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

October 15, 2021 **Refer to NMFS No:** WCRO-2021-02408

Randall LaVack
Branch Chief, Senior Environmental Planner
California Department of Transportation, District 5
50 Higuera Street
San Luis Obispo, California 93401-5415

Re: Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Route 1/9 Intersection Improvement Project (EA #465800)

Dear Mr. LaVack:

Thank you for the California Department of Transportation's (Caltrans)[1] letter of September 1, 2021, 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 Route 1/9 Intersection Improvement Project.

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

The enclosed biological opinion is based on our review of Caltrans' proposed project and describes NMFS' analysis of potential effects on threatened Central California Coast (CCC) steelhead, endangered CCC coho, and designated critical habitat for CCC coho salmon in accordance with section 7 of the ESA. In the enclosed biological opinion, NMFS concludes the project is not likely to jeopardize the continued existence of CCC steelhead or CCC coho; nor is it likely to adversely modify CCC coho salmon critical habitat. However, NMFS anticipates that take of CCC steelhead may occur. An incidental take statement which applies to this project with non-discretionary terms and conditions is included within the enclosed opinion. NMFS has reviewed the proposed project for potential effects on EFH and determined that the proposed project would adversely affect EFH for Pacific Coast Salmon, which are managed under the Pacific Coast Salmon Fishery Management Plan. While the proposed action will result in adverse

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

effects to EFH, the proposed project contains measures to minimize, mitigate, or otherwise off set the adverse effects; thus, no EFH Conservation Recommendations are included in this opinion.

If you have any questions concerning this consultation, or if you require additional information, please contact Elena Meza, North-Central Coast Office in Santa Rosa, California at 707-575-6068 or via email at elena.meza@noaa.gov.

Sincerely,

Alecia Van Atta
Assistant Regional Administrator
California Coastal Office

Enclosure

cc: Karen Holmes, Caltrans District 5, karen.holmes@dot.ca.gov
Connor Ritchie, Caltrans District 5, connor.ritchie@dot.ca.gov
Kelly Hardwicke, H.T. Harvey & Associates, khardwicke@harveyecology.com
Joshua Spangrud, City of Santa Cruz, JSpangrud@cityofsantacruz.com
Christopher Schneider, City of Santa Cruz Public Works, cschneiter@cityofsantacruz.com
E-File ARN 151422SWR2012SR00055

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

Route 1/9 Intersection Improvement Project (EA # 465800)

NMFS Consultation Number: WCRO-2021-02408
Action Agency: California Department of Transportation (Caltrans)

Table 1. 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	N/A	N/A
Central California Coast Coho salmon (*O. tshawytscha*)	Endangered	No	No	Yes	No

Table 2. Essential Fish Habitat and NMFS' Determinations:

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

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

Issued By:

Alecia Van Atta
Assistant Regional Administrator
California Coastal Office

Date: October 15, 2021

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1 INTRODUCTION

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

1.1 Background

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

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

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

1.2 Consultation History

On February 22, 2012, NMFS issued a letter of concurrence for the project that concluded the project was not likely to adversely affect the Central California Coast (CCC) steelhead (*Oncorhyncus mykiss*), CCC coho salmon (*O. kisutch*), or their designated critical habitat. The City of Santa Cruz (project applicant) initiated construction of the project on June 21, 2021. During dewatering of the project site on August 17, 2021, a biological consultant (H.T. Harvey & Associates, hereafter referred to as H.T. Harvey) observed approximately 4-5 juvenile CCC steelhead in the pool and ceased dewatering immediately. On August 18, 2021, following the discovery of CCC steelhead, H.T. Harvey contacted NMFS to discuss this finding and its implications for project implementation. NMFS recommended H.T. Harvey organize a conference call with NMFS, the City of Santa Cruz (City), Caltrans, and the California Department of Fish and Wildlife (CDFW) as soon as possible to discuss the unexpected presence of CCC steelhead in the action area. This conference call was held on August 19, 2019, and included representatives from the City, Caltrans, NMFS, CDFW, and H.T. Harvey. During the conference call it was determined that CDFW's permit for the project would not be affected by the presence of CCC steelhead, yet Caltrans did not have Federal ESA authorization to take (relocate) CCC steelhead. NMFS requested a site visit to observe conditions of the pool where steelhead were observed. NMFS visited the site with representatives of H.T. Harvey, the City, and Caltrans on August 19, 2021 and observed very poor habitat conditions at the site (see Section 2.4 Environmental Baseline for a description of site conditions).

A conference call was held on August 20, 2021 among NMFS and Caltrans leadership, and the City project representatives. During that call NMFS explained there was no immediate mechanism for Caltrans to obtain ESA authorization for relocation of steelhead located at the project site. NMFS also explained the risks of Caltrans moving forward with the project if they were to not receive ESA authorization from NMFS. Caltrans leadership expressed their concerns about moving forward without ESA authorization and conveyed to NMFS they were likely going to request reinitiation of consultation. NMFS ensured Caltrans they would expedite the consultation to complete it within 60 days so the City could reinitiate work in the fall.

On September 1, 2021, Caltrans provided NMFS the Route 1/9 Intersection Improvement Project Biological Assessment (BA) with and requested reinitiation of consultation with NMFS. In the BA, Caltrans determined the project is likely to adversely affect CCC steelhead and not likely to adversely affect CCC coho. Caltrans also incorrectly determined CCC coho critical habitat was not present in the action area, therefore, they did not make a determination on the effects of the project on CCC coho (see a description of the species and critical habitat present in the action area in Section 2.2 of this biological opinion).

On September 16, 2021, NMFS met with Caltrans and City representatives regarding the information needed to initiate formal ESA Section 7 consultation. During the meeting, NMFS requested design plans, a hazardous material spill prevention control and countermeasure plan, a post-construction mitigation monitoring plan, a fish handling and relocation plan, and the Natural Environmental Study, and asked questions about the remaining work timeline. NMFS also informed Caltrans CCC coho critical habitat is present in the action area and requested they provide an effects determination for CCC coho critical habitat.

Throughout early October 2021, NMFS received several of the documents and information requested during our September 16, 2021 coordination call with the City and Caltrans including: design plans, a hazardous material spill prevention control and countermeasure plan, fish handling and relocation plan, Natural Environment Study, length of creek to be dewatered, updated effects determination for CCC coho critical habitat, and an updated project description. With receipt of all of the information requested, on October 13, 2021, NMFS determined that we had sufficient information to initiate consultation. By email on October 14, 2021, NMFS notified Caltrans of this October 13, 2021 consultation initiation date.

1.3 Proposed Federal Action

Under the ESA, "action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies (50 CFR 402.02). Under the MSA, Federal action means any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken by a Federal Agency (50 CFR 600.910).

The City proposes to alter the intersection of Route 1 and Route 9 in the City of Santa Cruz in Santa Cruz County. The project will add additional turn lanes, bicycle lanes, and shoulders to address the existing long vehicle queues that occur. The purpose of the project is to improve traffic operations, better accommodate existing and projected traffic volumes, and improve safety.

Some work on the project was completed under the original consultation before Caltrans reinitiated consultation with NMFS. The work that was completed is described in the Environmental Baseline, Section 2.4. The remaining work includes: (1) dewatering and fish relocation; (2) demolition and construction; and (3) revegetation.

Project activities proposed to occur in and around surface waters in the action area involve extension of the existing 750 linear foot culvert (an approximation of the length) containing the Arroyo de San Pedro Regalado (Arroyo) by 15 feet. The City will construct an earthen embankment and retaining wall that will support the roadway widening over the drainage culvert located at the northeast corner of the Route 1/9 intersection. The embankment would have a 2:1 slope with the toe of the embankment extending approximately 40 feet beyond the existing roadway. Minor excavation up to 4 feet deep would be needed for the proposed embankment; this excavation would occur within the existing embankment and culvert areas that were backfilled following construction of the original culvert. The existing concrete apron and cutoff wall that extends about 25 feet from the existing culvert would remain in place or be reconstruction "in-kind". The concrete retaining wall will be extended uphill from the existing culvert outfall. The extended retaining wall is approximately 11 feet tall, founded on spread footings above the top of the existing culvert. Additional construction above the top of the bank includes widening the Route 1/9 intersection by adding turn lanes, bicycle lanes, and shoulders to address traffic congestion.

As an alternative to the above, the City may construct the following design: extension of an existing concrete retaining wall uphill from the existing 6-feet-in-diameter reinforced concrete pipe (RCP) outfall for the Arroyo. The extended retaining wall is approximately 11 feet tall, founded on spread footings, and above the top of the existing 6-feet-in-diameter RCP. Under this alternative, no work would be required below the top of bank of the Arroyo except fish relocation. The City proposes to relocate fish from the pool because they observed steelhead that are currently trapped in the pool which has very poor water quality and limited cover because of the City's vegetation removal activities. Under this alternative, the City would not dewater the channel beyond what is needed to relocate fish from the pool below the culvert. If streamflows in the Arroyo increase to the extent that fish could volitionally move out of the pool, the City would not need to relocate fish from the pool. When considering either alternative, equipment staging will occur in already disturbed areas within Caltrans' existing right-of-way.

Access to the creek bed may be needed to complete the above work, depending on the final alternative chosen. All in-channel work will be conducted during the dry season when flows are at annual lows (June 15 to November 15). In-channel work is expected to take approximately three weeks to complete.

Also, the City has prepared a mitigation, monitoring and reporting plan for the restoration of disturbed areas following construction (H.T. Harvey & Associates 2020). The post-construction plans include native tree, shrub and groundcover plantings in the riparian zone (H.T. Harvey & Associates 2020). The mitigation site and all riparian areas disturbed by the project will also be seeded with the native riparian seed mix.

A Stormwater Pollution Prevention Plan (SWPPP) and Spill Prevention Control and Countermeasures Plan (SPPC) will be implemented to maintain water quality within the Arroyo during construction. These plans include measures such as isolating on-site earthen stockpiles with a silt fence, filter fabric, and/or straw bales/fiber rolls. Silt fence and/or fiber rolls will also be placed at bridge abutments, new abutment excavation areas, and any other locations when work could result in loose sediment possibly entering the creek. The silt fence/fiber rolls would be maintained and kept in place for the duration of the project. Any sediment or debris captured by the fence/rolls will be removed before the fence/rolls are removed. Additional erosion, sediment, and material stockpile best management practices (BMPs) would be employed, as necessary, between work areas and the adjacent waterway to avoid the potential for sediment latent runoff to enter the stream.

Per Clean Water Act section 402, the State Water Resources Control Board (State Board) issues permits to entities that operate facilities, and operate and maintain highway systems that will discharge storm water to waters of the United States. Per State Board regulations, Caltrans and the City have prepared a Storm Water Control Plan (SWCP) that includes measures they will implement to minimize the discharge of polluted stormwater from operation and maintenance of the highway. The SWCP includes measures to control and reduce the discharge of pollutants to the maximum extent practicable (MEP), including management practices, control techniques and system, design and engineering methods appropriate for the control of such pollutants. Compliance with the MEP standard involves applying BMPs that are effective in reducing or eliminating the discharge of pollutants to the waters of the United States. MEP emphasizes pollutant reduction and source control BMPs to prevent pollutants from entering stormwater runoff. MEP may require treatment of the stormwater runoff if it contains pollutants.

As part of the proposed action, the City plans to use several avoidance and minimization measures (AMMs) to protect aquatic species and habitats during construction and maintenance activities. Section 2.4.6 of the biological assessment provides a complete list of measures. The AMMs have been selected to protect water quality, stream processes, and riparian vegetation during construction and the operations and maintenance of the facility. For example, measures to protect aquatic species include the use of seasonal work windows for in-channel work (June 15 to November 15), exclusion screens upstream and downstream of the construction area, and training of construction personnel. For water quality protection, measures include allowing poured concrete to fully cure before contact with streamflow, dedicated staging and containment areas for fueling of equipment, minimized access points and areas of disturbance, use of erosion control and sediment detention devices, inspection and immediate repair of vehicles for fluid or grease leaks, and replanting of disturbed areas.

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

2.2 Rangewide Status of the Species and Critical Habitat

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

2.2.1 Species Description and Life History

The biological opinion analyses the effects of the federal action on the following federally listed species (Distinct Population Segment [DPS] or Evolutionarily Significant Unit [ESU]) and designated critical habitat:

Endangered Central California Coast (CCC) coho salmon ESU (*Oncorhynchus kisutch*)
Endangered (70 FR 37160; June 28, 2005)
Critical habitat (64 FR 24049; May 5, 1999);

Threatened Central California Coast (CCC) steelhead DPS (*O. mykiss*)
Threatened (71 FR 834, January 5, 2006).

The CCC steelhead DPS includes steelhead in coastal California streams from the Russian River to Aptos Creek, and the drainages of Suisun, San Pablo, and San Francisco Bays eastward to Chipps Island at the confluence of the Sacramento and San Joaquin Rivers. In addition, the DPS includes steelhead from one active artificial propagation program, the Don Clausen Fish Hatchery Program.[2] The CCC coho salmon ESU includes coho salmon from Punta Gorda in northern California, south to, and including, Aptos Creek in central California, as well as populations in tributaries to San Francisco Bay, excluding the Sacramento-San Joaquin River System. In addition, the ESU includes coho salmon from the following artificial propagation programs: the Russian River Coho Salmon Captive Broodstock Program[3], and the Southern Coho Salmon Captive Broodstock Program.[4]

The action area is within designated critical habitat for CCC coho salmon. CCC coho salmon critical habitat is designated to include all river reaches accessible to listed coho salmon from Punta Gorda in northern California south to the San Lorenzo River in central California, and includes two tributaries to San Francisco Bay, Arroyo Corte Madera Del Presidio and Corte Madera Creek. Critical habitat consists of the water, substrate, and adjacent riparian zone of estuarine and riverine reaches (including off-channel habitats).

[2] Kingfisher Flat Hatchery previously had a small CCC steelhead hatchery program that released steelhead smolts into Scott Creek and the San Lorenzo River. This program was terminated in 2014.
[3] Formerly referred to as the Don Clausen Fish Hatchery Captive Broodstock Program.
[4] Formerly referred to as the Scott Creek/King Fisher Flats Conservation Program and the Scott Creek Captive Broodstock Program.

2.2.1.1 Steelhead Life History

Steelhead are anadromous forms of *Oncorhynchus mykiss*, spending some time in both fresh- and saltwater. Juveniles migrate to the ocean where they mature. Adult steelhead return to freshwater rivers and streams to reproduce, or spawn. Unlike Pacific salmon, steelhead are iteroparous, or capable of spawning in multiple years before death (Busby et al. 1996; Moyle 2002). Although one-time spawners are the great majority, Shapovalov and Taft (1954) reported that repeat spawners are relatively numerous (17.2 percent) in central California coastal streams. Eggs (laid in gravel nests called redds), alevins (gravel dwelling hatchlings), fry (juveniles newly emerged from stream gravels), and other juvenile life stages all rear in freshwater until they migrate to the ocean where they reach maturity.

O. mykiss exhibit a variable life history. Coastal *O. mykiss* populations in central and southern California are classified into three principle life history strategies: fluvial-anadromous, lagoon anadromous, and freshwater resident or non-anadromous (Boughton et al. 2007). The anadromous forms of CCC steelhead are classified as "winter-run" steelhead because they emigrate from the ocean to their natal streams to spawn annually during the winter; although run times can extend into spring (Moyle 2002). Within the CCC steelhead DPS, adults typically enter freshwater between December and April, with peaks occurring in January through March (Wagner 1983; Fukushima and Lesh 1998). It is during this time that streamflow (depth and velocity) are suitable for adults to successfully migrate to and from spawning grounds. The minimum stream depth necessary for successful upstream migration is about 13 centimeters (cm), although short sections with depths less than 13 cm are passable (Thompson 1972). More optimal water velocities for upstream migration are in the range of 40-90 cm/s, with a maximum velocity beyond which upstream migration is not likely to occur of 240 cm/s (Thompson 1972).

Redds are generally located in areas where the hydraulic conditions limit fine sediment accumulations. Reiser and Bjornn (1979) found that gravels of 1.3-11.7 cm in diameter were preferred by steelhead. Survival of embryos is reduced when fines smaller than 6.4 mm comprise 20 to 25 percent of the substrate. This is because, during the incubation period, the intragravel environment must permit a constant flow of water in order to deliver dissolved oxygen and remove metabolic wastes. Studies have shown embryo survival is higher when intragravel velocities exceed 20 cm/hour (Coble 1961; Phillips and Campbell 1961). The number of days required for steelhead eggs to hatch is inversely proportional to water temperature and varies from about 19 days at 15.6˚ degrees (°) Celsius (C) to about 80 days at 5.6°C. Fry typically emerge from the gravel two to three weeks after hatching (Barnhart 1986). Other intragravel parameters such as the organic material in the substrate affect the survival of eggs to fry emergence (Shapovalov and Taft 1954; Everest et al. 1987; Chapman 1988).

Once emerged from the gravel, steelhead fry rear in edgewater habitats along the stream and gradually move into pools and riffles as they grow larger. Cover, sediment, and water quality are important habitat components for juvenile steelhead. Cover in the form of woody debris, rocks, overhanging banks, and other in-water structures provide velocity refuge and a means of avoiding predation (Shirvell 1990; Bjornn and Reiser 1991). Steelhead, however, tend to use riffles and other habitats not strongly associated with cover during summer rearing more than other salmonids. In winter, juvenile steelhead become less active and hide in available cover, including gravel or woody debris. Young steelhead feed on a wide variety of aquatic and terrestrial insects, and emerging fry are sometimes preyed upon by older juveniles. Water temperature can influence the metabolic rate, distribution, abundance, and swimming ability of rearing juvenile steelhead (Barnhart 1986; Bjornn and Reiser 1991; Myrick and Cech 2005). Optimal temperatures for steelhead growth range between 10 and 19°C (Hokanson et al. 1977; Wurtsbaugh and Davis 1977; Myrick and Cech 2005). Fluctuating diurnal water temperatures are also important for the survival and growth of salmonids (Busby et al. 1996).

Although variation occurs, CCC juvenile steelhead that exhibit an anadromous life history strategy usually rear in freshwater for 1-2 years (NMFS 2016b). CCC steelhead smolts emigrate episodically from freshwater in late winter and spring, with peak migrations occurring in April and May (Shapovalov and Taft 1954; Fukushima and Lesh 1998; Ohms and Boughton 2019). Steelhead smolts in California range in size from 120 to 280 mm (fork length) (Shapovalov and Taft 1954; Barnhart 1986). Smolts migrating from the freshwater environment may temporarily utilize the estuarine habitats for saltwater acclimation and feeding prior to entering the ocean.

Juvenile steelhead of the lagoon-anadromous life history rear in lagoons for extended periods (Smith 1990; Boughton et al. 2006; Hayes et al. 2008). Lagoons are a specific type of estuarine habitat where a seasonal impoundment of water develops after a sandbar forms at the mouth of the watershed, temporarily separating the fresh and marine environments (Smith 1990). Like other estuary types, bar-built lagoons can serve as important rearing areas for many fish and invertebrate species—including juvenile steelhead (Simenstad et al. 1982; Smith 1990; Robinson 1993; Martin 1995). Due to the combination of high prey abundance and seasonally warmer temperatures, juvenile steelhead that rear in lagoons have been found to achieve superior growth rates relative to upstream fish of the same cohort, and can therefore disproportionally represent future adult steelhead returns (Bond et al. 2008; Hayes et al. 2008). This is especially important considering that lagoon habitats often represent a fraction of the watershed area.

2.2.1.2 Coho Salmon Life History

The life history of the coho salmon in California has been well documented (Shapovalov and Taft 1954; Hassler 1987; Weitkamp et al. 1995). In contrast to the life history patterns of other anadromous salmonids, coho salmon in California generally exhibit a relatively simple three-year life cycle. Adult salmon typically begin the immigration from the ocean to their natal streams after heavy late-fall or winter rains breach the sand bars at the mouths of coastal streams (Sandercock 1991). Coho salmon are typically associated with small to moderately-sized coastal streams characterized by heavily forested watersheds; perennially-flowing reaches of cool, high quality water; dense riparian canopy; deep pools with abundant overhead cover; instream cover consisting of large, stable woody debris and undercut banks; and gravel or cobble substrates (Sandercock 1991). Immigration continues into March, generally peaking in December and January, with spawning occurring shortly after arrival at the spawning ground (Shapovalov and Taft 1954).

When in freshwater, optimal habitats for coho salmon include adequate quantities of: (1) deep complex pools formed by large woody debris; (2) adequate quantities of water; (3) cool water temperatures [when maximum weekly average water temperatures exceed 18°C coho salmon are absent from otherwise suitable rearing habitat (Welsh et al. 2001); temperatures between 12-14° C are preferred; and the upper lethal limit is between 25-26°C.]; (4) unimpeded passage to spawning grounds (adults) and back to the ocean (smolts); (5) adequate quantities of clean spawning gravel; and (6) access to floodplains, side channels and low velocity habitat during high flow events. Numerous other requirements exist (i.e., adequate quantities of food, dissolved oxygen, low turbidity, etc.), but in many respects these other needs are generally met when the six freshwater habitat requirements listed above are at a properly functioning condition.

The eggs generally hatch after four to eight weeks, depending on water temperature. Survival and development rates depend, in part, on fine sediment levels within the redd. Under optimum conditions, mortality during this period can be as low as 10 percent; under adverse conditions of high scouring flows or heavy siltation, mortality may be close to 100 percent (Baker and Reynolds 1986). McMahon (1983) found that egg and fry survival drops sharply when fines make up 15 percent or more of the substrate. The newly-hatched fry remain in the redd from two to seven weeks before emerging from the gravel (Shapovalov and Taft 1954). Upon emergence, fry seek out shallow water, usually along stream margins. As they grow, juvenile coho salmon often occupy habitat at the heads of pools, which generally provide an optimum mix of high food availability and good cover with low swimming cost (Nielsen 1992). In the spring, as yearlings, juvenile coho salmon undergo a physiological process, or smoltification, which prepares them for living in the marine environment. Emigration timing is correlated with precipitation events and peak upwelling currents along the coast. Entry into the ocean at this time facilitates more growth and, therefore, greater marine survival (Holtby et al. 1990).

2.2.2 Status of the Listed Species

NMFS assesses four population viability[5] parameters to discern the status of the listed ESUs and DPSs and to assess each species ability to survive and recover. These population viability parameters are: abundance, population growth rate, spatial structure, and diversity (McElhany et al. 2000). While there is insufficient data to evaluate these population viability parameters quantitatively, NMFS has used existing information to determine the general condition of the populations in the CCC steelhead DPS, the CCC coho salmon ESU, and factors responsible for the current status of these listed species.

The population viability parameters are used as surrogates for numbers, reproduction, and distribution, which are included in the regulatory definition of “jeopardize the continued existence of” (50 CFR 402.02). For example, abundance, population growth rate, and distribution are surrogates for numbers, reproduction, and distribution, respectively. The fourth parameter, diversity, is related 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.

2.2.2.1 CCC Steelhead DPS

Historically, approximately 70 populations 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

[5] NMFS defines a viable salmonid population as “an independent population of any Pacific salmonid (genus *Oncorhynchus*) that has a negligible risk of extinction due to threats from demographic variation, local environmental variation, and genetic diversity changes over a 100- year time frame” (McElhany et al. 2000).

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). More recent estimates for the Russian River are on the order of 4,000 fish (NMFS 1997a). Abundance estimates for smaller coastal streams in the DPS indicate low but stable levels with recent estimates for several streams (Lagunitas, Waddell, Scott, San Vicente, Pudding, and Caspar creeks) of individual run sizes of 500 fish or less (62 FR 43937; August 18, 1997). Some loss of genetic diversity has been documented and attributed to previous among-basin transfers of stock and local hatchery production in interior populations in the Russian River (Bjorkstedt et al. 2005). In San Francisco Bay streams, reduced population sizes and fragmented habitat conditions has likely also depressed genetic diversity in these populations. For more detailed information on trends in CCC steelhead abundance, see Busby et al. 1996; NMFS 1997a; Good et al. 2005; Spence et al. 2008; Williams et al. 2011; and Williams et al. 2016.

CCC steelhead long-term population trends suggest a negative growth rate, indicating the DPS may not be viable in the long-term. 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 remain present in most streams throughout the DPS, roughly approximating the known historical range, CCC steelhead likely possess a resilience that has slowed their rate of decline relative to other salmonid species. The 2005 status review concluded that steelhead in the CCC steelhead DPS remain "likely to become endangered in the foreseeable future" (Good et al. 2005). On January 5, 2006, NMFS issued a final determination that the CCC steelhead DPS is a threatened species, as previously listed (71 FR 834).

The most recent status update concludes that steelhead in the CCC DPS remains "likely to become endangered in the foreseeable future", as new and additional information available since Williams et al. (2011) does not appear to suggest a change in extinction risk (Williams et al. 2016). In the most recent status review, NMFS concluded that the CCC steelhead DPS should remain listed as threatened (NMFS 2016a).

2.2.2.2 CCC Coho Salmon ESU

Historically, the CCC coho salmon ESU was comprised of approximately 76 coho salmon populations. Most of these were dependent populations that needed immigration from other nearby populations to ensure their long-term survival. Historically, there were 11 functionally independent populations and 1 potentially independent population of CCC coho salmon (Spence et al. 2008, Spence et al. 2012). Most of the populations in the CCC coho salmon ESU are currently doing poorly as a result of low abundance, range constriction, fragmentation, and loss of genetic diversity, as described below.

Brown et al. (1994) estimated that annual spawning numbers of coho salmon in California ranged between 200,000 and 500,000 fish in the 1940s, which declined to 100,000 fish by the 1960s, followed by a further decline to 31,000 fish by 1991. More recent abundance estimates vary from approximately 600 to 5,500 adults (Good et al. 2005). Williams et al. (2011) indicated that CCC coho salmon are likely to continue to decline in number. CCC coho salmon have also experienced acute range restriction and fragmentation. Adams et al. (1999) found that in the mid 1990’s coho salmon were present in 51 percent (98 of 191) of the streams where they were historically present, and documented an additional 23 streams within the CCC coho salmon

ESaU in which coho salmon were found for which there were no historical records. More recent genetic research has documented reduced genetic diversity within subpopulations of the CCC coho salmon ESU (Bjorkstedt et al. 2005). The influence of hatchery fish on wild stocks has likely also contributed to the lack of diversity through outbreeding depression and disease.

Available data from the few remaining independent populations suggests population abundance continues to decline, and many independent populations that in the past supported the species overall numbers and geographic distributions have been extirpated. This suggests that populations that historically provided support to dependent populations via immigration have not been able to provide enough immigrants for many dependent populations for several decades. The near-term (10-20 years) viability of many of the extant independent CCC coho salmon populations is of serious concern. These populations may not have enough fish to survive additional natural and human caused environmental change.

The CCC coho salmon ESU also includes coho salmon from the following conservation hatchery programs: the Russian River Coho Salmon Captive Broodstock Program at Don Clausen Fish Hatchery in Sonoma County, California, and the smaller Southern Coho Salmon Captive Broodstock Program at Kingfisher Flat Hatchery in the Scott Creek watershed, Santa Cruz County, California. While differing in size and funding, both programs were initiated in 2001 in response to severely depressed coho salmon abundances. Fish are collected from the wild, brought into the hatcheries, genetically tested, and spawned to maximize diversity and prevent inbreeding. In the hatchery, fish are raised to various ages, fed krill, tagged, and released into streams throughout the watersheds. This release strategy allows the fish to imprint on the creek with the aim that they will return to these streams as adults so they can spawn naturally. Juvenile coho salmon and coho salmon smolts have been released into several Russian River tributaries and coastal watersheds in San Mateo and Santa Cruz counties.

None of the five diversity strata defined by Bjorkstedt et al. (2005) currently support viable coho salmon populations. According to Williams et al. (2016), recent surveys suggest CCC coho salmon abundance has improved slightly since 2011 within several independent populations (mainly north of San Francisco bay), although all populations remain well below their high-risk dispensation thresholds identified by Spence et al. (2008). The Russian River and Lagunitas Creek populations are relative strongholds for the species compared to other CCC ESU populations, the former predominantly due to out-planting of hatchery-reared juvenile fish from the Russian River Coho Salmon Captive Broodstock Program. The most recent status review (NMFS 2016a) documents conditions for CCC coho salmon have not improved since the last status review in 2011 (Williams et al. 2016). The overall risk of CCC coho salmon extinction remains high, and the most recent status review reaffirmed the ESU's endangered status (NMFS 2016a). NMFS' recovery plan (NMFS 2012) for the CCC coho salmon ESU identified the major threats to population recovery. These major threats include roads, water diversions and impoundments, and residential development.

2.2.3 Status of CCC Coho Salmon Critical Habitat

For CCC coho salmon critical habitat, the following essential habitat types were identified: 1) juvenile summer and winter rearing areas; 2) juvenile migration corridors; 3) areas for growth and development to adulthood; 4) adult migration corridors; and 5) spawning areas (64 FR 24049). Essential features (or PBFs as discussed above) for coho salmon 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 24049).

The condition of CCC coho salmon critical habitat, specifically its ability to provide for their conservation, has been degraded from conditions known to support viable salmonid populations. NMFS has determined that currently depressed population conditions are, in part, the result of the following human-induced factors affecting critical habitat[6]: logging, urban and agricultural land development, mining, stream channelization, and bank stabilization, dams, wetland loss, and water withdrawals (including unscreened diversions for irrigation). Habitat impacts of concern include altered streambank and channel morphology, elevated water temperature, lost spawning and rearing habitat, habitat fragmentation, impaired gravel and wood recruitment from upstream sources, degraded water quality/quantity, lost riparian vegetation, and increased sediment delivery into streams from upland erosion (Weitkamp et al. 1995; Busby et al. 1996; 64 FR 24049; 70 FR 37160; 70 FR 52488).

Based on NMFS familiarity with the landscapes in which these critical habitats occur, these impacts continue to persist today. Widespread diverting of rivers and streams, as well as the pumping of groundwater hydraulically connected to streamflow, has dramatically altered the natural hydrologic cycle in many of the streams within the CCC coho ESU which can delay or preclude migration and dewater aquatic habitat. Stream channelization, commonly caused by streambank hardening and stabilization, represents a very high threat to instream and floodplain habitat throughout much of the designated critical habitat, as detailed within the CCC coho salmon recovery plan (NMFS 2012). Streambank stabilization confines stream channels and precludes natural channel movement, resulting in increased streambed incision, reduced habitat volume and complexity. Furthermore, recent studies have identified the degradation of some tires as a causal factor in salmonid mortalities, even in concentrations of less than one part per billion (Tian et al. 2020). The identified contaminant, 6-PPD quinone, has been found where both rural and urban roadways drain into waterways (Sutton et al. 2019). Studies have identified this issue and determined the cause of observed mortalities of adult and juvenile coho salmon in both field (Scholz et al. 2011) and laboratory settings respectively (Chow et al. 2019). Overall, the current condition of CCC coho salmon critical habitat is degraded, and does not provide the full extent of conservation value necessary for the recovery of the species.

The CZU Lightening Complex started as a series of lightening fires on August 16, 2020 across western Santa Cruz and San Mateo counties (California Department of Forestry and Fire Protection and California Department of Conservation 2020). The fire was fully contained on September 22, 2020; a total of 86,509 acres burned. Portions of the burned area represented some of the highest quality habitat for salmonids south of San Francisco (NMFS 2020b). The long-term impacts on such valuable salmonid habitat are yet to be determined. However, there is heightened concern related to increased sediment run-off and erosion, decreased riparian vegetation, increased stream temperatures, and decreased water quality. There have not been detailed habitat inventories since the fires and first winter rains, but it is likely that CCC coho salmon spawning, rearing, and migratory habitat was directly and indirectly, impacted by the fire and recent rain events.

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[6] Other factors, such as over fishing and artificial propagation have also contributed to the current population status of these species. All these human induced factors have exacerbated the adverse effects of natural environmental variability from such factors as drought and poor ocean productivity.

2.2.4 Global Climate Change

Another factor affecting the rangewide status of CCC steelhead and CCC coho salmon 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). Snowmelt 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 and CCC coho salmon 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 and coho salmon 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 and CCC coho salmon, in the Santa Cruz Mountains, are not dependent on snowmelt driven streams and thus not affected by declining snow packs.

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

In the San Francisco Bay region[7], 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 twenty-first 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 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 periods, climate conditions not caused by the human addition of carbon dioxide to the atmosphere are more likely to predominate (Cox and Stephenson 2007; Smith et al. 2007; Santer et al. 2011).

Finally, climate change is also affecting water circulation and temperature patterns in the marine environment. In fall 2014, and again in 2019, a marine heatwave, known as “The Blob”[8], formed

[7] Both the San Francisco Bay and Monterey Bay regions exhibit similar Mediterranean climate patterns. The action areas are located within the Monterey Bay region.

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

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

2.3 Action Area

"Action area" means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). The action area is located adjacent and within the Arroyo at the intersection of Highway 1 and Highway 9 (Intersection) in the City of Santa Cruz in Santa Cruz County, California. The area directly impacted from construction activities is 780 linear feet of the channel in the Arroyo[9], and approximately 300 feet of the Arroyo immediately downstream of the dewatered area where temporary construction effects may occur. The action area also includes the active construction areas along the streambanks and adjacent to the Arroyo, where the embankments, retaining wall, apron, and culvert will be constructed.

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 Description of Arroyo Creek Watershed and the Action Area

The Arroyo originates within Pogonip City Park in Santa Cruz, California, and is fed by perennial flows. Within Pogonip City Park, the creek has a healthy riparian zone, although the terrain is reportedly steep California live oak arroyo habitat with perennial flows emanating from underlying Karst deposits and not conducive to salmonid spawning or rearing (Gary Kittleson, personal communication, September 29, 2021). The upper Arroyo does not contain suitable habitat for the species and no historical occurrences of salmonids have been documented. The Arroyo was not considered in NMFS' recovery plans (NMFS 2012; NMFS 2016b). When it exits the park, the Arroyo enters less forested and more industrial areas for roughly 0.25 miles where it passes through at least one additional culvert before it enters the approximately 750-foot culvert beneath Highway 9 in the action area (Figure 1). Below the culvert in the action area, the creek forms a pool of roughly 30 feet and then travels roughly 500 feet to converge with the San Lorenzo River (H.T. Harvey 2011). The San Lorenzo River originates in the Santa Cruz

[9] Dewatered distance within the Arroyo is anticipated to include the culvert (approximately 750 feet) and the pool below the culvert (approximately 30 feet).

Mountains and flows south to meet the Monterey Bay approximately two miles south the project site.

Prior to initiation of construction, the riparian habitat in the action area contained a tree canopy dominated by mature eucalyptus (Eucalyptus sp.), nonnative stonefruit (Prunus sp.), native coast live oak (*Quercus agrifolia*), and native arroyo willow (*Salix lasiolepis*) (H.T. Harvey 2020) (Figure 2). The understory of the riparian forest included Himalayan blackberry (*Rubus armeniacus*), English ivy (*Hedera helix*), sticky eupatorium (*Ageratina adenophora*), bamboo (*Phyllostachys sp.*) iceplant (*Carpobrotus edulis*), native poison oak (*Toxicodendron diversilobum*), seedlings of native coast live oak, buckeye (*Aesculus californica*), and California bay laurel (*Umbellaria californica*).The action area was cleared of all trees and shrubs by Caltrans/City during the first stage of this project prior to re-initiation of consultation (Figure 3). The current state of the riparian zone in the action area is bare soil with some Himalayan blackberry and English ivy still present. Additionally, a houseless encampment was present prior to construction. Although the encampment is no longer present following vegetation clearing for the project, large amounts of trash remain at the site, including within the pool containing CCC steelhead, in the creek downstream, and in the riparian zone. As of October 1, 2021, the Arroyo surface flow extends a short distance downstream from the pool in the action area, not reaching the San Lorenzo River.

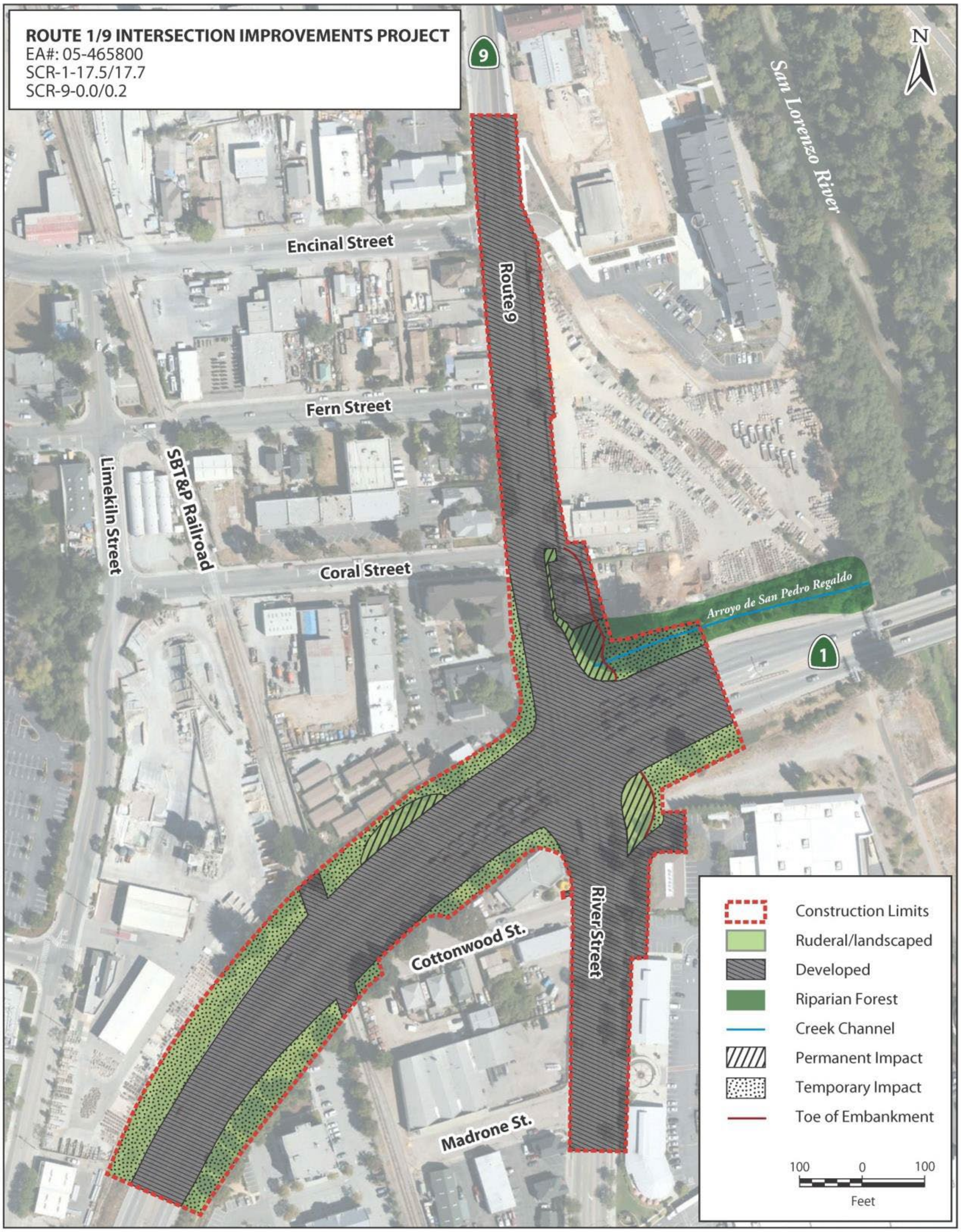

Figure 1. Map of the Vicinity of the Action Area

Figure 2. Photo of action area prior to construction. Photo provided by Graniterock.

Figure 3. Photo of action area after vegetation clearing, September 2021. Photo provided by Gary Kittleson.

2.4.1.1 Status of CCC Steelhead in the Action Area

The San Lorenzo River watershed supports one of the largest steelhead populations within the Santa Cruz Mountains Diversity Stratum (NMFS 2016b). This population is functionally independent and likely provides frequent dispersal to nearby smaller coastal populations. Recovery criteria for the CCC steelhead San Lorenzo River population is a spawner density target of 3,200 (NMFS 2016b). The reach of the San Lorenzo River near the project area is used primarily during migration by upriver-migrating adult steelhead and downriver-emigrating juveniles (smolts). CCC steelhead adults typically migrate into the San Lorenzo River Watershed from the Monterey Bay between November and April, and juvenile steelhead emigrate from the watershed between February and June (Fukushima and Lesh 1998). Steelhead rearing habitat in the San Lorenzo River near the Arroyo confluence is considered poor and further limited in dry years by low summer flows.

Complete annual estimates of adult steelhead escapement to the San Lorenzo River watershed do not exist. Spatially balanced spawning ground surveys conducted as part of California's Coastal Monitoring Program have produced partial estimates of escapement for the winters of 2012-13 to 2014-15 (Table 3). These estimates were made during the recent, multi-year drought between 2012 and 2016, and show a steep drop in abundance following the winter of 2013-14.

Table 3. Estimates of adult steelhead escapement to the San Lorenzo River watershed during the winters of 2012-13 to 2014-15 (Jankovitz 2013; Goin 2015; Goin 2016)

Winter	Point Estimate	Low 95% CI	High 95% CI
2012-13	648	0	1,717
2013-14	777	343	1,211
2014-15	188	76	300

There are no records of CCC steelhead in the Arroyo, although it is unclear whether fish surveys have been conducted there. Juvenile steelhead have been observed in the Arroyo within 100 feet of the confluence with the San Lorenzo River in previous years, but no further upstream (G. Kittleson, personal communication, September 29, 2021). However, small numbers of juvenile steelhead were found in the creek during initial project construction. Based on this finding, CCC steelhead are expected to occur in the action area year-round, including the proposed in water work window of June 1 to November 15. It is unclear whether spawning has occurred in the Arroyo, but successful spawning appears unlikely as the area is heavily disturbed by urban land uses and the culvert likely precludes steelhead from moving into the upper reaches of the Arroyo (e.g., due to high flow rates during periods when water in the culvert is deep enough for steelhead to move through it). As a result, steelhead are unlikely to spawn in the Arroyo and are therefore not expected to use this creek for migration. It is more likely that juvenile steelhead entered the creek from the San Lorenzo River while the Arroyo was still connected to the river. Given the poor habitat conditions and that the culvert blocks passage, steelhead most likely utilize the action area for rearing.

During construction in August 2021, dewatering of a pool within the area immediately downstream of the culvert was in process when H.T. Harvey biologists observed several juvenile *O. mykiss*, presumed to be steelhead, within the pool. While the total number of steelhead present in the pool is unknown because dewatering was stopped as soon as fish were spotted, the observation of steelhead here indicate presence within the project area. Based on a photograph taken on August 17, 2021, NMFS counted approximately 50 steelhead within the pool. Because the pool was not fully dewatered, and poor water quality (i.e., turbidity) prevents further investigation into how many fish may be within the depths of the pool, NMFS estimates no more than 100 are present within area to be dewatered.

2.4.1.2 Status of CCC Coho Salmon in the Action Area

Historically, CCC coho salmon were believed to inhabit all or most of the accessible coastal streams in Santa Cruz County. By the 1960's CCC coho salmon were believed present in seven populations in Santa Cruz County including the San Lorenzo River System (Bryant 1994). More recently, observations of coho salmon in the San Lorenzo River watershed have been scarce. One adult, natural origin coho salmon was caught in the Felton Diversion Dam on the San Lorenzo River in the winter of 2012/2013, and a very small number of hatchery-origin adults are occasionally detected (i.e., tag detected) at the Felton Diversion dam tag antenna. Juvenile coho salmon were last captured (electrofishing) and observed (snorkeling) in the San Lorenzo River watershed in 2005, in Bean Creek and Zayante Creek, which feed into the San Lorenzo River (Hagar 2005, Alley 2019).

There are no records of CCC coho in the Arroyo, although it is unclear whether fish surveys have been conducted there. It is unlikely that accessible salmonid spawning habitat exists in the Arroyo due to the heavily modified nature of the riparian and instream habitat (G. Kittleson, personal communication, September 29, 2021). Rearing habitat is likely to be limited to accessible waters downstream from the culvert in the action area, near the confluence of the Arroyo and the San Lorenzo River.

Although there is a chance CCC coho might be present in the nearby San Lorenzo River, NMFS does not expect coho salmon will be present in Arroyo during the project. The Arroyo has been disconnected from the San Lorenzo River for most of summer 2021 so juveniles are unlikely to swim in from the San Lorenzo River. Additionally, the very small number of returning coho adults are likely to use areas with higher quality habitat within the San Lorenzo watershed. Coho salmon could occur in the Arroyo in the future after construction, when the Arroyo reconnects to the San Lorenzo River, though their presence is expected to be extremely rare and transient.

2.4.2 Status of Critical Habitat in the Action Area

The action area is designated critical habitat for CCC coho salmon. PBFs include substrate, water quality, water quantity, water temperature, water velocity, cover/shelter, food, riparian vegetation, space, and safe passage conditions. Although the Arroyo apparently receives perennial flows, the flow in the action area is was very low as of October 1, 2021 (approximately 0.5 cubic feet per second). In low flow years, the Arroyo can become disconnected from the San Lorenzo River. As of October 1, surface flow in the Arroyo ceased roughly 100 feet downstream from the end of the culvert, well before reaching the confluence. However, water depth in the pool and culvert in the action area were 1-2 feet, suggesting the area remains wetted even in drought conditions. This water depth is sufficient to support juvenile salmonids, but likely not adults.

Water quality and habitat conditions are currently marginal in the action area for sustaining juvenile salmonids. Algal growth and aquatic plants covered some of the pool in the action area as of October 1, 2021 (Figure 3). Water conditions in the pool are currently turbid and warm. H.T. Harvey consultants monitored water quality within the pool using an YSI EcoSense DO200 Series Dissolved Oxygen/Temperature Meter from late-August 2021 to mid-October 2021. Three locations were sampled within the pool, one of which was sampled near the bottom and at the surface (i.e., four readings total in the pool). These readings were taken in the morning (approximately 8 a.m.) and in the afternoon (approximately 2 p.m.). Monitoring data indicate conditions in the pool are currently marginal for supporting steelhead. Weekly average dissolved oxygen (DO) ranged from approximately 5.1 mg/L to 5.5 mg/L in September 2021 (Figure 4). Juvenile salmonid mortality can be avoided if daily minimum DO remains above 3.9 mg/L, and the weekly average of minimum DO values remains above 4.6 mg/L (WDOE 2002). Weekly average water temperatures ranged from approximately 17.8ºC to 18.0ºC and weekly maximum temperatures averaged 18.5ºC to 19.0ºC in September 2021 (Figure 5). Studies indicate the lethal threshold for steelhead is 23.9ºC (75ºF) (Bell 1986). However, impacts likely occur at temperatures below this threshold. Decreased foraging in juvenile steelhead occurs as pool temperatures reach 22°C and above 22°C steelhead will leave to find areas with lower temperatures (Nielsen et al. 1994). Additionally, a seven-day average of the daily maximum temperatures of less than or equal to 14.38°C will typically prevent warm water disease effects on salmonids (WDOE 2002).

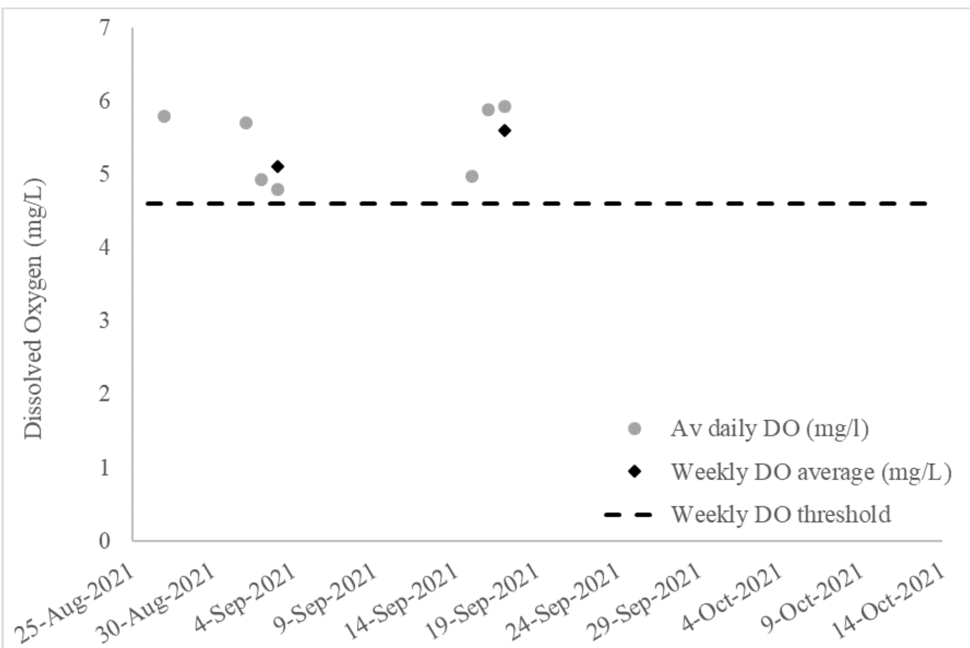

Figure 4. Dissolved oxygen readings at pool below culvert in the action area.

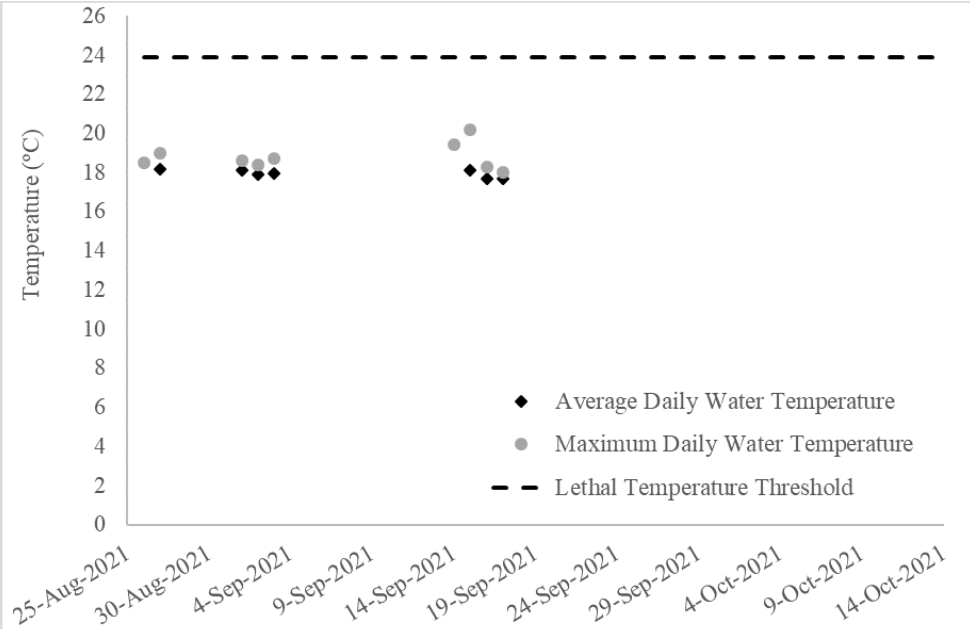

Figure 5. Water temperature readings at pool below culvert in action area.

The Arroyo within the action area has stream bed substrate consisting of cobbles, gravel, and clay as well as a variety of refuse. The average width of the Ordinary High Water Mark was determined to be 20 feet wide (outside the culvert). Site soils are mapped as Soquel loam, 0 to 2 percent slopes (NRCS 2017). The Soquel loam soil series is a deep loamy, moderately well drained soil derived from alluvium (H.T. Harvey & Associates 2020).

There is effectively no riparian cover in the action area due to vegetation removal during initial construction on this project. Within the pool there may be a small amount of cover for fish provided by algal mats or aquatic plants near the edges, rocks or refuse. The culvert provides cover from direct sunlight and is accessible to fish using the pool even at low water conditions. The culvert is a 6-feet-in-diameter concrete pipe.

Juvenile CCC steelhead were found in the action area, therefore it is possible the action area could also support CCC coho rearing. The action area is unlikely to support spawning of CCC coho due to lack of suitable habitat and seasonal connection to the San Lorenzo (i.e., connection may not be viable when adult migration occurs). Immediately upstream from the pool in the action area, the Arroyo enters a 750 linear foot culvert and further upstream it passes through other highly modified areas. Although there is no available surveys of habitat quality in the Arroyo upstream from the action area, it is unlikely CCC coho spawning could be supported given the highly altered condition of the creek. Although the culvert is likely wide enough to allow passage of adult steelhead at higher streamflow, the length of the culvert could make passage challenging for steelhead even if the habitat upstream was conducive to spawning.

The long-term effects of climate change have been presented above, and include changes to air and water temperature and the timing and magnitude of precipitation events that may affect steelhead, coho salmon, and critical habitat by changing water quality and streamflow levels in the action area. The threat to salmonids in the action area from climate change is likely going to mirror what is expected for the rest of Central California. NMFS expects that average dry season air temperatures in the action area would continue to increase, heat waves would become more extreme, and droughts and wildfire would occur more often (Hayhoe et al. 2004; Lindley et al. 2007; Schneider 2007; Westerling et al. 2011; Moser et al. 2012; Kadir et al. 2013). Many of these changes are likely to further degrade CCC coho salmon critical habitat within the action area by, for example, reducing streamflow during the dry season and raising summer water temperatures.

2.4.3 Previous Section 7 Consultations and Section 10(a)(1)(A) Permits in the Action Area

NMFS has completed programmatic consultations for salmonid habitat restoration actions that include the action area of this project. These programmatic consultations include the NOAA Restoration Center's restoration program, the Corps' Regional General Permit #12 programmatic consultation, and the Santa Cruz Countywide Partners in Restoration Permit Coordination Program. These consultations anticipate a limited amount of take for juvenile salmonids during instream work conducted in the summer months. NMFS determined these restoration actions are likely to improve habitat conditions for listed species and that the limited amount of take anticipated is unlikely to affect future adult returns.

In addition to the consultations described above, NMFS also completed formal consultation on the County of Santa Cruz's Large Woody Material Management Program in Santa Cruz County. NMFS concluded the proposed suite of activities was likely to adversely affect ESA-listed fish species and critical habitat.

Activities conducted under the NMFS' ESA Section 10(a)(1)(A) research Permit 15824-2R: Santa Cruz County Stream Habitat and Juvenile Salmonid Monitoring Program - San Lorenzo, Soquel, Aptos and Corralitos Watersheds could occur within the action area, but are unlikely due to the limited presence of salmonids in the Arroyo. Salmonid monitoring approved under this permit includes carcass surveys, smolt outmigration trapping, and juvenile density surveys. In general, these activities are closely monitored and require measures to minimize take during the research activities. NMFS determined these research activities are unlikely to affect future adult returns.

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, both during and post-project completion, associated with the proposed project may affect CCC steelhead, and their critical habitat. The following may result from construction activities: unintentional direct injury or mortality during fish collection, relocation, and dewatering activities; loss of benthic habitat; increases in suspended sediments and turbidity; reductions in riparian vegetation and cover; hazardous materials and contaminants from heavy machinery, construction materials, and stormwater runoff; and sustained fish passage conditions.

2.5.1 Fish Collection and Relocation

To facilitate the completion of the project, a portion of the Arroyo may need to be dewatered. As discussed above, a maximum of 780 linear feet would be dewatered if the City chooses to move forward with the culvert extension alternative. If the City proposes to move forward with the alternative that avoids in-channel work, the City would not dewater the channel beyond what is needed to relocate fish from the pool below the culvert. If streamflows in the Arroyo increase to the extent that fish could volitionally move out of the pool, the City would not need to relocate fish from the pool.

For the culvert extension alternative, the City proposes to collect and relocate fish in the work areas prior to, and during dewatering, to avoid fish stranding and exposure to construction activities. For the alternative with no in-channel work, the City proposes to relocate fish using similar methods (e.g., some dewatering may be necessary) as they would for the culvert extension alternative, yet they would not maintain a dewatered condition after the fish are relocated. Before and during dewatering of the Arroyo, steelhead will be captured by a qualified biologist using one or more of the following methods: dip net, seine, thrown net, block net, minnow trap, and electrofishing. Collected steelhead will be relocated to an appropriate stream reach that will minimize impacts to captured fish, and to fish that are already residing at the release site(s). Fish handling and relocation are scheduled to occur as soon as possible given that water quality conditions within the proposed action area are unsuitable. As described above in Section 2.4.1.1, the action area provides rearing habitat to juveniles; thus, NMFS does not expect adults or smolts to be present within the action area during the fall dewatering/fish handling activity. Only juvenile steelhead are expected to be in the action area during dewatering. Thus, NMFS expects capture and relocation of listed salmonid species will be limited to pre-smolting and young-of-the-year juvenile steelhead.

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

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

To estimate the number of steelhead that may be present in Arroyo, we used observations made by H.T. Harvey biologists described in Section 2.4.1.1 during dewatering of the creek where 50 presumed steelhead were identified (via photograph) within the pool immediately downstream from the culvert. Using this observation, and considering that the pool was not fully dewatered and was very turbid preventing a more detailed visual survey of the pool, NMFS estimates that no more than 100 juvenile steelhead will be present in the dewatered area when relocation and dewatering activities occur.

Applying applicable AMMs to fish collection, relocation, and dewatering activities is expected to appreciably reduce the effects of project actions on steelhead. Specifically, steelhead collection and relocation activities conducted by NMFS-approved fisheries biologists will ensure proper equipment operation and application of NMFS guidelines thereby minimizing injury and mortality to steelhead. NMFS expects applying AMMs will effectively minimize injury and mortality to steelhead in the action area.

2.5.2 Dewatering

As described above, completion of the culvert extension alternative will require dewatering of Arroyo. Cofferdams and a series of pipes will be used to temporarily divert flows around the work site during construction. Dewatering of the channel is estimated to affect up to 780 linear feet of Arroyo. NMFS anticipates temporary changes to instream flow within the project site during installation of the diversion system, and during dewatering operations. Once installation of the diversion system is complete, flow above and below the work site should be the same as free-flowing pre-project conditions, except within the dewatered reaches where stream flow is bypassed and/or pools are dewatered. These fluctuations in flow are anticipated to be small, gradual, and short-term, but are expected to cause temporary loss, alteration, and reduction of aquatic habitat, and in the case of areas that will be dewatered, will likely result in mortality of any steelhead that avoid capture during fish relocation activities.

Streamflow diversion and dewatering at the project site could harm any rearing steelhead by concentrating or stranding them in residual wetted areas before they are relocated. Steelhead that avoid capture in the work area will likely die during dewatering activities due to desiccation, thermal stress, or may be crushed by equipment or foot traffic if not found by biologists while water levels within the reaches recede. Because the pre-dewatering fish relocation efforts at the project site will be performed by qualified biologists, NMFS expects that the number of juvenile steelhead that will be killed as a result of stranding during dewatering activities will be very small, likely no more than one percent of the steelhead within the work site prior to dewatering.

Dewatering operations may affect benthic (bottom dwelling) aquatic macroinvertebrates, an important source for salmonids. Benthic aquatic macroinvertebrates at each project site may be killed or their abundance reduced when river habitat is dewatered (Cushman 1985). However, effects to aquatic macroinvertebrates resulting from stream flow diversion and dewatering activities will be temporary because construction activities will be short lived, and the dewatered reach will not exceed 780 linear feet in the Arroyo. Rapid recolonization (typically one to two months) of disturbed areas by macroinvertebrates is expected following rewatering (Cushman 1985, Thomas 1985, Harvey 1986). Within action area the effect of macroinvertebrate loss on juvenile steelhead is likely to be negligible because food from upstream sources (via drift) would be available downstream of the dewatered areas since stream flow will be bypassed around the project work sites. Based on the foregoing, steelhead are not anticipated to be exposed to a reduction in food sources at the work site from the minor and temporary reduction in aquatic macroinvertebrates as a result of dewatering activities.

Beyond the dewatered area, the temporary stream diversion is expected to resemble typical summer low flow conditions. The diversion system at the work site could restrict movement of listed salmonid species in a manner similar to the normal seasonal isolation of pools by intermittent flow conditions that typically occur during summer within a portion of some streams through the range of CCC steelhead.

2.5.3 Increased Sedimentation and Turbidity

The proposed project will result in disturbance of the streambed and banks for construction. Construction activities within the action area may result in disturbance of the dewatered streambed and banks for equipment access, construction activities, and placement/removal of stream diversion structures. While the cofferdams and stream diversion systems are in place, construction activities are not expected to degrade water quality in the action area because the work areas will be dewatered and isolated from flowing waters. This disturbed soil on the creek banks is more easily mobilized when later fall and winter storms increase streamflow levels. Thus, NMFS anticipates disturbed soils could affect water quality in the action area in the form of small, short-term increases in turbidity during rewatering (i.e., cofferdam removal), and subsequent higher flow events during the first winter storms post-construction.

Instream and near-stream construction activities have been shown to result in temporary increases in turbidity (reviewed in Furniss et al. 1991, Reeves et al. 1991, 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 disease, and can also cause fish mortality (Sigler et al. 1984, Berg and Northcote 1985, Gregory and Northcote 1993, Velagic 1995, Waters 1995). Even small pulses of turbid water will cause salmonids to disperse from established territories (Waters 1995), which can displace fish into less suitable habitat and/or increase competition and predation, decreasing chances of survival. Increased sediment disposition can fill polls and reduce the amount of cover available to fish, decreasing the survival of juveniles (Alexander and Hansen 1986).

Chronic elevated sediment and turbidity levels may affect salmonids as described above. However, sedimentation and turbidity levels associated with cofferdam removal, rewetting of the construction sites within the action area, and subsequent rainfall events are not expected to rise to the levels described in the previous paragraph because the project's proposed soil and channel stabilization measures will be implemented to avoid and/or minimize sediment mobilization. Additionally, Caltrans' proposed additional AMMs and BMPs (associated with its water pollution control plan) specifically aimed at reducing erosion, scour, and sedimentation in storage and staging areas, and from dewatering (Caltrans 2021). Therefore, any resulting elevated turbidity levels would be minor, occur for a short period, and be well below levels and duration shown in the scientific literature as cause injury or harm to salmonids (Sigler et al. 1984, Newcombe and Jensen 1996). NMFS expects any sediment or turbidity generated by the project would not extend more than 100 feet downstream of the worksites, or the furthest extent of the wetted channel if less than 100 linear feet, based on site conditions and methods used to control sedimentation and turbidity. Thus, NMFS does not anticipate harm, injury, or behavioral impacts to juvenile salmonids associated with exposure to minor elevated suspended sediment levels that could reduce their survival chances.

2.5.4 Pollution from Hazardous Materials and Contaminants

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

The equipment needed to complete the project has the potential to release debris, hydrocarbons, concrete, and similar contaminants into surface waters at both work sites. These effects have the potential to harm or injure exposed fish and temporarily degrade habitat. However, AMMs proposed will substantially reduce or eliminate the potential for construction materials and debris to enter waterways. Limiting the work window to the dry season from June 15 to November 15 will limit hazardous material exposure to juvenile salmonids, and eliminate potential for containments to adversely affect the most sensitive life stages (i.e., eggs, alevin, and fry). Equipment will be checked daily to ensure proper operation and avoid any leaks or spills. Proper storage, treatment, and disposal of construction materials and discharge management is expected to substantially reduce or eliminate contaminants entering the waterway via runoff. A SWPP, SPPC, and SWCP will be implemented to maintain water quality within the Arroyo during and after construction. Implementation of these plans are expected to reduce or avoid sediment and toxic materials from transporting into the Arroyo and render the potential for the project to degrade water quality and adversely affect salmonids improbable.

2.5.5 Fish Passage

Fish passage at the project site is currently impaired. Under the current condition, the 750-foot-long culvert likely prevents salmonids from moving into the upper reaches of the Arroyo due to high flow rates during periods when water in the culvert is deep enough for steelhead to move through it (Caltrans 2021). Thus, the current condition is likely a full barrier to salmonid passage upstream. The proposed project will perpetuate the existing condition by replacing the culvert in-kind, and furthermore, potentially extending its length by approximately 15 feet.

Passage to the upper Arroyo has likely been impaired for salmonids since the original culvert was constructed. NMFS does not expect salmonids to occur in the Arroyo aside from occasionally straying into the lower reaches from the San Lorenzo River because suitable habitat in the Arroyo is extremely limited. More suitable habitat is located in nearby areas and streams downstream of the culvert where they can successfully rear or spawn. Therefore, even though the project will maintain a complete barrier to salmonid passage it will not result in the reduction in the performance of individual salmonids.

2.5.6 Removal of Riparian Vegetation and Habitat Loss

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

Riparian vegetation provides the cover and habitat complexity required by rearing steelhead throughout the action area. The removal of riparian vegetation at the work site will likely result in both permanent and temporary reductions in shade and cover for fish, will remove sources of woody debris that may contribute to habitat diversity and complexity, and may result in increased stream temperatures.

Trimmed vegetation is expected to grow back and the native vegetation disturbed during construction will be replanted on-site, following project completion. The site will be monitored to ensure the success of revegetation efforts to restore areas impacted by removal of native riparian vegetation. Therefore, the services provided by vegetation, such as shade and cover, sediment storage and filtering, nutrient inputs, sources of woody debris, and habitat complexity (i.e., cover) will remain degraded at the site until new vegetation is replanted and becomes established. When considering complete removal of trees, we expect riparian vegetation attributes will return to pre-project levels after native trees are replanted and established; possibly within 5-10 years due to Caltrans' proposed AMMs, revegetation measures, and vegetation growth rates. Because of the timing and establishment of the on-site revegetation and recruitment of new woody debris, loss of riparian vegetation may cause individual salmonids to seek alternative areas for cover and forage, in the rare occasion they use the action area for rearing. Such temporary displacement of salmonids is not expected to reduce their individual performance because there are sites nearby that provide these features and can accommodate additional individuals without becoming overcrowded. Furthermore, salmonids are not expected to use the site as rearing because there is no suitable spawning adjacent to the action area and the rearing habitat is degraded.

2.5.7 Critical Habitat Effects

Generally, PBFs or critical habitat for coho are found within the action area, and include sites for rearing (see section 2.4.2). As discussed above, construction activities and post-construction condition of the action area are expected to result in both temporary and permanent disturbance to the Arroyo and adjacent streambanks which could result in impacts to critical habitat by diminishing PBFs.

Mobilization of sediment during construction and post-construction activities has the potential to result in high levels of turbidity and suspended sediment if appropriate AMMs are not implemented. Caltrans, however, is proposing AMMs that will isolate work sites from live streams and prevent pulses of sediment from entering streams after construction is complete. Some minor and temporary increases in turbidity and sediment is expected to occur within the dewatered reaches and a portion of the stream downstream of the active work sites (up to 100 linear feet). Such increases are not expected to alter water quality, substrate conditions, or pool habitat to the extent that PBFs in the action area would be diminished.

Dewatering approximately 780 linear feet of Arroyo Creek in the action area for up to three weeks during the dry season will temporarily diminish PBFs within the dewatered reach for during that timeframe. Furthermore, salmonid forage at the site will be reduced for up to two months following the dewatering event, after which, macroinvertebrates abundance is expected to return to pre-dewatering levels (Cushman 1985, Thomas 1985, Harvey 1986).

The project will maintain the existing passage barrier, furthermore, it will reduce available rearing habitat by 15 linear feet. Because critical habitat within the area is highly urbanized and degraded, and is only expected to support juvenile rearing, a small number of juvenile coho may encounter the worsened conditions.

Removal of riparian vegetation will impact critical habitat at the work site. Impacts to freshwater rearing and migratory sites that provide shade, cover, sediment storage and filtering, nutrient inputs, and habitat complexity will occur as a result of removal of trees, vegetation, and tree trimming to complete construction. Trimmed trees are expected to grow back in a short amount of time on site. When considering the complete removal of trees, we expect riparian vegetation attributes will return to pre-project levels after native trees are replanted and established; possibly within 5-10 years due to Caltrans' proposed AMMs, revegetation measures, and vegetation growth rates. During the construction and revegetation timeframe, critical habitat on site will suffer reductions is shade, sediment storage and filtering, nutrient inputs, and habitat complexity. These reductions will temporarily diminish the quality of coho critical habitat PBFs in the action area.

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 the 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.

The action area includes one site located within Santa Cruz County, California within Arroyo (Arroyo de San Pedro Regalado). Threatened CCC steelhead and CCC coho salmon critical habitat occur within the Arroyo. The Arroyo is located within the CCC coho salmon ESU and CCC steelhead DPS Santa Cruz Mountains Diversity Stratum. It is a small drainage of the San Lorenzo River that does not support a coho or steelhead population, and was not referenced in NMFS' recovery plans for CCC coho or steelhead (NMFS 2012; NMFS 2016b). Based on the extensive loss of historic habitat due to dams, forestry practices, bank stabilization, and urban and agricultural land development, and the degraded condition of remaining spawning and rearing habitats, CCC steelhead and coho have experienced severe declines.

As described in Section 2.5 Effects of the Action, NMFS identified the following components of the project that may result in effects to CCC steelhead and CCC coho salmon critical habitat: fish collection and relocation, dewatering, increases in suspended sediment and other construction related contaminants, perpetuation of a fish passage barrier, and reductions in riparian vegetation and cover. Of these, fish collection and relocation, and dewatering have the potential to result in reduced fitness, injury, and/or mortality of CCC steelhead. Coho critical habitat could be negatively affected by dewatering, construction related turbidity and sedimentation, perpetuation of a fish passage barrier, and vegetation removal.

2.7.1 <u>Listed Species</u>

The project proposes to dewater approximately 780 linear feet of the Arroyo for up to three weeks; in-channel construction is scheduled to occur from June 15-November 15. Based on the field observations that identified juvenile steelhead within the work site on August 17, 2021, NMFS anticipates that only rearing juvenile steelhead will be present in the action area during construction, and no adult or smolt life stages of steelhead would be affected by the dewatering and fish relocation project activities. NMFS estimates that up to 100 juvenile steelhead may be present in the reach to be dewatered prior to construction. Although there is a chance CCC coho might be present in the nearby San Lorenzo River, NMFS does not expect coho salmon will be present in Arroyo during the project.

Anticipated mortality from relocation is expected to be two percent (or less) of the steelhead relocated, and mortality expected from dewatering is expected to be one percent (or less) of the fish in the areas prior to dewatering (combined mortality not to exceed three percent). Therefore, NMFS expects no more than three juvenile steelhead at the work site would be injured or killed by fish relocation/dewatering during construction.

For short-term effects, climate change is not expected to significantly worsen existing conditions over the time frame considered in this biological opinion. Considering the above, we do not expect climate change to affect CCC steelhead or CCC coho in the action area beyond the scope considered in this biological opinion. For the long-term effects, climate change would likely worsen conditions if total precipitation in California declines and critically dry years increase. These conditions would likely modify water quality, streamflow levels, rearing habitat and salmonid migration. The overall reduction in habitat quality caused by the project is minor and limited to a small area of a watershed where there is no documented use by salmonids, and therefore, even if climate change reduced the overall habitat quality in the future, when combined with this proposed action any amplification in habitat degradation would be very small.

In addition to the adverse effects described above, we also consider the potential impacts of increased sedimentation and turbidity, pollution from hazardous materials and contaminants, and removal of riparian vegetation, and habitat loss. The implementation of proposed AMMs is expected to render the potential for fish to be exposed to pollution from hazardous materials and contaminants during and after construction improbable. Similarly, increased sedimentation and turbidity, and removal of riparian vegetation and habitat loss are not expected to result in reductions in fitness of individual salmonids within the action area. NMFS does not expect any of the aforementioned effects to combine with other effects in any significant way. Effects from construction are limited in time and area and fish losses due to capture and relocation are minimal and only occur to juvenile salmonids.

The proposed project will maintain and extend a culvert which is a complete barrier to salmonid fish passage. Because the Arroyo upstream of the culvert provides no suitable habitat or conservation benefit to the species (NMFS 2012; NMFS 2016), the perpetuation of this condition will have a minor effect on individual salmonids. Salmonids that are unable to move upstream through the lengthened culvert are anticipated to be able to find suitable habitat conditions downstream of the action area. Similarly, adequate habitat exists downstream of the site to support salmonids that may encounter the culvert and subsequently leave the area to find better habitat conditions.

We do not expect the proposed project to affect the persistence or recovery of the San Lorenzo River populations of steelhead or coho in the CCC steelhead DPS or CCC coho ESU, respectively. We base this conclusion on our findings above which considered the status of the species, the environmental baseline, all of the potential effects of the action, and the cumulative effects.

2.7.2 Critical Habitat

The project site is critical habitat for the CCC coho salmon ESU. In our adverse modification analysis, we consider the condition of critical habitat, the potential effects of the project (completed and pending) on critical habitat, and whether or not those effects are expected to directly or indirectly diminish the value of critical habitat for the conservation of CCC coho salmon. We also consider the potential for climate change to alter conditions in the action area such that critical habitat may be affected over the duration of time we consider for this consultation. These elements (conditions of critical habitat across the ESU, in the watershed, and in the action area; effects of the project on critical habitat, and effects of climate change on critical habitat) are considered further below.

Across the CCC coho salmon ESU, critical habitat has been degraded by habitat alteration and development. While conditions vary throughout, critical habitat is generally impaired by habitat alteration and fragmentation, water diversion, and groundwater extraction. Some of these factors also affect CCC coho salmon critical habitat in Arroyo, which has been impaired by bank stabilization and urban development. Both watershed-wide factors and action area-specific factors affect critical habitat in the action area leading to reduced habitat complexity and accessibility, poor substrate quality, increased water temperatures, and limited juvenile rearing habitat.

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. For this project, in-water activities would occur on a short-term basis; thus, the above effects of climate change are not likely to be detected within that period. 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. As discussed above, climate change could modify water quality, stream flow levels, rearing habitat, and salmonid migration over the long-term. Because the overall reduction in rearing habitat quality cause by the project is minor, or limited to a small area of the watersheds, even if climate change reduced the overall habitat quality in the future, when combined with this proposed action any amplification in habitat degradation will be very small.

Effects to critical habitat from the proposed project are expected to include temporary impacts during construction activities, and altered habitat conditions post-construction from reduced riparian vegetation, and permanent habitat loss from culvert installation. During dewatering activities, forage supporting juvenile development will be diminished at the work site for up to three weeks. Therefore, salmonid summer rearing habitat will be reduced in area equal to the dewatered area (up to 780 linear feet) for up to 3 weeks, and another 2 months after the site is rewatered as a result of macroinvertebrate reductions. Sedimentation and turbidity following rewatering of the site and during subsequent storms could result in minor and temporary effects to juvenile rearing areas within 100 linear feet downstream of the construction area. Critical habitat at the site will also suffer reductions in vegetation associated cover and forage during the construction and revegetation timeframe of 5-10 years. These reductions will diminish the quality of salmonid freshwater rearing and adult forage sites at the site during the 5-10 year construction and revegetation timeframe. The installation of the culvert will further degrade the available rearing critical habitat PBFs at that site, and perpetuate the degradation of juvenile and adult migration corridors. The project as a whole is therefore expected to degrade PBFs important for the following essential habitat types: juvenile summer and winter rearing areas, juvenile migration corridors, areas for growth and development to adulthood, and adult migration corridors in the action area. However, the overall degradation of PBFs in the action area is minor or of limited extent in a watershed that provides negligible conservation value to CCC coho.

When added to the environmental baseline, cumulative effects, species status, the effects to critical habitat from the proposed action are not expected to appreciably reduce the quality and function of critical habitat at the larger CCC coho salmon ESU level.

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, CCC coho, or destroy or adversely modify designated critical habitat for CCC coho salmon.

2.9 Incidental Take Statement

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

2.9.1 Amount or Extent of Take

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

Take of listed juvenile CCC steelhead is likely to occur during fish relocation and dewatering of Arroyo between October 15 and November 15, 2021. The number of CCC steelhead that are likely to be incidentally taken during dewatering activities is expected to be small, and limited to the pre-smolt and young-of-the-year juvenile life stage. NMFS expects that no more than two percent of the juvenile steelhead within the dewatered portion of Arroyo will be injured, harmed, or killed during fish relocation activities. NMFS also expects that no more than one percent of the fish within the same dewatered area will be injured, harmed, or killed during dewatering activities. Because no more than 100 juvenile steelhead are expected to be present within the 780 linear foot dewatered reach of Arroyo, NMFS expects no more than 3 juvenile CCC steelhead will be harmed or killed by the project. If more than 100 juvenile steelhead are captured or more than 3 juvenile steelhead are harmed 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 are necessary and appropriate to minimize take of salmonids:

1) undertake measures to ensure that injury and mortality to steelhead resulting from fish relocation and dewatering activities is low;
2) undertake measures to minimize harm to salmonids from construction of the project and degradation of aquatic habitat; and
3) prepare and submit plans and reports regarding the effects of fish relocation, construction of the project, and post-construction site performance.

2.9.4 Terms and Conditions

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

1) The following terms and conditions implement reasonable and prudent measure 1:
    a. Caltrans or the contractor will allow any NMFS employee(s), or any other person designated by NMFS, to accompany field personnel to visit the project site during activities described in this opinion.
    b. Caltrans or the contractor will retain qualified biologists with expertise in the area of anadromous salmonid biology, including handling, collecting, and relocating salmonids; salmonid/habitat relationships' and biological monitoring of salmonids. Caltrans or the contractor shall ensure that all fisheries biologists working on this project be qualified to conduct fish collections in a manner which minimizes all potential risks to ESA-listed salmonids. Electrofishing, if used, shall be performed by a qualified biologist and conducted according to the *NOAA Fisheries Guidelines for Electrofishing Waters Containing Salmonids Listed under the Endangered Species Act, June 2000.* See: https://media.fisheries.noaa.gov/dam-migration/electro2000.pdf
    c. The biologists will monitor to construction site during placement and removal of cofferdams and channel diversions to ensure that any adverse effects to salmonids are minimized. The biologists will be on site during all dewatering events to capture, handle, and safely relocate salmonids to an appropriate location. The biologist will notify NMFS staff at 707-575-6068 or

elena.meza@noaa.gov, one week prior to capture activities in order to provide an opportunity for NMFS staff to observe the activities. During fish relocation activities the fisheries biologists shall contact NMFS staff at the above number, if mortality of federally listed salmonids exceeds three percent of the total number of fish collected on site, at which time NMFS will stipulate measures to reduce take of steelhead.

   d. Steelhead will be handled with extreme care and kept in water to the maximum extent possible during rescue activities. All captured fish will be kept in cool, shaded, aerated water protected from excessive noise, jostling, or overcrowding anytime they are not in the stream, and fish will not be removed from this water
   e. If any steelhead are found dead or injured, the biological monitor will contact NMFS staff at 707-575-6068 or elena.meza@noaa.gov. The purpose of the contact is to review the activities resulting in take, determine if additional protective measures are required, and to ensure appropriate collection and transfer of salmonid mortalities and tissue samples. All steelhead mortalities will be retained. Tissue samples are to be acquired from each mortality per the methods identified in the NMFS Southwest Fisheries Science Genetic Repository protocols (contact the above NMFS office at the phone number provided) and sent to: NOAA Coastal California Genetic Repository, Southwest Fisheries Science Center, 110 McAllister Way, Santa Cruz, California 95060.
   f. Non-native fish that are captured during fish relocation activities shall not be relocated to anadromous streams, or areas where they could access anadromous habitat.

2) The following terms and conditions implement reasonable and prudent measure 2:
   a. Any pumps used to divert live stream flow will be screened and maintained throughout the construction period to comply with NMFS' Fish Screening Criteria for Anadromous Salmonids (2000).
   b. Construction equipment used within the river channel will be checked each day prior to work within the creek channel (top of bank to top bank) and, if necessary, action will be taken to prevent fluid leaks. If leaks occur during work in the channel, Caltrans or their contractors will contain the spill and remove the affected soils.
   c. Once construction is completed, all project-introduced material must be removed, leaving the creek was it was before construction. Excess materials will be disposed of at an appropriate disposal site.
3) The following terms and conditions implement reasonable and prudent measure 3:
   a. Caltrans must provide a written report to NMFS by January 15 of the year following construction. The report must be submitted to the parties and addresses described above in 1c. The report must contain, at minimum, the following information:
      i. Project Construction and Fish Relocation Report – The report must include the following contents:
         1. **Construction Related Activities** – The report(s) must include the dates construction began, a discussion of design

compliance including: vegetation installation, discussion of any unanticipated effects or unanticipated levels of effects on salmonids, including a description of any and all measures taken to minimize those unanticipated effects, and a statement as to whether or not the unanticipated effects had any effect on the ESA-listed fish; the number of steelhead killed or injured during the project action; and photographs taken before, during, and after the activity from photo reference points.

2. **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 steelhead; if an electrofisher was used for fish collection, a copy of the logbook must be included; the number of fish relocated by species; the number of fish injured or killed by species and a brief narrative of the circumstances surrounding ESA-listed fish injuries or mortalities; and a description of any problems which may have arisen during the relocation activities and a statement as to whether or not the activities had any unforeseen effects.

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

1. **Post-Construction Vegetation Monitoring and Reporting –** Caltrans must develop and submit for NMFS' review a plan to assess the success of revegetation of the site. Report documenting post-project conditions of vegetation installed at the site will be prepared and submitted annually of January 15 for the first five years following project completion, unless the site is documented to be performing poorly, then monitoring requirements will be extended. Reports will document vegetation health and survivorship and percent cover, natural recruitment of native vegetation (if any), and any maintenance or replanting needs. Photographs must be included. If poor establishment is documented, the report must include recommendations to address the source of the performance problems.

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).

2.11 Reinitiation of Consultation

This concludes formal consultation for the Route 1/9 Intersection Improvement Project.

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

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

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

This analysis is based, in part, on the EFH assessment provided by the Caltrans and descriptions of EFH for the Pacific Coast salmon Fishery Management Plans *(FMP)* (PFMC 2014) contained in the fishery management plans developed by the PFMC and approved by the Secretary of Commerce.

3.1 Essential Fish Habitat Affected by the Project

Pacific Coast Salmon EFH may be adversely affected by the proposed action within the action area.

3.2 Adverse Effects on Essential Fish Habitat

The potential adverse effects of the project on EFH for Pacific Coast Salmon have been described in the preceding biological opinion and include temporary minor disturbances to the streambed, bank, and flow from project site dewatering; temporary elevated turbidity levels from suspended sediment and degraded water quality; loss of riparian vegetation; streambank habitat degradation, and blocking fish movements. As described in the biological opinion above, the project site dewatering and turbidity effects are anticipated to be temporary and minor due to the small amount of area impacted relative to the total quantity of habitat available in the action area. The project includes measures to protect water quality in the action area, and although riparian vegetation will be degraded, in-kind onsite revegetation of native trees will occur to replace vegetation lost during construction activities to restore the area. The project's extension of a fish passage barrier is expected to perpetuate truncated fish passage opportunities in the Arroyo. However, the Arroyo does not provide suitable habitat conditions for coho upstream of the action area. Therefore, the effects of the barrier are negligible.

3.3 Essential Fish Habitat Conservation Recommendations

Based on the information developed in our effects analysis (see preceding biological opinion), NMFS has determined that the proposed action would adversely affect EFH for federally managed CCC coho salmon within the Pacific Coast Salmon FMP. Section 305(b)(4)(a) of the MSA authorizes NMFS to provide EFH Conservation Recommendations that will minimize adverse effects of an activity. Although adverse effects are anticipated as a result of the proposed project, the proposed minimization and avoidance measures, and best management practices in the accompanying biological opinion are sufficient to avoid, minimize, and/or mitigate for the anticipated affects. Therefore, no additional EFH Conservation Recommendations are necessary at this time that would otherwise offset the adverse effects to EFH.

3.4 Supplemental Consultation

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

4 DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

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

4.1 Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended users of this opinion are Caltrans and their contractors. Individual copies of this opinion were provided to Caltrans. The document will be available within two weeks at the NOAA Library Institutional Repository [https://repository.library.noaa.gov/welcome]. The format and naming adheres to conventional standards for style.

4.2 Integrity

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

4.3 Objectivity

Information Product Category: Natural Resource Plan

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

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

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

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

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