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

January 4, 2022 **Refer to NMFS No:** WCRO-2021-01512

Melissa Coppola
Acting Office Chief, Biological Sciences and Permits
California Department of Transportation, District 4
P.O. Box 23660, M/S 8E
Oakland, California 94623-0660

Re: Endangered Species Act Section 7(a)(2) Biological Opinion for the Arroyo de la Laguna Bridge Replacement Project (04-0J550)

Dear Ms. Coppola:

Thank you for the California Department of Transportation's (Caltrans)[1] letter of June 18, 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 Arroyo de la Laguna Bridge Replacement Project (04-0J550). This consultation was conducted in accordance with the 2019 revised regulations that implement section 7 of the ESA (50 CFR 402, 84 FR 45016).

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 (*Oncorhynchus mykiss*) 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 the species. However, NMFS anticipates that take of CCC steelhead may occur. An incidental take statement which applies to this project with terms and conditions is included with the enclosed biological opinion.

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[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.

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: Matthew Rechs, Caltrans, Branch Chief, matthew.rechs@dot.ca.gov
Nicole Christie, Caltrans, Biologist, nicole.christie@dot.ca.gov
e-file: ARN 151422WCRO2021SR00116

Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion

Arroyo de la Laguna Bridge Replacement Project

NMFS Consultation Number: WCRO-2021-01512

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

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

Issued By:

Alecia Van Atta
Assistant Regional Administrator
California Coastal Office

Date: January 4, 2022

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1. INTRODUCTION

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

1.1. Background

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

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

1.2. Consultation History

By letter dated June 18, 2021, Caltrans requested initiation of formal consultation under the ESA and provided NMFS the Arroyo de la Laguna Bridge Replacement Project Biological Assessment (BA). The BA included the following: draft hydraulics report, habitat assessment, tree survey and inventory, geomorphic assessment and thalweg survey, and several project figures. We reviewed these materials and on July 2, 2021, we requested additional information via phone. In addition, we sent out an email reiterating our information request on July 19, 2021. In our correspondence we requested the following: description of tree and vegetation removal, clarification on temporary impacts as they relate to hardscape, design plans for the proposed new bridge, and an estimate of the number of steelhead that may be within the proposed action area. The aforementioned information was requested to ensure that NMFS had sufficient information to estimate the risk to listed species and habitat from the proposed action.

In addition to the above, NMFS also requested the following information: description of how wide the channel is at the ordinary high water mark (OHWM), how far below the bankfull width does the OHWM occur, description/illustration of how the proposed bridge design interacts with the OHWM, and additional information (i.e., height, fish passage and sediment transport analysis, and anchoring details) regarding the concrete weir immediately upstream from the existing bridge. Finally, NMFS recommended that Caltrans consider including the following additional components within their reference reach analysis: length and width of channel, slope of individual habitat units (e.g., pools and riffles), function of (i.e., sediment trapping, bank armoring, scouring potential, etc.) large woody debris (LWD) within the reference reach, sediment storage (i.e., presence of mid-channel or point bars) characteristics, flow capabilities of side channels, and investigation of thalweg migration. This information was requested to determine if the proposed bridge design may impact fluvial channel processes. This information was requested via email on July 20, 2021.

On August 16, 2021 Caltrans responded to our July 2, 2021 request for more information via email, and provided the following information: updated description of tree and vegetation removal, clarification on temporary impacts, cross sections detailing the proposed new bridge design, and survey information on steelhead. We reviewed these additional materials and determined that they provided sufficient information in response to our July 2, 2021 information request.

During several calls with the Caltrans biologist in August 2021, we became aware that Caltrans would not be able to provide most information requested within our July 20, 2021 letter within the allotted 45-day period due to Caltrans' lack of funding to gather new data to develop new materials at this stage of project development. Thus, Caltrans did not respond to NMFS' information request from July 20, 2021. Despite the missing information, we decided there was enough information to analyze the project using a worst-case scenario approach to estimate the risk to listed species and habitat from the proposed action, and determined that the information provided on August 16, 2021 was sufficient to initiate consultation. NMFS notified Caltrans of the August 16, 2021 consultation initiation date via email on September 8, 2021.

1.3. Proposed Federal Action

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

Caltrans proposes to replace the Arroyo de la Laguna Bridge (Bridge No. 33-0043) to repair scour, and to improve the bridge's structural integrity to meet current design standards for safety. The existing bridge and piers are skewed relative to the primary flow direction, and the proposed bridge would be built along the same alignment. The Project is located within Niles Canyon in the town of Sunol, in Alameda County. The project will take place on State Route 84 (SR 84) at post mile (PM) 17.2 (Figure 1). The existing Arroyo de la Laguna Bridge was constructed in 1939 and is approximately 38 feet wide and 310 feet long (0.27 acres). The current bridge features 12-foot-wide, single lanes in each direction, 1-foot-wide shoulders, 5-foot-wide pedestrian sidewalks in each direction, and original railing from 1939. The proposed bridge will be a three-span structure approximately 320 feet long and 64 feet wide (0.47 acres), with two 12-foot lanes, a 14-foot-wide pedestrian path, and 9-foot shoulders. The new bridge will be supported by two abutment foundations and two piers. Each pier will be supported by six 36-inch-diameter above-ground piles, for a total of twelve supporting piles. Each of the twelve piles will be supported by a sub-surface 60-inch cast-in-drilled-hole (CIDH) pile that will be installed to a depth of approximately 80 feet.

Completion of the project is expected to take three construction seasons to complete, following the approximate schedule:

<u>Year One</u>

- Place erosion control and temporary BMPs
- Place temporary creek diversion
- Construct access road in northeast corner of the bridge
- Complete clearing and grubbing
- Place temporary k-rail on existing bridge along the construction stage line, close bridge portion to be removed, and shift traffic
- Construct access road in southeast corner of bridge
- Saw cut and remove north side of bridge deck
- Remove northern portion of abutments, wing walls, and foundations

- Construction northern portion of the new bridge
- Shift traffic to newly constructed portion of bridge
- Remove temporary creek diversion
- Place erosion control and temporary BMPs

Year Two

- Clearing and grubbing
- Place temporary creek diversion
- Construct access roads in northeast and southeast corners of the bridge
- Place temporary k-rail on existing bridge along the construction stage line, close bridge portion to be removed, and shift traffic
- Remove southern portion of the existing bridge
- Construct southern portion of new bridge
- Shift eastbound traffic to the southern portion of the new bridge
- Remove temporary creek diversion
- Place erosion control and temporary BMPs

Year Three

- Clearing and grubbing
- Place temporary creek diversion
- Construct access roads in northeast and southeast corners of the bridge
- Remove middle portion of the existing bridge
- Construct middle portion of the new bridge
- Shift traffic to newly constructed bridge portion
- Construct sidewalk on southern side of the bridge
- Removed temporary creek diversion
- Place erosion control and temporary BMPs
- Restore areas within the access roads to preconstruction conditions
- Install Midwest Guardrail System or crash cushions
- Repave roadway to final grade, restripe lanes, and open roadway to traffic
- Complete installation of permanent erosion control, site restoration, and clean up

To gain access to the work area, temporary access roads will be constructed at two different locations. The first road will be approximately 130 feet long and will be located at the northeast corner of the existing bridge. The second access road will be approximately 133 feet long and will be located along the southeast corner of the existing bridge. The roads will be 10 to 12 feet wide and covered with 6 inches of clean washed gravel. The project will also require a staging area for construction equipment that will be located northeast of the Pleasanton-Sunol Road and SR-84 intersection. To prepare the staging and access locations, the area will be cleared and grubbed which involves removing and disposing of all unwanted surface material such as trees, brush, grass, weeds, downed trees, and other materials. Grubbing entails removing unwanted vegetative matter from beneath the ground surface, such as stumps, roots, buried logs, and other debris. To complete the project, approximately 2.33 acres of habitat will be temporarily impacted. Following completion of the project, all temporary construction areas (including access roads) will be revegetated. While not known at this time, it is expected that specific replanting ratios (e.g., 3:1) will be required as part of the anticipated permit requirements associated with a 1602 streambed alteration agreement, and 404 and 401 permits.

Figure 1. Project Action Area

To demolish the existing bridge, concrete railings will be removed via jack hammer, the bridge deck will be saw-cut and sections removed via a crane. The existing piers and abutments will be demolished from the top down to the foundation using hand-operated jack hammers, and the spread footing foundations will be completely removed using a backhoe, or excavator fitted with a hoe ram. Trucks and loaders will be used to collect debris and haul material off-site. Sheet piles will be installed using a vibratory hammer to protect any roadway fallout prior to removal of the abutments.

Temporary falsework will be installed for support and to create a work area for the construction of each new section of the bridge. The contractor will ultimately determine falsework specifications, but Caltrans assumes that falsework will be five feet wider than the new bridge segment being constructed to allow for adequate workspace. The wooden falsework will be supported on temporary pads within the Arroyo de la Laguna Creek channel, and will be comprised of either gravel and/or timber brought into the site via cranes, loaders, man lifts, forklifts, dump trucks, hands tools, and soil compactors. After each construction season, falsework will be removed and temporary pads will be graded to match surrounding conditions.

To construct the new bridge, holes will be drilled to a depth of approximately 80 feet to accommodate the CIDH piles to support the bridge, and concrete will be poured and formed on-site. Any ground water encountered during drilling to accommodate the CIDH piles will be contained and placed into a settling tank before being released downstream of the work site. The area behind the existing abutments will be excavated to accommodate the new abutment foundations that will be formed and poured on-site. All existing metal beam guard rails on both sides of the bridge will be removed and replaced with Midwest guardrail systems. To conform the existing roadway to the newly widened bridge, the shoulders of the Niles Canyon roadway will be widened. To complete the widening, a two-foot-wide portion of the asphalt pavement at the existing edge of pavement will be removed completely and replaced with an aggregate base. Removal and replacement of the pavement will require a maximum of 30-inch-deep excavation. As a result of the new impervious surface greater than 1 acre associated with the new bridge, Caltrans will construct permanent bio retention structures to manage stormwater runoff. The size of the bio retention structures will be 4% of the new impervious surface area, and the location, types, and sizes of the permanent structures will be developed during the design phase. As part of the project, Caltrans will develop a maintenance program for the permanent bio retention structures for long-term management. Construction of the new bridge will result in approximately 0.14 acres of permanent impacts to riparian and riverine habitat.

Access to the creek bed is needed to complete construction, and while instream construction work will be conducted during the dry season when flows are at annual lows (June 1 to October 15) a creek diversion will be necessary. To gain access, water will be temporarily diverted around the work area using temporary cofferdams both up- and down-stream of the construction area, in combination with a temporary diversion pipe and an infiltration trench.[2] If the area is already dry, there may be a need to dewater any pools that would otherwise restrict access to the work site. A maximum of 550 linear feet of Arroyo de la Laguna Creek will be diverted/dewatered to complete the project. As a result, approximately 0.66 acres of the creek bed will be temporarily impacted during each dewatering event.

Caltrans proposes to include several avoidance and minimization measures (AMM) that will be implemented before, during, and after construction to prevent and minimize project-related effects to CCC steelhead and surrounding habitat. These measures include working within the in-water work window of June 1 to October 15; ensuring proper handling and relocation of listed salmonids during dewatering/diverting activities; ensuring establishment of revegetation areas; preventing introduction of contaminants into waterways; ensuring complete removal and proper disposal of all construction waste; implementing erosion control measures; development of a fish handling and relocation plan, a habitat restoration and revegetation plan, a stormwater pollution prevention plan (SWPPP), and a storm water management plan (SWMP) that includes provisions to protect sensitive areas and prevent/minimize storm and non-storm water discharges. A detailed list of the AMMs and additional best management practices (BMPs) are described in Caltrans' biological assessment (2021).

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

[2] The final design of the temporary stream diversion, and materials used, will be at the discretion of the contractor.

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

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

2.1. Analytical Approach

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

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

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

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

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

- Evaluate the rangewide status of the species and critical habitat expected to be adversely affected by the proposed action.
- Evaluate the environmental baseline of the species and critical habitat.

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

Within the action area (see Section 2.3 for description of the action area) of this project, no areas of critical habitat have been designated by NMFS. However, our analysis of the proposed action does evaluate the effects of the Project on habitat for CCC steelhead, and focuses on migrating and rearing habitat conditions within the action area.

2.2. Rangewide Status of the Species

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.

2.2.1. Species Description and Life History

This biological opinion analyzes the effects of the federal action on CCC steelhead. CCC steelhead are listed as threatened under the ESA (71 FR 834, January 5, 2006). The CCC steelhead distinct population segment (DPS) includes steelhead in coastal California streams from the Russian River to Aptos Creek, and drainages of Suisun Bay, San Pablo Bay, and San Francisco Bay (72 FR 5248). The ESA listing of CCC steelhead DPS only applies to the anadromous form of *O. mykiss*, and under current conditions, Arroyo de la Laguna Creek does not support a population of anadromous *O. mykiss* due to a complete barrier (called the Bay Area Rapid Transit [BART] Weir) to upstream passage located approximately 8 miles downstream from the action area. However, construction is underway for a fish passage facility that would re-establish volitional passage over the BART Weir and other barriers nearby by fall 2022. Once fish passage between Alameda Creek and the San Francisco Bay is restored, CCC steelhead within the Alameda Creek watershed, including the action area, would become a listed species with protections afforded by the ESA. Thus, at the time of issuance of this biological opinion, *O. mykiss* within the Arroyo de la Laguna are not considered anadromous and are therefore not considered part of the CCC steelhead DPS. Because the project is expected to take three construction seasons to complete (i.e., 2022-2024 or later), anadromy between Alameda Creek and the San Francisco Bay is anticipated to be restored during project operations. Therefore, *O. mykiss* occurring in the action area once anadromy is restored to the watershed (late 2022) are considered a part of the CCC steelhead DPS. Arroyo de la Laguna Creek, including the action area of the Project, is not designated as critical habitat for CCC steelhead.

Steelhead are the anadromous form of *O. mykiss*, spawning in freshwater and migrating to marine environments to grow and mature. Steelhead have a complex life history that requires successful transition between life stages across a range of freshwater and marine habitats (i.e., egg-to-fry emergence, juvenile rearing, smolt outmigration, ocean survival, and upstream migration and spawning). Steelhead exhibit a high degree of life history plasticity (Shapovalov and Taft 1954; Thrower et al. 2004; Satterthwaite et al. 2009; Hayes et al. 2012). The occurrence and timing of these transitions are highly variable and generally driven by environmental conditions and resource availability (Satterthwaite et al. 2009; Sogard et al. 2012).

Steelhead are generally divided into two ecotypes based on timing and state of maturity when returning to freshwater: summer-run and winter-run. Summer-run steelhead return to natal streams in spring and early summer while they are still sexually immature and spend several months maturing before spawning in January and February. Winter-run steelhead enter natal streams as mature adults with well-developed gonads. They typically immigrate between December and April and spawn shortly after reaching spawning grounds (Shapovalov and Taft 1954; Moyle et al. 2008). Winter-run steelhead are the most common ecotype and are the only ecotypes expressed in the CCC steelhead DPS.

Adult steelhead spawn in gravel substrates with low sedimentation and suitable flow velocities. Females lay eggs in redds, where they are quickly fertilized by males and covered. Egg survival depends on oxygenated water circulating through the gravel, facilitating gas exchange and waste removal. Adults usually select spawning sites in pool-riffle transition areas of streams with gravel cobble substrates between 0.6 to 10.2 centimeters (cm) in diameter and flow velocities between 40-91 cm per second (Smith 1973; Bjornn and Reiser 1991). Eggs incubate in redds for approximately 25 to 35 days depending on water temperature (Shapovalov and Taft 1954). Incubation time depends on water temperature, with warmer temperatures leading to lower incubation periods due to increased metabolic rates. Eggs hatch as alevin and remain buried in redds for an additional two to three weeks until yolk-sac absorption is complete (Shapovalov and Taft 1954). Optimal conditions for embryonic development include water temperatures between 6 and 10°C, dissolved oxygen near saturation, and fine sediments less than 5% of substrate by volume (Bjornn and Reiser 1991; USEPA 2001).

Upon emerging from redds, juvenile steelhead occupy edgewater habitats where flow velocity is lower and cover aids in predator avoidance. Rearing juveniles feed on a variety of aquatic and terrestrial invertebrates. As they grow, juveniles move into deeper pool and riffle habitats where they continue to feed on invertebrates and have been observed feeding on younger juveniles (Chapman and Bjornn 1969; Everest and Chapman 1972). Juveniles can spend up to four years rearing in freshwater before migrating to the ocean as smolts, although they typically only spend one to two years in natal streams (Shapovalov and Taft 1954; Busby et al. 1996; Moyle 2002). Successful rearing depends on stream temperatures, flow velocities, and habitat availability. Preferred water temperature ranges from 12 to 19°C and sustained temperatures above 25°C are generally considered lethal (Smith and Li 1983; Busby et al. 1996; Moyle 2002; McCarthy et al. 2009). In Central California streams, juvenile steelhead are able to survive peak daily stream temperatures above 25°C for short periods when food is abundant (Smith and Li 1983). Response to stream temperatures can vary depending on the conditions to which individuals are acclimated, however, consistent exposure to high stream temperatures results in slower growth due to elevated metabolic rates and lower survival rates overall (Hokanson et al. 1977; Busby et al. 1996; Moyle 2002; McCarthy et al. 2009).

Juveniles undergo behavioral, morphological, and physiological changes in preparation for ocean entry, collectively called smoltification. Juveniles begin smoltification in freshwater and the process continues throughout downstream migration with some smolts using estuaries for further acclimation to saltwater prior to ocean entry (Hayes et al. 2008). Juveniles typically will not smolt until reaching a minimum size of 160 mm (Burgner et al. 1992). Smoltification is cued by increasing photoperiod. Stream temperatures influence the rate of smoltification, with warmer temperatures leading to more rapid transition. Downstream migration of smolts typically occurs from April to June when temperature and stream flows increase. Preferred temperature for smoltification and outmigration is between 10 and 17°C with temperatures below 15°C considered optimal (Hokanson et al. 1977; Wurtsbaugh and Davis 1977; Zedonis and Newcomb 1997; Moyle 2002; Myrick and Cech 2005). In coastal systems with seasonal lagoons, smolts may take advantage of higher growth potential in productive lagoon habitats before ocean entry (Osterback et al. 2018).

Adult steelhead are known to be highly migratory during ocean residency but little is known of their habitat use and movements. They have been observed moving north and south along the continental shelf, presumably to areas of high productivity to feed (Barnhart 1986). Adults will typically spend one to two years in the ocean, feeding and growing in preparation for spawning (Shapovalov and Taft 1954; Busby et al. 1996). Upstream migration typically begins once winter rains commence and stream flows increase. For coastal systems with seasonal freshwater lagoons, winter storms are required to breech the sandbars and allow access to upstream spawning sites. Within the action area, steelhead migrate through large, permanently open bays; CCC steelhead migrate through San Francisco Bay and Monterey Bay, respectively. Unlike most congenerics, steelhead are iteroparous, meaning they can return to spawn multiple times. Adult steelhead may spawn up to four times in their lifetime, although spawning runs predominantly consist of first-time spawners (~59%) (Shapovalov and Taft 1954). The maximum life span of steelhead is estimated to be nine years (Moyle 2002).

2.2.2. Status of the Listed CCC Steelhead DPS

NMFS assesses four population viability[3] 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 and factors responsible for the current status of these listed species.

The population viability parameters are used as surrogates for numbers, reproduction, and distribution, as defined in the regulatory definition of jeopardy (50 CFR 402.20). For example, abundance, population growth rate, and distribution are surrogates for numbers, reproduction,

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[3] 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).

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.

Historically, approximately 70 populations of steelhead existed in the CCC steelhead DPS (Spence et al. 2008; Spence et al. 2012). Approximately 37 of these populations 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).

Abundance data for CCC steelhead are limited; however, existing information indicates population abundances have been substantially reduced from historical levels. In the mid-1960's, a total of 94,000 adult steelhead were estimated to spawn in CCC steelhead rivers, including 50,000 fish in the Russian River, the largest population in the DPS (Busby et al. 1996). 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) at individual run sizes of 500 fish or less (62 FR 43937). Some loss of genetic diversity has been documented and attributed to previous among-basin transfers of stock and local hatchery production in interior populations in the Russian River (Bjorkstedt et al. 2005). In San Francisco Bay streams, reduced population sizes and habitat fragmentation has likely also led to loss of genetic diversity in these populations. For more detailed information on trends in CCC steelhead abundance, see: Busby et al. 1996; Good et al. 2005; Spence et al. 2008; Williams et al. 2011; and Williams et al. 2016.

CCC steelhead have experienced serious declines in abundance and long-term population trends suggest a negative growth rate, indicating the DPS may not be viable in the long-term. DPS populations that historically provided enough steelhead immigrants to support dependent populations may no longer be able to do so, thereby putting dependent populations at increased risk of extirpation. Recent status reviews and return data indicate an ongoing potential for the DPS to become endangered in the future (Good et al. 2005). In 2006, NMFS issued a final determination that the CCC steelhead DPS is a threatened species, as previously listed (71 FR 834). A CCC steelhead viability assessment completed in 2008 concluded that populations in watersheds that drain to San Francisco Bay are highly unlikely to be viable, and that the limited information available did not indicate that any other CCC steelhead populations could be demonstrated to be viable (Spence et al. 2008).

In the Santa Cruz Mountains, the California Coastal Monitoring Program (CMP) has been recently initiated for CCC steelhead. New information from three years of the CMP indicates that population sizes there are perhaps higher than previously thought. However, the long-term downward trend in the Scott Creek population, which has the most robust estimates of abundance, is a source of concern. Although steelhead occur in the Russian River, the ratio of hatchery fish to natural origin fish remains a concern. The viability of San Francisco Bay watershed populations remains highly uncertain. Population-level estimates of adult abundance are not available for any of the seven independent populations inhabiting the watersheds of the coastal strata (Novato Creek, Corte Madera Creek, Guadalupe River, Saratoga Creek, Stevens Creek, San Francisquito Creek, and San Mateo Creek). The scarcity of information on CCC steelhead abundance continues to make it difficult to assess whether conditions have changed appreciably since the previous status review assessment of Williams et al. (2011). On May 26, 2016, NMFS chose to maintain the threatened status of the CCC steelhead (81 FR 33468).

2.2.3. Global Climate Change

Another factor affecting the range wide status of CCC steelhead 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 discernible change (Kadir et al. 2013). CCC steelhead may have already experienced some detrimental impacts from climate change. NMFS believes the impacts on listed salmonids to date are relatively minor but increasing (see below) because natural, and local, climate factors likely still drive most of the climatic conditions salmonids experience, and many of these factors have much less influence on salmonid abundance and distribution than human disturbance across the landscape. In addition, CCC steelhead are not dependent on snowmelt driven streams and thus not directly affected by declining snow packs.

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

In the San Francisco Bay region, warm temperatures generally occur in July and August, but as climate change takes hold, the occurrences of these events will likely begin in June and could continue 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 project 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 steelhead. 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. 2021). The projections described above are for the mid to later 21st Century. In shorter time frames, climate conditions not caused by the human addition of carbon dioxide to the atmosphere are more likely to predominate (Cox and Stephenson 2007, Santer et al. 2011).

2.3. Action Area

"Action area" means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). The action area encompasses the streambed and banks of the Arroyo de la Laguna Creek, the active channel where the existing bridge crosses the creek[4], as well as the active channel approximately 330 linear feet upstream and 390 linear feet downstream of the bridge that is subject to increased turbidity and sedimentation. The action area also includes areas needed for access and staging, existing roadway, shoulders, and non-vegetation turnouts.

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 Alameda Creek Watershed

The Alameda Creek watershed has experienced a number of land-use practices that have resulted in major changes to watershed processes and related instream morphology. Over the past 150-years, the watershed has experienced major channel modifications for flood control purposes, urbanization, agricultural development, grazing, and the development of domestic water supply. Historically, a large marsh complex was located near the current location of Pleasanton. The marsh consisted of distributaries with no defined channels. At high floods, the northern tributaries that drained into the marsh would connect to Arroyo de la Laguna, likely facilitating steelhead passage. Over 10 miles of canals were built in the early 1900s to connect several northern tributaries (Arroyo las Positas, Arroyo Mocho, and Arroyo del Valle) to Arroyo de la Laguna (Stanford et al. 2013). Much of the historic farmland has now been urbanized; however, cattle grazing is still the predominant land use within undeveloped lands throughout the watershed, particularly in eastern Livermore Valley. Three major dams within the watershed have severely altered the natural hydrology and have significantly reduced the amount of accessible high value steelhead habitat that historically existed within the watershed. In addition to these historic and ongoing land uses, substantial portions of the watershed are designated as regional and state parklands.

The majority of the lower and northern portions of Alameda Creek watershed are divided by the urban cities of San Ramon, Dublin, Pleasanton, Livermore, Fremont, Hayward, and Union City. Water resources and operations within the Alameda Creek watershed are controlled by the Alameda County Water District (ACWD), Zone 7 Water Agency (Zone 7), the Department of Water Resources (DWR), and the San Francisco Public Utilities Commission (SFPUC). The SFPUC and DWR operate three major dams in the watershed, two operated by SFPUC and one by DWR. ACWD, SFPUC, and Zone 7 are the three local agencies responsible for water supply

[4] Latitude/longitude: 37.59278/-121.8834

operations in the watershed. The SFPUC owns and manages much of the southern watershed historically occupied by steelhead. Zone 7 owns and manages about a third of the channels in the Livermore Valley portion of the watershed. The cities of Dublin, Livermore, and Pleasanton also own and manage portions of the channels for flood protection. The Alameda County Flood Control and Water Conservation District manages the lower Alameda Creek Flood Control Channel and many of the county roads and stream culverts throughout the watershed. East Bay Regional Park District manages the parklands and various water bodies within the watershed for recreational opportunities. Private landowners receive some assistance from the Natural Resource Conservation Service with managing their agricultural and cattle grazing lands. There are also many stakeholders and NGOs, including the Alameda Creek Alliance, involved in restoring steelhead to Alameda Creek that participate in the Alameda Creek Fisheries Restoration Workgroup.

2.4.2. Status of Listed CCC Steelhead DPS in the Action Area

Arroyo de la Laguna Creek is the main tributary to Alameda Creek from the northern portion of the Alameda Creek watershed; and connects to Alameda Creek less than a mile downstream of the action area. Due to construction of a barrier near the mouth of Alameda Creek (i.e., BART Weir) in 1972, steelhead no longer have volitional passage into the majority of the watershed including the action area. This complete passage barrier, located approximately 8 miles downstream of the action area, has depleted the Alameda Creek steelhead population. The historical steelhead population within the Alameda Creek watershed has been identified as a functionally independent population within the CCC steelhead DPS (Spence et al. 2008; Bjorkstedt et al. 2005). Based on an assessment of habitat suitability, the size of the watershed, its potential production capacity (i.e., number of adults), and geographic location the NMFS Steelhead Recovery Team selected Alameda Creek as an “essential” population for the recovery of the CCC steelhead DPS, with recovery criteria set as a spawner density target of 2,900 adults (as described in NMFS 2016). The restoration of fish passage for CCC steelhead to access the Alameda Creek watershed is identified as a high priority in the NMFS Coastal Multispecies Recovery Plan (NMFS 2016).

Empirical information regarding the historical population of steelhead in Alameda Creek is very limited. However, there are accounts which indicate the presence of steelhead at the time of construction of Calaveras Dam, completed in 1925. More recently, there are accounts of steelhead in Alameda Creek prior to completion of the Flood Control Channel in 1972. Photographic records appear to document the historical runs; however, no reliable scientific records exist of the size of steelhead spawning populations or the distribution of spawning and rearing areas that once occurred within the watershed. Historical accounts of steelhead in the Alameda Creek watershed were compiled as part of the San Francisco Estuary Institute’s (SFEI) comprehensive assessment of watershed conditions prior to significant Euro-American modification (Stanford et al. 2013):

> “The Alameda Creek watershed historically supported significant numbers of steelhead although there are no reliable quantitative estimates for the number of adult fish or spawning run size (Daily Alta California 1889b; Welch 1931; Shapovalov 1938c; Shapovalov 1938b; Shapovalov 1938a; CDFG 1953; Evans 1954; Fisher 1959; Smith 1998; Leidy et al. 2005; Becker et al. 2007; Alameda Creek Alliance 2012). Steelhead remains have been recovered from Native American archeological sites adjacent to

> Alameda Creek (Gobalet 2004). In addition to steelhead, Alameda Creek also historically supported resident rainbow trout in headwater streams inaccessible to steelhead, typically in stream reaches above physical barriers such as waterfalls and cascades (Leidy 2007). Leidy et al. (2005a) documented the historical existence of a spawning run or reproducing population of rainbow trout/steelhead in 19 streams within the Alameda Creek watershed, and a probable spawning run or reproducing population in another two streams. Prior to construction of dams and other barriers, steelhead would likely have had complete or partial spawning access to at least 16 of the 21 (76%) assessed streams (Leidy et al. 2005a)."

During the past two decades, several observations of adult steelhead have been made downstream of the BART weir, indicating that adult steelhead sporadically return to the watershed in an attempt to complete their life history. They are, however, unable to pass upstream. In 1998 and in subsequent years (i.e., 1999, 2006, 2008, 2017, and 2019), individual adult steelhead were captured below the BART weir by local government agencies and citizen groups, and released at various locations throughout the watershed (e.g., Niles Canyon and lower Alameda Creek). In 1998, steelhead were observed spawning in very poor substrate conditions downstream of the BART weir. Due to poor habitat conditions within the area, the fertilized eggs from this spawning event were collected and moved to an offsite incubation facility to ensure survival. The eggs hatched successfully and the resulting fry were released into Alameda Creek near Sunol Park (Gunther et al. 2000). In 1999, three adult steelhead were captured and released upstream of BART weir. In 2006, six adult steelhead were collected and released upstream, and one female was observed excavating a red below the BART weir. In February 2008, two adult steelhead were captured below the BART weir and released in the Niles Canyon reach of Alameda Creek. These two fish exhibited spawning behavior on March 2nd and 3rd of 2008, in Stonybrook Creek (NMFS 2013). No adult steelhead were observed at the BART Weir from 2009 through 2011. In 2012 and 2016, multiple steelhead were documented via webcam at the BART weir (pers. Comm. Jeff Miller). In 2017, nine adult steelhead were collected from the area immediately downstream of the BART weir. One fish was adipose fin-clipped, indicating that it was of hatchery-origin, and this fish was released downstream. For the remaining eight adult steelhead collected in 2017, five were tagged with radio transmitters and all eight were released in the Niles Canyon reach of Alameda Creek (NMFS 2013). In 2019, four steelhead were seen at the BART weir, and one female with an intact adipose fin was collected and was fitted with a radio transmitter. This female was later tracked into Stonybrook Creek (5 miles downstream of project area) where she was observed spawning with a native rainbow trout (Pers. Comm. Jeff Miller).

In a 2013 survey of Arroyo de la Laguna Creek, including the action area, was completed to assess habitat conditions within the creek and determine if, and how, it may support steelhead (Entrix). Results from the survey indicate that within the action area rearing and migration habitat exist, albeit of marginal quality. The channel substrate had a strong component of gravel, with some components of sand and other fine sediments. The depth of the channel ranged from 3-10 feet, with frequent occurrences of pool and riffle habitat. The average pool depth was two feet deep, and while there was some vegetative cover, this component is likely a limiting factor of the areas ability to provide high quality rearing habitat during the summer months. Furthermore, mean weekly average temperatures were measured to be between 22-25 °C during the summer months, indicating that conditions are likely "stressful" and/or "potentially lethal" to juvenile rearing steelhead (Entrix 2013). In a more recent habitat analysis, the action area appeared to show similar conditions to those observed in 2013. Warm water temperatures coupled with sparse instream cover (i.e., large woody debris, undercut banks, etc.), both in complexity and frequency, suggested that the area still exhibits a limited ability to provide optimal conditions for summer rearing of juvenile steelhead (Caltrans 2021).

The existing bridge, and supporting continuous pier walls, are skewed relative to the primary flow direction of the Arroyo de la Laguna Creek, which over the long-term has forced flow and sediment transport toward the south bank (Photo 1). These conditions have resulted in both pronounced scour and excessive deposition as a result of flow being inhibited from laterally migrating, and constantly being pushed to one side along this stretch of the Arroyo de la Laguna. In addition, the existing condition and orientation of the existing bridge has inhibited bar development, and has likely exacerbated the scour problem at the bridge. The existing bridge is not a fish passage barrier. However, a fish passage impediment exists approximately 80 feet upstream of the existing bridge (Photo 2).

Photo 1. Existing bridge looking downstream (southeast). Source: Caltrans BA (2021).

Photo 2. SFPUC concrete weir. Source: California Fish Passage Assessment Database

Based on the aforementioned information, NMFS expects that the action area has habitat conditions that are adequate to support small numbers of rearing and migrating steelhead year-round. Yet, with the proposed in-water work window of June 1 to October 15, only juvenile CCC steelhead are expected to be present within the action area during the proposed summer work window.

The number of steelhead that may be present during fish collection is difficult to estimate given there hasn't been a run of anadromous steelhead in the watershed since 1972, when the BART weir and flood control channel were constructed. Based on surveys conducted in nearby watersheds with similar characteristics (Leidy et al. 2005) steelhead abundance in the action area could range from 10-20 juvenile steelhead per 100 feet of stream once anadromy is restored and steelhead begin to repopulate the watershed. Due to the timing of the project and the current condition of habitat in the action area, we estimate steelhead abundance will be on the lower end of regional abundance estimates (10 fish per 100 feet) during project construction.

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 habitat. The following may result from construction activities: unintentional direct injury or mortality during fish collection, relocation, and dewatering activities; loss of benthic habitat; increasesin suspended sediments and turbidity; reductions in riparian vegetation and cover; increases in shade, hazardous materials and contaminants from heavy machinery and construction materials; stormwater runoff; altered channel morphology and fish passage condition. Project effects are described in more detail below.

2.5.1. Fish Collection and Relocation

To facilitate completion of the project, portions of the Arroyo de la Laguna Creek will need to be dewatered. As discussed above, a maximum amount of 550 linear feet will be dewatered in three consecutive dry seasons (e.g., 2022-2024 or later). Caltrans proposes to collect and relocate fish in the work areas prior to, and during dewatering, to avoid fish stranding and exposure to construction activities. Before, and during, dewatering of the construction site, juvenile 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). Since construction is scheduled to occur between June 1 and October 15, relocation activities will occur during the summer low-flow period after emigrating smolts have left and before adults have immigrated for spawning. Only juvenile steelhead are expected to be in the action area during the construction period. Therefore, NMFS expects capture and relocation of listed steelhead will be limited to pre-smolting and young-of-the-year juveniles.

Based on the estimated number of steelhead that may occur in the action area once anadromy is established (late 2022), we anticipate up to 55 individual steelhead may be encountered each work season after anadromy is restored with a maximum cumulative amount of 165 individual steelhead encountered during the life of the project.[5]

Fish collection and relocation activities pose a risk of injury or mortality to rearing juvenile salmonids. Any fish collecting gear, whether passive (Hubert 1996) or active (Hayes et al. 1996) has some associated risk to fish, including stress, disease transmission, injury, or death. The amount of unintentional injury and mortality attributable to fish capture varies widely, depending on the method used, the ambient conditions, and the expertise and experience of the field crew. Since fish relocation activities will be conducted by qualified fisheries biologists following NMFS electrofishing guidelines (NMFS 2000), injury and mortality of juvenile salmonids during capture and relocation will be minimized. Based on prior experience with current relocation techniques and protocols likely to be used to conduct the fish relocation, unintentional mortality of listed juvenile salmonids expected from capture and handling procedures is not likely to exceed two percent, or two fish per construction season.[6]

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 salmonids, or cascade through the

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[5] In 2022- no steelhead are expected to be present due to a complete barrier downstream. In subsequent construction seasons, 2023 and later, when anadromy will have been restored, we anticipate up to 10 juvenile steelhead per 100 linear feet will occur within the action area. Based on the size of the dewatered reach (550 linear feet), there may be up to 55 juvenile steelhead present in the dewatered reach during each construction season after anadromy is restored. If all three construction seasons occur after anadromy is restored, up to 165 individual steelhead may be captured and relocated over the life of the project.

[6] The number of steelhead that may be killed during fish relocation is estimated to be 2 percent of the individuals that are captured. In years after anadromy is restored to the watershed, this would be 2 percent of 55 steelhead (1.1 steelhead, or 2). In years prior to anadromy being restored, the amount would be 2 percent of zero, or zero fish killed and captured.

watershed population of these species. Fish that avoid capture during relocation may be exposed to risks described in the following section on dewatering (see Section 2.5.2 below).

Applying applicable AMMs to fish collection, relocation, and dewatering activities is expected to appreciably reduce the effects of project actions on juvenile 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 juvenile steelhead. Restricting the work window to June 1 to October 15 will limit the effects to stream rearing juvenile salmonids. NMFS expects applying AMMs will effectively minimize injury and mortality to juvenile steelhead in the action area.

2.5.2. Dewatering

As described above, completion of the project will require dewatering of the Arroyo de la Laguna Creek. 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 affected up to 550 linear feet of Arroyo de la Laguna Creek. NMFS anticipates temporary changes to instream flow within, and downstream of, the project site during installation of the diversion system, and during dewatering operations. Once installation of the diversion systems are complete, stream flow above and below the work sites should be the same as free-flowing pre-project conditions, except within the dewatered reaches where stream flow is bypassed and/or pools are dewatered. These fluctuations in flow are anticipated to be small, gradual, and short-term, but are expected to cause a temporary loss, alteration, and reduction of aquatic habitat, and in the case of areas that will be dewatered, will likely result in mortality of any steelhead that avoid capture during fish relocation activities.

Stream flow diversion and dewatering could harm any rearing steelhead individuals by concentrating or stranding them in residual wetted areas before they are relocated. Juvenile steelhead that avoid capture in the project 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 reach 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.[7]

Dewatering operations at the work site may affect benthic (bottom dwelling) aquatic macroinvertebrates, an important food source for steelhead. Benthic aquatic macroinvertebrates at the project site may be killed or their abundance reduced when 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 550 linear feet within the Arroyo de la Laguna Creek. Rapid recolonization (typically one to two months) of disturbed areas by

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[7] The number of steelhead that may be killed during dewatering is estimated to be 1 percent of the individuals that are captured. In years after anadromy is restored to the watershed, this would be 1 percent of 55 steelhead (0.55 steelhead, or 1). In years prior to anadromy being restored, the amount would be 1 percent of zero, or zero fish killed and captured.

macroinvertebrates is expected following rewatering (Cushman 1985, Thomas 1986, Harvey 1986). Within the action area, the effect of macroinvertebrate loss on juvenile steelhead is likely to be negligible because food from upstream sources (via drift) would be available downstream of the dewatered area since stream flow will be bypassed around the work site. Based on the foregoing, juvenile steelhead are not anticipated to be exposed to a reduction in food sources at the work site from the minor and temporary reduction in aquatic macroinvertebrates as a result of dewatering activities.

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 steelhead 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 throughout the range of CCC steelhead. Because habitat in and around the action area is adequate to support steelhead, NMFS expects steelhead will be able to find food both up- and downstream of the action area as needed during dewatering activities.

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 cofferdam and stream diversion is in place, construction activities are not expected to degrade water quality in the action area because the work areas will be dewatered and isolated from flowing waters. This disturbed soil on the creek bank is more easily mobilized when later fall and winter storms increase streamflow levels. Thus, NMFS anticipates disturbed soils could affect water quality in the action area in the form of small, short-term increases in turbidity during rewatering (i.e., cofferdam removal), and subsequent higher flow events during the first winter storms post-construction.

Instream and near-stream construction activities have been shown to result in temporary increases in turbidity (reviewed in Furniss et al. 1991, Reeves et al. 1991, 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 pools and reduce the amount of cover available to fish, decreasing the survival of juveniles (Alexander and Hansen 1986).

Chronic elevated sediment and turbidity levels may affect salmonids as described above. However, sedimentation and turbidity levels associated with cofferdam removal, rewetting of the construction sites within the action area, and subsequent rainfall events are not expected to rise to the levels described in the previous paragraph because the project’s proposed soil and channel stabilization measures will be implemented to avoid and/or minimize sediment mobilization. Additionally, Caltrans’ proposed additional AMMs and BMPs 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 steelhead (Sigler et al. 1984, Newcombe and Jensen 1996). NMFS expects any sediment or turbidity generated by the project would not extend more than 100 feet downstream of the worksites, based on site conditions and methods used to control sedimentation and turbidity. Thus, NMFS does not anticipate harm, injury, or behavioral impacts to juvenile steelhead 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 at both work sites 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 1 to October 15 will limit hazardous material exposure to juvenile salmonids, and eliminate potential for containments to adversely affect the most sensitive life stages (i.e., eggs, alevin, and fry). Equipment will be checked daily at both work sites to ensure proper operation and avoid any leaks or spills. Proper storage, treatment, and disposal of construction materials and discharge management is expected to substantially reduce or eliminate contaminants entering both waterways via runoff. A SWPPP and a SWCP will be implemented to maintain water quality during and after construction within the Arroyo de la Laguna Creek, and render the potential for the project to degrade water quality and adversely affect steelhead improbable. Furthermore, Caltrans will also construct permanent bio retention structures and develop a maintenance program for these structures for long-term management of stormwater. Due to these measures, permanent structures, and long-term management plan, conveyance of toxic materials into active waters at the work site both during, and after, project construction is not expected to occur, and potential for the project to degrade water quality and adversely affect steelhead is improbable.

2.5.5. Removal of Riparian Vegetation, Habitat Loss, and Increased Shade

The project will result in permanent and temporary reductions in riparian vegetation, including tree removal and trimming, necessary for construction access and staging. 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 limited cover and habitat complexity required by migrating and rearing steelhead throughout the action area. As a result of the project, up to 2.33 acres of riparian habitat may be temporarily impacted. However, tree and vegetation removal will be minimized to the maximum extent feasible to prevent erosion and to reduce potential impacts of riparian vegetation removal on steelhead. The removal of riparian vegetation 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 project 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 sites until new vegetation is replanted and becomes established. When considering complete removal of trees, we expect riparian vegetation attributes on-site 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 steelhead to seek alternative areas for cover and forage. Such temporary displacement of steelhead 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. However, a number of individuals could remain in the area directly adjacent to areas where vegetation is either temporarily or permanently impacted. For individuals that choose to stay in the area, the impacts of reduced shade, cover, and other vegetative services (i.e., sediment storage and filtering, nutrient input, etc.) from removal of riparian vegetation is not expected to significantly reduce their performance. Furthermore, as a result of Project construction, the action area will see an increase in shaded environments on the Arroyo de la Laguna Creek because of the new bridge. This new shaded area (0.200 acres) may provide nominal benefits (i.e., cooler water temperatures) to steelhead within the action area; however, it could also reduce the amount of riparian vegetation growing on the creek banks and bed adjacent to the bridge. Due to the small area affected by new shading, NMFS expects that effects that bridge widening will have on riparian vegetation will not negatively impact the behavior or fitness of individual steelhead.

2.5.6. Fish Passage and Altered Channel Morphology

The proposed new bridge will be located along the same alignment (i.e., skewed relative to the primary direction of flows) as the existing bridge. Of the six CIDH piers proposed to support the new bridge (see Section 1.3 above), only two will interact with the bankfull channel. Compared to the existing bridge, which is supported on three continuous pier walls that all interact with the bankfull channel, NMFS expects that the proposed new bridge will result in similar or lesser sediment and flow alterations as the existing bridge. Consequently, the proposed new bridge does not appear to be at risk of causing a fish passage barrier. There is the potential for scour, headcutting, or erosion resulting from the proposed new bridge piers located within the bankfull width to worsen fish passage conditions at this upstream concrete weir. To avoid and/or minimize this anticipated impact, NMFS will participate in future meetings with Caltrans (and other resource agencies) to provide engineering input into the development of designs.

2.6. Cumulative Effects

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

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

2.7. Integration and Synthesis

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

The action area includes one site located within Alameda County, California within Arroyo de la Laguna Creek which is a main tributary of Alameda Creek. Arroyo de la Laguna Creek currently does not support a steelhead population due to a complete barrier to anadromy (i.e., BART weir) approximately 8 miles downstream of the action area. The loss of upstream fish passage at the BART Weir has prevented steelhead access to all suitable spawning and rearing habitat in the Alameda Creek watershed, including the action area, since the early 1970s. Furthermore, based on the extensive loss of historic habitat due to dams and weirs, and the degraded condition of the remaining available spawning, rearing, and migratory areas, CCC steelhead populations in the watersheds that drain to the San Francisco Bay have experienced severe declines. However, once the anticipated fish ladder associated with the BART weir becomes operational (anticipated in fall 2022) and restores anadromy to the Alameda Creek watershed, CCC steelhead are expected to be found within the action area despite the sub-optimal habitat conditions described above. CCC steelhead are listed as threatened, but the action area is not designated critical habitat.

The historical steelhead population within the Alameda Creek watershed has been identified as a functionally independent population within the CCC steelhead DPS (Spence et al. 2008; Bjorkstedt et al. 2005). Based on an assessment of habitat suitability, the size of the watershed, its potential production capacity (i.e., number of adults), and geographic location the NMFS Steelhead Recovery Team selected Alameda Creek as an "essential" population for the recovery of the CCC steelhead DPS, with recovery criteria set as a spawner density target of 2,900 adults (as described in NMFS 2016). The restoration of fish passage for CCC steelhead to access the Alameda Creek watershed is identified as a high priority in the NMFS Coastal Multispecies Recovery Plan (NMFS 2016).

As described in Section 2.5 Effects of the Action, NMFS identified the following components of the project that may result in effects to CCC steelhead: fish collection and relocation, dewatering, increases in sedimentation and turbidity, pollution from hazardous materials and contaminants, removal of riparian vegetation, habitat loss, and increased shade, and fish passage and altered channel morphology. Of these, fish collections and relocation, and dewatering have the potential to result in reduced fitness, injury, and/or mortality of CCC steelhead.

The project proposes to dewater approximately 550 linear feet of the Arroyo de la Laguna Creek for up to 5.5 months in three consecutive dry seasons. Therefore, it is anticipated that only rearing juvenile steelhead would be affected by project activities, and no adult steelhead or migrating steelhead smolts would be affected by the project activities. Furthermore, due to the sub-optimal habitat conditions noted above, the small area of stream affected, and low summer streamflow, NMFS estimates that a very small number (0-55) of juvenile CCC steelhead may be present in the dewatered reach prior to construction each year. Individuals present will likely make up a very small proportion of the steelhead population in Alameda Creek. Anticipated mortality from relocation is expected to be two percent (or less) of the fish relocated (2 fish per construction season), and mortality expected from dewatering is expected to be one percent (or less) (1 fish per construction season) of the fish in the area prior to dewatering (combined mortality not to exceed three percent). Due to the relatively large number of juveniles produced by each spawning pair, steelhead spawning in the Alameda Creek watershed in future years are likely to produce enough juveniles to replace the few (3 per year/9 over entire project) that may be lost at the project site due to relocation and dewatering. Thus, it is unlikely that the small potential loss of juvenile steelhead during the life of the project will impact future adult returns.

In addition to the adverse effects described above, we also consider the potential impacts of increased sedimentation and turbidity, pollution from hazardous materials and contaminants, removal of riparian vegetation, habitat loss, increased shading, and fish passage and channel morphological changes. The implementation of proposed AMMs is expected to render the potential for fish to be exposed to pollution from hazardous materials and contaminants during and after construction improbable. Increased sedimentation and turbidity and temporary loss and degradation of habitat in the dewatered areas will cease shortly after construction is complete and will only result in minor impacts to steelhead. Riparian vegetation removed to construct the project will take up to 10 years to return to pre-project levels. During this timeframe, individual steelhead exposed to reduced cover and forage will be able to successfully complete their life cycle in the action area or alternative nearby habitats. The small shaded area that will be created by the bridge (0.200 acres) is expected to only have negligible effects on steelhead. The new bridge will maintain or improve current geomorphic conditions such that fish passage at the bridge will not be impaired. NMFS does not expect any of the aforementioned effects to combine with other effects in any significant way.

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 in the action area beyond the scope considered in this biological opinion. For the long-term effects, climate change would likely worsen conditions if total precipitation in California declines and critically dry years increase. These conditions would likely modify water quality, streamflow levels, rearing habitat and steelhead migration. The overall reduction in habitat quality caused by the project is limited to a small area of a watershed and therefore, even if climate change reduced the overall habitat quality in the future, when combined with this proposed action any amplification in habitat degradation would be very small.

We do not expect the proposed project to affect the persistence or recovery of the Alameda Creek population of steelhead in the CCC steelhead DPS. 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.

2.8. Conclusion

After reviewing and analyzing the current status of the listed species, 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. No critical habitat has been designated within the action area for this species; therefore, none was analyzed.

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 de la Laguna Creek between June 1 and October 15. Construction will be completed within three construction seasons; therefore, dewatering is anticipated to occur up to three times to complete the project. 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 550 linear foot dewatering area of Arroyo de la Laguna Creek 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 55 juvenile steelhead are expected to be present within the 550 linear foot dewatered reach of Arroyo de la Laguna each construction season, NMFS does not expect more than 2 juvenile CCC steelhead will be harmed or killed by the project. When considering the proposed maximum of three dewatering events that might be necessary to complete the work, no more than 165 juvenile steelhead are expected to be present at the site. Thus, NMFS expects no more than 6 juvenile steelhead would be injured or killed by fish relocation/dewatering over the life of the project.

Incidental take will have been exceeded if:

- more than 55 juvenile CCC steelhead are captured each year;
- more than 165 juvenile CCC steelhead are captured during the life of the project;
- more than 2 juvenile CCC steelhead are harmed or killed during each year; or
- more than 6 juvenile CCC steelhead are harmed or killed during the life of the project.

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.

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 juvenile CCC steelhead:

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 steelhead 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 applicant has a continuing duty to monitor the impacts of incidental take and must report the progress of the action and its impact on the species as specified in this ITS (50 CFR 402.14). If the entity to whom a term and condition is directed does not comply with the following terms and conditions, protective coverage for the proposed action would likely lapse.

1. The following terms and conditions implement reasonable and prudent measure 1:
   a) Caltrans or the contractor will allow any NMFS employee(s), or any other person designated by NMFS, to accompany field personnel to visit the project sites 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 be qualified to conduct fish collections in a manner which minimizes all potential risks to ESA-listed salmonids. Electrofishing, if used, shall be performed by a qualified biologists and conducted according to the *NOAA Fisheries Guidelines for Electrofishing Waters Containing Salmonids Listed under the Endangered Species Act, June 2000*. See: https://media.fisheries.noaa.gov/dam-migration/electro2000.pdf
   c) The biologist will monitor the construction sites during placement and removal of cofferdams and channel diversions to ensure that any adverse effects to salmonids are minimized. The biologist will be on site during all dewatering events to capture, handle, and safely relocation salmonids to an appropriate location. The biologist will notify NMFS staff at 707-575-6068 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 biologist shall contact NMFS staff at the above number, if mortality of federally listed salmonids exceeds three percent of the total steelhead collected, at which time NMFS will stipulate measures to reduce the take of salmonids.
   d) Salmonids will be handled with extreme care and kept in water to the maximum extent possible during rescue activities. All captured fish will be kept in cool, shaded, aerated water protected from excessive noise, jostling, or overcrowding any time they are not in the stream, and fish will not be removed from this water expect when released. To avoid predation, the biologists will have at least two containers and segregate young-of-the-year from larger age classes and other potential aquatic predators. Captured salmonids will be relocated, as soon as possible, to a suitable instream location (pre-approved by NMFS) in which suitable habitat conditions are present to allow for adequate survival of transported fish and fish already present.
   e) If any steelhead or salmon are found dead or injured, the biological monitor will contact NMFS staff at 707-575-6068 or elena.meza@noaa.gov. All salmonid

mortalities will be retained until further direction is provided by the NMFS biologist (listed above).

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

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

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

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) To ensure that the project designs (channel reconfiguration and proposed bridge design) avoid/minimize fish passage impacts, Caltrans shall include NMFS staff in design meetings to provide engineering input into development of designs during the PS&E phase. In addition, Caltrans shall provide 35, 65, 95, and 100% design plans of the channel reconfiguration and proposed bridge designs to NMFS for review and comment. Caltrans shall provide a minimum of 30 calendar days to review and develop comments regarding the draft design plans. Draft design plans should be sent to Elena Meza at elena.meza@noaa.gov.

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

c) 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).

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

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

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

a) Caltrans must provide a written report to NMFS by January 15 of the year following construction. The report must be submitted to the parties and addresses described above in 1.c. The report must contain, at minimum, the following information:

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

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

ii) **Fish Relocation** - The report must include a description of the location from which fish were removed and the release site including photographs; the date and time of the relocation effort; a description of the equipment and methods used to collect, hold, and transport salmonids; if an electrofisher was used for fish collection, a copy of the logbook must be included; the number of fish relocated by species; the number of fish injured or killed by species and a brief narrative of the circumstances surrounding ESA-listed fish injuries or mortalities; and a description of any problems which may have arisen during the relocation activities and a statement as to whether or not the activities had any unforeseen effects.

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

i) **Post-Construction Vegetation Monitoring and Reporting** - Caltrans must develop and submit for NMFS' review a plan to assess the success of revegetation of the site. A draft of the revegetation monitoring plan must be submitted to NMFS (address specified in 1(c) above) for review and approval prior to the beginning of the in-stream work season, at each project location. Reports documenting post-project conditions of vegetation installed at the site will be prepared and submitted annually on January 15 for the first five years following project completion, unless the site is documented to be performing poorly, then monitoring requirements will be extended. Reports will document vegetation health and survivorship and percent cover, natural recruitment of native vegetation (if any), and any maintenance or replanting needs. Photographs must be included. If poor establishment is documented, the report must include recommendations to improve conditions.

ii) **Post-Construction Vegetation Monitoring and Reporting** - Caltrans must develop and submit for NMFS' review a plan to assess the success of revegetation of the site. A draft of the revegetation monitoring plan must be submitted to NMFS (address specified in 1(c) above) for review and approval prior to the beginning of the in-stream work season, at each project location. Reports documenting post-project conditions of vegetation installed at the site will be prepared and submitted annually on January 15 for the first five years following project completion, unless the site is documented to be performing poorly, then monitoring requirements will be extended. Reports will document vegetation health and survivorship and percent cover, natural recruitment of native vegetation (if any), and any maintenance or replanting needs. Photographs must be included. If poor establishment is documented, the report must include recommendations to 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). NMFS has no conservation recommendations for this project.

2.11. Reinitiation of Consultation

This concludes formal consultation for the Arroyo de la Laguna Bridge Rehabilitation 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. Data Quality Act Documentation and Pre-Dissemination Review

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

3.1. Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended users of this opinion are Caltrans and their contractors. Individual copies of this opinion were provided Caltrans. The document will be available within 2 weeks at the NOAA Library Institutional Repository [https://repository.library.noaa.gov/welcome]. The format and naming adhere to conventional standards for style.

3.2. Integrity

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

3.3. Objectivity

Information Product Category: Natural Resource Plan

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

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

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

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

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