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

September 8, 2023 **Refer to NMFS No:** WCRO-2023-00778

Julie East
Senior Environmental Scientist - Branch Chief E1
North Region Environmental
California Department of Transportation, District 1
1656 Union Street
Eureka, California 95501-3700

Re: Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson–Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Eel River Bridge Seismic Retrofit Project in Humboldt County, California [EA 01-0A111/EFIS 01-1600-0148]

Dear Ms. East:

Thank you for your letter of April 24, 2023, requesting initiation of consultation with NOAA's National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 et seq.) for the California Department of Transportation's (CalTrans)[1] proposed Eel River Bridge Seismic Retrofit Project (Project).

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

The enclosed biological opinion describes NMFS' analysis of effects on individual threatened California Coastal (CC) Chinook salmon (*Oncorhynchus tshawytscha*) and threatened Northern California (NC) steelhead (*O. mykiss*) and their designated critical habitat, as well as designated critical habitat for threatened Southern Oregon/Northern California Coast (SONCC) coho salmon (*O. kisutch*) in accordance with section 7 of the ESA. 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 CC Chinook salmon Evolutionarily Significant Unit (ESU) or the NC steelhead Distinct Population Segment (DPS), nor is the Project likely to destroy or adversely modify designated critical habitat for these species. NMFS expects the proposed action would result in incidental take of CC Chinook salmon and NC steelhead. An incidental take statement with terms and conditions is included with the enclosed biological

[1] Caltrans is acting as the lead agency for ESA Section 7(a)(2) and MSA Section 305(b) formal consultation under National Environmental Policy Act Assignment from Federal Highway Administration (327 Memorandum of Understanding (MOU) 2022 and 326 MOU 2022). As assigned by the MOUs, Caltrans is responsible for the environmental review, consultation and coordination on this project.

opinion. NMFS concurs with Caltrans' determination that the Project is not likely to adversely affect individual SONCC coho salmon or their critical habitat.

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

Please contact Jeffrey Jahn of the NMFS Northern California Office in Arcata, California at (707)-825-5173, or Jeffrey.Jahn@noaa.gov if you have any questions concerning this consultation, or if you require additional information.

Sincerely,

Alecia Van Atta
Assistant Regional Administrator
California Coastal Office

Enclosure

cc: Jeff Wright, Caltrans, Eureka, California
Amon Armstrong, Caltrans, Eureka, California
e-file FRN 151422WCR2023SR00122

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

Eel River Seismic Retrofit Project

Humboldt County, California

NMFS Consultation Number: WCRO-2023-00778
Action Agency: California Department of Transportation

Affected Species and NMFS' Determinations:

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

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

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

Issued By:

Alecia Van Atta
Assistant Regional Administrator
California Coastal Office

Date: September 8, 2023

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1. INTRODUCTION

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

1.1. Background

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

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

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

1.2. Consultation History

In April 2021, the California Department of Transportation (Caltrans) requested technical assistance from NMFS to evaluate the potential effects of the Eel River Bridge Seismic Retrofit Project on listed fish species. On June 15, 2022, NMFS Fisheries Biologist Mike Kelly visited the site with Caltrans biologists and California Department of Fish and Wildlife (CDFW) fisheries biologists. Caltrans corresponded with NMFS for clarification of potential effects to EFH from April 21, 2022, to April, 2023.

On April 25, 2023, NMFS received an email from Caltrans that included: 1) a letter requesting initiation of section 7 consultation for potential impacts on Southern Oregon/North California Coast (SONCC) coho salmon, California Coastal (CC) Chinook salmon, and Northern California (NC) steelhead and their designated critical habitats; and 2) the April 2023 Biological Assessment (BA) for the Eel River Bridge Seismic Retrofit Project (Project) No. EA 01-0A111/EFIS 01-1600-0148. This package included sufficient information to initiate consultation for the Project.

On July 5, 2022, the U.S. District Court for the Northern District of California issued an order vacating the 2019 regulations that were revised or added to 50 CFR part 402 in 2019 ("2019 Regulations," see 84 FR 44976, August 27, 2019) without making a finding on the merits. On September 21, 2022, the U.S. Court of Appeals for the Ninth Circuit granted a temporary stay of the district court's July 5 order. On November 14, 2022, the Northern District of California issued an order granting the government's request for voluntary remand without vacating the 2019 regulations. The District Court issued a slightly amended order two days later on November 16, 2022. As a result, the 2019 regulations remain in effect, and we are applying the 2019 regulations here. For purposes of this consultation and in an abundance of caution, we considered whether the substantive analysis and conclusions articulated in the biological opinion and incidental take statement would be any different under the pre-2019 regulations. We have determined that our analysis and conclusions would not be any different.

1.3. Proposed Federal Action

Under the ESA, "action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies (see 50 CFR 402.02). The project proposes to seismically retrofit and replace portions of the Eel River Bridge in Humboldt County, California.

The proposed action is described in detail in Caltrans' BA (Caltrans 2023). Project elements that may affect coho salmon, Chinook salmon, or steelhead or their designated critical habitats, 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 and their construction contractor(s).

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

1.3.1. Construction Activities

Construction is anticipated to start in 2026 and is estimated to take approximately two to three years to complete. Construction activities associated with bridge work require access from the ground and river channel substrate along both sides of the bridge. The project would involve vegetation removal, access road construction and grading, temporary river trestle construction including pile driving, installation of a clear water diversion system, and aquatic species relocation. In addition, the removal of gravel-surface exposed rebar and concrete debris from the 1964 flood and bridge collapse may occur within the river channel adjacent to the bridge.

After installing a debris catchment system below the bridge and above the river channel, the existing through-truss bridge would be demolished and removed. The existing oblong piers would be replaced by smaller cylindrical columns. New piers, seismic joints, base isolation bearings, and a new Pre-Stressed, Cast-In-Place Post-Tensioned box girder bridge would be constructed. Seismic retrofits would occur at the footings of Piers 6, 7, and 8 and Abutment 9. Construction of a retaining wall, installation of a drainage inlet and stormwater dissipators, and construction of the realigned northbound roadway approach to Abutment 1 on the south bank of the river would then occur.

Construction access and staging areas are available in the medians between the northbound and southbound bridges on either side of the Eel River. Northbound traffic would be detoured to the southbound bridge until project completion.

- Remove the existing through-truss bridge from Abutment 1 to Pier 5.
- Remove concrete and steel debris present on channel surface.
- At Pier 5, construct new pier, seismic joint and base isolation bearing.
- Construct a Pre-Stressed, Cast-In-Place Post-Tensioned box girder bridge from Abutment 1 to Pier 5.
- Retrofit footings at Piers 6, 7, and 8.
- Retrofit Abutment 9.
- Strengthen overhang and upgrade bridge railing.
- Place 1" polyester overlay from Abutment 1 to Abutment 9.
- Install drainage inlet and rock slope protection (RSP) dissipator.
- Construct re-aligned northbound roadway approach to Abutment 1.
- Place erosion control and revegetate access roads.

1.3.1.1 Staging and Access Roads

The project would require temporary access road construction. Access beneath the bridge would likely be from both sides of the river. Vegetation removal and light grading would be needed to construct the roads below or directly adjacent to the northbound bridge. Once all work is completed, the temporary access roads would be removed, and the embankments restored and revegetated.

1.3.1.2 Riparian Vegetation Removal

Due to construction access, the proposed project would temporarily impact approximately 0.56 acre of upland riparian vegetation. All vegetation removal would occur only as needed to allow equipment access and construction. Most of the vegetation removed would be understory species immediately adjacent to the existing bridges where it is subject to periodic disturbance from bridge maintenance and public recreational activities (e.g., fishing, off- roading) and ongoing noise and visual impacts from the highway. Temporary road access to the river bar would require tree removal on both sides of the river.

1.3.1.3 Trestles

If construction equipment is required to ford wetted channels or water crossings, temporary bridges on spread footing, gravel pads, or trestles may be constructed. Temporary bridges or trestles, anticipated to be 20 to 30 feet wide, would be installed prior to any pier foundation or scour remediation work. Approximately 20 to 30 temporary H-pile or small diameter pipe piles (≤ 24-inches) would be possible. If piles are required for the temporary trestle, they would be small diameter piles (≤ 24-inches) driven in the gravel bars. Rows of piles would likely be spaced every 30 feet along the length of the trestle, and 8 feet apart within rows.

1.3.1.4 Construction Equipment

Typical construction equipment used for this project type would include pavers, cranes, drills, drill rigs, hoe rams, pile drivers, vibratory hammers, jackhammers, excavators, backhoes, manlifts, cranes, pickup trucks, hauling and dump trucks, concrete trucks, boom trucks, compactors, portable generators, saws, pumps, site trailers, storage boxes, and mobile filtration boxes. Mobile filtration boxes may be used for dewatering needs in lieu of sediment basins.

1.3.1.5 Cofferdam Installation and Clear Water Diversion

Construction site dewatering may be required during pier construction, retrofit work, and demolition of existing pier footings. Cofferdam installation would occur within the wetted river channel using vibratory hammers and sheet piles or aqua barriers (large water bladders) to dewater the areas around each pier foundation. The sheet piles would likely be 5 to 10 feet outside the footprint of existing foundations. Instead of using cofferdams, the contractor may elect to excavate to the necessary depth below grade and dewater the work area using pumps. Water pumped from the excavation or cofferdam would likely be pumped to settlement tanks or a sedimentation basin located on the river bar. Sheet pile cofferdams are constructed using cranes, vibratory pile hammers, and excavators.

Water would then be pumped out of the cofferdam. Since the cofferdam might experience groundwater intrusion, continuous pumping may be necessary. In this scenario, water would likely be pumped to a sediment basin or tank. Cofferdams may also be constructed at bent locations on land if water intrusion is anticipated.

A clear water diversion system would be installed seasonally, if necessary, to divert water around pier construction or retrofit areas. The diversion would be approximately 345 feet long. As mentioned above the Clear water diversions consist of a system of structures and measures that intercept clear surface water upstream from a project work area and transport it around the work area to a downstream discharge location. Water generated from dewatering operations from cofferdams would be disposed of per the *Caltrans Field Guide to Construction Site Dewatering* (Caltrans 2014) and the authorized Dewatering Plan (Caltrans 2023).

1.3.1.6 Fish Relocation

Fish may be present within the limits of the diversion. If so, a qualified biologist will relocate fish prior to implementing the diversion. The contractor will be required to provide Caltrans an Aquatic Species Relocation Plan (as part of the Construction Site Dewatering and Diversion Plan) for approval prior to any diversion. Caltrans will provide this plan to NMFS and the CDFW for review to ensure that the plan is consistent with the assumptions made in this opinion.

If any salmonids are removed from the work area, they would be relocated to nearby suitable habitat downstream of the diversion. Fish exclusion and relocation would likely be conducted using seining gear, electrofishing gear, or dip nets. If electrofishing is necessary, it would be performed by a qualified fisheries biologist with appropriate training and experience in electrofishing techniques. Excluding temperature and conductivity limits, 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* (CDFW 2010).

All salmonids removed from the work area would be relocated to nearby suitable habitat downstream of the diversion. If unexpected life stages of salmonids are observed (e.g., adults or smolts), or unforeseen injury or mortality of federally or state listed salmonids occurs, NMFS and CDFW would be contacted immediately. Once aquatic species have been relocated from the work area, the temporary diversion would be constructed using clean gravel. A combination of plastic liner, gravel bags, a water bladder, and/or other impermeable materials would be used to direct water. Dewatering drawdown would occur incrementally to fully assess any fish not captured during initial efforts and to avoid stranding.

The biologist would be present during all phases of in-stream construction to assist with relocation efforts as they arise. Additionally, provisions for dewatering and aquatic species relocation would include the following measures:

- All electrofishing would take place as early in the day as practicable.

- The diversion would be of sufficient length to avoid hydroacoustic impacts (injury) to fish from activities associated with retrofit of the bridge, which is estimated to be no less than 115 feet and up to 345 linear feet from the source of impact noise disturbance (Caltrans 2023).

- The orientation, siting and type of fish screens used for dewatering operations would be selected to prevent entrapment.

- Any gravel added to the channel to create a flat working surface would be removed prior to removal of the diversion, except river rock.

- Water generated from the dewatering operations from cofferdams would be disposed of per the *Field Guide to Construction Site Dewatering* (Caltrans 2014) and the Caltrans-authorized Dewatering Plan.

1.3.1.7 Demolition and Removal of Bridge Deck and Piers

All structure removal work would be performed in accordance with approved demolition and lead compliance plans. Removal would begin with torch-cutting and removal of bracing members. After removing the bracing, the truss steel above the deck would be removed.
The bridge deck concrete would be broken with a hydraulic ram mounted to an excavator (hoe-ram). Concrete rubble would fall to a containment system (possibly suspended by a crane) before being broken up further. Once deck removal is completed, steel girders would be removed by crane. Abutment and pier demolition would be the final demolition operation. Work on Abutment 1 would not likely require shoring (earth-retaining structures). Pier removal could require a sheet pile cofferdam to control water and remove the pier below original ground. Cofferdam installation is discussed above.

1.3.1.8 Falsework and Replacement

As the substructure work moves ahead into Span 2, falsework construction for the new bridge would likely begin in Span 1. Five spans of falsework bents could be expected for each of the four bridge spans, potentially extending a total of 781 feet into the river channel. Each falsework bent would likely be founded on driven steel piles constructed with cranes, all-terrain-type forklifts, impact pile hammers, and man-lifts. At this time, the type of steel pile determined to be most feasible would be either small diameter pipe piles (assuming 24-inch diameter x 40 feet long) or H-piles. If 24-inch pipes are used, there would be between 95 and 100 per trestle. If H-piles are used, there would be approximately 150 to 160 per trestle. Each bridge span of stringers and soffit decking could take one to two weeks to complete, depending on crew size and falsework design. Upon completion of the superstructure, the abutment would be backfilled, and the bridgework equipment removed.

Currently, the foundation type has not been selected, although it is anticipated the footings could consist of 36-inch-diameter, Cast-In-Steel-Shell (CISS) piles or 12-foot-diameter, Cast-In-Drilled-Hole (CIDH) pile shafts with driven steel casings. The same means and methods for bridge pier removal would apply to the new foundation construction. Reinforcing steel, formwork, and concrete for either type of foundation type would be placed from the trestle deck. Concrete would be delivered in typical mixer trucks and placed with a concrete pump. Concrete pouring for the pier shafts would likely be done inside the cofferdams, with the sheet pile being extracted after completion.

1.3.1.9 Bridge Retrofit

Due to the need to share trestle access, all retrofit and new substructure work would likely follow bridge removal operations. Substructure work would begin with installation of a shoring system that would be similar in all respects to the pier removal work described above. Substructure retrofit work is anticipated to consist of pile shaft enlargement and steel casings around the existing pier. As the substructure retrofit work moves ahead in station, the new foundation work could follow starting at Abutment 1, then Piers 2, 3, 4, and 5.

1.3.1.10 Stormwater Drainage

The new bridge spans would be built to allow stormwater to be conveyed to Abutment 1, where it would be directed into a bioswale or Rock Slope Protection (RSP) pad well above the ordinary high-water mark (OHWM) at the top of bank. All discharges from the new impervious surface would be treated by bio-infiltration through organic material before reaching waterways/floodplain, as required per the 2012 National Pollutant Discharge Elimination System permit. Soil below the bio- swale and RSP would primarily be sandy-loam and very conducive to percolation and filtration.

1.3.1.11 Hydroacoustic Monitoring

Caltrans would set up the diversion and utilize block nets and seines to exclude fish from the range of potential impacts due to pile driving. If river conditions preclude fish exclusion, hydroacoustic monitoring may be conducted during construction activities that have the potential to produce impulsive sound waves within the Eel River. This may include work that requires land-based pile driving and hoe ramming or jackhammering associated with bridge widening/removal and partial removal of rock.

If needed, a *Hydroacoustic Monitoring Plan* would be prepared by a qualified hydroacoustic specialist prior to construction and the draft plan would be provided to NMFS for review. The *Hydroacoustic Monitoring Plan* would describe the monitoring methodology, frequency of monitoring, positions hydrophones would be deployed, techniques for gathering and analyzing data, quality control measures, and reporting protocols.

1.3.1.12 Revegetation, Plant Establishment, and Invasive Weed Control

After all construction materials are removed, the project area would be restored to a natural setting by grading, placing erosion control, and replanting with native species. A Revegetation and Monitoring Plan would be developed that outlines methods that would be implemented to restore all areas temporarily impacted by construction. Replanting would be subject to a plant establishment period as defined by project approvals, which would require Caltrans to adequately water plants, replace unsuitable plants, and remove invasive weeds. Caltrans would also implement a program of invasive weed control in all areas of soil disturbance caused by construction to improve habitat for native species in and adjacent to disturbed soil areas within the project limits.

1.3.2. Conservation Measures and Best Management Practices

Water pollution control scheduling and methods will be specified in the contractor’s Storm Water Pollution Prevention Plan. 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. Refer to Caltrans’ BA and the above-referenced manuals for details.

2. Endangered Species Act: Biological Opinion And Incidental Take Statement

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

The designations of critical habitat for CC Chinook salmon and NC steelhead use the term primary constituent element (PCE) or essential features. The 2016 final rule (81 FR 7414; February 11, 2016) that revised the critical habitat regulations (50 CFR 424.12) replaced this term with physical or biological features (PBFs). The shift in terminology does not change the approach used in conducting a "destruction or adverse modification" analysis, which is the same regardless of whether the original designation identified PCEs, PBFs, or essential features. In this biological opinion, we use the term PBF to mean PCE or essential feature, as appropriate for the specific critical habitat.

The ESA Section 7 implementing regulations define effects of the action using the term "consequences" (50 CFR 402.02). As explained in the preamble to the final rule revising the definition and adding this term (84 FR 44976, 44977; August 27, 2019), that revision does not change the scope of our analysis, and in this opinion we use the terms "effects" and "consequences" interchangeably.

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

- Evaluate the rangewide status of the species and critical habitat expected to be adversely affected by the proposed action.
- Evaluate the environmental baseline of the species and critical habitat.
- Evaluate the effects of the proposed action on species and their critical habitat using an exposure–response approach.
- Evaluate cumulative effects.
- In the integration and synthesis, add the effects of the action and cumulative effects to the environmental baseline, and, in light of the status of the species and critical habitat, analyze whether the proposed action is likely to: (1) directly or indirectly reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species; or (2) directly or

indirectly result in an alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species.

- If necessary, suggest a reasonable and prudent alternative to the proposed action.

2.2. Rangewide Status of the Species and Critical Habitat

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

2.2.1. Species Description and General Live History

2.2.1.1 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.

2.2.1.2 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 between March 1 and July 1 each year, although they have been observed as late as September (Ricker et al. 2014).

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 Recovery Plan for SONCC Coho Salmon (NMFS 2014) and 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).

2.2.2.1 Status of CC Chinook Salmon

2.2.2.1.1 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). The new information available since 2016 indicates that recent trends across the ESU have been mixed and that overall extinction risk for the ESU is moderate and has not changed appreciably since the previous viability assessment (Spence 2022).

2.2.2.1.2 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.

2.2.2.2 Status of NC Steelhead

2.2.2.2.1 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. The new information for NC steelhead available since the previous viability assessment indicates that overall extinction risk is moderate and has not changed appreciably since the prior assessment (Spence 2022).

2.2.2.2.2 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).

2.2.2.3 Status of Critical Habitats

NMFS considers the action area to be designated critical habitat for SCC Chinook salmon and NC steelhead.

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). 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.

2.2.3. Factors Responsible for the Decline of Species and Degradation of Critical Habitat

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. Late 1980s and early 1990s droughts and unfavorable ocean conditions were identified as further likely causes of decreased abundance (Good et al. 2005). 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.

2.2.4. Global Climate Change

Another factor affecting the range wide status of CC Chinook salmon and NC steelhead, and aquatic habitat at large is climate change. Recent work by the NMFS Science Centers ranked the relative vulnerability of west-coast salmon and steelhead to climate change. In California, listed coho and Chinook salmon are generally at greater risk (high to very high risk) than listed steelhead (moderate to high risk) (Crozier et al 2019). Impacts from global climate change are already occurring in California. For example, average annual air temperatures, heat extremes, and sea level increased in California over the last century (Kadir et al. 2013). Snowmelt from the Sierra Nevada has declined (Kadir et al. 2013). Although CC Chinook salmon and NC steelhead are not dependent on snowmelt driven streams, they have likely already experienced some detrimental impacts from climate change through lower and more variable stream flows, warmer stream temperatures, and changes in ocean conditions. California experienced well below average precipitation during the 2012-2016 drought, as well as record high surface air temperatures in 2014 and 2015, and record low snowpack in 2015 (Williams et al. 2016). Paleoclimate reconstructions suggest the 2012-2016 drought was the most extreme in the past 500 to 1000 years (Williams et al. 2016; Williams et al. 2020; Williams et al. 2022). Anomalously high surface temperatures substantially amplified annual water deficits during 2012-2016. California entered another period of drought in 2020. These drought periods are now likely part of a larger drought event (Williams et al. 2022). This recent long-term drought, as well as the increased incidence and magnitude of wildfires in California, have likely been exacerbated by climate change (Williams et al. 2020, Williams et al. 2022, Diffenbaugh et al. 2015, Williams et al. 2019).The threat to CC Chinook salmon and NC steelhead from global climate change is expected to increase in the future. Modeling of climate change impacts in California suggests that average summer air temperatures are expected to continue to increase (Lindley et al. 2007; Moser et al. 2012). Heat waves are expected to occur more often, and heat wave temperatures are likely to be higher (Hayhoe et al. 2004; Moser et al. 2012; Kadir et al. 2013). Total precipitation in California may decline and the magnitude and frequency of dry years may increase (Lindley et al. 2007; Schneider 2007; Moser et al. 2012). Similarly, wildfires are expected to increase in frequency and magnitude (Westerling et al. 2011; Moser et al. 2012). Increases in wide year-to- year variation in precipitation amounts (droughts and floods) are projected to occur (Swain et al. 2018). Estuarine productivity is likely to change based on changes in freshwater flows, nutrient cycling, and sediment amounts (Scavia et al. 2002; Ruggiero et al. 2010).

In marine environments, ecosystems and habitats important to juvenile and adult salmonids are likely to experience changes in temperatures, circulation, water chemistry, and food supplies (Brewer and Barry 2008; Feely 2004; Osgood 2008; Turley 2008; Abdul-Aziz et al. 2011; Doney et al. 2012). Some of these changes, including an increased incidence of marine heat waves, are likely already occurring, and are expected to increase (Frölicher, et al. 2018). In fall 2014, and again in 2019, a marine heatwave, known as "The Blob"[2], formed throughout the northeast

[2] https://www.fisheries.noaa.gov/feature-story/new-marine-heatwave-emerges-west-coast-resembles-blob

Pacific Ocean, which greatly affected water temperature and upwelling from the Bering Sea off Alaska, south to the coastline of Mexico. The marine waters in this region of the ocean are utilized by salmonids for foraging as they mature (Beamish 2018). Although the implications of these events on salmonid populations are not fully understood, they are having considerable adverse consequences to the productivity of these ecosystems and presumably contributing to poor marine survival of salmonids.

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 encompasses the entire construction footprint that would be subject to direct impacts from ground disturbance and vegetation clearing, including where staging and material storage may occur. This includes U.S. 101 roadway and shoulders from PM R53.7 to PM M54.2, access road areas under the bridge in vegetated areas surrounding Eel River, and the staging areas between the bridges. The action area also includes the Eel River channel, and its adjacent wetlands and waters within the vicinity of the bridge, that could be exposed to localized, minor pulses of turbidity stemming from ground disturbance, and the extent of potential underwater noise transmittal that could result in hydroacoustic impacts to fish.

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 higher water temperatures and reduced flows.

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

Chinook salmon in the action area belong to the Lower Eel/South Fork population of the CC Chinook salmon ESU, which the NMFS Coastal Multispecies Recovery Plan suggests is likely well below the number needed to be at a low risk of extinction (NMFS 2016). Steelhead in the action area belong to the South Fork Eel River population of NC steelhead, which is also likely well below the number needed to be at a low risk of extinction (NMFS 2016).

Chinook salmon and steelhead trout at least transiently occupy the mainstem Eel River and associated tributaries, using the area primarily as migration corridors (Yoshiyama and Moyle 2010). High summer water temperatures most likely exclude Chinook salmon and all but the hardiest steelhead from the mainstem Eel River during the summer and fall months (June through September) (Yoshiyama and Moyle 2010). However, it is possible that Chinook salmon and steelhead more substantively occupy the middle mainstem Eel River area during seasons when water temperatures are low. There is virtually no rain in summer, so low flows occur May through October.

- Adult Chinook salmon are likely to be present in the action area from October to January.
- Adult steelhead are likely to be present in the action area from November to June.
- Juvenile Chinook salmon are likely to be present in the action area until mid-June.
- Juvenile steelhead may be present in Eel River within the action area year-round.

Juvenile salmonid spatial structure surveys were conducted on the Mainstem Eel River in the action area between June and October from 2013 to 2016 (Lam and Powers 2016). Spatial structure surveys focus on a population's abundance distributed among available or potentially available habitats. No salmonids were observed in the project area during the surveys; this was attributed to the maximum daily temperatures exceeding 72°F (22 degrees Celsius) and thermal tolerances of salmonids. In 2022, snorkel surveys were conducted in the Eel River to assess fish presence and document temporal trends of target species. The survey area was approximately 1,000 feet of the main Eel River, from 200 feet upstream from the northbound bridge to the first pool below the southbound bridge. No salmonids were observed within habitats immediately adjacent to the NB bridge. Seven juvenile (1+) steelhead, one juvenile Chinook salmon, and four unidentified juvenile salmonids were observed in the lower part of the survey reach.

The condition of CC Chinook salmon and NC steelhead critical habitats, specifically the habitats' ability to provide for their conservation, is degraded from conditions known to support viable populations. During the summer months of construction activities, it is likely that low river flows will limit summer habitat within the action area for salmonids. However, if flows are higher than expected, tributaries might provide cool water refuge within the action area for these species. Stream habitat within the action area consists of a long riffle under the bridge that transitions into a run before passing the southbound bridge.

Streams surveyed within the action area have a dominant substrate of cobble and gravel, with sand and exposed compacted soils also present, to a minor extent. The tributary streams and low flow channel of the Eel River are unvegetated. The riverine portion of the active channel of the Eel River above the low flow channel supports sparse herbs and willow seedlings. The riverine community transitions to montane riparian or fresh emergent wetland vegetation communities within the active channel or at the ordinary high water mark (OHWM) of the Eel River and its tributaries. Floodplain terrace deposits border the mainstem Eel River where riparian forests of red alder (*Alnus rubra*), willow (*Salix spp*.), black cottonwood (*Populus trichocarpa*), and bigleaf maple trees (*Acer macrophyllum*) are the dominant forest type. This area is characterized by unstable soils that are susceptible to surface erosion (CDFW 2010).

During the rainy season, the river flows are high and turbid in the action area and little to none of the gravel bars or un-vegetated banks are exposed. During this period, the river supports the migration of special status anadromous salmonids and other fish species that migrate upstream to spawn. It is also during this time that juvenile life stages of salmonids migrate out to sea as smolts, or to the estuary to rear for a few weeks or several months before entering the ocean. During the dry season, river discharge is considerably reduced and most of the riverine habitat is exposed gravel and sand with sparse vegetation.

The topography of the action area consists of a relatively level floodplain and steep banks of the Eel River and floodplain terrace deposits above the banks of the Eel River. The project footprint generally runs parallel to U.S. 101 and the Eel River passes through the center of the project footprint. Elevations range from 40 feet (12 meters) above mean sea level in the center of the channel to 130 feet (40 meters) above mean sea level along U.S. 101.

2.4.2. Factors Affecting Species in the Action Area

The Eel River watershed is the third largest watershed in California and drains approximately 3,684 square miles (5,929 square km) of the California North Coast. The headwaters of this river system stem from Lake Pillsbury and flow over 800 river miles (1,287 km) to the Pacific Ocean near the cities of Fortuna and Ferndale (CDFW 2010a). At the project location, the Eel River drains from east to west, while its tributaries drain from south to north. Hydrology for the features within the action area is generally provided by sheet flow, snow melt, springs, and groundwater.

The floods of 1955 and 1964 catastrophically impacted the mainstem river by depositing large amounts of sediment in the channel (CDFW 2010a). The river reach of the action area has a general gradient of less than 2% and the aquatic habitat is homogenous and simplified lacking large woody debris, boulders, and other natural channel roughness elements. The most complex instream habitat within the project footprint and general action area appears to be the result of bridge pier scour and off-channel habitat presumably created by bridge debris (concrete) from the 1964 bridge collapse. Filling of pools by sediment is an issue in every creek CDFW surveyed in the upper mainstem Eel River subbasin (CDFW 2010a). In addition to the Eel River, there are two small ephemeral drainages adjacent to the highway and within the action area that flow to the Eel River at the river's south bank. These drainages provide hydrology that support wetlands and are located adjacent to the two bridges.

During spatial structure surveys from 2013 to 2016, recorded maximum water temperatures in the mainstem reaches ranged from 62.6 to 75.2°F (17 to 24°C) with an average of 68.4°F (20.2°C) and a median of 68°F (20°C). The majority of the action area, including where dewatering and work would occur, had a maximum recorded temperature of >71.6°F (22°C).

The upstream and downstream portions of the action area had recorded temperature maximums of 19-22°C (66.2-71.6°F). Caltrans biologists deployed temperature data loggers during the summer of 2022 to obtain river temperatures. Temperatures within the action area were determined to be at or above sub-optimal and lethal limits for salmonid species during most of the in-stream work period of June 15 to October 15.

An additional factor affecting listed salmonids in the action area are the presence of other invasive species, especially the Sacramento pikeminnow (*Ptychocheilus grandis*). It is a large piscivorous cyprinid (minnow) native to the Sacramento-San Joaquin drainage and several smaller coastal drainages in California. Pikeminnow were introduced into the Eel River system in Pillsbury Lake in 1979. Adult pikeminnow are known to consume native salmonid species and native amphibians. Pikeminnow may compete with or prey directly on salmonids, but predation is typically associated with larger adult animals (Brown and Moyle 1981). Larger pikeminnow prefer low velocity habitat in deeper water, typically deeper than one meter. These larger animals will use deep pools as daytime refugia, migrating into shallower riffle habitat to feed (Harvey and Nakamoto 1999). Adult Sacramento pikeminnow at the upstream limit of their range in one Eel River tributary moved downstream up to 14.3 miles (23 km) during the winter and tended to return to their original position the following spring, where they remained through the summer (Harvey and Nakamoto 1999). Pikeminnow not only prey directly on juvenile steelhead but displace them from pool habitat into less desirable riffle habitat, presumably resulting in reduced growth and survival (Moyle et al., 2008). During snorkel surveys for salmonids in June 2022, Caltrans biologists observed over 1,000 Sacramento pikeminnow of various age classes within 500 feet of the Eel River Bridge. In July 2022, approximately 500 pikeminnow were observed 500 feet downstream from the northbound bridge. Large adult pikeminnow were observed occupying the bridge pier scour pools within the action area. Also, hundreds, if not thousands of larval fish were also observed; assumed to be California roach or pikeminnow. Bullfrogs have also been detected within the action area.

2.5. Effects of the Action

Under the ESA, "effects of the action" are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action (see 50 CFR 402.02). A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (see 50 CFR 402.17). In our analysis, which describes the effects of the proposed action, we considered the factors set forth in 50 CFR 402.17(a) and (b).

2.5.1. Fish Collection and Relocation Activities

To facilitate completion of the project, portions of the Eel River will need to be dewatered during each construction season. As discussed above, a maximum amount of 345 linear feet will be dewatered each construction season. Caltrans proposes to collect and relocate fish in the work areas prior to, and during dewatering, to avoid fish stranding and exposure to construction activities. As detailed above, Caltrans proposes to construct a temporary stream diversion in order to protect the creek from construction work. As described in Section 2.4 of this opinion, fish numbers at the location can vary between years, but generally the water temperatures during the in-water work season (June 15 – October 15) are around or over the upper limits of tolerance for salmonids. Presently, the instream habitat in the area to be dewatered lacks significant complex cover, which may allow the use of a seine and block nets to effectively allow fish to voluntarily move to areas downstream of the diversion footprint without the need to handle these fish. However, the length of the diversion will likely prevent most fish from being herded out. Therefore, we expect most fish will be captured using seines and dipnets, and electrofishing would be employed to capture any remaining fish.

Collected CC Chinook salmon and NC steelhead will be relocated to an appropriate stream reach downstream of the bridge that will minimize impacts to captured fish, and to fish that are already residing at the release site(s). Since construction is scheduled to occur between June 15 and October 15, relocation activities will occur during the summer low-flow period after emigrating smolts have left and before adults have immigrated for spawning. NMFS expects capture and relocation of listed salmonids will be limited to primarily pre-smolting and young-of-the-year juvenile Chinook salmon and steelhead. While it is possible out-migrating steelhead kelts may be present, it is unlikely that any would be trapped in the dewatered section of stream.

Fish collection and relocation activities pose a risk of injury or mortality to rearing juvenile salmonids. Any fish collecting gear, whether passive (Hubert 1996) or active (Hayes et al. 1996) has some associated risk to fish, including stress, disease transmission, injury, or death. The amount of unintentional injury and mortality attributable to fish capture varies widely, depending on the method used, the ambient conditions, and the expertise and experience of the field crew. Since fish relocation activities will be conducted by qualified fisheries biologists following NMFS electrofishing guidelines (NMFS 2000), injury and mortality of juvenile salmonids during capture and relocation will be minimized. Based on prior experience with current relocation techniques and protocols likely to be used to conduct the fish relocation, unintentional mortality of listed juvenile salmonids expected from capture and handling procedures is not likely to exceed 2 percent.

Relocated fish may also have to compete with other fish, causing increased competition for available resources such as food and habitat. To reduce the potential for competition, fish relocation sites will selected by the approved biologist to ensure the sites have adequate habitat to allow for survival of transported fish and fish already present. Nonetheless, crowding could occur which would likely result in increased inter- and intraspecific competition at those sites. Responses to crowding by salmonids include self-thinning, resulting in emigration and reduced salmonid abundance with increased individual body size within the group, and/or increased competition (Keeley 2003). Relocation sites will be selected to ensure they have similar water temperatures as the capture sites, and adequate habitat to allow for survival of transported fish and fish already present. However, some of the fish released at the relocation sites may choose not to remain in these areas and move either upstream or downstream to areas that have more vacant habitat and a lower density of fish. As each fish moves, competition remains either localized to a small area or quickly diminishes as fish disperse. In some instances, relocated fish may endure some short-term stress from crowding at the relocation sites. Such stress is not likely to be sufficient to reduce their individual fitness or performance. NMFS cannot accurately estimate the number of fish likely to be exposed to competition, but does not expect this short-term stress to reduce the individual performance of juvenile salmonids, or cascade through the watershed population of these species. Fish that avoid capture during relocation may be exposed to risks described in the following section on dewatering (see Section 2.5.2 below).

Applying applicable Avoidance and Minimization Measures (AMMs) to fish collection, relocation, and dewatering activities is expected to appreciably reduce the effects of project actions on juvenile steelhead. Specifically, salmonid collection and relocation activities conducted by NMFS-approved fisheries biologists will ensure proper equipment operation and application of NMFS guidelines thereby minimizing injury and mortality to juvenile steelhead. Restricting the work window to June 15 to October 15 will limit the effects to stream rearing juvenile salmonids. NMFS expects applying AMMs will effectively minimize injury and mortality to juvenile steelhead in the action area. Therefore, given the measures that would be implemented to avoid and minimize impacts to fish during relocation efforts, NMFS expects no more than three percent of all relocated fish would be subject to potential injury or mortality.

As described in Section 2.4 of this opinion, fish numbers at the location can vary between years, but generally the creek temperatures during the in-water work season (June 15 – October 15) are around or over the upper limits of tolerance for salmonids. Given the variation in habitat quantity between years due to varying streamflows, and the dataset of fish observations presented in Section 2.4.1, we make a conservative estimate of the numbers of fish that may be handled. This estimate is based on life history characteristics of the species, interannual variability, and professional judgement about the quality and quantity of available habitat.

Therefore, NMFS conservatively estimates that up to 10 juvenile CC Chinook salmon and 40 juvenile NC steelhead may require relocation each in-water construction season. If we apply the three-percent mortality rate (rounded up to the nearest whole number) to the total number of juvenile salmonids that we estimate could be captured and relocated, we would expect that no more than one juvenile CC Chinook salmon and two juvenile NC steelhead would be injured or killed during relocation for each in-water construction season.

2.5.2. Stream Diversion and Dewatering

As described above, completion of the project will require dewatering of the Eel River. Cofferdams or a bladder dam and a series of pipes will be used to temporarily divert flows around the work site during construction. Dewatering of the channel is estimated to affect up to 345 linear feet of the Eel River. NMFS anticipates temporary changes to instream flow within, and downstream of, the project site during installation of the diversion system, and during dewatering operations. Once installation of the diversion systems are complete, stream flow above and below the work sites should be the same as free-flowing pre-project conditions, except within the dewatered reaches where stream flow is bypassed and/or pools are dewatered. These fluctuations in flow are anticipated to be small, gradual, and short-term, but are expected to cause a temporary loss, alteration, and reduction of aquatic habitat, and in the case of areas that will be dewatered, will likely result in mortality of any steelhead that avoid capture during fish relocation activities.

The diversion would remain in place during the instream work period for two to three construction seasons. Diversions would be installed on or after June 15 and removed prior to October 15 during each year of construction. The timing of diversion avoids the late fall-winter migration period for adult salmonids that may pass through the project area to spawn, and most of the spring-early summer smolt out-migration. The diversion would allow fish passage downstream for any late smolt out-migrants after June 15.

Dewatering operations at the work site may affect benthic (bottom dwelling) aquatic macroinvertebrates, an important food source for steelhead. Benthic aquatic macroinvertebrates at the project site may be killed or their abundance reduced when the creek habitat is dewatered (Cushman 1985). However, effects to aquatic macroinvertebrates resulting from stream flow diversion and dewatering activities will be temporary because construction activities will be short lived, and the dewatered reach will not exceed 345 linear feet within the Eel River. Rapid recolonization (typically one to two months) of disturbed areas by macroinvertebrates is expected following rewatering (Cushman 1985, Thomas 1986, Harvey 1986). Within the action area, the effect of macroinvertebrate loss on juvenile steelhead is likely to be negligible because food from upstream sources (via drift) would be available downstream of the dewatered area since stream flow will be bypassed around the work site. Based on the foregoing, juvenile steelhead are not anticipated to be exposed to a reduction in food sources at the work site from the minor and temporary reduction in aquatic macroinvertebrates as a result of dewatering activities. Because habitat in and around the action area is adequate to support salmonids, NMFS expects steelhead will be able to find food both upstream and downstream of the action area as needed during dewatering activities.

2.5.3. Pile Driving and Sound Impacts

Impact pile driving is proposed by the Project for the temporary construction elements, as well as for construction of bridge foundations, bridge abutments, as well as the use of an excavator mounted hoe ram for demolition work.

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. NMFS believes that all steelhead and Chinook salmon present at the start of construction will be over two grams. Sound energy levels at or above 206 dB (re: 1 μPa) may injure exposed fish with a single pile strike. Additionally, single-strike sound energy above 150 dB (re: 1 μPa) is considered to elicit behavioral responses in fish, and sound energy below this threshold is considered the "effective quiet" level where behavioral responses are not elicited and sound energy does not accumulate toward the injury thresholds.

Caltrans conducted a hydroacoustic assessment to evaluate potential underwater noise levels generated by planned construction activities and determined that peak sound pressure from pile driving, hoe ramming, and jackhammering would not be expected to exceed currently adopted hydroacoustic noise thresholds known to cause injury to fish of any size at either bridge location (Caltrans 2023, Appendix C—Hydroacoustic Assessment).

Design of the temporary structures or trestles is completed by the contractor at the time of construction. The assumptions included in this assessment are based on the construction engineer's best estimate of potential construction activity. The temporary structures may be supported by driven piles, drilled piles, spread footings on timber pads, or a combination of all. Driven piles would most likely be installed with a low energy impact hammer (32K ft- lbs) or vibratory hammer. It is estimated the piles would be H-piles or steel pipe piles 24 inches or less in diameter. There could be up to 600 pile strikes per day. At this time, it is assumed piles would be installed on land immediately adjacent to shallow water.

Based on the data compiled from various projects, unattenuated peak sound pressure levels are expected to occasionally exceed the 206 dB peak injury criteria at 33 feet (10 meters). The daily cumulative SEL would be exceeded beyond 10 meters with and without sound attenuation. With attenuated impact pile driving, the 187 dB cumulative SEL threshold is estimated to be exceeded up to 171 feet (52 meters) from the source. The 150 dB root mean square (RMS) behavioral threshold would be exceeded up to 2,822 feet (860 meters) from the source. Cofferdams may be constructed using sheet piles. Sheet piles are typically installed with a vibratory hammer and underwater noise is not expected to cause injury to fish.

Bridge foundation information will not be available until much later in the development of the foundation design. Based on available information, it is anticipated the foundations could consist of 36-inch diameter Cast-In-Steel-Shell (CISS) piles or 12-foot diameter Cast-In-Drilled-Hole (CIDH) pile shafts with driven steel casings. These foundation types could utilize a vibratory hammer in combination with an impact hammer. Hammer energy could be in the range of 70K–150K ft-lbs with anticipated strikes per day of 1,000 to 3,000.

For the 36-inch diameter CISS piles, unattenuated peak sound pressure levels are expected to exceed the 206 dB peak injury criteria at 33 feet (10 meters). For attenuated piles, the 187 dB cumulative SEL threshold would be exceeded at up to 1,083 feet (330 meters) from the source. The 150 dB RMS behavioral threshold would be exceeded up to 7,067 feet (2,154 meters) from the source. However, this distance would most likely be less than the estimate due to bends in the river and presence of gravel bars in the river channel.

For the 12-foot diameter CIDH piles, unattenuated and attenuated peak sound pressure levels are expected to exceed the 206 dB peak threshold at 82 feet (25 meters) from the pile. For attenuated piles, the 187 dB cumulative SEL threshold would be exceeded up to 2,717 feet (828 meters) from the source, and the 150 dB RMS behavioral threshold would be exceeded over 16,404 feet (5,000 meters) from the source. However, this distance would most likely be less than the estimate due to bends in the river and presence of gravel bars in the river channel.

Caltrans would set up the diversion and utilize block nets and seines to exclude fish from the range of potential impacts due to pile driving. If river conditions preclude fish exclusion, hydroacoustic monitoring may be conducted during construction activities that have the potential to produce impulsive sound waves within the Eel River. This may include work that requires land-based pile driving and hoe ramming or jackhammering associated with bridge widening/removal and partial removal of rock.

A Hydroacoustic Monitoring Plan would be prepared by a qualified hydroacoustic specialist prior to construction and the draft plan would be provided to NMFS for review. The Hydroacoustic Monitoring Plan would describe the monitoring methodology, frequency of monitoring, positions hydrophones would be deployed, techniques for gathering and analyzing data, quality control measures, and reporting protocols. Groundborne noise can be unpredictable and varies from site to site because it depends on site conditions, such as soil saturation and soil composition. Because of the uncertainties, to identify when abatement is necessary, noise levels would be monitored by a trained hydroacoustic specialist during all operations that could potentially produce impulsive sound waves. To stay below the cumulative SEL limit, daily construction time limit (as determined by monitoring) may be required and would be included in the Hydroacoustic Monitoring Plan.

In the event salmonids are present within the action area during the proposed work periods, potential impacts from noise and visual disturbance would likely be minor and short term, and unlikely to result in injury or mortality of fish. Exposure to any individual fish passing through the diversion is expected to be minimal and those fish that are exposed may relocate to nearby suitable habitat upstream or downstream of the project sites. Therefore, Caltrans has determined that negative effects on listed salmonids of any life stage and primary biological factors of their designated critical habitat (rearing and migration) due to disturbance from impact driving and hoe-ramming would be minimal.

2.5.4. Increased Sedimentation and Turbidity

Deconstruction of the existing bridge and construction of the partial replacement of the northbound Eel River Bridge, installation of temporary stream diversions and construction of in-stream restoration would disturb soils which could potentially be transported to the wetted channels during storm events. Deconstruction of portions of the bridge could produce fugitive dust emissions that could reach the project area watercourses or fall to the ground and later be discharged to waterways. There is also potential for increases in sediment delivery post construction if areas of soil disturbance are not stabilized and remain susceptible to erosion. While the cofferdam and stream diversion is in place, construction activities are not expected to degrade water quality in the action area because the work areas will be dewatered and isolated from flowing waters. This disturbed soil on the creek bank is more easily mobilized when later fall and winter storms increase streamflow levels. Thus, NMFS anticipates disturbed soils could affect water quality in the action area in the form of small, short-term increases in turbidity during rewatering (i.e., cofferdam removal), and subsequent higher flow events during the first winter storms post-construction.

Instream and near-stream construction activities have been shown to result in temporary increases in turbidity (reviewed in Furniss et al. 1991, Reeves et al. 1991). Sediment may affect fish by a variety of mechanisms. High concentrations of suspended sediment can disrupt normal feeding behavior and efficiency (Cordone and Kelley 1961, Bjornn et al. 1977, Berg and Northcote 1985), reduce growth rates (Crouse et al. 1981), and increase plasma cortisol levels

(Servizi and Martens 1992). High turbidity concentrations can reduce dissolved oxygen in the water column, result in reduced respiratory functions, reduce tolerance to disease, and can also cause fish mortality (Sigler et al. 1984, Berg and Northcote 1985, Gregory and Northcote 1993, Velagic 1995, Waters 1995). Even small pulses of turbid water will cause salmonids to disperse from established territories (Waters 1995), which can displace fish into less suitable habitat and/or increase competition and predation, decreasing chances of survival. Increased sediment disposition can fill pools and reduce the amount of cover available to fish, decreasing the survival of juveniles (Alexander and Hansen 1986).

Chronic elevated sediment and turbidity levels may affect salmonids as described above. However, sedimentation and turbidity levels associated with cofferdam removal, rewetting of the construction sites within the action area, and subsequent rainfall events are not expected to rise to the levels described in the previous paragraph because the project's proposed soil and channel stabilization measures will be implemented to avoid and/or minimize sediment mobilization. Therefore, any resulting elevated turbidity levels would be minor, occur for a short period, and be well below levels and duration shown in the scientific literature as cause injury or harm to steelhead (Sigler et al. 1984, Newcombe and Jensen 1996). NMFS expects any sediment or turbidity generated by the project would not extend more than 100 feet downstream of the worksites, based on site conditions and methods used to control sedimentation and turbidity. Thus, NMFS does not anticipate harm, injury, or behavioral impacts to salmonids associated with exposure to minor elevated suspended sediment levels that could reduce their survival chances.

2.5.5. Pollution from Hazardous Materials and Contaminants

Operating equipment in and near streams has the potential to introduce hazardous materials and contaminants into streams. Potentially hazardous materials include wet and dry concrete debris, fuels, and lubricants. Spills, discharges, and leaks of these materials can enter streams directly or via runoff. If introduced into streams, these materials could impair water quality by altering the pH, reducing oxygen concentrations as the debris decomposes, or by introducing toxic chemicals such as hydrocarbons or metals into aquatic habitat. Oil and similar substances from construction equipment can contain a wide variety of polynuclear hydrocarbons (PAHs) and metals. PAHs can alter salmonid egg hatching rates and reduce egg survival as well as harm the benthic organisms that are a salmonid food source (Eisler 2000). Disturbance of streambeds by heavy equipment or construction activities can also cause the resuspension and mobilization of contaminated stream sediment with absorbed metals.

The equipment needed to complete the project has the potential to release debris, hydrocarbons, concrete, and similar contaminants into surface waters at both work sites. These effects have the potential to harm or injure exposed fish and temporarily degrade habitat. However, AMMs proposed will substantially reduce or eliminate the potential for construction materials and debris to enter waterways. Limiting the work window to the dry season from June 15 to October 15 will limit hazardous material exposure to juvenile salmonids, and eliminate potential for containments to adversely affect the most sensitive life stages (i.e., eggs, alevin, and fry). Equipment will be checked daily to ensure proper operation and avoid any leaks or spills. Proper storage, treatment, and disposal of construction materials and discharge management is expected to substantially reduce or eliminate contaminants entering both waterways via runoff. A Stormwater Pollution Prevention Plan will be implemented to maintain water quality during and after construction within the Eel River and render the potential for the project to degrade water quality and adversely affect salmonids improbable. Furthermore, Caltrans will also construct permanent bio retention structures and develop a maintenance program for these structures for long-term management of stormwater. Due to these measures, permanent structures, and long-term management plan, conveyance of toxic materials into active waters at the work site both during, and after, project construction is not expected to occur, and potential for the project to degrade water quality and adversely affect salmonids is improbable.

2.5.6. Post Construction Water Quality

Published work has identified storm water from roadways and streets as causing a high percentage of rapid mortality of adult coho salmon in the wild (Scholz et al. 2011) and laboratory settings (McIntyre et al. 2018). Subsequent laboratory studies showed this morality also occurred in juvenile coho salmon (Chow et al. 2019) as well as to juvenile steelhead and Chinook salmon (Brinkmann et al. 2022, McIntyre and Scholz, unpublished results, 2020). The new bridge resulting from Project construction may expose salmonids to the degradation product of tires (6PPD-quinone) which has been identified as the causal factor in coho salmon mortality at concentrations of less than a part per billion (Tian et al. 2022, Tian et al. 2021) and to juvenile steelhead trout at concentrations of one part per billion (Brinkmann et al. 2022, J. McIntyre and N. Scholz, unpublished results, 2020). This contaminant is widely used by multiple tire manufacturers and the tire dust and shreds that produce it have been found to be ubiquitous where both rural and urban roadways drain into waterways (Sutton et al. 2019, Feist et al. 2018). Steelhead mortality can begin as soon as seven hours post exposure (Brinkmann et al. 2022). Effects appear to be related to cardiorespiratory disruption, consistent with symptoms (surface swimming and gaping followed by loss of equilibrium (Sholz et al. 2011)) and therefore sublethal effects such as disruption of behaviors needed for survival (e.g., predator avoidance) and swimming performance are expected. Additional research concerning sublethal effects is needed. Mortality can be prevented by infiltrating the road runoff through soil media containing organic matter which results in removal of this (and other) contaminant(s) (Fardel et al. 2020, Spromberg et al. 2016, McIntrye et al. 2015).

The exposure will be minimized through post-construction storm water BMPs intended to address water quality concerns associated with road projects such as where there is an increase in impervious surfaces. These changes in peak stormwater runoff rates would be offset through permanent design measures, such as the new bridge not containing scuppers that drain water directly into the creek, directing flows through new drainage systems, and through restoring riparian vegetation and replacing wetland and non-wetland roadside ditches. Therefore, we expect salmonid mortality associated with Project construction, when implemented with the proposed preventative water quality control measures, will be avoided.

2.5.7. Removal of Riparian Vegetation

As mentioned above, Project construction activities will involve some tree trimming and removal. Riparian vegetation helps maintain stream habitat conditions necessary for salmonid growth, survival, and reproduction. Riparian zones and wetland/aquatic vegetation serve important functions in stream ecosystems such as providing shade (Poole and Berman 2001), sediment storage and filtering (Cooper et al. 1987, Mitsch and Gosselink 2000), nutrient inputs (Murphy and Meehan 1991), water quality improvements (Mitsch and Gosselink 2000), channel and streambank stability (Platts 1991), source of woody debris that creates fish habitat diversity (Bryant 1983, Lisle 1986, Shirvell 1990), and both cover and shelter for fish (Bustard and Narver 1975, Wesche et al. 1987, Murphy and Meehan 1991). Riparian vegetation disturbance and removal can degrade these ecosystem functions and impair stream habitat. Removal of riparian vegetation increases stream exposure to solar radiation, leading to increases in stream temperatures (Poole and Berman 2001).

All temporary and temporal impacts to riparian and wetland areas would be restored to preexisting conditions post construction and permanent impacts would be offset through additional on-site restoration and off-site mitigation. The project would not result in long term changes to the water chemistry or substantial change to the physical characteristics (e.g., substrate and flow) of the river after construction is complete. Given the scale of these impacts and the measures to restore riparian and wetland function post construction, effects to salmonids and their associated critical habitat are expected to be minimal.

2.5.8. Impacts to Channel Form and Function

Habitat modification from bridge construction would result in instream impacts from replacement of two large oblong piers with three smaller cylindrical piers within the stream. Permanent impacts would result from replacement of the two existing oblong Piers 4 and 5 below the OHWM which would remove approximately 0.028 acre of existing bridge piers. Three new cylindrical piers would be constructed with a total permanent instream structure amount of 0.007 acre of bridge pier. Even though this project would add an additional pier below the OHWM, it would result in less overall instream structure area below the OHMW by 0.0198 acre.

By reducing the amount of fill in the Project area through the through replacement of the in-channel piers, the new bridge abutments will encroach less in the stream channel as compared to existing bridge. The reduction of fill in the river is expected to allow the stream channel to transport sediment and develop a natural pool, and riffle sequence. Disturbance from using heavy equipment in the streambed is expected to be minimized with winter high flow events that will redistribute gravels and restore channel form.

2.5.9. Impacts to Critical Habitat

The action area is designated critical habitat for CC Chinook salmon and NC steelhead. Features of critical habitat found within the action area include sites for migration, spawning, and rearing. Effects of the proposed project on designated critical habitat may include elevated turbidity, streambank and floodplain habitat degradation, and precluding natural fluvial and geomorphic channel dynamics.

Regarding effects to critical habitat from project site dewatering, for the same reasons described above for juvenile salmonids, adverse effects to CC Chinook salmon and NC steelhead, and their critical habitat PBFs are expected to be temporary, insignificant, and will recover relatively quickly (one to two months) after the project site is re-watered. Similarly, for reasons described above for juvenile salmonids, turbidity levels from suspended sediment are expected temporary and have minor effects to the value of critical habitat in the action area.

Minor impacts to Large Woody Debris recruitment and shade are expected to reduce habitat quality in the action area. The onsite Revegetation Plan would restore riparian habitat in areas of temporal loss, promoting growth and diversity of native species and improving riparian function within the action area. Also, as mentioned above, the reduction of fill in the creek is expected to allow the stream channel to transport sediment and develop a natural pool and riffle sequence. Therefore, the project is likely to improve the value of available critical habitat in the action area for the foreseeable future.

2.6. Cumulative Effects

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

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

2.7. Integration and Synthesis

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

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

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

Chinook salmon in the action area belong to the Lower Eel/South Fork population of CC Chinook salmon, which the Coastal Multispecies Recovery Plan suggests is likely well below the number needed to be at a low risk of extinction (NMFS 2016). Steelhead in the action area belong to the South Fork Eel River population of NC steelhead, which is also likely well below the number needed to be at a low risk of extinction (NMFS 2016).

As described in Section 2.5 *Effects of the Action*, NMFS identified the following components of the project that may result in effects to CC Chinook salmon and NC steelhead: fish collection and relocation, dewatering, increases in sedimentation and turbidity, pollution from hazardous materials and contaminants, removal of riparian vegetation, habitat loss, and altered channel morphology. Of these, fish collections and relocation, and dewatering have the potential to result in reduced fitness, injury, and/or mortality of CC Chinook salmon and NC steelhead. Prior to dewatering the site each work season, fish would be collected and relocated from the work areas. Fish that elude capture and remain in the Project area during dewatering may die due to desiccation or thermal stress, or be crushed by equipment or foot traffic if not found by biologists during the drawdown of stream flow. However, based on the low mortality rates for similar capture and relocation efforts, NMFS anticipates few juvenile salmonids would be injured or killed by fish relocation and construction activities during implementation of the Project. Anticipated mortality from capture and relocation is expected to be less than three percent of the total number of fish relocated, and mortality expected from dewatering is expected to be less than one percent of the fish in the action area prior to dewatering. Due to the relatively large number of juveniles produced by each spawning pair, salmonids spawning in the Eel River watershed in future years are likely to produce enough juveniles to replace the few that may be lost at the Project construction site due to relocation and dewatering. It is unlikely that the small potential loss of juveniles by this Project would impact future adult returns of CC Chinook salmon and NC steelhead in the Eel River.

In addition to the adverse effects described above, we also consider the potential impacts of increased sedimentation and turbidity, pollution from hazardous materials and contaminants, removal of riparian vegetation, habitat loss, increased shading, and fish passage and channel morphological changes. The implementation of proposed AMMs is expected to render the potential for fish to be exposed to pollution from hazardous materials and contaminants during and after construction improbable. Increased sedimentation and turbidity and temporary loss and degradation of habitat in the dewatered areas will cease shortly after construction is complete and will only result in minor impacts to salmonids. Riparian vegetation removed to construct the project will take up to 10 years to return to pre-project levels. During this timeframe, individual steelhead exposed to reduced cover and forage will be able to successfully complete their life cycle in the action area or alternative nearby habitats. The removal of instream fill associated with the new bridge piers will improve geomorphic conditions in the area. NMFS does not expect any of the aforementioned effects to combine with other effects in any significant way.

The proposed action will temporarily degrade PBFs and essential habitat types in the action area, namely those related to juvenile rearing. Effects to species' critical habitat from the proposed

Project are expected to include temporary impacts due to Project construction, and permanent benefits due to reduced fill in the river. The temporary impacts are expected to be associated with disturbances to the stream bed, bank, riparian corridor, and surface flow. As discussed above, these temporary impacts are not expected to adversely affect PBFs of CC Chinook salmon and NC steelhead critical habitat because aquatic habitat at the site would be restored after the water diversion system is removed.

For short-term effects, climate change is not expected to significantly worsen existing conditions over the time frame considered in this biological opinion. Considering the above, we do not expect climate change to affect CC Chinook salmon and NC steelhead, in the action area beyond the scope considered in this biological opinion. For the long-term effects, climate change would likely worsen conditions if total precipitation in California declines and critically dry years increase. These conditions would likely modify water quality, streamflow levels, rearing habitat and steelhead migration. The overall reduction in habitat quality caused by the project is limited to a small area of a watershed and therefore, even if climate change reduced the overall habitat quality in the future, when combined with this proposed action any amplification in habitat degradation would be very small.

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, any effects of interrelated and interdependent activities, 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 habitats.

2.9. Incidental Take Statement

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

2.9.1. Amount or Extent of Take

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

Take of listed juvenile CC Chinook salmon and NC steelhead is likely to occur during fish relocation and dewatering of the Eel River between June 15 and October 15. Construction will be completed in up to three construction seasons. The number of NC steelhead CC Chinook salmon that are likely to be incidentally taken during dewatering activities is expected to be limited to the pre-smolt and young-of-the-year juvenile life stage. NMFS expects that no more than three percent of the juvenile steelhead within the 345 linear foot dewatering area of the Eel River will be injured, harmed, or killed during fish relocation activities. NMFS also expects that no more than one percent of the fish within the same dewatered area will be injured, harmed, or killed during dewatering activities.

Incidental take will have been exceeded if:

- More than 10 juvenile CC Chinook salmon are captured during a construction season; or
- More than one juvenile CC Chinook salmon are harmed or killed during a construction season;
- More than 40 juvenile NC steelhead salmon are captured during a construction season; or
- More than two juvenile NC steelhead are harmed or killed during a 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 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 injury and mortality to steelhead resulting from fish relocation and dewatering activities is low.

2. Ensure construction methods, minimization measures, and monitoring are properly implemented during construction.

3. Prepare and submit plans and reports regarding the effects of fish relocation, sound monitoring, construction of the project, and post-construction site-performance.

2.9.4. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the Federal action agency must comply (or must ensure that any applicant complies) with the following terms and conditions. The Caltrans or any applicant has a continuing duty to monitor the impacts of incidental take and must report the progress of the action and its impact on the species as specified in this ITS (50 CFR 402.14). If the entity to whom a term and condition is directed does not comply with the following terms and conditions, protective coverage for the proposed action would likely lapse.

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

    a) Caltrans or the contractor will retain qualified biologists with expertise in the area of anadromous salmonid biology, including handling, collecting, and relocating salmonids; salmonid/habitat relationships; and biological monitoring of salmonids. Caltrans or the contractor shall ensure that all fisheries biologists be qualified to conduct fish collections in a manner which minimizes all potential risks to ESA-listed salmonids. Electrofishing, if used, shall be performed by a qualified biologists and conducted according to the *NOAA Fisheries Guidelines for Electrofishing Waters Containing Salmonids Listed under the Endangered Species Act, June 2000*. See: https://media.fisheries.noaa.gov/dam-migration/electro2000.pdf

    b) The biologist will monitor the construction sites during placement and removal of cofferdams and channel diversions to ensure that any adverse effects to salmonids are minimized. The biologist will be on site during all dewatering events to capture, handle, and safely relocation salmonids to an appropriate location. The biologist will notify NMFS staff at 707-825-5173 or Jeffrey.Jahn@noaa.gov, one week prior to capture activities in order to provide an opportunity for NMFS staff to observe the activities. During fish relocation activities the fisheries biologist shall contact NMFS staff at the above number, if mortality of federally listed salmonids exceeds three percent of the total steelhead collected, at which time NMFS will stipulate measures to reduce the take of salmonids.

    c) Salmonids will be handled with extreme care and kept in water to the maximum extent possible during rescue activities. All captured fish will be kept in cool, shaded, aerated water protected from excessive noise, jostling, or overcrowding any time they are not in the stream, and fish will not be removed from this water expect when released. To avoid predation, the biologists will have at least two containers and segregate young-of-the-year from larger age classes and other potential aquatic predators. Captured salmonids will be relocated, as soon as possible, to a suitable instream location in which suitable habitat conditions are present to allow for adequate survival of transported fish and fish already present.

    d) If any steelhead or salmon are found dead or injured, the biological monitor will contact NMFS staff at 707-825-5173 or Jeffrey.Jahn@noaa.gov. All salmonid mortalities will be retained until further direction is provided by the NMFS biologist (listed above).

i) Tissue samples are to be acquired from each mortality prior to freezing the carcass per the methods identified in the NMFS Southwest Fisheries Science Center Genetic Repository protocols: Either a 1 cm square clip from the operculum or tail fin, or alternately, complete scales (20-30) should be removed and placed on a piece of dry blotter/filter paper (e.g., Whatman brand). Fold blotter paper over for temporary storage. Samples must be airdried as soon as possible (don't wait more than 8 hours). When tissue/paper is dry to the touch, place into a clean envelope labeled with Sample ID Number. Seal envelope.

ii) Include the following information with each tissue sample using the Salmonid Genetic Tissue Repository form or alternative spreadsheet: Collection Date, Collection Location (County, River, Exact Location on River), Collector Name, Collector Affiliation/Phone, Sample ID Number, Species, Tissue Type, Condition, Fork Length (mm), Sex (M, F or Unk), Adipose Fin Clip (Y or N), Tag (Y or N), Notes/Comments.

iii) Send tissue samples to: NOAA Coastal California Genetic Repository, Southwest Fisheries Science Center, 110 McAllister Way, Santa Cruz, California 95060.

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

a) To ensure that the project is built as designed and contractors adhere to construction best management practices, monitoring will be performed during construction by skilled individuals. Monitors will demonstrate prior knowledge and experience in stream channel design and restoration, fish passage design, construction minimization measures, and the needs of native fish, including steelhead. Monitoring will be performed daily. The monitor(s) will work in close coordination with project management personnel, the project design (engineering) team, and the construction crew to ensure that the project is built as designed.

b) Any pumps used to divert live stream flow will be screened and maintained throughout the construction period to comply with NMFS' Fish Screening Criteria for Anadromous Salmonids (2000).

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

d) Once construction is completed, all project-introduced material must be removed, leaving the creek as it was before construction. Excess materials will be disposed of at an appropriate disposal site.

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

a) Caltrans must provide a written report to NMFS by January 15 of the year following construction. The report must be submitted to Jeffrey.Jahn@noaa.gov. The report must contain, at minimum, the following information:

b) Project Construction and Fish Relocation Report – the report must include the following contents:

i) *Construction Related Activities* – The report(s) must include the dates construction began, a discussion of design compliance including: vegetation installation, and post-construction longitudinal profile and cross sections; a discussion of any unanticipated effects or unanticipated levels of effects on salmonids, including a description of any and all measures taken to minimize those unanticipated effects and a statement as to whether or not the unanticipated effects had any effect on ESA-listed fish; the number of salmonids killed or injured during the project action; and photographs taken before, during, and after the activity from photo reference points.

ii) *Fish Relocation* - The report must include a description of the location from which fish were removed and the release site including photographs; the date and time of the relocation effort; a description of the equipment and methods used to collect, hold, and transport salmonids; if an electrofisher was used for fish collection, a copy of the logbook must be included; the number of fish relocated by species; the number of fish injured or killed by species and a brief narrative of the circumstances surrounding ESA-listed fish 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.

c) *Hydroacoustic Monitoring* - A Hydroacoustic Monitoring Plan would be prepared by a qualified hydroacoustic specialist prior to construction. NMFS would be provided the Hydroacoustic Monitoring Plan for review prior to initiation of any pile driving or demolition work. The Hydroacoustic Monitoring Plan would describe the monitoring methodology, frequency of monitoring, positions that hydrophones would be deployed, techniques for gathering and analyzing data, quality control measures, and reporting protocols.

d) *Post-Project Monitoring Reports and Surveys* – Project reports and survey information will be sent to the address above in 1(c), and must include the following contents:

i) *Post-Construction Vegetation Monitoring and Reporting* - Caltrans must develop and submit for NMFS' review a plan to assess the success of revegetation of the site. A draft of the revegetation monitoring plan must be submitted to NMFS for review and approval prior to the beginning of the in-stream work season, at each project location. Reports documenting post-project conditions of vegetation installed at the site will be prepared and submitted annually on January 15 for the first five years following project completion, unless the site is documented to be performing poorly, then monitoring requirements will be extended. Reports will document vegetation health and survivorship and percent cover, natural recruitment of native vegetation (if any), and any maintenance or replanting needs. Photographs must be included. If poor establishment is documented, the report must include recommendations to improve conditions.

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). NMFS has no conservation recommendations for this project.

2.11. Reinitiation of Consultation

This concludes formal consultation for the Eel River Seismic Retrofit Project.

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

2.12. "Not Likely to Adversely Affect" Determinations

The action area provides habitat for threatened SONCC coho salmon (70 FR 52488) and designated critical habitat for this species (64 FR 24049). Based upon known life history characteristics, habitat conditions and available fish survey data, Caltrans determined the proposed action may affect, but is not likely to adversely affect SONCC coho salmon and their critical habitat.

Work within the Eel River stream bed will be restricted to the June 15 – October 15 work window. If the work area is not dry, it will be isolated from surface water through installation of temporary cofferdams and a temporary water diversion to bypass the work area. Any pools or other wetted stream features present prior to construction will be dewatered and native fish will be relocated to suitable habitat. Due to the life history strategy of coho salmon, neither juvenile nor adult coho salmon individuals are expected to be present in the action area at the time of construction. Therefore, the effects of the proposed action to individuals is expected to be discountable, as there are no individuals expected to be exposed.

Features of critical habitat found within the action area include sites for migration and rearing. Effects of the proposed project on designated critical habitat may include elevated turbidity, streambank and floodplain habitat degradation, and precluding natural fluvial and geomorphic channel dynamics.

Regarding effects to critical habitat from project site dewatering, for the same reasons described above in Section 2.5 for juvenile CC Chinook salmon and NC steelhead, adverse effects to SONCC coho salmon, and their critical habitat PBFs are expected to be temporary, insignificant, and will recover relatively quickly (one to two months) after the project site is re-watered. Similarly, for reasons described above for juvenile CC Chinook salmon and NC steelhead, turbidity levels from suspended sediment are expected temporary and have minor effects to the value of critical habitat in the action area.

Minor impacts to Large Woody Debris recruitment and shade are expected to reduce habitat quality in the action area. The onsite Revegetation Plan would restore riparian habitat in areas of temporal loss, promoting growth and diversity of native species and improving riparian function within the action area.

As mentioned above, instream fill would be reduced with the new bridge pier installations, improving natural processes in the river. Therefore, the project is likely to improve the value of available critical habitat in the action area for the foreseeable future.

As described in the BA and in Section 2.5, all impacts to salmonid habitat are expected to be minor 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 SONCC coho salmon 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 2016) contained in the fishery management plans developed by the PFMC and approved by the Secretary of Commerce.

3.1. Essential Fish Habitat Affected by the Project

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 rearing and possible spawning habitat for coho salmon and Chinook salmon 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. There HAPCs in the action area include complex channel and floodplain habitat, spawning habitat, and thermal refugia.

3.2. Adverse Effects on Essential Fish Habitat

The potential effects to coho salmon and Chinook salmon habitat have already been described in the Effects of the Action section of this opinion (Section 2.5) and in Section 2.12. The adverse effects to EFH and HAPCs in the action area include:

1. Temporary reduction in available habitat due to the proposed stream diversion.

2. Temporary reduction in water quality caused by increase in suspended sediments and turbidity during construction, and during the first rain events following construction.

3. Temporary loss of riparian vegetation.

3.3. Essential Fish Habitat Conservation Recommendations

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

3.4. 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 users of this opinion are Caltrans. Other interested users could include CDFW and others interested in the conservation of the affected ESUs/DPS. Individual copies of this opinion were provided to Caltrans. The document will be available within 2 weeks at the NOAA Library Institutional Repository [https://repository.library.noaa.gov/welcome]. The format and naming adhere to conventional standards for style.

4.2. Integrity

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

4.3. Objectivity

Information Product Category: Natural Resource Plan

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

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

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

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

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