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

March 17, 2023 **Refer to NMFS No:** WCRO-2022-02970

Thomas Holstein
Environmental Branch Chief
Office of Local Assistance
California Department of Transportation, District 4
P.O. Box 23660, MS-10B
Oakland, California 94623-0660

Re: Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson–Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the San Anselmo Bridge Preventive Maintenance Program

Dear Mr. Holstein:

Thank you for your letter of November 18, 2022, 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 San Anselmo Bridges Preventive Maintenance Program in the Town of San Anselmo, California.

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. As a result, the 2019 regulations are once again in effect, and we are applying the 2019 regulations here. For purposes of this consultation, 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.

Thank you, also, for your request for consultation pursuant to the essential fish habitat (EFH) provisions in Section 305(b) of the Magnuson–Stevens Fishery Conservation and Management Act [16 U.S.C. 1855(b)] for this action. However, after reviewing the proposed action, we concluded that there are no adverse effects on EFH. Therefore, we are hereby concluding EFH consultation.

The enclosed biological opinion is based on our review of California Department of Transportation (CalTrans)[1] proposed project and describes NMFS' analysis of potential effects on threatened Central California Coast (CCC) steelhead and the designated critical habitat for the species. NMFS concludes that the project is not likely to jeopardize the continued existence of the species; nor is it likely to destroy or adversely modify critical habitat. However, NMFS anticipates that take of the species would occur in the form of harm, injury, or mortality during dewatering and fish relocation activities. An incidental take statement with terms and conditions is included with the enclosed biological opinion. NMFS has also found that the proposed bridge project is not likely to adversely affect designated critical habitat for CCC coho salmon.

Please contact Andrew Trent at (707) 578-8553, or email at andrew.trent@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: Keevan Harding, Caltrans, Oakland, CA, keevan.harding@dot.ca.gov
Copy to ARN E-File: 151422WCR2022SR00212

[1] Caltrans is acting as the lead agency under direction of the June 2007 Memorandum of Understanding (MOU) (23 U.S. C. 326) between Caltrans and the Federal Highway Administration. As assigned by the MOU, Caltrans is responsible for the environmental review, consultation and coordination on this project.

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

San Anselmo Bridges Preventative Maintenance Project

NMFS Consultation Number: WCRO-2022-02970
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?
Central California Coast steelhead (*Oncorhynchus mykiss)*	Threatened	Yes	No	No	No
Central California Coast coho (*O. kisutch*)	Endangered	No	No	No	No

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

Issued By:

Alecia Van Atta
Assistant Regional Administrator
California Coastal Office

Date: March 17, 2023

TABLE OF CONTENTS

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

1.2. Consultation History

On November 18, 2022, NMFS received an email from the California Department of Transportation (Caltrans) that included: 1) a letter requesting initiation of Section 7 consultation for potential impacts on CCC steelhead, and their designated critical habitat due to implementation of the proposed project; and 2) the March 2021 Biological Assessment (BA) for the San Anselmo Bridges Preventive Maintenance Program, Town of San Anselmo, Marin County, Bridges No. 27C0040 and 27C-0073, State of California Department of Transportation, Caltrans District 4 - No. BPMP-5159(022). This package included sufficient information to initiate consultation for this 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. As a result, the 2019 regulations are once again in effect, and we are applying the 2019 regulations here. For purposes of this consultation, 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). Two bridges in the Town of San Anselmo, Sir Francis Drake Boulevard Bridge (Caltrans Bridge No. 27C-0040) and Barber Avenue Bridge (Caltrans Bridge No. 27C-0073), have been flagged for preventive maintenance and will be repaired through the Caltrans' Bridge Preventive Maintenance Program

(BPMP), funded by the federal Highway Bridge Program (HBP) and are proposed for construction. Barber Avenue Bridge and Sir Francis Drake Boulevard Bridge are approximately 2,000 and 2,500 feet upstream from the confluence of Corte Madera and Ross Creek respectively.

In general, maintenance and construction work performed on both bridges, will involve staging all equipment and tools on the bridge surface for construction or lowered down to the creek bed from the street with a truck mounted crane. Construction work below the bridge decks and in the channel would be performed between June 1 and October 15 in order to avoid the spawning and migration season for steelhead. Work at the bridge deck and roadway level may occur outside this work window. Vehicles and equipment will be moved in and out of the action area as needed. Construction for maintenance repairs specific to each bridge are described below.

Sir Francis Drake Boulevard Bridge

The Sir Francis Drake Boulevard Bridge is a single-span bridge supported by a reinforced, horizontal, concrete beam (girder) constructed over San Anselmo Creek circa 1929. The bridge is in a commercial district near the intersection of several local arterial roads in central San Anselmo, known as "the Hub." The bridge is reported to have a significant average daily traffic of 34,000 cars as of 2011. The structure is approximately 44 feet long and 91 feet wide, supporting four lanes of traffic and sidewalks on a deck surface approximately 20 feet above the creek bed. There are no as-built plans available from the original construction of the bridge.

The BPMP repairs will consist of:

- Rehabilitation of the bridge deck by removing the 2-inch-thick asphalt concrete from nearly half of its travel way through grinding of the asphalt concrete, sealing cracks on the deck with methacrylate, and overlaying it with polyester concrete. The deck work will be done at night, involving lane reductions and two multi-night construction stagings to maintain one lane of traffic open in each direction, and returning to normal lanes and operations during the morning rush hour.

- Removing and replacing two paved-over and deteriorated rubber seals at the joints connecting the bridge to the substructure connecting the bridge to the ground on either end (the bridge abutments). The existing joint seals will be removed (if any remain), and the vacated area (expansion gap) will be cleaned before a new rubber or pourable seal is placed in the two bridge abutment joints.

- Repair of cracks, flaky material (spall), and exposed rusty rebar in the bridge's underside concrete (soffit), as well as cracks in the north abutment and failed patches at the north abutment and a girder.

- Repair of concrete cracks in the existing bridge rails.

Work at the bridge deck and street level, consisting of deck re-paving and joint seal repairs, will be performed in two stages at night, between the end of evening and beginning of morning rush-

hour periods. Traffic on Sir Francis Drake Boulevard will be restricted to one lane throughout the work period. The work below the deck and in the channel will take from several days to two weeks during the dry season, within the proposed construction work window of June 1 - October 15 when this reach of the creek is at its lowest flow rates. The creek will be either dry or have minimal flow during this period. Flow diversion or dewatering, though not anticipated, may be required at this site. If this is needed, up to approximately 170 linear feet of stream would be dewatered to isolate the work area from flowing and/or pooled water. The above-deck work may take place during, before or after the same period.

Barber Avenue Bridge

The Barber Avenue Bridge is a four-span bridge over San Anselmo Creek reported to have been constructed in 1930. It is supported by a concrete beam with a T-shaped cross section (t- beam) thicker at the supports than at the middle of the span. The bridge is in a mostly residential area near the intersection with Sir Francis Drake Boulevard and has an average daily traffic of 1,500 cars (in 2011). The structure is approximately 115 feet long and approximately 36 feet wide. It supports two lanes of traffic and a narrow sidewalk on each side nearly 20 feet above the creek bed.

The BPMP repairs will target the structural concrete elements above the creek bed and ground levels, and will consist of:

- Removal of all asphalt concrete on the bridge deck, having a thickness of approximately 0.5 inch (per 2011 Bridge Inspection Report), repair of any unsound deck concrete, special cleaning of the deck, and application of methacrylate and deck polyester concrete overlay.

- Replacement of the bridge joint seals at each abutment.

- Repair of damage such as cracks and flakes in the structural concrete at the bottoms of several support beams (girders) through patching with epoxy grout or application of carbon fiber wraps to the structure.

- Repair of concrete damage such as cracks, flakes, and poor previous patchwork in the three bridge pier walls below the deck.

During construction, Barber Avenue will be closed to through traffic at the bridge location for nearly one block from the street's intersection with Sir Francis Drake Boulevard to a curve in the road past the bridge. The work below deck and in the creek will take several weeks during the dry season, within the proposed construction work window of June 1 – October 15, when this reach of the creek is at its lowest flow rates or dry. Flow diversion or dewatering, though not anticipated, may be required at this site. If this is needed, up to approximately 91 linear feet of stream would be dewatered to isolate the work area from flowing and/or pooled water. The above-deck work may take place during, before or after the same period.

Work within San Anselmo Creek is necessary to complete the proposed Action for access to and to conduct the repairs. Repair work is focused on the existing above grade structure and no disturbance to the creek bed is anticipated. San Anselmo Creek is designated critical habitat for steelhead and coho salmon, and steelhead may be present in the stream at the time of work activities. In addition, San Anselmo Creek contains designated Essential Fish Habitat (EFH) for Pacific salmon.

To avoid the steelhead spawning and migration season, construction within the bed and banks of the creek will be completed between June 1 and October 15. All cofferdams and construction materials will be removed from the creek bed at the end of this work window. Any work within the bed and banks of the channel before or after this period (June 1 – October 15) will require written notice to and approval from NMFS. Work will be conducted in isolation from flowing or pooled surface water. If surface water is present cannot be avoided to complete construction activities, prior to the start of in-water activities, the work area will be isolated using temporary cofferdams, and flowing or pooled water shall be temporarily diverted around or pumped out of the area.

A fish rescue will be completed if water remains in the proposed project area at the time work in the creek bed occurs, and if work activities require dewatering. This includes flowing water and pools containing water with potential to support fish. A fish rescue and relocation plan shall be developed prior to the onset of any in-water work. The plan shall be implemented by a qualified biologist during dewatering activities in San Anselmo Creek. The fish rescue and relocation plan shall include an overview of the proposed methods for dewatering, expected location and duration of dewatering activities, and methods for conducting fish rescue and relocation during dewatering activities.

If dewatering is necessary, pumps with 0.1-inch mesh will be used to remove standing water from the work area within the cofferdams to a filtration basin to prevent direct discharge into the creek. If a filtration basin is not available, filter bags will be placed surrounding the hose-release and the hose-release end will be placed on a level area outside of the wetted creek channel to allow water to settle prior to returning to the creek. No pumped water will be directly discharged into the creek. Allowing the pumped water to settle in a filtration basin or be released through filter bags will prevent excessive turbidity or sediment loads during the dewatering process.

Concrete, dust, and other debris from concrete repair and removal activities will be captured with a containment system and removed from the work site so as not to enter the creek channel. Where disturbed, the creek channel will be restored to the pre-project grade and condition using native cobble, gravel, and soils in appropriate ratios.

Section 2.4 of the biological assessment (Caltrans 2022) is incorporated here by reference and describes several construction methods and best management practices that will be implemented to avoid and minimize impacts to listed species and their habitat in the action area including, but not limited to:

- Erosion and Sediment Control;
- Prevention of Accidental Spills and Pollution;

- Air Quality and Dust Control.

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

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

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

2.1. Analytical Approach

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

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

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

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

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

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

2.1.1. Use of Best Available Scientific and Commercial Information

To conduct the assessment presented in this opinion, NMFS examined an extensive amount of information from a variety of sources. Detailed background information on the biology and status of the listed species and critical habitat has been published in a number of documents including peer reviewed scientific journals, primary reference materials, and governmental and non-governmental reports. Additional information regarding the potential effects of the proposed Project-related activities on the listed species in question, their anticipated response to these actions, and the environmental consequences of the actions as a whole was formulated from the aforementioned resources, and the following biological assessment.

- Biological Assessment: San Anselmo Bridges Preventive Maintenance Program. California Department of Transportation and the Town of San Anselmo. BPMP-5159(022). September, 2022.

For information that has been taken directly from published, citable documents, those citations have been reference in the text and listed at the end of this document. A complete record of this consultation is on file at NMFS North-Central Coast Office in Santa Rosa, California (ARN #151422WCR2022SR00212).

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. Listed Species

This biological opinion analyzes the effect of the proposed San Anselmo Bridges Preventive maintenance Program in the Town of San Anselmo, Marin County, California on CCC steelhead in San Anselmo Creek. CCC steelhead are listed as threatened under the ESA (71 FR 834, January 5, 2006). The CCC steelhead distinct population segment (DPS) includes steelhead in coastal California streams from the Russian River to Aptos Creek, and the drainages of Suisun Bay, San Pablo Bay, and San Francisco Bay. CCC steelhead occur in San Anselmo Creek and are expected to be present in the action area during construction. The action area includes critical habitat for CCC steelhead (70 FR 52488; September 2, 2005).

2.2.2. Steelhead General Life History

Steelhead are anadromous fish, spending some time in both fresh and saltwater. The older juvenile and adult life stages occur in the ocean, until the adults ascend freshwater streams to spawn. Eggs (laid in gravel nests called redds), alevins (gravel dwelling hatchlings), fry (juveniles newly emerged from stream gravels), and young juveniles all rear in freshwater until they become large enough to migrate to the ocean to finish rearing and maturing to adults. General reviews for steelhead in California document much variation in life history (Shapovalov and Taft 1954, Barnhart 1986, Busby *et al.* 1996, McEwan 2001). Although variation occurs in coastal California, steelhead usually live in freshwater for 1 to 2 years in central California, then spend 2 or 3 years in the ocean before returning to their natal stream to spawn. Steelhead may spawn 1 to 4 times over their life. Adult steelhead returning from the ocean to the Corte Madera Creek watershed which includes San Anselmo Creek typically immigrate to freshwater between December and April, peaking in January and February, and juveniles migrate as smolts from the watershed to the ocean from January through June, with peak emigration occurring in April and May (Fukushima and Lesh 1998).

Steelhead fry rear in edgewater habitats and move gradually into pools and riffles as they grow larger. Cover is an important habitat component for juvenile steelhead, both as a velocity refuge and as a means of avoiding predation (Shirvell 1990, Meehan and Bjornn 1991). Steelhead, however, tend to use riffles and other habitats not strongly associated with cover during summer rearing more than other salmonids. Young steelhead feed on a wide variety of aquatic and terrestrial insects, and emerging fry are sometimes preyed upon by older juveniles. Rearing steelhead juveniles prefer water temperatures of 7.2-14.4 degrees Celsius (°C) and have an upper lethal limit of 23.9°C (Barnhart 1986, Bjornn and Reiser 1991). They can survive in water up to 27°C with saturated dissolved oxygen conditions and a plentiful food supply. Fluctuating diurnal water temperatures also aid in survivability of salmonids (Busby *et al.* 1996). Juvenile steelhead emigrate episodically from natal streams during fall, winter, and spring high flows, to the ocean to continue rearing to maturity.

Adults returning to spawn may migrate several miles, hundreds of miles in some watersheds, to reach their natal streams. Although spawning typically occurs between January and May, the specific timing of spawning may vary a month or more among streams within a region, and within streams inter-annually. Spawning (and smolt emigration) may continue through June (Busby *et al*. 1996). Female steelhead dig a nest in the stream and then deposit their eggs. After fertilization by the male, the female covers the nest with a layer of gravel. Steelhead do not necessarily die after spawning and may return to the ocean, sometimes repeating their spawning migration one or more years. The embryos incubate within the nest. Hatching time varies from about three weeks to two months depending on water temperature. The young fish emerge from the nest about two to six weeks after hatching.

2.2.3. Status of CCC Steelhead

In this opinion, NMFS assesses four population viability parameters to help us understand the status of CCC steelhead and the population's ability to survive and recover. These population viability parameters are: abundance, population growth rate, spatial structure, and diversity (McElhany *et al.* 2000). NMFS has used existing information to determine the general condition of each population and factors responsible for the current status of the DPS. We use these population viability parameters as surrogates for numbers, reproduction, and distribution, the criteria found within the regulatory definition of jeopardy (50 CFR 402.20). For example, the first three parameters are used as surrogates for numbers, reproduction, and distribution. We relate the fourth parameter, diversity, to all three regulatory criteria. Numbers, reproduction, and distribution are all affected when genetic or life history variability is lost or constrained resulting in reduced population resilience to environmental variation at local or landscape-level scales.

Historically, approximately 70 populations[2] of steelhead existed in the CCC steelhead DPS (Spence *et al.* 2008, Spence *et al.* 2012). Many of these populations (about 37) were independent, or potentially independent, meaning they had a high likelihood of surviving for 100 years absent anthropogenic impacts (Bjorkstedt *et al.* 2005). The remaining populations were dependent upon immigration from nearby CCC steelhead DPS populations to ensure their viability (McElhaney *et al*. 2000, Bjorkstedt *et al*. 2005).

While historical and present data on abundance are limited, CCC steelhead numbers are substantially reduced from historical levels. A total of 94,000 adult steelhead were estimated to spawn in the rivers of this DPS in the mid-1960s, including 50,000 fish in the Russian River - the largest population within the DPS (Busby *et al.* 1996). Recent estimates for the Russian River are on the order of 4,000 fish (NMFS 1997). Abundance estimates for smaller coastal streams in the DPS indicate low but stable levels with recent estimates for several streams (Lagunitas, Waddell, Scott, San Vincente, Soquel, and Aptos creeks) of individual run sizes of 500 fish or less (62 FR 43937). Some loss of genetic diversity has been documented and attributed to previous among-basin transfers of stock and local hatchery production in interior populations in the Russian River (Bjorkstedt *et al*. 2005). In San Francisco Bay streams, reduced population

[2] Population as defined by Bjorkstedt *et al*. 2005 and McElhaney *et al*. 2000 as, in brief summary, a group of fish of the same species that spawns in a particular locality at a particular season and does not interbreed substantially with fish from any other group. Such fish groups may include more than one stream. These authors use this definition as a starting point from which they define four types of populations (not all of which are mentioned here).

sizes and fragmentation of habitat has likely also led to loss of genetic diversity in these populations. For more detailed information on trends in CCC steelhead abundance, see: Busby *et al*. 1996, NMFS 1997, Good *et al*. 2005, Spence *et al*. 2008, Spence *et al.* 2012, Williams *et al.* 2011.

CCC steelhead abundance has declined significantly in recent decades, and long-term population trends suggest a negative growth rate. This indicates the DPS may not be viable in the long term. DPS populations that historically provided enough steelhead immigrants to support dependent populations may no longer be able to do so, placing dependent populations at increased risk of extirpation. However, because CCC steelhead have maintained a wide distribution throughout the DPS, roughly approximating the known historical distribution, CCC steelhead likely possess a resilience that will slow their decline relative to other salmonid DPSs or Evolutionary Significant Units in worse condition. On January 5, 2006, NMFS determined that the CCC steelhead DPS remained a threatened species, as previously listed (71 FR 834). A 2008 viability assessment of CCC steelhead concluded that populations in watersheds that drain to San Francisco Bay are highly unlikely to be viable, and that the limited information available did not indicate that any other CCC steelhead populations could be demonstrated to be viable (Spence *et al.* 2008). The most recent status review reaffirmed that steelhead in the CCC steelhead DPS remain "likely to become endangered in the foreseeable future" (Williams *et al.* 2011).

2.2.4. CCC Steelhead Critical Habitat Status

Critical habitat was designated for CCC steelhead on September 2, 2005 (70 FR 52488). In designating critical habitat, NMFS considers, among other things, the essential PBFs within the designated area that are essential to the conservation of the species and that may require special management considerations or protection.

PBFs for CCC steelhead and their associated essential features within freshwater include:

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

The condition of CCC 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 present depressed population conditions are, in part, the result of the following human-induced factors affecting critical habitat: logging, agricultural and mining

activities, urbanization, stream channelization, dams, wetland loss, and water withdrawals, including unscreened diversions for irrigation. Impacts of concern include alteration of streambank and channel morphology, alteration of water temperatures, loss of spawning and rearing habitat, fragmentation of habitat, loss of downstream recruitment of spawning gravels and large woody debris, degradation of water quality, removal of riparian vegetation resulting in increased streambank erosion, loss of shade (higher water temperatures) and loss of nutrient inputs (Busby *et al.* 1996, 70 FR 52488). Water development has drastically altered natural hydrologic cycles in many of the streams in the DPS. Alteration of flows results in migration delays, loss of suitable habitat due to dewatering and blockage; stranding of fish from rapid flow fluctuations; entrainment of juveniles into poorly screened or unscreened diversions, and increased water temperatures harmful to salmonids. Overall, current condition of CCC steelhead critical habitat is degraded, and does not provide the full extent of conservation value necessary for the recovery of the species.

A final recovery plan for CCC steelhead was prepared by NMFS in October 2016 (NMFS 2016). The plan describes key threats, actions needed to achieve recovery, and measurable criteria by which NMFS will determine when recovery has been reached. Recovery plan actions are primarily designed to restore ecological processes that support healthy steelhead populations, and address the various activities that harm these processes and threaten the species' survival. The recovery plan calls for a range of actions including the restoration of floodplains and channel structure, restoring riparian conditions, improving streamflows, restoring fish passage, protecting and restoring estuarine habitat, among other actions.

2.2.5. Global Climate Change

One factor affecting the range-wide status of the CCC steelhead DPS, and aquatic habitat at large is climate change. Impacts from global climate change are already occurring in California. For example, average annual air temperatures, heat extremes, and sea level have all increased in California over the last century (Kadir *et al*. 2013). Snow melt from the Sierra Nevada has declined (Kadir *et al*. 2013). However, total annual precipitation amounts have shown no discernable change (Kadir *et al*. 2013). CCC steelhead may have already experienced some detrimental impacts from climate change. NMFS believes the impacts on listed salmonids to date are likely fairly minor because natural, and local climate factors likely still drive most of the climatic conditions steelhead experience, and many of these factors have much less influence on steelhead abundance and distribution than human disturbance across the landscape. In addition, CCC steelhead are not dependent on snowmelt driven streams and, thus, not affected by declining snow packs.

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

In the San Francisco Bay region, warm temperatures generally occur in July and August, but as climate change takes hold, the occurrences of these events will likely begin in June and could continue to occur in September (Cayan *et al*. 2012). Climate simulation models project that the San Francisco region will maintain its Mediterranean climate regime, but experience a higher degree of variability of annual precipitation during the next 50 years and years that are drier than the historical annual average during the middle and end of the 21st Century. The greatest reduction in precipitation is projected to occur in March and April, with the core winter months remaining relatively unchanged (Cayan *et al.* 2012).

Estuaries may also experience changes detrimental to salmonids. Estuarine productivity is likely to change based on changes in freshwater flows, nutrient cycling, and sediment amounts (Scavia *et al*. 2002, Ruggiero *et al*. 2010). In marine environments, ecosystems and habitats important to juvenile and adult salmonids are likely to experience changes in temperatures, circulation, water chemistry, and food supplies (Brewer and Barry 2008, Feely *et al.* 2004, Osgood 2008, Turley 2008, Abdul-Aziz *et al*. 2011, Doney *et al*. 2012). The projections described above are for the mid to late 21st Century. In shorter time frames, climate conditions not caused by the human addition of carbon dioxide to the atmosphere are more likely to predominate (Cox and Stephenson 2007, Santer *et al*. 2011).

2.3. Action Area

"Action area" means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). The action area for the San Anselmo Bridges Preventative Maintenance Program consists of the Sir Francis Drake Bridge, Caltrans Bridge Number 27C-0040, which is located over San Anselmo Creek between Tunstead Avenue and Bank Street, just south of the "Hub" within the central business district of the Town of San Anselmo; and the Barber Avenue Bridge, located over San Anselmo Creek between Sir Francis Drake Boulevard and Entrata Avenue, in a residential area and also within the central portion of the Town. As mentioned above, Barber Avenue Bridge and Sir Francis Drake Boulevard Bridge are approximately 2,000 and 2,500 feet upstream from the confluence of Corte Madera and Ross Creek. The action area includes bridge footprints where work will be done, the banks disturbed by any clearing and grubbing, and the streambed of San Anselmo Creek. These channel reaches contain the area of the cofferdams, streambed area to be dewatered (171 linear feet at the Sir Francis Drake Bridge site, 91 linear feet at the Barber Avenue Bridge site), and the channel downstream to include the length of the waterway in which any temporary disruption to habitat (e.g., fine sediment plume) might be detectable. Additionally, the action area includes 500 feet upstream or downstream of each construction site where fish relocation activities may occur.

2.4. Environmental Baseline

The "environmental baseline" refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultations, and the impact of State or private actions

which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline (50 CFR 402.02).

2.4.1. Status of CCC Steelhead and Critical Habitat in the Action Area

According to Leidy et al. 2005, San Anselmo Creek may be the most important tributary to Corte Madera Creek for salmonid production. The lower reach of San Anselmo Creek that contains the two Project action areas was described by A. A. Rich and Associates as "characterized by long alternating lateral scour pool/riffle sequences with many man-made structures, mainly concrete retaining walls." Within the Action Area, San Anselmo Creek is usually perennial or intermittent during the proposed dry season work window, depending on the water year and flow conditions. Average stream discharge measured downstream at the Ross Post Office USGS stream gauge varies from approximately 7 cubic feet per second (cfs) in early May to 0.25 cfs in early September (USGS 2021).

The Sir Francis Drake Boulevard Bridge has concrete wingwalls and footings on its upstream end. During the May 5, 2020, site visit, there was minimal flow through the creek in the Action Area, with the flowing portions of the creek varying from a few feet to up to 10 feet in width. Deeper pools and glide flow sections are located both upstream and downstream of the bridge, with riffle and shallow pool habitat present beneath the structure itself. The Barber Avenue (approximately 2000 feet upstream from the confluence) Bridge rests on concrete piers, including a middle support that divides the channel into a higher gravel-bar portion on the north side that was dry at the time of the site visit, and a lower, southerly portion with streamflow present, approximately 10-15 feet in width. Slow glides, riffle and shallow pool habitat are found beneath the bridge as well as upstream and downstream of the structure.

According to a 2006 fish passage assessment of Corte Madera Creek and its tributaries conducted by Taylor and Associates, partial or complete barriers limiting fish passage remain downstream of the Action Area (Taylor and Associates 2006). The concrete channel below the existing bulkhead and poorly functioning fish ladder near the Ross Post Office are barriers for migrating adult salmonids during high flows because of limited low-velocity resting areas within the channel (Love and Associates 2007) and poor passage conditions, particularly during higher migration flows at the ladder/bulkhead (Love and Associates 2006). More recently, the County of Marin Flood Control District has published a Draft Environmental Impact Report (EIR) proposing a multi-benefit flood risk reduction and fisheries habitat improvement project in Corte Madera Creek downstream of the Action Area (Panorama Environmental 2021). The Draft EIR concludes that the existing Denil fish ladder and concrete channel impede fish passage because the concrete channel creates shallow, high velocity flows during the migration season, the channel has insufficient resting pools for fish passage, and there is no jump pool below the fish ladder to accommodate fish attempting to enter and pass through the ladder.

Surveyors in August of 2017 observed juvenile steelhead/rainbow trout approximately 700 feet downstream of Barber Avenue Bridge in pools located approximately 100 feet upstream and 175 feet downstream of the Winship Avenue Bridge over San Anselmo Creek, respectively (approximately 75 to 100 individuals total in a range of size classes between approximately 50

and 150 millimeters). No other recent survey data was available, but surveys in the 1990s consistently found *O. mykiss* of multiple age classes in the Corte Madera Creek watershed which suggests good natural propagation. CDFG surveys in the 1960s reported that the majority of the steelhead nursery area in San Anselmo Creek was in the lower half of the creek. CDFG surveys in 1969 estimated the steelhead population of San Anselmo Creek to be 23,000 individuals with juveniles inhabiting the 2 miles of creek between the confluence with Fairfax Creek and Winship Avenue Bridge (Leidy et al. 2005b). A. A. Rich and Associates estimates the mean trout populations, as a function of habitat type within San Anselmo Creek, to be .01 – 12.76 fish per square meter.

2.4.2. Factors Affecting the Species Environment in the Action Area

San Anselmo Creek is a tributary to Corte Madera Creek, which is a tributary to San Francisco Bay, located in Marin County California that drains a watershed of approximately 14.7 square miles. The creek is located primarily in developed residential areas but it originates in the less impacted reaches within the Cascade Canyon Open Space Preserve. Mixed hardwood forest dominates the watershed. The watershed is located in a Mediterranean climatic region, with over 90 percent of annual precipitation occurring between November and April. Cool, moist coastal fog generally alternates with clear, warm weather during the months of May through September, and significant rainfall during that time is rare. The project is in the lower reaches of San Anselmo Creek within the urbanized corridor of eastern Marin County. The lower reaches of San Anselmo Creek are heavily altered from decades of grazing, logging, and farming of the area, and ultimately urbanization. The creek banks are generally steep and deeply cut below the floodplain. To prevent erosion, the creek has been semi-channelized in many locations where the banks have been reinforced with RSP, concrete, and retaining walls.

In the action areas, San Anselmo Creek is a low-gradient perennial stream characterized by lateral scour pool and riffle sequences. This reach is heavily impacted by channel incision and bank armoring. Several lateral scour pool/riffle sequences identified within the action area are associated with RSP, undercut banks, the bridge structure, and a concrete retaining wall. The channel contains riffle and pool habitat with substrate composed of gravels and cobble, scattered concrete and rock debris, and exposed bedrock. Tree roots extend from the banks into pools in some locations, providing undercut refuge and other complex rearing habitat. Portions of the bank have been stabilized with concrete, concrete sacks, and rock slope protection to prevent erosion.

2.4.3. Previous Section 7 Consultations Affecting the Action Area

No known previous Section 7 consultations have occurred within the action area.

2.4.4. Climate Change Impacts in the Action Area

The long-term effects of climate change have been presented under the Rangewide Status of the Species and Critical Habitat section of this opinion (2.2.5). These include changes to streamflow regimes, water temperatures, and rainfall patterns. Listed species in the action area may have already experienced some detrimental impacts from climate change. These natural factors are likely less influential on fish abundance and distribution than anthropogenic impacts across the

action area. Future climate change impacts in the action area are likely to increase as air and water temperatures warm, and precipitation rates change. However, during the timeframe considered in this opinion, these changes are expected to materialize as insignificant alterations to current habitat conditions in 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).

Construction activities associated with the proposed project may affect CCC steelhead and their habitat. The following may result from construction activities: unintentional direct mortality during fish collections, relocations, and dewatering activities; temporary loss of benthic habitat, reductions in riparian vegetation and cover, and temporary impacts to channel bed morphology.

2.5.1. Fish Relocation Activities

To facilitate construction, the Project proposes to dewater up to approximately 170 linear feet of the San Anselmo Creek stream channel at the Sir Francis Drake Boulevard site and up to 91 feet at the Barber Avenue site. The Project proposes to collect and relocate fish in the work area prior to dewatering to avoid fish stranding and exposure to construction activities. Relocation activities would occur during the summer low-flow period after emigrating smolts have left and before adults have immigrated for spawning. Therefore, NMFS expects capture of listed steelhead for relocation would be limited to pre-smolting juveniles. Before and during dewatering of the construction site, juvenile steelhead and other fish would be captured by seining, dip netting and electrofishing. Collected fish would be relocated away from the work site to an appropriate location within San Anselmo Creek with adequate water quality/quantity, cover, and forage.

Data to precisely quantify the amount of steelhead that would be relocated by this Project are not available. Due to recent observations, perennial flow through the area, and suitable fish habitat characteristics in the action area even though it is heavily modified, NMFS expects steelhead to be present. To estimate the number of juvenile steelhead likely to be present in the action area, NMFS considered the 2018 downstream observations of 75 to 100 individual trout, as well as A. A. Rich and Associates estimate of the relative number of trout in the creek as 1.5 per square meter (3.28 square feet) (Caltrans 2021). The width of San Anselmo Creek through the project areas during the construction season is approximately 20 feet and the length is approximately 170 and 91 feet respectively, feet giving an approximate area of 3,400 square feet and 1,820 square feet (315.8 and 169.1 square meters). NMFS is using the 1.5 trout/square meter to approximate the number that will be present since some habitat in the action area will be poor, while the pools should hold more fish, making it a reasonable estimate for the entire area to be

dewatered. Using a density estimate of 1.5 fish per square meter, approximately 473 juvenile steelhead would be present in the 170 foot dewatered stretch of creek at the San Anselmo Bridge site and 254 juvenile steelhead would be present in the 91 feet of dewatered section at the Barber Avenue Bridge site. Based on this information, NMFS expects the maximum number of steelhead that will be captured and relocated from the action area by this Project to be 727 pre-smolting juvenile steelhead between the two construction sites.

Fish 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 would be conducted by qualified fisheries biologists, direct effects to, and mortality of juvenile salmonids during capture would be minimized.

Although sites selected for relocating fish should have similar water temperature as the capture sites and are expected to have adequate habitat, in some instances relocated fish may endure short-term stress from crowding at the relocation sites. Relocated fish may have to contend with other fish causing increased competition for available resources such as food and habitat area. Frequent responses to crowding by steelhead include emigration and reduced growth rates (Keeley 2003). 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 steelhead. As each fish moves, competition remains either localized to a small area or quickly diminishes as fish disperse. NMFS does not expect impacts from increased competition would be large enough to adversely affect the survival chances of individual steelhead, or cascade through the watershed population of these species based on the small area that would likely be affected and the small chance of mortality of salmonids likely to be relocated. Sufficient habitat appears to be available in San Anselmo Creek upstream and downstream of the Project sites to sustain fish relocated without crowding other juvenile steelhead.

Based on information from other relocation efforts, NMFS estimates injury and mortalities would be less than three percent of those steelhead that are relocated. Data on fish relocation efforts since 2004 shows most mortality rates are below three percent for steelhead (Collins 2004, CDFG 2005, 2006, 2007, 2008, 2009, 2010a, 2010b). Fish that avoid capture during relocation effects may be exposed to risks described in the following section on dewatering.

2.5.2. Dewatering

The Project proposes to isolate the work with cofferdams and bypass streamflow around the construction areas. Dewatering of the channel would affect approximately 170 and 91 linear feet of San Anselmo Creek at the Sir Francis Drake Boulevard site and the Barber Avenue Bridge site respectively.

NMFS anticipates temporary changes to instream flow within and downstream of the Project site during the dewatering process prior to construction. These fluctuations in flow are anticipated to be small, gradual, and short-term. Once the cofferdams and pipeline bypass system is installed,

streamflow above and below the work sites should be the same as free-flowing pre-project conditions except within the dewatered work area where streamflow is bypassed. The dewatering of 170 and 91 feet of channel is expected to cause a temporary reduction of aquatic habitat. Juvenile steelhead that avoid capture in the Project work area would likely die during dewatering activities due to desiccation, thermal stress, or crushed by heavy equipment during construction operations. However, due to the pre-dewatering fish relocation efforts to be performed by qualified biologists, NMFS expects that the number of juvenile steelhead that would be killed as a result of stranding during dewatering activities would be less than one percent of the fish within the action area prior to dewatering.

The temporary cofferdams and water diversion structures in the stream are not expected to impact juvenile steelhead movements in San Anselmo Creek beyond typical summer low-flow conditions. The cofferdams and dewatered reach would restrict movement of juvenile steelhead in a manner similar to the normal seasonal reduction of flow that typically occurs during summer within portions of some streams throughout the range of CCC steelhead. Although steelhead do not experience intermittent flows in the action area in all summers, the limited duration of water diversion is unlikely to adversely affect individual steelhead rearing upstream or downstream of the dewatered reach. By conforming to NMFS screen criteria (NMFS 1996), the screen's mesh size will prevent fish from passing into the pump and intake water velocities will be low enough to allow small steelhead life stages to swim away.

Benthic (i.e., bottom dwelling) aquatic macroinvertebrates within the Project site may be killed or their abundance reduced when the two sites are dewatered (Cushman 1985). However, effects to aquatic macroinvertebrates resulting from stream dewatering would be temporary because construction activities would be relatively short-lived and the dewatered reach is relatively small. Rapid recolonization (typically one to two months) of disturbed areas by macroinvertebrates is expected following rewatering (Cushman 1985, Thomas 1985, Harvey 1986). In addition, the effect of macroinvertebrate loss on juvenile steelhead would likely be negligible because food from upstream sources (via drift) would be available downstream of the dewatered areas since streamflow would be bypassed around the Project work site. Food sources derived from the riparian zone would not be affected by the Project. Based on the foregoing, NMFS does not expect the loss of aquatic macroinvertebrates as a result of dewatering activities would adversely affect threatened CCC steelhead.

As described above, NMFS expects injury and mortality of juvenile steelhead associated with fish relocation to be less than three percent of the total amount of steelhead captured, and mortality associated with dewatering activities to be less than one percent of the number of steelhead present within the action area prior to dewatering. Given our assumption of three percent injury or mortality for relocation activities, and less than one percent mortality for dewatering activities, NMFS expects no more than 15 juvenile steelhead at the Sir Francis Boulevard site and 8 juvenile steelhead at the Barber Avenue site would be injured or killed by construction-related dewatering and fish relocation efforts.

2.5.3. Increased Mobilization of Sediment in the Stream Channel

The proposed action would result in the disturbance of the streambed and banks for equipment access and construction. Disturbed soils may become mobilized when fall and winter rains

return subsequent to construction. NMFS anticipates these activities would result in small short-term increases in turbidity during rewatering and subsequent higher flows caused by winter storms after construction is completed. 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, and Spence *et al.* 1996).

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 diseases, 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 may 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 deposition can fill pools and reduce the amount of cover available to fish, decreasing the survival of juveniles (Alexander and Hansen 1986).

Although sediment and turbidity may affect listed salmonids as described above, sedimentation and turbidity levels associated with the proposed Project, including bridge work done from within the channel, are not expected to rise to the levels discussed in the previous paragraph because the Project proposes measures to prevent the mobilization of sediment during and after construction. During construction, NMFS expects sediment input to the creek would be minimal, because the Project proposes a debris containment and capture system, to ensure concrete and other materials do not fall into the creek. NMFS expects any sediment or turbidity generated by the Project would not extend more than 100 feet downstream of the work site based on site conditions (low flows) and methods used to control sediment and turbidity. NMFS does not anticipate harm, injury, or behavioral impacts to CCC steelhead associated with exposure to elevated suspended sediment levels that would be generated by this Project.

2.5.4. Toxic Chemicals

Oils and similar substances from construction equipment can contain a wide variety of polynuclear aromatic hydrocarbons (PAHs) and metals. Both can result in adverse impacts to salmonids. 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). Some of the effects that metals can have on salmonids are immobilization and impaired locomotion, reduced growth, reduced reproduction, genetic damage, tumors and lesions, developmental abnormalities, behavior changes (avoidance), and impairment of olfactory and brain functions (Eisler 2000).

The Project has proposed several measures to prevent the discharge of contaminants and avoid degradation of creek waters during construction activities. The stream would be dewatered when construction equipment is working in the streambed; spill containment and remediation material would be nearby; and vehicles would not be fueled or otherwise serviced within the stream bed. Due to these measures, NMFS expects that an accidental spill and toxic chemical contamination of the action area would be unlikely.

2.5.5. Impacts to Critical Habitat

Features of critical habitat for CCC steelhead 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, and streambank degradation from equipment access. However, there is no excavation work being done within the stream channel, with just the debris catchment system to prevent debris from entering the channel. The habitat function is not expected to change from the conditions that existed before the work on the bridges. Therefore, the Project is unlikely to compromise 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.
CCC steelhead are listed as threatened. Based on the loss of historic habitat due to dams and the degraded condition of remaining spawning and rearing areas, CCC steelhead populations in watersheds that drain to San Francisco Bay, including San Anselmo Creek, have experienced severe declines. Due to incised banks, channel armoring, and urbanization, steelhead occur in San Anselmo Creek in densities and abundance lower than historic levels. Juvenile CCC steelhead are expected to be present within the action area during construction; however, the number of individuals that are present is expected to be lower due to the small area of stream affected and low summer streamflows. Those present likely make up a small proportion of steelhead in San Anselmo Creek. Due to the timing of the proposed action, no adult steelhead or migrating steelhead smolts would be adversely affected by the Project.

As described in the *Effects of the Action* section above, NMFS identified dewatering and fish relocation as the adverse effects on CCC steelhead in the action area that would result from the proposed Project. Prior to dewatering 170 and 91 linear feet of creek for construction, fish would be collected and relocated from the work area. Fish that elude capture and remain in the Project area during construction activities would likely die due to desiccation or thermal stress, or be crushed by equipment during construction operations. However, based on the low mortality rates for similar capture and relocation efforts, NMFS anticipates few juvenile steelhead would be injured or killed by fish relocation and construction activities during implementation of this Project. Anticipated mortality from capture and relocation is expected to be less than three percent of the fish relocated, and mortality expected from dewatering is expected to be less than one percent of the fish in the area prior to dewatering. Because no more than 473 juvenile steelhead are expected to be present at the Sir Francis Boulevard site, and 254 juvenile steelhead at the Barber Avenue site, NMFS expects no more than 15 and 8 (23 total) juvenile steelhead would be injured or killed by fish relocation and dewatering. Due to the relatively large number of juveniles produced by each spawning pair, steelhead spawning in the San Anselmo Creek watershed in future years are likely to produce enough juveniles to replace the few that may be lost at the Project site due to relocation and dewatering. It is unlikely that the small potential loss of juveniles by this Project would impact future adult returns.

Regarding future climate change effects in the action area, California could be subject to higher average summer air temperatures and lower total precipitation levels. Reductions in the amount of snowfall and rainfall would reduce streamflow levels in Northern and Central Coastal rivers. Estuaries may also experience changes in productivity due to changes in freshwater flows, nutrient cycling, and sediment amounts. For this Project, in-water activities will occur in a single year between June 15 and October 15, and the above effects of climate change will not be detected within that time frame. If the effects of climate change are detected over the short term, they will likely materialize as moderate changes to the current climate conditions within the action area. These changes may place further stress on CCC steelhead populations. The effects of the proposed action combined with moderate climate change effects may result in conditions similar to those produced by natural ocean-atmospheric variations as described in the Environmental Baseline section of this opinion (Section 2.4) and annual variations. CCC steelhead are expected to persist throughout these phenomena, as they have in the past, even when concurrently exposed to the effects of similar projects.

2.8. Conclusion

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

2.9. Incidental Take Statement

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without a special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt

to engage in any such conduct. “Harm” is further defined by regulation to include significant habitat modification or degradation that actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, or sheltering (50 CFR 222.102). “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: NMFS anticipates that take of threatened CCC steelhead during preventative maintenance on Sir Francis Drake Boulevard Bridge and Barber Avenue Bridge over San Anselmo Creek in the town of San Anselmo, California will be associated with fish collection and relocation during stream dewatering.

The number of threatened steelhead that may be incidentally taken during Project activities is expected to be limited to the pre-smolt juvenile life history stage. Take is anticipated to occur during fish relocation and dewatering in a 170-foot long and 91-foot long reaches at the Project sites between June 15 and October 15. The number of juvenile steelhead relocated during Project construction is anticipated to be no more than 727 (473 at Sir Francis Boulevard site and 254 at Barber Avenue site), and no more than 22 juvenile steelhead (15 and 8 respectively) are expected to be injured, or killed during fish relocation and dewatering activities.

If more than 473 or 254 (727 total) juvenile steelhead are captured at the Sir Francis Drake Boulevard and Barber Avenue sites respectively, or more than 15 or 8 (23 total) juvenile steelhead are injured or killed, incidental take will have been exceeded.

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 (RPM) are necessary and appropriate to minimize take of CCC steelhead:

(1) Undertake measures to ensure that harm and mortality to listed steelhead resulting from fish relocation and dewatering activities is low.

(2) Undertake measures to minimize harm to CCC steelhead resulting during and from construction of the Project.

(3) Prepare and submit reports which summarize the effects of construction, fish relocation, and dewatering activities, 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. Caltrans has a continuing duty to monitor the impacts of incidental take and must report the progress of the action and its impact on the species as specified in this ITS (50 CFR 402.14). If the entity to whom a term and condition is directed does not comply with the following terms and conditions, protective coverage for the proposed action would likely lapse.

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

    a. At least 60 days prior to the initiation of construction, a stream dewatering plan and a fish relocation plan shall be provided to NMFS for review and approval.

    b. Captured fish shall be handled with extreme care and kept in water to the maximum extent possible during relocation activities. All captured fish shall be kept in cool, shaded, aerated water protected from excessive noise, jostling, or overcrowding any time they are not in the stream, and fish shall not be removed from this water except when released. To avoid predation, the biologist shall have at least two containers and segregate young-of-year fish 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 habitat condition are present to allow for adequate survival of transported fish and fish already present.

    c. If any salmonids are found dead or injured, the biologist shall contact NMFS biologist Andrew Trent by phone immediately at (707) 578-8553 or the NMFS North-Central Coast Office at (707) 575-6050. The purpose of the contact is to review the activities resulting in take and to determine if additional protective measures are required. All salmonid mortalities shall be retained, placed in an appropriately-sized sealable plastic bag, labeled with the date and location of collection, fork length measured, and frozen as soon as possible. Frozen samples shall be retained by the biologist until specific instructions are provided by NMFS. The biologist may not transfer biological samples to anyone other than the NMFS North-Central Coast Office without obtaining prior written approval from NMFS. Any such transfer will be subject to such conditions as NMFS deems appropriate.

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

   a. Construction equipment used within the creek channel will be checked each day prior to work within the creek 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 (top of bank to top of bank), Caltrans, the Town of Ross or their contractor will contain the spill and remove the affected sediment.

   b. In areas where concrete is used, a dry work area must be maintained to prevent conveyance of runoff from curing concrete to the surface waters of the adjacent stream at all times. Water that inadvertently contacts uncured concrete must not be discharged into surface waters.

   c. Once construction is completed, all Project-introduced material (pipe, cofferdam, *etc*.) must be removed. Excess materials will be disposed of at an appropriate disposal site. All cofferdams, pumps, pipes and other diversion materials will be removed from the stream upon work completion and no later than October 15.

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

a. Caltrans or the Town of San Anselmo must provide a written report to NMFS by January 31 of the year following construction of the proposed action. The report must be provided to NMFS North-Central Coast Office, Attention: North Coast Branch Chief, 777 Sonoma Avenue, Room 325, Santa Rosa, California, 95404-6528. The report must contain, at a minimum, the following information:

   i. Construction Related Activities – The report must include the dates construction began and was completed, a discussion of any unanticipated effects or unanticipated levels of effects on salmonids, a description of any and all measures taken to minimize those unanticipated effects and a statement as to whether or not 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, 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.

2.9.5. **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. 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. At least 60 days prior to the initiation of construction, a stream dewatering plan and a fish relocation plan shall be provided to NMFS for review and approval.

    b. Captured fish shall be handled with extreme care and kept in water to the maximum extent possible during relocation activities. All captured fish shall be kept in cool, shaded, aerated water protected from excessive noise, jostling, or overcrowding any time they are not in the stream, and fish shall not be removed from this water except when released. To avoid predation, the biologist shall have at least two containers and segregate young-of-year fish 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 habitat condition are present to allow for adequate survival of transported fish and fish already present.

    c. If any salmonids are found dead or injured, the biologist shall contact NMFS biologist Andrew Trent by phone immediately at (707) 578-8553 or the NMFS North-Central Coast Office at (707) 575-6050. The purpose of the contact is to review the activities resulting in take and to determine if additional protective measures are required. All salmonid mortalities shall be retained, placed in an appropriately-sized sealable plastic bag, labeled with the date and location of collection, fork length measured, and frozen as soon as possible. Frozen samples shall be retained by the biologist until specific instructions are provided by NMFS. The biologist may not transfer biological samples to anyone other than the NMFS North-Central Coast Office without obtaining prior written approval from NMFS. Any such transfer will be subject to such conditions as NMFS deems appropriate.

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

    a. Construction equipment used within the creek channel will be checked each day prior to work within the creek 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 (top of bank to top of bank), Caltrans, the San Anselmo, or their contractor will contain the spill and remove the affected sediment.

    b. In areas where concrete is used, a dry work area must be maintained to prevent

conveyance of runoff from curing concrete to the surface waters of the adjacent stream at all times. Water that inadvertently contacts uncured concrete must not be discharged into surface waters.

c. Once construction is completed, all Project-introduced material (pipe, cofferdam, *etc*.) must be removed. Excess materials will be disposed of at an appropriate disposal site. All cofferdams, pumps, pipes and other diversion materials will be removed from the stream upon work completion and no later than October 15.

4. The following terms and conditions implement reasonable and prudent measure 4:

a. Caltrans or the Town of San Anselmo must provide a written report to NMFS by January 31 of the year following construction of the proposed action. The report must be provided to NMFS North-Central Coast Office, Attention: North Coast Branch Chief, 777 Sonoma Avenue, Room 325, Santa Rosa, California, 95404-6528. The report must contain, at a minimum, the following information:

i. Construction Related Activities – The report must include the dates construction began and was completed, a discussion of any unanticipated effects or unanticipated levels of effects on salmonids, a description of any and all measures taken to minimize those unanticipated effects and a statement as to whether or not 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, 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.

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 San Anselmo Bridges Preventative Maintenance Project on San Anselmo Creek in the town of San Anselmo, California.

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

Under the ESA, "effects of the action" are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (50 CFR 402.02). In our analysis, which describes the effects of the proposed action, we considered 50 CFR 402.17(a) and (b). When evaluating whether the proposed action is not likely to adversely affect listed species or critical habitat, NMFS considers whether the effects are expected to be completely beneficial, insignificant, or discountable. Completely beneficial effects are contemporaneous positive effects without any adverse effects to the species or critical habitat. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Effects are considered discountable if they are extremely unlikely to occur.

Historically, the Corte Madera Creek watershed, including San Anselmo Creek, supported CCC coho salmon. Recorded observations of coho within the watershed date from 1926 to 1984; the last sighting of coho was in 1984 (Leidy et al. 2005b). Based on this information, NMFS considers endangered CCC coho extirpated from San Anselmo Creek and the greater Corte Madera Creek watershed. Thus, Caltrans has determined in the Project's biological assessment that the project is expected to have no effect on endangered CCC coho salmon. However, Corte Madera Creek, including San Anselmo Creek, is designated critical habitat for endangered CCC coho salmon (64 FR 24049).

For CCC coho salmon critical habitat, the following essential habitat types have been identified: 1) juvenile summer and winter rearing areas; 2) juvenile migration corridors; 3) areas for growth and development; 4) adult migration corridors; and 5) spawning areas. Within these habitat types, the PBFs of coho salmon critical habitat include adequate: 1) substrate, 2) water quality, 3) water quantity, 4) water temperature, 5) water velocity, 6) cover/shelter, 7) food, 8) riparian vegetation, 9) space, and 10) safe passage conditions (64 FR 24029). Within the action area, the PBFs for CCC coho salmon migration are moderate to good condition. PBFs in the action area

for CCC coho salmon spawning are poor. PBFs for juvenile summer rearing, and growth and development are poor due to high summertime water temperatures, low summertime flow conditions, and impaired substrate, cover, shelter, and water velocity conditions.

NMFS evaluated the proposed project for potential adverse effects to CCC coho salmon critical habitat. NMFS considered the life history of CCC coho salmon (Weitkamp et al. 1995), aerial photographs of the work sites, and current habitat conditions. The effects of the proposed action on CCC coho salmon critical habitat are reasonably likely to include effects from dewatering, temporary increases in suspended sediment concentrations, and temporary and minimal reductions in riparian vegetation.

As discussed in Section 2.5 of this opinion for CCC steelhead critical habitat, effects to habitat from proposed actions are expected to be temporary, insignificant, or discountable. Dewatering would result in temporary and minor impacts to water quality and streamflow, and could cause the temporary reduction of prey (macroinvertebrates) within the affected reaches. However, impacts to streamflow are not expected to impair habitat conditions beyond those that typically occur during summertime low flow conditions, and macroinvertebrate populations are expected to recover within one to two months after construction. Increases in turbidity will be negligible because of BMPs incorporated by the project to avoid or minimize the discharge of sediments. The potential for construction–related toxins and pollutants to be introduced to the stream is expected to be discountable due to the spill prevention, containment, and disposal measures that are included in the project. Disturbances to riparian vegetation would be minimal and would entail only light pruning if necessary. For the above reasons, the potential effects of the Project are considered insignificant or discountable and are not expected to result in either a net change to existing habitat values in the action area or result in adverse impacts to designated critical habitat for CCC coho salmon.

3. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

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

3.1. Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended users of this opinion are the California Department of Transportation. Other interested users could include the Town of San Anselmo, citizens of Marin County and others interested in the conservation of threatened steelhead. Individual copies of this opinion were provided to the Caltrans. The document will be available within two weeks at the NOAA Library Institutional Repository [https://repository.library.noaa.gov/welcome]. The format and naming adhere to conventional standards for style.

3.2. Integrity

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

3.3. Objectivity

Information Product Category: Natural Resource Plan

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

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

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

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