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

February14, 2022 **Refer to NMFS No:** WCRO-2021-00706

Cristin Hallissy
Chief, Office of Biological Sciences and Permits
California Department of Transportation, District 4
Post Office Box 23660, MS 8E
Oakland, California 94623-0660

Re: Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Ritchey Creek Bridge Replacement Project near the City of Calistoga in Napa County, California (EA 04-4J990)

Dear Ms. Hallissy:

Thank you for your letter of November 5, 2020, 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 Ritchey Creek Bridge Replacement Project (Project) near the City of Calistoga in Napa County, California.

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

The enclosed biological opinion is based on our review of the California Department of Transportation (Caltrans)[1] proposed project and describes NMFS' analysis of potential effects on threatened Central California Coast (CCC) steelhead and the designated critical habitat for the species 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 threatened CCC steelhead, nor is the Project likely to result in the destruction or adverse modification of critical habitat for CCC steelhead. However, NMFS anticipates take of CCC steelhead will occur during dewatering and fish relocation activities as a result of project construction, and may occur post-construction due to pollutants in stormwater runoff. An incidental take statement with terms and conditions is included with the enclosed biological opinion.

[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.

NMFS has also reviewed the proposed project for potential effects on EFH and determined that the action would adversely affect EFH for Pacific Coast Salmon, which are managed under the Pacific Coast Salmon Fishery Management Plan. We have included a conservation recommendation to minimize adverse effects to EFH.

Please contact Daniel Logan, North-Central Coast Office, San Francisco Bay Branch, at (707) 575-6053 or dan.logan@noaa.gov, if you have any questions concerning this consultation, or if you require additional information.

Sincerely,

Alecia Van Atta
Assistant Regional Administrator
California Coastal Office

Enclosure

cc: Robert Blizard, Caltrans (robert.blizard@dot.ca.gov)
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Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Response

Ritchey Creek Bridge Replacement Project

NMFS Consultation Number: WCRO-2021-00706

Action Agency: California Department of Transportation

Affected Species and NMFS' Determinations:

ESA-Listed Species	Status	Is Action Likely to Adversely Affect Species?	Is Action Likely To Jeopardize the Species?	Is Action Likely to Adversely Affect Critical Habitat?	Is Action Likely To Destroy or Adversely Modify Critical Habitat?
Central California Coast steelhead (*Oncorhynchus mykiss)*	Threatened	Yes	No	Yes	No

Essential Fish Habitat and NMFS' Determinations:

Fishery Management Plan That Identifies EFH in the Project Area	**Does Action Have an Adverse Effect on EFH?**	**Are EFH Conservation Recommendations Provided?**
Pacific Coast Salmon	Yes	Yes

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

Alecia Van Atta
Assistant Regional Administrator
California Coastal Office

Date: February 14, 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 USC 1531 *et seq*.), as amended and implementing regulations at 50 CFR part 402 .

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

We completed pre-dissemination review of this document using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (DQA) (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The document will be available within two weeks at the NOAA Library Institutional Repository [https://repository.library.noaa.gov/welcome]. A complete record of this consultation is on file at NMFS North-Central Coast Office in Santa Rosa, California (ARN #151422WCR2020SR00229).

1.2. Consultation History

On February 27, 2019, the California Department of Transportation (Caltrans) requested from NMFS technical assistance related to consultation process, and NMFS trust resources present within the anticipated action area for the Ritchey Creek Fish Passage and Bridge Replacement Project (Project). Between June and August 2019, Caltrans coordinated with NMFS regarding fish passage remediation at the site. On August 26, 2019, Caltrans hosted a site visit with WRECO (a consultant hired by Caltrans), NMFS, and CDFW. During this visit, NMFS and CDFW requested from Caltrans a more extensive creek survey that extended both upstream and downstream from the proposed bridge replacement site.

On November 5, 2020, Caltrans provided to NMFS the Ritchey Creek Bridge Replacement Project (04-04J990) biological assessment (November 2020), and requested initiation of formal consultation pursuant to section 7 of the ESA and consultation for EFH pursuant to the MSA.

On November 12, 2020, NMFS notified Caltrans that the Project review was being transferred to NMFS staff with the Central Valley Office due to excessive workload issues in Santa Rosa. NMFS reviewed the materials provided by Caltrans and determined that there was insufficient information to initiate consultation. By email dated December 2, 2020, NMFS requested more information regarding the Project including the following: design plans for channel reconstruction; detailed dewatering plan; length of stream to be dewatered; how long diversion will be in place; how salmonids will be captured and relocated from the area; a summary of

stormwater quantity and quality for pre- and post-project construction; description of any long-term stormwater management; description of the action area; and description of the manner in which the proposed action may affect listed species or critical habitat, including any cumulative effects.

On February 16, 2021, Caltrans delivered to NMFS a second letter requesting initiation of ESA formal consultation and EFH consultation. The request included a revised biological assessment (February 2021) with several appendices related to species lists, site photos, design plans, geomorphology studies, temporary creek diversion system, stream flow assessment, and the draft fish passage design/plan set.

On April 22, 2021, NMFS delivered to Caltrans another letter requesting additional information pertaining to the Ritchey Creek Bridge Replacement Project. NMFS asked for additional details related to the proposed dewatering of Ritchey Creek, and requested that Caltrans incorporate long-term stormwater management measures, such as the use of low impact development treatment control measures for stormwater discharges from State Route 29 (SR 29) into Ritchey Creek.

By letter dated May 10, 2021, Caltrans provided to NMFS a written response to NMFS' April 22, 2021, letter. In its response, Caltrans provided more detail on the channel dewatering process, reiterated its intention of starting work on June 1, and stated that Caltrans does not propose any post-construction measures to treat stormwater discharges from SR 29 to Ritchey Creek.

On August 4, 2021, Caltrans hosted an online meeting regarding the Project and invited staff from NMFS, California Department of Fish and Wildlife (CDFW), and the San Francisco Bay Regional Water Quality Control Board (RWQCB) to participate.

On September 23, 2021, NMFS provide to Caltrans, via email, engineering comments and recommendations on the Draft Ritchie Creek Fish Passage Design and Report, submitted as Appendix F to the Project's February 2021 *Biological Assessment and Essential Fish Habitat Assessment*.

During November and December 2021, NMFS and Caltrans exchanged emails regarding the schedule for completing the section 7 consultation and additional information required to complete the biological opinion's project description.

1.3. Proposed Federal Action

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

Caltrans is proposing to replace the SR 29 crossing of Ritchey Creek at post mile 33.13 in Napa County, California. The current crossing impedes passage of threatened Central California Coast

(CCC) steelhead. Caltrans designed the replacement structure to improve fish passage at the site so that they can request Total Maximum Daily Load compliance unit credits to address requirements of their statewide National Pollution Discharge Elimination System permit.

Following is a summary of the project description provided in the Project's *Biological Assessment and Essential Fish Habitat Assessment* (Caltrans February 2021). Some construction activities will occur concurrently. Construction is proposed to occur over one dry season, with work in the creek occurring from June 1 to October 31. Caltrans has planned for all Project construction to be completed within 13 months.

1.3.1 Worksite Preparation

Worksite preparation will include installation of construction stormwater and erosion control measures, vegetation removal, staging areas construction, and relocation of utilities. Caltrans will employ various techniques to control movement of sediment, construction debris, and stormwater within the work area, in accordance with its Stormwater Pollution Prevention Plan. Vegetation clearing will be confined to the area within the Project footprint. Vegetation removal will be completed using hand tools wherever possible, though, chainsaws, grinders, excavators, or other equipment may be used for vegetation that cannot be removed by hand. Advance tree and vegetation removal will be performed between October 1 and January 31 in the year prior to construction to avoid bird nesting season. Habitat that can be avoided during construction will be flagged and delineated with exclusion fencing. Terrestrial wildlife exclusion fencing will also be installed.

In order to create safe areas to stage construction equipment and supplies, Caltrans will create a staging area on the existing pullout north of the creek adjacent to the northbound travel lane of SR 29. The total area of temporary disturbance from construction staging areas is 0.41 acres. Some equipment and materials will be staged, temporarily, on the SR 29 surface bypassed, as well. Also, Caltrans will construct a temporary road to allow equipment access to the dewatered portion of Ritchey Creek, and will relocate overhead utilities from the construction area.

To create a dry work area within the channel, Caltrans will construct a temporary diversion system within Ritchey Creek using cofferdams and pipes to bypass any surface streamflow past the construction area. The streamflow of Ritchey Creek will be bypassed to the lower cofferdam, using gravity and a pipe system sized sufficiently to handle baseflow conditions anticipated during the time period between June 1 and October 31. When construction is completed, the flow diversion structure will be removed as soon as possible in a manner that will allow flow to resume with the least disturbance to the substrate. To minimize the risk of stranding fish, cofferdams will be removed so surface elevations of water impounded upstream from the dewatered area will not be reduced at a rate greater than one inch per hour. This will minimize the risk of beaching and stranding of fish as the area upstream from the upper cofferdam becomes dewatered. The length of Ritchey Creek to by dewatered is about 220 linear feet. The stream will be dewatered for about four months to facilitate Project construction.

After the temporary bypass system is installed and prior to other in-water construction activities, Caltrans will capture and relocate all fish from Ritchey Creek between the two cofferdams, using traditional fish capture gear, such as seines, dip nets, and electrofishing equipment. All captured

steelhead will be placed in devices containing creek water and then relocated to suitable habitat downstream of the dewatered section of the stream. Caltrans proposes to prepare a detailed fish relocation plan and submit it to NMFS for review and comment at least 30 days prior to project construction. If a pump is needed to dewater the work area, the intake will be fitted with wire mesh no larger than 0.2 inch or will be buried in a gravel-filled sump. A biologist will remain on-site during stream dewatering activities.

After the temporary dewatering system has been installed, Caltrans may construct a falsework or timber mat system to provide a work area over the dewatered channel and to the further protect the stream channel from accidental discharged of construction debris.

1.3.2 Construction of a Temporary Bridge

Before demolishing the existing SR 29 crossing, Caltrans will install a prefabricated, single-span, two-lane temporary steel modular bridge just downstream (6 to 10 feet) of the existing crossing to maintain traffic flow during construction of the new bridge. Caltrans will construct temporary concrete abutments at each approach to the temporary bridge. The temporary bridge will be about 28 feet (ft.) wide and 120 ft. long. The temporary bridge will be assembled onsite at a temporary staging area and be installed using a crane. Construction of the temporary detour bridge will take about 1-3 months. After the temporary bridge is completed, Caltrans will divert traffic from SR 29 onto the temporary bridge to create a safe working area for the duration of demolition of the existing bridge and construction of the new structure. After construction of the new bridge is complete, Caltrans will return traffic from the temporary bridge to the new bridge. After construction of the new bridge, Caltrans will remove the temporary bridge, its abutments, any pavement added for the temporary bridge, and grade the areas disturbed for the temporary bridge.

1.3.3 Demolition of Existing Bridge

Bridge demolition will begin in the middle of the bridge and work backwards to the abutments. The bridge concrete deck will be saw-cut into individual pieces, lifted from their supports using a crane, and hauled away. The remaining portions of the bridge abutments will be removed up to 10 ft. below the existing channel grade. Materials from bridge demolition will be hauled away for proper disposal.

1.3.4 Construction of the New Bridge

Caltrans will build the new bridge abutments about 5 ft. behind the existing abutments. After excavating approximately 10 ft. below the existing channel grade, Caltrans will install formworks and steel reinforcement, and then pour concrete to form the new footings and abutments. Caltrans will construct reinforced concrete wing walls on each side of the abutment to act as retaining walls for adjacent soil. Once the abutments and wing walls are completed, Caltrans will install the new cast-in-place slab bridge deck at the same location of the existing bridge. The proposed new bridge is approximately 44 ft. wide and 35 ft. long (approximately 1,540 square feet). Construction of the new bridge and abutments will occur over 2-6 months.

Similar to the existing bridge, no scuppers will be incorporated into the bridge deck. Stormwater from the new bridge deck will flow laterally to the ends of the bridge rail and then drain off the

bridge to the road shoulders and creek below. Stormwater from the roadway adjacent to the new bridge will sheet flow off road surfaces onto road shoulders.

1.3.5 Channel Contouring

After removing the existing bridge and associated in-channel concrete, Caltrans will grade the creek to accommodate the new wider crossing. Grading will extend both upstream and downstream of the replacement bridge. To maintain channel stability, as well as create resting habitat and improved passage conditions for fish, Caltrans will create a pool downstream of the new bridge using buried weirs and rock bands. The location and shape of the bands and weirs will be determined with input from a fish passage engineer. Caltrans will use salvaged native bed material or engineered streambed material to contour the channel bed after construction of the weirs and rock bands. The proposed fish passage design will also incorporates rock ramps through the project reach under the SR 29 crossing.

1.3.6 Revegetation

Caltrans will revegetate disturbed areas using an assemblage of appropriate native species with guidance from regulatory agencies and California Department of Parks and Recreation.

1.3.7 Monitoring

Caltrans will develop a fish passage and habitat mitigation monitoring plan, and provide it to regulatory agencies for review and comment before commencing construction.

1.3.8 Avoidance and Minimization Measures

The Project will implement best management practices to avoid and minimize temporary impacts from construction activities including the following: (1) environmental awareness training to all contractor crew members; (2) delineating work areas to minimize impacts to habitat beyond the work limit or to protect vegetation within the work area; (3) removing invasive plant species during construction and replanting with appropriate native plant species (grasses, shrubs, and trees); and (4) implementing an approved stormwater pollution prevention plan during construction. Caltrans proposes to limit all construction activities within the Ritchey Creek channel to the period between June 1 and October 31. Details for all proposed avoidance and minimization measures are found in the Project's *Biological Assessment and Essential Fish Habitat Assessment* (Caltrans February 2021).

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

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

The ESA establishes a national program for conserving threatened and endangered species of fish, wildlife, plants, and the habitat upon which they depend. As required by section 7(a)(2) of the ESA, each Federal agency must ensure that its actions are not likely to jeopardize the continued existence of endangered or threatened species, or 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 provides 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 relies on the definition of "destruction or adverse modification," which "means a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species" (50 CFR 402.02).

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

The 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 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.

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

> Caltrans. 2021. Fish Passage Barrier Removal and Ritchie Creek Bridge Replacement, National Marine Fisheries Service Biological Assessment and Essential Fish Habitat Assessment, State Route 29 - Calistoga, California, District 4-NAP-029-33.13, EA 04-4J990 / PID 04-1600-0037, February 2021. 61 pages, plus appendixes.

Information taken directly from published, citable documents are referenced in the text and listed at the end of this document. A complete record of this consultation is on file at NMFS North-Central Coast Office in Santa Rosa, California (ARN #151422WCR2020SR00229).

2.2. Rangewide Status of the Species and Critical Habitat

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

2.2.1 Listed Species

This biological opinion analyzes the effect of the proposed Project in Napa County, California on CCC steelhead in Ritchey Creek. CCC steelhead are listed as threatened under the ESA (71 FR 834, January 5, 2006). The CCC steelhead distinct population segment (DPS) includes steelhead in coastal California streams from the Russian River to Aptos Creek, and the drainages of Suisun Bay, San Pablo Bay, and San Francisco Bay. In addition, this biological opinion analyzes the

effects on designated critical habitat for threatened CCC steelhead (September 2, 2005; 70 FR 52488). Ritchey Creek is designated critical habitat for CCC steelhead.[2]

2.2.2 Steelhead Life History

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

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

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

[2] In the Federal Register Notice describing the final rule for critical habitat for Central California Coast steelhead, Ritchey Creek was spelled Ritchie Creek. The latitude/longitude endpoints of critical habitat for Central California Coast steelhead for that watershed (38.5369, -122.5652) were confirmed as being in the Ritchey Creek watershed. The U.S. Board on Geographic Names uses the spelling Ritchey.

2.2.3 Status of CCC Steelhead

Historically, approximately 70 populations of steelhead are believed to have existed in the CCC steelhead DPS (Spence *et al*. 2008). Many of these populations (approximately 37) were independent, or potentially independent, meaning they historically had a high likelihood of surviving for 100 or more years absent anthropogenic impacts (Bjorkstedt *et al*. 2005). The remaining populations were dependent upon immigration from nearby CCC steelhead DPS populations to ensure their persistence (McElhaney *et al*. 2000, Bjorkstedt *et al*. 2005). While historical and current data of abundance are limited, CCC steelhead DPS numbers are substantially reduced from historical levels. A total of 94,000 adult steelhead were estimated to spawn in the rivers of this DPS in the mid-1960s, including 50,000 fish in the Russian River – the largest population within the DPS (Busby *et al*. 1996). Near the end of the 20th century, McEwan (2001) estimated that the wild steelhead population in the Russian River watershed was between 1,700 and 7,000 fish. 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, Soquel, and Aptos creeks) of individual run sizes of 500 fish or less (62 FR 43937). However, as noted in Williams *et al*. (2016) data for CCC steelhead populations remain scarce outside of Scott Creek, which is the only long-term dataset and shows a significant decline. Short-term records indicate the low but stable assessment of populations is reasonably accurate; however, it should be noted that there is no population data for any populations outside of the Santa Cruz Mountain stratum, other than hatchery data from the Russian River.

Although available time series data sets are too short for statistically robust analysis, the information available indicates CCC steelhead populations have likely experienced serious declines in abundance, and apparent long-term population trends suggest a negative growth rate. This would indicate the DPS may not be viable in the long term, and DPS populations that historically provided enough steelhead immigrants to support dependent populations may no longer be able to do so, placing dependent populations at increased risk of extirpation. However, because CCC steelhead have maintained a wide distribution throughout the DPS, roughly approximating the known historical distribution, CCC steelhead likely possess a resilience that could slow their decline relative to other salmonid DPSs or Evolutionary Significant Units in worse condition. The 2005 status review concluded that steelhead in the CCC steelhead DPS remain "likely to become endangered in the foreseeable future" (Good *et al.* 2005), a conclusion that was consistent with a previous assessment (Busby *et al.* 1996) and supported by the NMFS Technical Recovery Team work (Spence *et al.* 2008). On January 5, 2006, NMFS issued a final determination that the CCC steelhead DPS is a threatened species, as previously listed (71 FR 834).

Although numbers did not decline further during 2007/08, the 2008/09 adult CCC steelhead return data indicated a significant decline in returning adults across their range. Escapement data from 2009/2010 indicated a slight increase; however, the returns were still well below numbers observed within recent decades (Jeffrey Jahn, NMFS, personal communication, 2010).

In the Russian River, analysis of genetic structure by Bjorkstedt *et al*. (2005) concluded previous among-basin transfers of stock, and local hatchery production in interior populations in the

Russian River likely has altered the genetic structure of the Russian River populations. Depending on how "genetic diversity" is quantified, this may or may not constitute a loss of overall diversity. In San Francisco Bay streams, reduced population sizes and fragmentation of habitat has likely led to loss of genetic diversity in these populations. More detailed information on trends in CCC steelhead DPS abundance can be found in the following references: Busby *et al*. 1996, NMFS 1997, Good *et al.* 2005, and Spence *et al.* 2008.

The status review by NMFS (2011a) concluded that steelhead in the CCC steelhead DPS remain "likely to become endangered in the foreseeable future" as new information released since Good *et al.* 2005 did not appear to suggest a change in extinction risk. The most recent status review (Williams *et al*. 2016) reached the same conclusion. On May 26, 2016, NMFS affirmed no change to the determination that the CCC steelhead DPS is a threatened species (81 FR 33468), as previously listed (76 FR 76386).

2.2.4 CCC Steelhead Critical Habitat Status

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

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

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

The condition of CCC steelhead critical habitat, specifically its ability to provide for their conservation, has been degraded from conditions known to support viable salmonid populations. NMFS has determined that present depressed population conditions are, in part, the result of the following human-induced factors affecting critical habitat: logging, agricultural and mining activities; urbanization; stream channelization; dams; wetland loss; and water withdrawals, including unscreened diversions for irrigation. Impacts of concern include alteration of streambank and channel morphology, alteration of water temperatures, loss of spawning and rearing habitat, fragmentation of habitat, loss of downstream recruitment of spawning gravels and large woody debris, degradation of water quality, removal of riparian vegetation resulting in

increased streambank erosion, loss of shade (higher water temperatures) and loss of nutrient inputs (Busby *et al*. 1996, 70 FR 52488, NMFS 2016a). Water development has drastically altered natural hydrologic cycles in many of the streams in the DPS. Alteration of flows results in migration delays, loss of suitable habitat due to dewatering and blockage; stranding of fish from rapid flow fluctuations; entrainment of juveniles into poorly screened or unscreened diversions, and increased water temperatures harmful to salmonids.

Stormwater runoff from urban areas and roadways is a primary source of water quality degradation in aquatic habitats, including streams designated as CCC steelhead critical habitat. Various pesticides, petroleum hydrocarbons, metals, and other toxic chemical contaminants common to commercial, industrial and residential land-use activities have been documented in stormwater runoff (Caltrans 2000, 2003a, 2003b). These chemicals are mobilized from roads, lawns, and other surfaces by rainfall or irrigation, and are transported to aquatic habitats via terrestrial runoff and discharges from stormwater conveyances (Good 1993). Recent studies have identified the degradation of some tire products as a causal factor in salmonid mortalities, even in concentrations of less than one part per billion (Tian *et al*. 2020). The identified contaminant, 6PPD-quinone, has been found where both rural and urban roadways drain into waterways (Sutton *et al*. 2019). Studies have identified this issue and determined the cause of observed mortalities of adult and juvenile coho salmon in both field (Scholz *et al*. 2011) and laboratory settings respectively (Chow *et al*. 2019). Overall, current condition of CCC steelhead critical habitat is degraded, and does not provide the full extent of conservation value necessary for the recovery of the species.

A final recovery plan for CCC steelhead was completed by NMFS in October 2016 (NMFS 2016a). The plan describes key threats, actions needed to achieve recovery, and measurable criteria by which NMFS will determine when recovery has been reached. Recovery plan actions are primarily designed to restore ecological processes that support healthy steelhead populations, and address the various activities that harm these processes and threaten the species' survival. The recovery plan calls for a range of actions including the restoration of floodplains and channel structure, restoring riparian conditions, improving streamflows, restoring fish passage, protecting and restoring estuarine habitat, among other actions. Several recovery actions linked specifically to Ritchey Creek[3], including appropriate fish passage at the SR 29 crossing of Ritchey Creek, appear in the recovery plan for CCC steelhead (Table 1).

Table 1. Recovery actions for CCC steelhead identified for Ritchey Creek. A full description of recovery actions for CCC steelhead is found in NMFS (2016a).

Action ID	Abbreviated Action Description
NpR-CCCS-5.1.1.11	Evaluate, design, and implement appropriate fish passage at Highway 29 on Ritchey Creek.
NpR-CCCS-5.1.1.12	Evaluate, design, and implement appropriate fish passage at Bothe State Park entrance on Ritchey Creek.

[3] The Multi-Species Recovery Plan (NMFS 2016) uses two spellings for the creek name: Ritchie and Ritchey.

Action ID	Abbreviated Action Description
NpR-CCCS-5.1.1.27	Evaluate, design, and implement appropriate fish passage in Ritchey Creek and within Bothe State Park.
NpR-CCCS-3.1.1.7	Discontinue or minimize surface and groundwater extraction adjacent to high value habitat sub-basins and tributaries (Redwood Creek, Dry Creek, Ritchie Creek, Sulphur Creek, and York Creek).
NpR-CCCS-6.1.1.2	Identify and optimize the appropriate number of key LWD pieces in the following highest priority sub-basins: Redwood Creek, Dry Creek, Ritchie Creek, Sulphur Creek, and York Creek.
NpR-CCCS-8.1.1.3	Evaluate, design, and implement gravel quality and quantity strategies to the extent that the maximum amount of spawning habitat is achieved in the following sub- basins: Redwood Creek, Dry Creek, Ritchie Creek, Sulphur Creek, Carneros, Huichica, and York Creek.
NpR-CCCS-5.1.1.11	Evaluate, design, and implement appropriate fish passage at Highway 29 on Ritchey Creek.

2.2.5. Global Climate Change

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

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

In the San Francisco Bay region, warm temperatures generally occur in July and August, but as climate change takes hold, the occurrences of these events will likely begin in June and could continue to occur in September (Cayan *et al.* 2012). Climate simulation models project that the San Francisco region will maintain its Mediterranean climate regime, but experience a higher

degree of variability of annual precipitation during the next 50 years and years that are drier than the historical annual average during the middle and end of the 21st Century. The greatest reduction in precipitation is projected to occur in March and April, with the core winter months remaining relatively unchanged (Cayan *et al.* 2012).

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

2.3. Action Area

"Action area" means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). The action area for the Project consists of the streambed and banks of Ritchey Creek from the upstream extent of construction (*i.e.*., upper cofferdam) downstream to the confluence of Ritchey Creek with the Napa River, a distance of approximately 0.7 miles. The action area contains the area of Project construction, staging area, cofferdams, streambed area to be dewatered, fish relocation sites, and the portion of Ritchey Creek in which any temporary disruption to habitat (*e.g.*, fine sediment plume or first flush stormwater) might be detectable.

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).

Ritchey Creek is a perennial tributary to San Francisco Bay, via the Napa River. Ritchey Creek, within the action area, is located on alluvial deposits is a stream of low to moderate gradient (Caltrans 2021). Ritchey Creek, as it nears the Napa River, transitions to an alluvial, low-gradient stream. The climate within the action area is Mediterranean and receives about 42

inches of precipitation annually[4], with about 90 percent of annual precipitation occurring between November and April.[5] Cool fog in the mornings is common during the late spring and summer, and significant rainfall during that time is rare.

2.4.1 Status of Steelhead and Critical Habitat in the Action Area

Steelhead are native to and present in Ritchey Creek. Previous surveys and sampling of steelhead in Ritchey Creek report observations of young-of-the-year steelhead and multiple year classes (Leidy *et al*. 2005, Napa County RCD 2011, Napa County RCD and Prunuske Chatham 2012, California Department of Parks and Recreation 2015, Napa County RCD 2020, and Napa County RCD 2021) Densities of juvenile steelhead have not been consistently measured or reported in those documents, and even when reported, comparing among those reports are challenging, as the surveys used varied gear types and locations, reported metrics differently, and sampling was conducted in various years. Estimates of juvenile steelhead abundance in Ritchey Creek from those earlier accounts range from 0.3 to 7.8 juvenile steelhead per linear foot of stream surveyed. Within the action area, Ritchey Creek primarily supports steelhead migration and juvenile rearing. However, a small amount of habitat useable for spawning and egg incubation may be present. Given the proposed construction period for the Project (*i.e*., June 1 through October 31), only juvenile steelhead are expected to be present in the action area during construction activities.

Based on current stream and riparian conditions, designated critical habitat within the action area is moderately degraded from properly functioning condition due to impacts from land use in the watershed (NMFS 2016a). Vegetation within the action area has been highly modified by human actions. On the southwestern side of SR 29 the landscape is managed as a state park with a rural residence. This landscape is heavily wooded with a mixture of coniferous and deciduous species – primarily native species, though non-native species are present too. The high canopy cover of Ritchey Creek is nearly complete in this area. Much of the woody understory vegetation in this area has been converted to primarily ruderal herbaceous plants. The landscape on the northeastern side of SR 29 is dominated by vineyard development, with associated buildings and roadways. A thin strip of riparian trees line portions of the channel between SR 29 and the Napa River, though farm roads, parking areas, and buildings have encroached on the riparian areas of Ritchey Creek.

The channel sinuosity is constrained by agricultural and rural residential development, rock and concrete revetment, levees, and the current SR 29 crossing. Rock revetment and levees are present along this portion of the stream. Throughout the action area, Ritchey Creek has an incised channel and is generally separated from its floodplain. Winter rearing habitat conditions for steelhead in Ritchey Creek in the action area is poor, as velocity refuge and floodplain feeding opportunities are lacking. With diminished lateral migration and disconnected flow, natural processes and channel functions of Ritchey Creek and its adjacent floodplain are impaired. Stormwater and other discharges potentially containing contaminants enter Ritchey Creek from roadways and adjacent properties within the action area. As a result, Ritchey Creek,

[4] USGS StreamStats report for the Ritchey Creek watershed.
[5] weatherbase.com, USClimateData.com, en.Climate-Data.org, and NOAA's National Weather Service.

throughout the action area has reduced food production and less functional habitat for rearing and spawning steelhead.

2.4.2 Factors Affecting Species Environment in the Action Area

SR 29 bisects, perpendicularly, the Ritchey Creek watershed. The upper Ritchey Creek watershed has mixed forests with a few ridgetop vineyards. Most of the watershed, upstream from the SR 29 crossing is contained in Bothe-Napa Valley State Park. Downstream from the crossing agricultural development, primarily vineyards, is the exclusive land use. Several fish passage impediments are present in Ritchey Creek caused by roadways (SR 29 crossing and road crossings within Bothe-Napa Valley State Park) that restrict steelhead from accessing important high-quality habitat upstream (NMFS 2016a). The California Department of Parks and Recreation modified one significant passage barrier (Spring Road crossing) in November 2019 to improve fish passage. Other road crossings remain in the park and plans are under development to remedy these impediments within the next few years. The SR 29 crossing of Ritchey Creek has been a barrier to fish passage under some flows for many years. Bothe-Napa Valley State Park has a well adjacent to Ritchey Creek that may be drawing underflow from the stream. The Glass Fire of October 2020 burned through parts of Bothe-Napa Valley State Park and damaged some riparian forests. Agricultural development downstream from the SR 29 crossing has encroached on the channel of Ritchey Creek from both sides of the stream. These agricultural activities have resulted in increased erosion, channel simplification, and toxic chemicals in stormwater runoff from impervious surfaces into Ritchey Creek.

2.4.3 Previous Section 7 Consultations Affecting the Action Area

No previous section 7 consultations have been undertaken within the action area. Section 10(a)(1)(A) research and enhancement permits and section 4(d) limits or exceptions could potentially occur in the Ritchey Creek watershed, including the action area of this Project. Salmonid monitoring approved under these programs includes carcass surveys, smolt outmigration trapping, and juvenile density surveys. In general, these activities are closely monitored and require measures to minimize take during the research activities. No research or enhancement activities authorized through Section 10(a)(1)(A), have occurred in the Ritchey Creek watershed to date. The Napa County RCD has a section 4(d) authorization for sampling steelhead in Ritchey Creek and surrounding streams in the Napa River watershed.

2.5. Effects of the Action

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

2.5.1 Fish Relocation Activities

Fish collection and relocation will be performed in coordination with dewatering prior to construction. The dewatered portion of Ritchey Creek within the action area will be the entire wetted surface for approximately 220 linear feet of channel. Caltrans proposes to collect and relocate fish to minimize the effects of dewatering the stream. Before and during dewatering of Ritchey Creek within the construction area, juvenile steelhead and other fish will be captured and relocated downstream from the work area to avoid direct mortality and minimize the possible stranding of fish in isolated pools. Fish within the area to be dewatered will be captured using electrofishing or dip nets and seines, and then transported and released by a qualified fisheries biologist to suitable instream locations in Ritchey Creek outside the work area.

All steelhead present in the area to be dewatered will need to be relocated or they will perish when the work area is dewatered. Steelhead relocation activities will occur during the summer and early fall low-flow period after emigrating smolts and kelts (post-spawned adults) have left the creek and prior to the adult migration and spawning season. Therefore, NMFS expects the CCC steelhead that will be captured during this project will be limited to pre-smolting juveniles. Previous sampling of steelhead in Ritchey Creek (Leidy *et al.* 2005) indicates that two or three year-classes of steelhead may be present during the summer and fall months.

Data to precisely quantify the number of steelhead that will be in the Project reach prior to construction are not available. Information from reported observations were generated using varying gear type (*e.g.*, visual observation, snorkel survey, single-pass electrofishing, and multiple-pass electrofishing) from widely disparate years (1964-2021). Some surveys sampled large portions of the stream, whereas other surveys focused on pools and other portions of the stream deeper than one foot. Further, some of the reports do not include any specific number of steelhead observed.

As a surrogate for information on steelhead densities in Ritchey Creek, information is available from recent observations at York Creek, a nearby tributary of the Napa River. In 2020, the City of St. Helena constructed a notch in the York Creek Dam. That construction necessitated dewatering of 200 linear feet of York Creek. During that construction, 93 juvenile steelhead, from three-year classes, were captured and relocated. Using the density of fish captured and relocated from the York Creek Dam project (0.5 fish per foot of dewatered channel) and allowing for a 50 percent variation in inter-annual population abundance, NMFS estimates that up to 154 juvenile steelhead may be located within 220 linear feet of Ritchey Creek in the action area. This is expected to be the maximum number of CCC steelhead that would be captured and relocated by the Project during construction.

Fish relocation activities pose a risk of injury or mortality to rearing juvenile salmonids. Any fish collecting gear, whether passive (Hubert 1996) or active (Hayes *et al*. 1996) has some associated risk to fish, including stress, disease transmission, injury, or death. The amount of unintentional injury and mortality attributable to fish capture varies widely, depending on the method used, the ambient conditions, and the expertise and experience of the field crew. Since fish relocation activities by the Project will be conducted by qualified fisheries biologists, direct effects to and mortality of juvenile steelhead during capture are anticipated to be minimized.

Based on information from other relocation efforts in California, NMFS estimates injury and mortalities would be less than three percent of those steelhead that are captured and relocated (Collins 2004, CDFG 2005, 2006, 2007, 2008, 2009, 2010a, 2010b, NMFS 2016b). Fish that avoid capture during relocation efforts may be exposed to risks described in the following section on dewatering. NMFS expects no more than three percent of the steelhead captured by the Project for dewatering will be injured or killed during relocation activities. Given that we anticipate the capture of 154 juvenile steelhead during this construction project, we expect no more than 5 juvenile steelhead are expected to be injured or killed during fish collection and relocation.

Sites selected in Ritchey Creek for relocating fish are expected to have similar and ample aquatic habitat as the capture site. In some instances, relocated fish may endure short-term stress from crowding at the relocation sites. Relocated fish may have to contend with other fish causing increased competition for available resources such as food and habitat area. Frequent responses to crowding by steelhead include emigration and reduced growth rates (Keeley 2003). Some of the fish released at the relocation sites may choose not to remain in these areas and move either upstream or downstream to areas that have more vacant habitat and a lower density of steelhead. As each fish moves, competition remains either localized to a small area or quickly diminishes as fish disperse. NMFS does not expect impacts from increased competition would be large enough to adversely affect the survival chances of individual steelhead, or cascade through the watershed population based on the small area that would likely be affected and the relatively small number of individuals likely to be relocated (particularly when compared with the remainder of individuals throughout the drainage not affected by the project). As described above, sufficient habitat appears to be available in Ritchey Creek to sustain fish relocated without crowding of other juvenile steelhead. Once construction activities are completed and the cofferdams removed in the late fall, juvenile steelhead will have the ability to return to the previously dewatered portion of the action area.

2.5.2 Dewatering

The Project proposes to isolate work areas with cofferdams and bypass streamflow around the construction area. Bypass piping will be installed to divert streamflow from upstream the construction area to below the construction area by gravity, a distance of approximately 220 linear feet of Ritchey Creek. NMFS anticipates only minor temporary changes to the streamflow of creek outside of the dewatered construction area during the dewatering process. These fluctuations in flow are anticipated to be small, gradual, and short-term. Once the cofferdam and pipeline bypass are installed and operational, streamflow above and below the work area should be the same as the pre-project conditions except within the dewatered work areas where streamflow is bypassed. The dewatering of up to 220 feet of channel is expected to cause a temporary reduction in the quantity of aquatic habitat in the action area of Ritchey Creek.

Juvenile steelhead that avoid capture in the project work area following relocation efforts may die due to desiccation, thermal stress, or by being crushed by equipment or foot traffic if not found by biologists as water levels recede within the area being dewatered. However, due to fish relocation efforts, NMFS expects the number of juvenile steelhead that would die as a result of stranding during dewatering activities would be one percent or less of the steelhead within the

work site prior to dewatering. NMFS anticipates up to 154 juvenile steelhead in the dewatered portion of Ritchey Creek; therefore, NMFS expects no more than 2 juvenile steelhead will avoid capture and die as a result of dewatering.

The temporary cofferdams and water diversion structures in the creek at the construction site are not expected to impact juvenile steelhead movements in Ritchey Creek with the exception of the small area (220 linear feet) to be dewatered. The low flow season timing of the Project's construction activities combined with the small portion of habitat (220 linear feet) to be dewatered, the placement of cofferdams and streamflow bypass diversion during the five month in-channel construction period are unlikely to adversely affect movements of individual steelhead in Ritchey Creek.

Benthic (*i.e.*, bottom dwelling) aquatic macroinvertebrates (a salmonid prey item) within the construction site may be killed or their abundance reduced when creek habitat is dewatered (Cushman 1985). However, effects to aquatic macroinvertebrates resulting from the construction streamflow bypass and dewatering will be temporary because in-water construction activities would be of relatively short duration and the dewatered area is relatively small (220 linear feet). Rapid recolonization (typically one to two months) of disturbed areas by macroinvertebrates is expected following channel re-watering (Cushman 1985, Thomas 1985, Harvey 1986). Based on the foregoing, NMFS does not expect the temporary loss of aquatic macroinvertebrates as a result of dewatering activities by the Project would adversely affect CCC steelhead during or after project implementation.

2.5.3 Increased Mobilization of Sediment in the Stream Channel and Water Quality

During construction, project activities at Ritchey Creek SR 29 bridge would result in disturbance of the creek bed and banks for equipment access, bank and channel contouring, placement of boulders, rock ramp construction, and for the placement/removal of the cofferdam. While the cofferdam and streamflow bypass system are in place, construction activities are not expected to degrade water quality in Ritchey Creek because the work area will be dewatered and isolated from the flowing waters of the creek. Post-construction, NMFS anticipates disturbed soils could affect water quality and critical habitat in the action area in the form of small, short-term increases in turbidity during re-watering (*e.g.*, following removal of the cofferdam) and subsequent higher flow events during the first winter storms post-construction. Disturbed soils on the creek bank are easily mobilized when late fall and winter storms increase streamflow levels. 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).

Increases in sediment may affect fish in a variety of ways. 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 and prolonged turbidity concentrations can reduce dissolved oxygen in the water column, result in reduced respiratory functions, reduce tolerance to diseases, and can also cause fish mortality (Sigler *et al*. 1984, Berg and Northcote 1985, Gregory and Northcote 1993, Velagic 1995, Waters 1995). Even small pulses of turbid water can cause salmonids to disperse from established territories (Waters 1995), which can

displace fish into less suitable habitat and/or increase competition and predation, thus decreasing chances of survival. Increased sediment deposition can fill pools thereby reducing the amount of potential cover and habitat available, and smother coarse substrate particles which can impair macroinvertebrate composition and abundance (Sigler *et al*. 1984, Alexander and Hansen 1986).

Although chronic elevated sediment and turbidity levels may affect steelhead and critical habitat, sedimentation and turbidity levels associated with this Project during cofferdam construction and removal, during the subsequent rewetting of the construction site within the action area, and during subsequent rainfall events are not expected to rise to the levels discussed in the previous paragraph, because the Project proposes soil and channel stabilization measures to minimize the mobilization of sediment. Due to the Project's proposed use of erosion control measures throughout the construction phase, and post-construction planting of native vegetation, NMFS anticipates there will be minimal area of disturbed, exposed soils remaining post-construction. Therefore, any resulting elevated turbidity levels would be small, only occur for a short period, and be well below levels and durations shown in the scientific literature as causing injury or harm to salmonids (see for example Sigler *et al*. 1984 or Newcombe and Jensen 1996). NMFS expects any sediment or turbidity generated by the Project would not extend more than 500 feet downstream of the work site in Ritchey Creek based on the site conditions and proposed methods to control sediment. NMFS does not anticipate harm, injury, or behavioral impacts to CCC steelhead associated with exposure to the minor elevated suspended sediment levels that would be generated by the Project.

2.5.4 Access to Historic Rearing and Spawning Habitat

While not an impassable barrier to upstream migration of steelhead, the existing SR 29 crossing of Ritchey Creek does impair steelhead migration under some flows (Napa RCD 2002, Napa RCD 2011, Napa RCD and Prunuske Chatham 2012). The proposed fish passage improvements and bridge replacement at the SR 29 crossing of Ritchey Creek will allow unimpeded passage and access to high quality spawning habitat upstream over a wider range of streamflow conditions. More frequent access to this high quality spawning habitat will benefit the steelhead population of the Ritchey Creek watershed by increasing the carrying capacity. The added spatial distribution of upper Ritchey Creek in combination with higher abundance contributes to population resilience and the ability of the Ritchey Creek population to fulfill their functional roles within the DPS. These benefits to steelhead in the Ritchey Creek watershed will support CCC steelhead recovery and conservation in the Napa River watershed. Successful completion of this Project will addresses one high priority action to facilitate recovery of CCC steelhead in Ritchey Creek and the Napa River watershed related to fish passage. Recovery action NpR-CCCS-5.1.1.11 calls for the evaluation, design, and implementation of appropriate fish passage at Highway 29 on Ritchey Creek (NMFS 2016a).

2.5.5. Water Quality Following Construction

Although the proposed Project addresses potential run-off and contaminants during construction of the new bridge, post-construction stormwater measures are not proposed as part of the Project. The existing SR 29 bridge crossing on Ritchey Creek does not provide for stormwater control or treatment, and runoff from the roadway will continue to discharge directly into Ritchey Creek. Published work has identified stormwater from roadways and streets as causing a high percentage of rapid mortality of adult coho salmon in the wild (Scholz *et al*. 2011) and laboratory settings (McIntyre *et al*. 2018). Subsequent laboratory studies showed this morality also occurred in juvenile coho salmon (Chow *et al*. 2019) as well as to juvenile steelhead and Chinook salmon (J. McIntyre and N. Scholz, unpublished data, 2020). A recent publication has identified a degradation product of tires (6PPD-quinone) as the causal factor in salmonid mortalities at concentrations of less than a part per billion (Peter *et al*. 2018, Tian *et al*. 2020). The parent compound (6PPD) is widely used by multiple tire manufacturers and the tire shreds/dust that produce the degradation product have been found to be ubiquitous where both rural and urban roadways drain into waterways (Feist *et al*. 2018, Sutton *et al*. 2019). Recent evaluations of exposures of these contaminants on juvenile steelhead and Chinook salmon resulted in mortality of up to 40 percent for steelhead and up to 10 percent for Chinook (J. McIntyre and N. Scholz, NMFS Northwest Fisheries Science Center, unpublished data).

Stormwater runoff can be effectively treated by infiltrating the road runoff through soil media containing organic matter, which results in removal of toxins and contaminants (McIntrye 2015, Spromberg 2016, Fardel *et al.* 2020). Caltrans (2003b) reached similar conclusions in their work evaluating roadside vegetated treatment sites at various slopes. Unlike traditional stormwater collection and conveyance practices, such as storm drain systems with direct outfalls to waterways, vegetated filter strips at the edges of paved surfaces or vegetated swales (*i.e.*, bioswales) can collect and convey stormwater in ways that infiltrate into soils with large amounts of organic matter that bind or otherwise remove contaminants from the stormwater before it reaches a stream (Caltrans 2003b, McIntrye *et al*. 2015). Without post-construction measures to treat or redirect stormwater derived from the SR 29 crossing, steelhead in the Ritchey Creek action area will be exposed to contaminated stormwater runoff originating from the bridge and associated roadway. Pollutants associated with vehicular traffic are expected to originate from the 1,540 square feet impervious surface of the bridge deck. Pollutants in post-construction runoff at the replacement bridge are expected to include oil, grease, polycyclic aromatic hydrocarbons (PAH), and other toxic chemicals associated with tires and vehicles. Concentration levels and toxicity will be seasonally affected by rainfall patterns and proximity to the SR 29 bridge. The highest concentration levels of constituents and chemical mixtures that are toxic to fish and aquatic life in stormwater runoff are expected to occur at the point of discharge. First-flush rain events after long antecedent dry periods (periods of no rain) will also have higher concentrations of pollutants.

In an examination of effect on juvenile salmon, McIntyre *et al*. (2015) exposed sub-yearling coho salmon to urban stormwater. In these experiments, 100 percent of the coho juveniles exposed to untreated highway runoff died within 12 hours of exposure. McIntyre *et al.* (2018) later examined the pre-spawn mortality rate of adult coho salmon exposed to urban stormwater runoff. In these experiments 100 percent of coho salmon exposed to stormwater mixtures

expressed abnormal behavior (*e.g.*, lethargy, surface respiration, loss of equilibrium, and immobility) within 2 to 6 hours after exposure.

For the Ritchey Creek site, we cannot estimate the number of individual CCC steelhead that will experience adverse effects from exposure to stormwater with a meaningful level of accuracy. We cannot predict the number or duration of stormwater runoff events, nor the number of individual fish that will be exposed during those events. Furthermore, not all exposed individuals will experience immediate adverse effects. We expect that every year some CCC steelhead (juvenile and adult) will experience sublethal effects such as stress, impaired olfactory performance, and reduced prey consumption. Additional effects to some CCC steelhead associated with exposure to contaminants in stormwater may include avoidance behaviors that disrupt feeding and migratory behavior, reduced growth, impairment of essential behaviors related to successful rearing and migration, cellular trauma, physiological trauma, reproductive failure, and mortality. These effects could extend in Ritchey Creek as far as 0.7 miles to the creek's confluence with the Napa River. When mixed with Napa River streamflow, contaminant levels originating from the SR 29 crossing in Ritchey Creek are likely to be diluted to levels that no longer pose a risk to steelhead.

2.5.6 Stream Channel Stabilization

By design, bridges and associated bank stabilization projects prevent lateral channel migration, effectively forcing streams into a simplified linear configuration. Without the ability to move laterally, stream channels tend to erode and deepen vertically (Leopold 1968; Dunn and Leopold 1978). The resulting "incised" channel fails to create and maintain aquatic and riparian habitat through lateral migration, and can instead impair groundwater/stream flow connectivity and repress floodplain and riparian habitat function. Simplified stream reaches typically produce limited macroinvertebrate prey and provide poor functional habitat for rearing juvenile salmonids (Florsheim *et al*. 2008).

The proposed concrete wing walls at the replacement bridge are expected to maintain the current channel alignment and result in simplification of habitat around the bridge abutments. The replacement bridge provides a longer span and, thus, the abutments encroach less on the stream channel as compared to existing bridge. Placing the bridge abutments and wing walls further back into the banks are expected to improve flood flow conveyance and sediment transport. However, the areas where the concrete wing walls are constructed will continue to impede channel migration and riparian development on both sides of Ritchey Creek. These habitat functions are not expected to change significantly from the conditions that currently exist with the existing bridge in place.

2.5.7 Effects on Critical Habitat

The critical habitat designation for CCC steelhead includes all of Ritchey Creek and its tributaries, from the confluence with the Napa River upstream to 38.5369, -122.5652 (September 2, 2005; 70 FR 52488).

2.5.7.1 Construction Impacts. As discussed above in sections 2.5.2 and 2.5.3 of this opinion, Project construction activities are expected to result in short-term disturbances to the channel and adjacent streambank areas. Localized and temporary impacts to Ritchey Creek in the form of

increased levels of turbidity and reduction in benthic invertebrate abundance are anticipated with construction of the temporary bridge and the replacement bridge. Degradation of water quality in the form of increased levels of turbidity and suspended fine sediment will generally be contained during construction by the use of cofferdams. Impacts to benthic habitat and associated invertebrates may occur as the channel adjusts to the new geometry following construction.

Caltrans proposes to revegetate areas disturbed by construction activities, including sites where trees and shrubs have been removed, using appropriate native riparian species upon completion of the Project. Other areas of disturbed or removed vegetation on access routes will be re-seeded to promote natural recruitment of native vegetation. Areas replanted and reseeded with riparian species are expected to recover within the short-term (*e.g.*, 2-5 years). Removal of riparian vegetation has the potential to affect Ritchey Creek with increased exposure to solar radiation and reduced invertebrate prey input from terrestrial sources. Therefore, NMFS expects temporary impacts to PBFs of critical habitat associated with foraging and water quality due to vegetation removal within the construction area. Due to the small area subject to vegetation removal and Caltrans' proposed revegetation plan, Project construction activities are not expected to have an appreciable effect on critical habitat PBFs associated with stream shading, cover, water temperature, or nutrient input in the action area.

2.5.7.2 Upstream Fish Passage. As discussed above in section 2.5.4 of this opinion, upon completion of the Project, fish passage is expected to improve at and near the SR 29 crossing of Ritchey Creek. Adult immigrating steelhead are expected to ascend the project reach without impairment to high quality spawning habitat in the upper Ritchey Creek watershed under a wider range of flow conditions. Impediments to fish passage throughout the Napa River watershed is a substantial threat to the recovery of CCC steelhead (NMFS 2016a); addressing the impaired fish passage found at the SR 29 crossing of Ritchey Creek is identified specifically as recovery action NpR-CCS-5.1.1.11.

With increased access to high quality spawning and rearing habitat in the upper watershed, the steelhead population of Ritchey Creek is expected to increase. With a larger number to adult returns to the watershed, an increase in marine-derived nutrients should also benefit critical habitat. Marine-derived nutrients are nutrients that are accumulated in the biomass of salmonids while they are feeding in the ocean. Salmon and steelhead can spend the majority of their life cycle marine environments, and, thus most of their size and high rate of growth can be attributed to abundant food sources they encounter in the ocean. When these fish return to freshwater as spawning adults, they contribute the marine-derived nutrients they have obtained through egg and carcass deposition. Iteroparous species such as anadromous trout can contribute marine-derived nutrients during multiple spawning events throughout their lifespan. The return of salmonids to rivers makes a significant contribution to the flora and fauna of both terrestrial and riverine ecosystems (Gresh *et al.* 2000), and has been shown to be vital for the growth of juvenile salmonids (Bilby *et al.* 1996, 1998). Evidence of the role of marine-derived nutrients and energy in ecosystems suggests this deficit may result in an ecosystem failure contributing to the downward spiral of salmonid abundance (Bilby *et al*. 1996). Reduction of marine-derived nutrients to watersheds is a consequence of the past century of decline in salmon abundance (Gresh *et al*. 2000).

Cederholm *et al*. (1999) suggested that aquatic macroinvertebrates likely benefit from marine derived nutrients through an increase in primary productivity, thereby creating a positive feedback loop for juvenile salmonids by increasing their food supply. In California, native riparian vegetation and cultivated wine grapes obtained significant amounts of marine-derived nutrients from salmonids (Merz and Moyle 2006). Marine-derived nutrients can be restored to the food web following dam removal as observed in a single year following dam removal on the Elwah River in Washington State (Tonra *et al*. 2015). In Ritchey Creek, an increase in adult steelhead returns to the watershed and the associated increase in contribution of marine-derived nutrients are expected to provide multiple benefits to PBFs of CCC steelhead critical habitat.

Water Quality Impacts. As discussed above in section 2.5.5 of this opinion, post-construction stormwater runoff from the replacement bridge deck is expected to result in adverse effects through the discharge of contaminants to Ritchey Creek. Without post-construction measures to treat or redirect stormwater from the bridge deck, pollutants associated with vehicular traffic are expected to originate from the 1,540 square feet impervious surface at the SR 29 bridge deck. Oil, grease, PAHs, and other chemicals associated with tires and vehicles that are toxic to fish and aquatic life are expected and concentration/toxicity levels will vary seasonally in Ritchey Creek downstream of the SR 29 crossing. Therefore, NMFS expects impacts to PBFs of critical habitat associated with degraded water quality and reduced prey due to contaminant levels in stormwater runoff.

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 in the environmental baseline (Section 2.4).

2.7. Integration and Synthesis

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

reducing its numbers, reproduction, or distribution; or (2) appreciably diminish the value of designated or proposed critical habitat as a whole for the conservation of the species

CCC steelhead are listed as threatened under the ESA. Based on the extensive loss of historic habitat due to dams and the degraded condition of remaining spawning and rearing areas, CCC steelhead populations in watersheds that drain to San Francisco Bay, including the Napa River and its tributaries, have experienced severe declines. Steelhead are present in Ritchey Creek, though abundance and densities are likely lower than historic conditions. The presence of the SR 29 crossing has adversely affected CCC steelhead and aquatic habitat in Ritchey Creek by impairing adult steelhead access to the high-quality spawning and rearing habitat upstream from the crossing. Park, transportation, and agricultural development has encroached on Ritchey Creek, resulting in reduced riparian vegetation, reduced channel complexity, increased channelization, and concentrated stormwater discharge to the stream. These factors lead to a flashier stream hydrograph, increased toxic inputs, and reduced quality aquatic habitat. Aquatic habitat for CCC steelhead throughout the action area is degraded.

As described in the *Effects of the Action* (Section 2.5) of this opinion, during Project construction NMFS anticipates adverse effects to steelhead and designated critical associated with dewatering of 220 linear feet of Ritchey Creek and relocation of steelhead. NMFS estimates up to 154 juvenile steelhead may be collected within the dewatered portion of Ritchey Creek and as many as 7 of these individuals may be injured or killed during relocation and dewatering. NMFS does not anticipate that adult steelhead will be in Ritchey Creek during construction activities.

Upon completion of the temporary stream bypass system, bridge construction activities and channel contouring will occur within a dewatered area that is isolated from the surface streamflow of Ritchey Creek. When the temporary cofferdams are removed following in-channel construction, activities may generate increased levels of turbidity in the water column due to the mobilization of the substrate when surface streamflow returns. Extended periods of high turbidity can reduce primary productivity of an aquatic area (Cloern 1987) and may cause the fish to suffer stress, reduced gill function and feeding ability (Benfield and Minello 1996, Nightingale and Simenstad 2001). However, the minor amount of disturbed sediment mobilized by Project construction activities is expected to be localized and dissipate quickly. If steelhead do encounter the area during a period of elevated turbidity, they are tolerant of levels of turbidity that exceed levels expected to result from this Project's construction activities. For these reasons, the potential effects of minor and localized areas of elevated turbidity associated with this Project's activities are expected to be insignificant to steelhead and critical habitat.

Post-construction stormwater runoff from the bridge and adjacent roadway is expected to directly discharge into Ritchey Creek contributing petroleum hydrocarbons, metals, and other toxic chemical contaminants common to roadway runoff. Background information from recent publications and laboratory research has identified a degradation product of tires (6PPD-quinone) as a causal factor in salmonid mortalities at concentrations of less than a part per billion (Tian *et al.* 2020). The parent compound (6PPD) is widely used by multiple tire manufacturers and the tire shreds/dust that produce the degradation product have been found to be ubiquitous where both rural and urban roadways drain into waterways (Sutton *et al*., 2019). 6PPD-quinone along with other contaminants related to vehicular traffic (*e.g.*, oil, greases, PAHs, and metals)

are expected to directly discharge into Ritchey Creek with stormwater runoff during periods of precipitation. We expect that every year some CCC steelhead (juvenile and adult) will experience sublethal effects including stress, impaired olfactory performance, and reduced prey consumption. Additional effects associated with exposure to contaminants in stormwater may include avoidance behaviors that disrupt feeding and migratory behavior, reduced growth, impairment of essential behaviors related to successful rearing and migration, cellular trauma, physiological trauma, reproductive failure, and mortality.

Completion of the bridge replacement and the associated modifications to the Ritchey Creek channel are expected to improve upstream fish passage for adult CCC steelhead at and near the SR 29 crossing of Ritchey Creek. Adult immigrating steelhead are expected to ascend the project reach without impairment to high quality spawning habitat in the upper Ritchey Creek watershed under a wider range of flow conditions. With increased access to high quality spawning and rearing habitat in the upper watershed, the steelhead population of Ritchey Creek is expected to increase. With a larger number to adult returns to the watershed, an increase in marine-derived nutrients should also benefit critical habitat.

Regarding future climate change effects in the action area, California could be subject to higher average summer air temperatures and lower total precipitation levels. Reductions in the amount of precipitation would reduce streamflow levels in Northern and Central Coastal rivers. Estuaries may also experience changes in productivity due to changes in freshwater flows, nutrient cycling, and sediment amounts. For this project, all adverse effects associated with the Project will occur during construction and the initial winter/spring following construction. These impacts would be completed in one year and the above effects of climate change are unlikely to be detected within this time frame. If the effects of climate change are detected over the short term, they will likely materialize as moderate changes to the current climate conditions within the action area. These changes may place further stress on CCC steelhead populations. The effects of the proposed Project combined with moderate climate change effects may result in conditions similar to those produced by natural ocean-atmospheric variations as described in the Environmental Baseline section of this opinion (Section 2.4) and annual variations. CCC steelhead are expected to persist throughout these phenomena, as they have in the past, even when concurrently exposed to the effects of similar projects.

NMFS does not anticipate the loss of up to seven (7) juvenile steelhead during Project construction activities to affect future adult returns of CCC steelhead. This loss of juveniles likely represents a miniscule percentage of the number of individuals in the Ritchey Creek population. The overall number of individuals in the population is expected to provide a compensatory effect, as the steelhead population in Ritchey Creek will be able to replace this very small number of juvenile steelhead lost during Project construction. Other areas of the Ritchey Creek watershed are expected to continue to contribute to the population during the time period when some juveniles in the action area may be harmed or killed as a result of this Project. Although some short-term adverse effects to water quality and riparian vegetation are anticipated during Project construction, the fish passage component of the Project is expected to benefit critical habitat by improving adult spawner access to the upper watershed. When added to the environmental baseline, cumulative effects, and species status, the effects of the proposed action

are not expected to appreciably reduce the quality and function of critical habitat for CCC steelhead.

2.8. Conclusion

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

2.9. Incidental Take Statement

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

2.9.1 Amount or Extent of Take

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

Take from Construction Activities
Take of threatened juvenile CCC steelhead is expected to occur during dewatering of 220 linear feet of the Ritchey Creek channel. Fish collection and relocation prior to dewatering may capture up to 154 juvenile steelhead and up to five (5) individuals may be injured or killed during these activities. NMFS anticipates that no more than two (2) additional juvenile steelhead will avoid capture during relocation efforts and die during dewatering of the work site. The anticipated level of take will be exceeded if more than 154 juvenile steelhead are collected and/or more than three (3) percent of the total number juvenile steelhead captured are injured or killed.

Harm from Stormwater Runoff
CCC steelhead in Ritchey Creek downstream of the new bridge are likely to harmed by stormwater runoff delivered to the stream from the replacement bridge. 6PPD-quinone along

with other contaminants associated to vehicular traffic (oil, greases, PAHs, metals, etc.) are expected to directly discharge into Ritchey Creek during intermittent stormwater runoff events. CCC steelhead (juvenile and adult) downstream of the SR 29 crossing will be exposed during these events and experience sublethal effects including stress, impaired olfactory performance, reduced prey consumption, and mortality.

The best available indicator for the extent of take expected due to stormwater runoff from the replacement bridge over Ritchey Creek is the physical extent (*i.e.*, square feet) of pollution generating surface at the bridge, as the amount of pollutants in stormwater is directly proportional to the amount of impervious surface discharging into the creek. For this project, 1,540 square feet of bridge deck is the physical extent of pollution generating impervious surface that will result in delivering pollutants associated with vehicular traffic to aquatic habitat in Ritchey Creek. Stormwater inputs will result in short-term reduction of water quality due to petroleum-related compounds and other contaminants washed off the bridge deck, which are reasonably certain to cause harm to CCC steelhead depending on the level of exposure. This surrogate measure of incidental take identified can be reasonably and reliably measured and monitored and serves as meaningful reinitiation trigger.

2.9.5. Effect of the Take

In the biological opinion, NMFS determined that the amount or extent of anticipated take, coupled with other effects of the proposed action, is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

2.9.6. Reasonable and Prudent Measures

"Reasonable and prudent measures" are nondiscretionary measures that are necessary or appropriate to minimize the impact of the amount or extent of incidental take (50 CFR 402.02).

NMFS believes the following reasonable and prudent measures are necessary and appropriate to minimize take of CCC steelhead:

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

2. Undertake measures to minimize harm to CCC steelhead and degradation of aquatic habitat during construction of the Project.

3. Submit draft design plans, findings from project analyses, hydraulic models and results, and methods of construction for NMFS' review and agreement to ensure the Project's fish passage goals are fully achieved.

4. Develop and implement a monitoring plan to ensure the channel geometry of Ritchey Creek within the action area achieves and maintains steelhead fish passage conditions as designed and constructed.

5. Implement measures to reduce direct delivery of runoff from the replacement bridge deck to Ritchey Creek.

6. Prepare and submit reports that summarize the effects of construction, fish relocation, and dewatering activities, and post-construction monitoring/site performance.

2.9.7. Terms and Conditions

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

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

   a. At least 60 days prior to the initiation of construction, Caltrans shall submit a stream dewatering plan and a fish relocation plan to NMFS for review and approval. The fish relocation plan shall include information on credentials of the biologists that will capture and relocate fish, specific gear and techniques to be used to capture fish, information on equipment proposed to keep fish cool and aerated after collection and before release, criteria used to identify release sites, and alternative release sites.

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

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

   d. If any salmonids are found dead or injured, the biologist shall contact NMFS biologist Daniel Logan by phone immediately at (707) 575-6053 or the NMFS North-Central Coast Office at (707) 575-6050. The purpose of the contact is to review the activities

resulting in take, determine if additional protective measures are required, and ensure appropriate collection and transfer of salmonid mortalities and tissue samples.

i. All salmonid mortalities will be retained until further direction is provided by the NMFS biologist listed above.

ii. 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 one (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. Fold blotter paper over for temporary storage. Samples must be air-dried as soon as possible (*i.e.*, do not wait more than 8 hours). When tissue/paper is dry to the touch, place into a clean envelope labeled with Sample ID Number, and seal the envelope.

iii. Include the following information with each tissue sample using the Salmonid Genetic Tissue Repository form or alternative spreadsheet: collection date, collection location (county, waterway, and exact location on the waterway), collector name, collector affiliation/phone, sample ID number, species, tissue type, condition, fork length (mm), sex (M, F, or Unk), presence of adipose fin clip (Y or N), presence of a tag? (Y or N), and relevant notes/comments.

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

e. Caltrans and its contractors shall allow any NMFS employee(s) or any other person(s) designated by NMFS, to access the work area during the construction period for the purpose of observing monitoring activities, evaluating fish and stream conditions, monitoring performance of aquatic protection measures, monitoring water quality, collecting fish samples, or perform other monitoring/studies. NMFS will notify Caltrans 24 hours prior to planning a site visit and will contact the contractor or other appropriate personnel on-site prior to entering the construction site.

2. The following terms and conditions implement reasonable and prudent measure 2:
   a. All pumps used to divert live streamflow shall be screened and maintained throughout the construction period to comply with NMFS' Fish Screening Criteria for Anadromous Salmonids (NMFS 2011b) (https://repository.library.noaa.gov/view/noaa/23894).

   b. If pumping is necessary to dewater the construction site between the cofferdams, the water shall be discharged to an upland location in a manner that the water does not drain overland back to the stream channel. Pump intakes shall be covered with appropriate sized screening material, complying with currently approved NMFS Fish Screening Criteria (NMFS 2011b) (https://repository.library.noaa.gov/view/noaa/23894), to prevent potential entrainment of fish or amphibians that failed to be removed. The sump and intake shall be checked periodically for fish and other aquatic wildlife.

c. All cofferdams, pumps, pipes and other diversion materials, and any construction debris and materials shall be removed from the stream channel upon work completion and no later than October 31.

d. Construction equipment shall be checked each day prior to work within the stream channel (*i.e.,* top of bank to top of bank) and, if necessary, action shall be taken to prevent fluid leaks. If leaks occur during work in the channel, Caltrans or their contractors shall contain the spill and remove all affected soils.

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

a. Caltrans shall provide 30, 60, 90 and 100 percent design plans for the channel and fish passage features to NMFS for review and comment to ensure the project creates stable and functional fish passage conditions at the SR 29 crossing of Ritchey Creek. Information provided to NMFS shall include the following: plan, profile, cross-sections, hydraulic modeling results, construction methods, and other relevant construction detail drawings of the proposed channel and fish passage design. Caltrans shall provide NMFS a minimum of 60 days to review and develop comments regarding each set of design plans.

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

a. Caltrans shall document as-built conditions with longitudinal and cross-sectional surveys immediately following construction to verify that the Project was constructed as designed and establish baseline conditions to evaluate future changes in channel profile or adjustment after winter storms occur.

b. Caltrans shall develop and implement a five (5) year monitoring plan to assess post-construction hydraulic and geomorphic conditions in Ritchey Creek at the SR 29 bridge. Monitoring shall include channel configuration, water depths, water velocities, and other applicable parameters to ensure the stream channel provides for fish passage as designed over the 5-year monitoring period. The draft monitoring plan shall be submitted to NMFS for review and approval by December 1, 2022.

c. If a persistent, significant impediment to upstream migration of steelhead is identified in the project reach, Caltrans shall develop and implement a plan to remedy the passage impediment so that the steelhead can successfully pass upstream of the SR 29 crossing of Ritchey Creek.

5. The following terms and conditions implement reasonable and prudent measure 5:

a. Caltrans must develop and implement measures to treat post-construction stormwater runoff from the bridge deck to reduce contaminant load entering Ritchey Creek. Measures shall be designed to avoid or minimize direct discharge of road-generated runoff to Ritchey Creek by diverting surface flow through vegetated areas, or similar

features. The proposed stormwater treatment plan shall be provided to NMFS for review and approval at least 120 days prior to the start of Project construction.

b. Structures designed and constructed to treat stormwater runoff shall receive regular long-term maintenance, with a focus on maintenance of the site in the early fall prior to the first rains of the winter season.

6. The following terms and conditions implement reasonable and prudent measure 6:

a. Caltrans shall provide a written report to NMFS by January 15 of the year following construction of the proposed action. The report shall be provided to Daniel Logan at dan.logan@noaa.gov or to NMFS North-Central Coast Office, Attention: San Francisco Bay Branch Chief, 777 Sonoma Avenue, Room 325, Santa Rosa, California, 95404-6528. The report must contain, at a minimum, the following information:

i. Construction Related Activities – The report must include the dates construction began and was completed, a discussion of any unanticipated effects or unanticipated levels of effects on steelhead, 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 steelhead, the number of steelhead 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 steelhead, the number of fish relocated by species, the number of fish injured or killed by species and a brief narrative of the circumstances surrounding steelhead 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.

b. Caltrans shall provide annual written reports to NMFS by January 15 for five (5) years post-construction with the results of channel/fish passage monitoring and vegetation restoration. Reports shall be provided to Daniel Logan at dan.logan@noaa.gov or to NMFS North-Central Coast Office, Attention: San Francisco Bay Branch Chief, 777 Sonoma Avenue, Room 325, Santa Rosa, California, 95404-6528. The reports must contain, at a minimum, the following information:

i. Post-Construction Site Performance – The report shall include a summary of annual monitoring activities performed for Term and Condition 4(b) above, including dates and a description of the locations for each specific monitoring activity with site photographs; a discussion of monitoring results; a review of previous monitoring findings, trends and changes observed; a discussion of assessments conducted with conclusions; a description of and rationale for any adaptive management activities recommended or implemented; and a description

of any problems which may have arisen during the monitoring of post-construction site performance.

ii. Vegetation Restoration Performance – The report shall include a summary of the success of riparian plantings and description of any supplemental riparian replanting to meet success criteria for vegetation restoration.

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).

1. To maximize the efficacy of the restoration efforts and to aid in recovery of steelhead, Caltrans should work collaboratively with the California Department of Parks and Recreation, the California Department of Fish and Wildlife, County of Napa, the Napa County Resource Conservation District, adjacent private landowners, and NMFS to place large wood and rootwad structures into Ritchey Creek to improved instream habitat conditions for steelhead. Implementation of this Conservation Recommendation will address a recovery action for CCC steelhead related to habitat complexity (NpR-CCCS-6.1.1.2) in the Ritchey Creek watershed.

In order for NMFS to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, NMFS requests notification of the implementation of any conservation recommendations. This notification shall be submitted to Daniel Logan at dan.logan@noaa.gov or NMFS Santa Rosa Area Office, Attention: Supervisor of San Francisco Bay Branch, 777 Sonoma Avenue, Room 325, Santa Rosa, California, 95404-6528.

2.11. Reinitiation of Consultation

This concludes formal consultation for the Ritchey Creek Bridge Replacement Project in Napa County, California.

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

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

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

This analysis is based, in part, on the EFH assessment provided by Caltrans and descriptions of EFH for Pacific Coast salmon contained in the fishery management plan developed by the Pacific Fishery Management Council (PFMC 2016) and approved by the Secretary of Commerce.

3.1 Essential Fish Habitat Affected by the Project

The downstream most portion of Ritchey Creek near its confluence with the Napa River contains EFH for Pacific Coast salmon (PFMC 2014), and will be adversely affected by stormwater discharges following construction of the replacement SR 29 bridge crossing of Ritchey Creek primarily during first flush rainfall events.

3.2 Adverse Effects on Essential Fish Habitat

The following actions are expected to adversely affect EFH for Pacific Coast salmon:

- Decreased water quality in Ritchey Creek could result as a consequence of discharges of stormwater from SR 29 and the potential introduction of toxic chemicals. Levels of toxic chemicals are typically higher during first flush events. See sections 2.5.5 and 2.5.6 of the opinion for further detail.

3.3 Essential Fish Habitat Conservation Recommendations

Given that adverse effects to EFH are anticipated, NMFS recommends that Caltrans develop and implement stormwater treatment measures specified in Reasonable and Prudent Measure 5 of the opinion.

Fully implementing the above EFH conservation recommendation would protect, by avoiding or minimizing the adverse effects described in section 3.2, above, for Pacific Coast salmon.

3.4 Statutory Response Requirement

As required by section 305(b)(4)(B) of the MSA, Caltrans must provide a detailed response in writing to NMFS within 30 days after receiving an EFH Conservation Recommendation. Such a response must be provided at least 10 days prior to final approval of the action if the response is inconsistent with any of NMFS' EFH Conservation Recommendations unless NMFS and the Federal agency have agreed to use alternative time frames for the Federal agency response. The response must include a description of the measures proposed by the agency for avoiding, minimizing, mitigating, or otherwise offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the Conservation Recommendations, the Federal agency must explain its reasons for not following the recommendations, including the scientific justification for any disagreements with NMFS over the anticipated effects of the action and the measures needed to avoid, minimize, mitigate, or offset such effects [50 CFR 600.920(k)(1)].

In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, we ask that in your statutory reply to the EFH portion of this consultation, you clearly identify the number of conservation recommendations accepted.

3.5 Supplemental Consultation

Caltrans must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a way that may adversely affect EFH, or if new information becomes available that effects the basis for NMFS' EFH Conservation Recommendations (50 CFR600.920(1)).

4. DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

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

4.5. 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 staff from Caltrans. Other interested users could include the California Department of Parks and Recreation, the County of Napa, the California Department of Fish and Wildlife, the Regional Water Quality Control Board, Napa County Resource Conservation District, citizens within the affected areas, and others interested in the conservation of aquatic and riparian resources. Individual copies of this opinion were provided to Caltrans, the California Department of Parks and Recreation, the California Department of Fish and Wildlife, and the Regional Water Quality

Control Board. The document will be available within two weeks at the NOAA Library Institutional Repository [https://repository.library.noaa.gov/welcome]. The format and naming adhere to conventional standards for style.

4.6. Integrity

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

4.7. Objectivity

Information Product Category: Natural Resource Plan

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

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

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

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

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Personal Communication

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