points; and a qualitative assessment of the fate of individual salmonids exposed to noise above barotrauma thresholds.

Fish Relocation – The report will include a description of the location from which fish were removed and the release site(s) including photographs; the date and time of the relocation effort; a description of the equipment and methods used to collect, hold, and transport salmonids; the number of fish relocated by species; the number of fish injured or killed by species and a brief narrative of the circumstances surrounding salmonid injuries or mortalities; and a description of any problems which may have arisen during the relocation activities and a statement as to whether or not the activities had any unforeseen effects.

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).

While no conifers, which provide long-term instream habitat value, will be removed, the removed alder trees could have shorter term habitat value if placed in streams or left on the gravel bar where they would be mobilized by high winter flows. Therefore, NMFS recommends that any trees or large wood that are removed during construction be made available to habitat restoration projects, or that a reasonable number of felled trees be placed on the gravel bar. Caltrans should offer these trees to restoration partners such as the Mattole Salmon Group. Caltrans may contact NMFS if help with such coordination is desired.

2.11 Reinitiation of Consultation

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

2.12 "Not Likely to Adversely Affect" Determinations

Juvenile and adult SONCC coho salmon migrate through the action area seasonally, but have not been found in this reach of the Mattole River during summer snorkel surveys conducted by MSG (MSG 2018b). The absence of juvenile coho salmon in this reach may be explained by high water temperatures, the long distance upstream where coho salmon typically spawn, the smolt outmigration being typically over by mid-June, and the outright scarcity of coho salmon in the watershed. Additionally, CDFW provided an email (CDFW 2018) to Humboldt County that states: … *based on proposed timing of project implementation (June 15 – October 15) we do not feel that the project is likely to result in State-defined take of coho salmon (catch, capture, kill) because they are highly unlikely to be present during the work window proposed*. This email is provided as Appendix D in the BA. Therefore, the effects of the proposed action to individuals is expected to be discountable, as there are no individuals expected to be exposed.

Critical habitat for SONCC coho salmon is present in the action area. As described in the BA and in section 2.5.4 of this opinion, all impacts to salmonid habitat are inconsequential and will occur during the summer construction season, and we expect these impacts to be undetectable by the time coho salmon return to the action area in the fall or winter. Therefore, the effects of the proposed action to SONCC coho salmon critical habitat is expected to be discountable

Based on this analysis, NMFS concurs with Caltrans that the proposed action is not likely to adversely affect the subject listed species and designated critical habitat.

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

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

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

developed by the Pacific Fisheries Management Council (PFMC) and approved by the Secretary of Commerce.

3.1 Essential Fish Habitat Affected by the Project

Essential Fish Habitat is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S.C. 1802[10]). "Waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish, and may include areas historically used by fish where appropriate; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" means habitat required to support a sustainable fishery and a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle. The term "adverse effect" means any impacts which reduce the quality and/or quantity of EFH. Adverse effects may include direct or indirect physical, chemical, or biological alterations of the waters or substrates and loss of, or injury to, benthic organisms, prey species, and their habitats, and other ecosystem components. Adverse effects may be site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.910). The EFH consultation mandate applies to all species managed under a Fishery Management Plan (FMP) that may be present in the action area.

There is suitable habitat for juvenile salmonid rearing, adult salmonid holding, and adult salmon spawning in the action area. Habitat Areas of Particular Concern (HAPC) are described as complex channel and floodplain habitat, spawning habitat, thermal refugia, estuaries, and submerged aquatic vegetation. HAPCs exist in the action area as: spawning habitat and floodplain habitat.

3.2 Adverse Effects on Essential Fish Habitat

The potential effects to salmonid critical habitat have already been described in the *Effects* section. The adverse effects to EFH and HAPCs in the action area include:

1. Temporary reduction in available habitat due to presence of work pads and detour bridge abutments.
2. Noise and visual disturbance during impact pile driving, pier demolition, and associated construction activities.
3. Temporary reduction in water quality caused by increase in suspended sediments and turbidity during construction of the work pads and detour bridge abutments, and the first rain events following construction.
4. Temporary and permanent loss of riparian vegetation.

3.3 Essential Fish Habitat Conservation Recommendations

The anticipated adverse effects from the proposed action are temporary and minor. However, NMFS has the following EFH recommendation:

> While no conifers, which provide long-term instream habitat value, will be removed, the removed alder trees could have shorter term habitat value if placed in streams or left on the gravel bar where they would be mobilized by high winter flows. Therefore, NMFS

recommends that any trees or large wood removed during construction be made available to habitat restoration projects, or that a reasonable number of felled trees be left on the gravel bar. Caltrans should offer these trees to restoration partners such as the Mattole Salmon Group. Caltrans may contact NMFS if help with such coordination is desired.

3.4 Supplemental Consultation

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

4. 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 user of this opinion is Caltrans. Other interested users could include the applicant (Humboldt County), CDFW, and restoration partners such as the Mattole Salmon Group. Individual copies of this opinion were provided to Caltrans. The document will be available within two weeks at the NOAA Library Institutional Repository [https://repository.library.noaa.gov/welcome]. The format and naming adhere to conventional standards for style.

4.2 Integrity

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

4.3 Objectivity

Information Product Category: Natural Resource Plan

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

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

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

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

5. REFERENCES

Anderson, P. G., B. R. Taylor, and G. C. Balch. 1996. Quantifying the Effects of Sediment Release on Fish and their Habitats. Canadian Manuscript Report of Fisheries and Aquatic Sciences No. 2346, Department of Fisheries and Oceans.

Bajer, A. 2011. Final report. Summer Steelhead Survey, 2009 season. Mattole River Watershed. Submitted in fulfillment of 319(H) III Contract #08-603-551-0. Mattole Salmon Group.

Bartholow, J. M. 2005. Recent water temperature trends in the Lower Klamath River, California. North American Journal of Fisheries Management 25(1):152–162.

Bjornn, T. C. and D. W. Reiser. (1991). Habitat Requirements of Salmonids in Streams. American Fisheries Society Special Publication 19(837): 83-138.

Caltrans 2015. Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish.CTHWANP-RT-15-306.01.01. Division of Environmental Analysis. November 2015.

Caltrans. 2017. Construction Site Best Management Practices (BMP) Manual. May 2017.

Caltrans. 2020. Honeydew Bridge Replacement Project biological assessment. Local Assistance reference BRLS-5904 (024). September 2020. Eureka, California.

CDFW (California Department of Fish and Wildlife). 2018. Email from Jennifer Olson to Humboldt County describing likelihood of coho salmon being in the action area. April 26, 2018.

Fisheries Hydroacoustic Working Group. (2008). Agreement in Principal for Interim Criteria for Injury to Fish from Pile Driving Activities. Memorandum to NOAA Fisheries, U.S. Fish and Wildlife Service, California/Washington/Oregon Departments of Transportation, California Department of Fish and Game, and U.S. Federal Highways Administration. June 12, 2008.

Flosi, G. S. Downie, J. Hopelain, M. Bird, R. Coey, and B. Collins. 2010. California Salmonid Stream Habitat Restoration Manual. Part IV Fish Sampling Methods. California Department of Fish and Game Wildlife and Fisheries Division.

Good, T. P., R. S. Waples, and P. Adams (*editors*). 2005. Updated status of federally listed ESUs of West Coast salmon and steelhead. U.S. Department of Commerce, NOAA Tech. Memo. NMFS-NWFSC-66. 597 pp.

Hayes, D. B., C. P. Ferreri, and W. W. Taylor. 1996. Active fish capture methods. Pages 193–220 *in* B.R. Murphy and D.W. Willis, editors. Fisheries Techniques, 2nd edition. American Fisheries Society. Bethesda, Maryland. 732 pp.

Intergovernmental Panel on Climate Change (IPCC). 2014. Climate Change 2014 Synthesis Report AR5. Valencia, Spain.

Kelly, M. 2006. Personal observation.

Kelly, M. 2009. Personal observation.

Kelly, M. 2011. Personal observation.

Lindley, S. T., R. S. Schick, E. Mora, P. B. Adams, J. J. Anderson, S. Greene, C. Hanson, B. May, D. McEwan, R. B. MacFarlane, C. Swanson, and J. G. Williams. 2007. Framework for assessing viability of threatened and endangered Chinook salmon and steelhead in the Sacramento-San Joaquin Basin. San Francisco Estuary and Watershed Science 5: Article 4.

Mattole River and Range Partnership. 2009. Mattole Integrated Coastal Watershed Management Plan. Foresight 2020. 190 pp.

MSG (Mattole Salmon Group). 2011. Spawning Ground Surveys, 2010-2011 Season. Petrolia, California. California Department of Fish & Game Contract No. P0910506 Mattole River Salmonid Population Monitoring & U. S. Department of the Interior Bureau of Land Management Assistance Agreement No. BCA072012.

MSG. 2015. Mattole Watershed Juvenile Coho Salmon Distribution Monitoring 2013-2014. Petrolia, California. California Department of Fish and Wildlife Fisheries Restoration Grant Program, Contract No. P1210521.

MSG. 2018a. Final Report: Mattole River 2017-2018 Adult Salmon and Steelhead Abundance Monitoring. California Department of Fish and Wildlife Fisheries Restoration Grants Program, Contract No. P160534.

MSG. 2018b. Mattole River Juvenile Coho Salmon Summer Spatial Structure Monitoring 2017. Technical Report prepared by the Mattole Salmon Group in partial fulfillment of California Department of Fish and Wildlife Fisheries Restoration Grant Program, Contract No. P1610536.

McElhany, P., M. H. Ruckelshaus, M. J. Ford, T. C. Wainwright, and E. P. Bjorkstedt. 2000. Viable salmonid populations and the recovery of evolutionarily significant units. U.S.

Dept. Commerce, NOAA Technical Memorandum NMFS-NWFSC-42. 156 pp.

Moyle, P. B. 2002. Inland Fishes of California. Second Edition. University of California Press. Berkeley, California.

Newcombe, C. P. and J. O. T. Jensen. 1996. Channel Suspended Sediment and Fisheries: A Synthesis for Quantitative Assessment of Risk and Impact. North American Journal of Fisheries Management, *16*(4): 693-727.

NMFS (National Marine Fisheries Service). 2000. Guidelines for Electrofishing Waters Containing Salmonids Listed Under the Endangered Species Act. June 2000. Available: http://www.westcoast.fisheries.noaa.gov/publications/reference_documents/esa_refs/section4d/electro2000.pdf.

NMFS (National Marine Fisheries Service). 2016. Final Coastal Multispecies Recovery Plan. National Marine Fisheries Service, West Coast Region, Santa Rosa, California.

Perry, R.W., Risley, J.C., Brewer, S.J., Jones, E.C., and Rondorf, D.W., 2011, simulating daily water temperatures of the Klamath River under dam removal and climate change scenarios: U.S. Geological Survey Open-File Report 2011-1243. 78 pp.

PFMC (Pacific Fishery Management Council). 2014. Appendix A to the Pacific Coast Salmon Fishery Management Plan, as modified by Amendment 18. Identification and description of essential fish habitat, adverse impacts, and recommended conservation measures for salmon. Pacific Fishery Management Council, Portland, Oregon. September 2014. 196 pp. + appendices.

Piscitelli, A. 2012. Juvenile salmonid downstream migrant trapping on the mainstem Mattole River at Petrolia, California, 2011. Mattole Salmon Group report. 25p.

Redding, J. M., C. B. Schreck, and F. H. Everest. 1987. Physiological Effects on Coho Salmon and Steelhead of Exposure to Suspended Solids. *Transactions of the American Fisheries Society, 116*(5), 737-744.

Ricker, S., and C. W. Anderson. 2014. Freshwater Creek salmonid life cycle monitoring station. Annual report. California Department of Fish and Game, Anadromous Fisheries Resource Assessment and Monitoring Program. 50 Ericson Ct., Arcata, California. 42 p. plus appendices.

Sandahl, J. F., D. H. Baldwin, J. J. Jenkins, and N. L. Scholz. 2007. A Sensory System at the Interface between Urban Stormwater Runoff and Salmon Survival. *Environmental Science and Technology 41*(8):2998–3004.

Ward, D. M., K. H. Nislow, J. D. Armstrong, S. Einum, C. L. Folt. 2007. Is the Shape of the Density–Growth Relationship for Stream Salmonids Evidence for Exploitative Rather than Interference Competition? *Journal of Animal Ecology, 76*:135–138.

Weitkamp, L. A., T. C. Wainwright, G. J. Bryant, G. B. Milner, D. J. Teel, R. G. Kope, and R. S. Waples. 1995. Status review of coho salmon from Washington, Oregon, and California. NOAA Technical Memorandum NMFS-NWFSC-24. U.S. Department of Commerce, NOAA, Northwest Fisheries Science Center, Seattle, Washington. 258 pp.

Williams, T. H., S. T. Lindley, B. C. Spence, and D. A. Boughton. 2011. Status review for Pacific salmon and trout listed under the Endangered Species Act: Southwest. National Marine Fisheries Service, Southwest Fisheries Science Center, Santa Cruz, California.

Williams, T. H., B. C. Spence, D. A. Boughton, R. C. Johnson, L. Crozier, N. Mantua, M. O'Farrell, and S. T. Lindley. 2016. Viability assessment for Pacific salmon and steelhead listed under the Endangered Species Act: Southwest. 2 February 2016 Report to National Marine Fisheries Service – West Coast Region from Southwest Fisheries Science Center, Fisheries Ecology Division 110 Shaffer Road, Santa Cruz, California 95060.

Federal Register Notices Cited

50 CFR 402.02. Interagency Cooperation—Endangered Species Act of 1973, as amended.

50 CFR 402.14. Consultation Procedures—Endangered Species Act of 1973, as amended.

50 CFR 402.16. Reinitiation of Formal Consultation—Endangered Species Act of 1973, as amended.

64 FR 24049. National Marine Fisheries Service. Final Rule and Correction. Designated Critical Habitat; Central California Coast and Southern Oregon/Northern California Coasts Coho Salmon. May 5, 1999.

70 FR 37160. National Marine Fisheries Service. Final Rule. Endangered and Threatened Species: Final Listing Determinations for 16 ESUs of West Coast Salmon, and Final 4(d) Protective Regulations for Threatened Salmonid ESUs. June 28, 2005.