UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4250

November 4, 2019 **Refer to NMFS No:** WCRO-2019-01914

Karen Holmes
Senior Environmental Planner
Department of Transportation, District 5
50 Higuera Street
San Luis Obispo, California 93401

Re: Endangered Species Act Section 7(a)(2) Revised Biological Opinion for the Old Creek Bridge Replacement Project at SR-1 in San Luis Obispo County (EA 05-0L722)

Dear Ms. Holmes:

Thank you for your letter received July 23, 2019, requesting reinitiation 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 Old Creek Bridge Replacement. The California Department of Transportation (Caltrans) is the lead federal agency as assigned by the Federal Highway Administration, pursuant to 23 USC 327, which became effective March 30, 2017. This consultation was conducted in accordance with the 2019 revised regulations that implement section 7 of the ESA (50 CFR 402, 84 FR 45016).

The biological opinion concludes that the proposed action is not likely to jeopardize the continued existence of the threatened South-Central California Coast Distinct Population Segment of steelhead (*Oncorhynchus mykiss*), or destroy or adversely modify its designated critical habitat. NMFS believes the proposed action is likely to result in incidental take of steelhead, therefore, the attached incidental take statement includes the amount and extent of anticipated incidental take with reasonable and prudent measures and non-discretionary terms and conditions to minimize and monitor incidental take of threatened steelhead.

Please contact Jess Adams at (562) 980-4013 or jessica.adams@noaa.gov if you have a question concerning this consultation, or if you require additional information.

Sincerely,

Alecia Van Atta
Assistant Regional Administrator
California Coastal Office

Enclosure

cc: Copy to ARN File # 151422WCR2017CC00241

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

Old Creek Bridge Replacement

NMFS Consultation Number: WCRO-2019-01914
Action Agency: California Department of Transportation

Table 1. Affected Species and NMFS' Determinations:

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

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

Issued By:

Alecia Van Atta
Assistant Regional Administrator

Date: November 4, 2019

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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.), and implementing regulations at 50 CFR 402.

We completed pre-dissemination review of this document using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (DQA) (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The document will be available within 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' California Coastal Office, Southern California Branch in Long Beach, California.

1.2 Consultation History

The consultation history for the Old Creek Bridge Project (proposed action) is exceedingly long. We will begin describing the consultation history in 2018, which follows NMFS' issuance of a September 25, 2017, biological opinion to Caltrans for the proposed action (NMFS 2017) and related effects pm threatened steelhead (*Oncorhynchus mykiss*) and designated critical habitat for this species. NMFS (2017) includes a description of the consultation history leading to that biological opinion.

On May 31, 2018, NMFS received Caltrans' letter requesting reinitiation of consultation due to the addition of geotechnical drilling to the proposed action. On June 14, 2018, NMFS and Caltrans discussed via teleconference the parameters of the biological opinion and predicted sound levels for the additional activity. Caltrans provided NMFS with more information on June 25, 2018, and NMFS responded on June 26, 2018, with a letter describing expected effects of the additional action and that reinitation was not necessary at that time.

On July 23, 2019, NMFS received Caltrans' letter requesting reinitiation of consultation due to changes in project plans involving placing a gravel pad in the creek instead of dewatering, eliminating pile driving and hydroacoustic monitoring, and increasing the amount of rock-slope protection (RSP) to be installed along the streambanks. NMFS determined it had received the required information regarding the proposed action to begin consultation, which was initiated on the same day. A new biological opinion is required because the changes in project plans causes an effect on the listed species and critical habitat that was not considered in NMFS' biological opinion dated September 25, 2017.

1.3 Proposed Federal Action

"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).

Overview of the Proposed Action: Caltrans proposes to replace the seismically deficient Old Creek Bridge (#49-0070R) along northbound State Route 1 with a cast-in-place or pre-cast concrete bridge (about 187-feet long and 44-feet wide). Construction of the proposed action is expected to be completed in two seasons with all instream work to occur between June 1 and October 31. Best management practices (BMP) are incorporated into the proposed action and will be implemented when bridge-construction activities are undertaken.

Proposed Activities to Prepare the Work Area for Construction: Preparing the work area for the bridge replacement involves building a temporary access road to the creek, removing steelhead from the work area, and creating a gravel pad to facilitate work in the dry.

Removing steelhead will involve installing block nets at the upstream and downstream boundaries of the work space. Caltrans proposes that biologists will enter the work space for the purpose of capturing and then relocating steelhead.

Once steelhead have been removed from the work area, a temporary gravel pad occupying approximately 8,214 ft^2 (0.189 ac) will be installed in Old Creek for the purpose of creating a centralized work platform in the dry. To create the gravel pad, nonwoven geotextile fabric will be installed across the creek bottom. Straw-filled gabions will be installed within the limits of the block nets across the creek to minimize transferring muddy upstream waters downstream, and then the block nets will be removed. Surface water will be contained in pipes under the gravel pad for release to the creek on the downstream side of the downstream-most gabion. Gravel fill will be slowly added on top of the geotextile fabric between the gabions, temporarily filling the work area to an elevation above the ordinary high water mark (OHWM).

Upon completion of the proposed action and construction activities, the gravel used to construct the work pad will be removed, the geotextile fabric, gabions, and pass-through pipes will be completely removed, and the creekbed will be returned to pre-construction conditions.

The following measures will be undertaken to minimize take of steelhead and adverse effects to aquatic habitat during the gravel pad installation process and subsequent construction activities:

- A biologist will be retained with experience in steelhead biology and ecology, aquatic habitats, biological monitoring, and capture, handling, and relocating fish species.
- The biologist will continuously monitor the placement of the temporary gravel work pad and its associated infrastructure in order to capture and relocate any stranded steelhead.
- The biologist shall capture and relocate stranded steelhead to suitable instream habitat upstream or downstream of the work area, using block nets, seine-netting, dip-netting, and providing aerated water in buckets for transport and ensuring adequate water temperatures during transport.
- The biologist shall note the number of steelhead observed in the affected area, the number of steelhead relocated, and the date and time of the collection and relocation.

- If pumps are utilized, water will be released to a settling basin to allow suspended sediment to settle out prior to re-entering the creek and intakes will be screened with no larger than 3/32-inch (2.38 mm) wire mesh to prevent steelhead from entering the pump system.
- The dismantling of the temporary gravel work pad and its associated infrastructure will be conducted in a manner that will minimize potential impacts to water quality.

Proposed Construction Activities: After the gravel pad is installed Caltrans will begin demolition of the existing bridge. Caltrans will install a pre-cast or cast-in-place concrete bridge supported by 48-inch diameter cast-in-drill hole (CIDH) piles. A total of 8 steel-pile casings will be installed within the streambed of Old Creek. Each CIDH pile may take approximately 16 days to install, followed by another 42 days for testing, column construction, bent cap construction, and bent cap curing. No pile driving will be used. Falsework will be placed on the gravel pad to construct the concrete bridge deck and the CIDH piles will be installed through the gravel pad. Existing sacked-concrete slope protection under the bridge will be removed and replaced with ¼ ton RSP. Additional RSP will be installed to accommodate 100-year storm flows and will result in approximately 400 ft^2 of additional RSP below the OHWM. The following measures will be undertaken to minimize adverse effects to aquatic habitat during construction activities.

- BMP (e.g., fiber rolls) will be maintained throughout the construction period to minimize erosion and sedimentation of the disturbed sections of the work area.
- All trash and construction debris will be removed from the worksite.
- Spill prevention and cleanup materials will be kept on-site and hazardous material spills within the project site will be cleaned immediately.
- All vehicle and equipment maintenance, cleaning, and refueling will occur in a staging area at least 100-feet away from aquatic areas.
- Creekbed contours shall be returned to their original condition.
- From the gravel working pad, necessary excavations to construct the new bridge will use roll off bins to contain and dewater excavated materials, replacing the bins as necessary when full of soil and rock. The water from the bins may be allowed to drain onto the gravel pad returning to the creek.
- A low flow channel may be cut into the gravel pad when a significant rainfall runoff event is forecast. No equipment will be stored overnight on the gravel working pad during a storm or runoff event (greater than 40% chance of forecasted rain).

Proposed Post-Construction Activities: Following construction of the proposed action, Caltrans proposes to implement a mitigation and monitoring plan (MMP) that includes planting native plant species. The MMP provides Caltrans' approach for the replacement of riparian habitat temporarily and permanently lost as a result of the proposed action. Temporary and permanent impacts will be mitigated at ratio of 1:1 and 3:1, respectively. A monitoring plan has been proposed by Caltrans to ensure biological resources are restored, but has not yet been provided.

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 non-discretionary 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 "to jeopardize the continued existence of" a listed species, which is "to engage in an action that 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 for the conservation of a listed species" (50 CFR 402.02).

The designation of critical habitat for threatened steelhead use 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 2019 regulations define effects of the action using the term "consequences" (50 CFR 402.02). As explained in the preamble to the regulations (84 FR 44977), that definition does not change the scope of our analysis and in this opinion we use the terms "effects" and "consequences" interchangeably.

Updates to the regulations governing interagency consultation (50 CFR part 402) were effective on October 28, 2019 [84 FR 44976]. This consultation was pending at that time, and we are applying the updated regulations to the consultation. As the preamble to the final rule adopting the regulations noted, "[t]his final rule does not lower or raise the bar on section 7 consultations, and it does not alter what is required or analyzed during a consultation. Instead, it improves clarity and consistency, streamlines consultations, and codifies existing practice." We have reviewed the information and analyses relied upon to complete this biological opinion in light of the updated regulations and conclude the opinion is fully consistent with the updated regulations.

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

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

2.2 Rangewide Status of the Species and Critical Habitat

This opinion examines the status of the threatened South Central California Coast (SCCC) Distinct Population Segment (DPS) f steelhead 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' current "reproduction, numbers, or distribution" as described in 50 CFR 402.02. 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 current function of the essential PBFs that help to form that conservation value.

2.2.1 Status of the Species

The threatened SCCC DPS of steelhead occupies rivers from the Pajaro River, Santa Cruz County, south to but not including the Santa Maria River, in Santa Barbara County. The decline of the species prompted listing of the SCCC DPS of steelhead as threatened on 18 August 1997 (62 FR 43937) and a revised listing on January 5, 2006 (71 FR 834). The status of the SCCC steelhead populations was assessed by NMFS' Biological Review Team (BRT) in 1996 (Busby et al.), 2005 (Good et al.), 2011 (Williams et al.), and 2016 (NMFS). Abundance of adult steelhead in the SCCC DPS declined from a historical high abundance of 25,000 returning adults, to an estimate of 4,750 adults in 1965 for five river systems (Pajaro, Salinas, Carmel, Little Sur, and Big Sur), to fewer than 500 adults currently (Boughton and Fish 2003; Good et al. 2005; Helmbrecht and Boughton 2005; Williams et al. 2011).

As part of the assessment and listing of SCCC steelhead, NMFS convened the BRT composed of an expert panel of scientists. The BRT evaluated the viability and extinction risk of naturally spawning populations within each DPS. The BRT found high risks to abundance, productivity, and the diversity of the SCCC DPS and expressed particular concern for the DPS's connectivity

and spatial structure. NMFS' latest 5-year status review for the South-Central California Coast DPS of steelhead states the following:

> "The extended drought and drying conditions associated with projected climate change has the potential to cause local extinction of *O. mykiss* populations and thus reduce the genetic diversity of fish within the South-Central California Coast Steelhead Recovery Planning Area." (p. 55, NMFS 2016)

Moreover, NMFS' recent assessment of viability for steelhead provides an indication that the South Central California Coast Steelhead DPS may be currently experiencing an increased extinction risk (Williams et al. 2016).

2.2.1.1 General Life History of Steelhead

O. mykiss possesses an exceedingly complex life history (Behnke 1992). Distinctly different than other Pacific salmon, steelhead adults can survive their first spawning and return to the ocean to reside until the next year to reproduce again. For returning adults, the specific timing of spawning can vary by a month or more among rivers or streams within a region, occurring in winter and early spring. The spawning time frames depend on physical factors such as the magnitude and duration of instream flows and sand-bar breaching. Once they reach their spawning grounds, females will use their caudal fin to excavate a nest (redd) in streambed gravels where they deposit their eggs. Males will then fertilize the eggs and, afterwards, the females cover the redd with a layer of gravel, where the embryos (alevins) incubate within the gravel. Hatching time can vary from approximately three weeks to two months depending on surrounding water temperature. The young fish (fry) emerge from the redd two to six weeks after hatching. As steelhead begin to mature, juveniles or "parr" will rear in freshwater streams anywhere from 1-3 years. Juvenile steelhead can also rear in seasonal coastal lagoons or estuaries of their natal creek, providing over-summering habitat.

Juvenile steelhead emigrate to the ocean (as smolts) usually in late winter and spring and grow to reach maturity at age 2-4, but steelhead can reside in the ocean for an additional 2-3 years before returning to spawn. The timing of emigration is influenced by a variety of parameters such as photoperiod, temperature, breaching of sandbars at the river's mouth and streamflow. Extended droughts can cause juveniles to become landlocked, unable to reach the ocean (Boughton et al. 2006).

Through studying the otolith (ear stone) microchemistry of *O. mykiss*, researchers further understand the complex and intricate life history of steelhead. Specifically, resident rainbow trout can produce steelhead progeny; likewise, steelhead can yield resident rainbow trout progeny (Zimmerman and Reeves 2000). Additionally, evidence indicates that sequestered populations of steelhead (e.g., above introduced migration barriers) can exhibit traits that are the same or similar to anadromous specimens with access to the ocean. Examples include inland resident fish exhibiting smolting characteristics and river systems producing smolts with no regular access for adult steelhead. This evidence suggests the ecological importance of the resident form to the viability of steelhead and the need to reconnect populations upstream and downstream of introduced migration barriers. The loss or reduction in anadromy and migration of juvenile steelhead to the estuary or ocean is expected to reduce gene flow, which strongly

influences population diversity (McElhany et al. 2000). Evidence indicates genetic diversity in populations of southern California steelhead is low (Girman and Garza 2006).

2.2.1.2 Steelhead Habitat Requirements

Habitat requirements of steelhead generally depend on the life history stage. Steelhead encounter several distinct habitats during their life cycle. Water discharge, water temperature, and water chemistry must be appropriate for adult and juvenile migration. Suitable water depth and velocity, and substrate composition are the primary requirements for spawning. Furthermore, dissolved oxygen concentration, pH, and water temperature are factors affecting survival of incubating embryos. The presence of interspatial spaces between large substrate particle types is important for maintaining water-flow through the nest as well as dissolved oxygen levels within the nest. These spaces can become filled with fine sediment, sand, and other small particles. Additionally, juveniles need abundant food sources, including insects, crustaceans, and other small fish. Habitat must also provide places to hide from predators, such as under logs, root wads and boulders in the stream, and beneath overhanging vegetation. Steelhead also need places to seek refuge from periodic high-flow events (side channels and off channel areas), and may occasionally benefit from the availability of cold-water springs or seeps and deep pools during summer. Estuarine habitats can be utilized during the seaward migration of steelhead, as these habitats have been shown to be nurseries for steelhead. Estuarine or lagoon habitats can vary significantly in their physical characteristics from one another, but remain an important habitat requirement as physiology begins to change while juvenile steelhead become acclimated to a saltwater environment.

2.2.1.3 Influence of a Changing Climate on the Species

Climate-driven changes to stream, estuarine and marine have the potential to significantly impact steelhead populations. Coupled with naturally stressful environments at the southern limit of the species distribution, multiple stressors are likely to be amplified by ongoing increases in temperature, changes in precipitation patterns, and decreases in snowpack (Mote et al. 2003; Hayhoe et al. 2004). Research suggests that a change in climate would be expected to shift species distributions as they expand in newly favorable areas and decline in marginal habitats (Kelly and Goulden 2008). When climate interacts with other stressors such as habitat fragmentation, additional threats to natural resources will likely emerge (McCarty 2001), including threats to the viability of steelhead populations. In particular, seasonal access to perennial, cool water habitats, especially smaller streams at higher elevations, will likely become more important to listed salmonids seeking refuge from unsuitable temperature and streamflow (Crozier et al. 2008).

World-wide CO_2 levels from human activities (*e.g.*, fossil fuel use) have been steadily increasing. Climate scientists have documented increases in global temperatures and predict continued increases (IPCC 2007). This warming is affecting large-scale atmospheric circulation patterns (Dettinger and Cayan 1995), and it is impacting climate at global, regional, and local scales (Zwiers and Zhang 2003; Cayan et al. 2008). Climate change is occurring and is accelerating (Battin et al. 2007; IPCC 2007).

Environmental monitoring data in the southwestern United States indicate changes in climatic trends that have the potential to affect steelhead life history strategy and habitat requirements.

The southwest U.S. average annual temperature is projected to rise approximately 4° F to 10° F over the region by the end of the century (USGCRP 2009). Southern California is also experiencing an increasing trend in droughts, measured by the Palmer Drought Severity Index from 1958 to 2007 (USGCRP 2009). Snyder and Sloan (2005) project mean annual precipitation in central western California will decrease by about 3-percent by the end of the century. Small thermal increases in summer water temperatures have resulted in suboptimal or lethal conditions and consequent reductions in *O. mykiss* distribution and abundance in the northwestern United States (Ebersole et al. 2001). Thus, climate variability will likely be an important factor in evaluating how the *Status of the Species* is influenced by changing climate.

Wildfire frequency, intensity, and extent are all important parameters to consider when considering a changing climate and associated impacts to steelhead and their habitat. Changes in vegetation communities for this region will likely include increases in the amount of grassland and decreases in most other major vegetation communities (*e.g.*, chaparral, riparian woodland). Based on a wildfire risk assessment in southern California, it was determined that the probability of large (>200-ha) fires ranges from a decrease of 29 to an increase of 28-percent (Westerling and Bryant 2008). The variation in range is due to the type of model used to make forecasts. Wildfires can have long-term benefits for fish habitat (such as producing influxes of spawning gravels to the stream), but in the short-term they can be catastrophic due to accumulation of fine sediment that negatively affects spawning, foraging and depth refugia (Boughton et al. 2007). Many of the foregoing climatic trends are likely to further degrade steelhead over-summering habitat in southern California by reducing stream flows and raising stream temperatures (Katz et al. 2013). Impacts to steelhead may result in increased thermal stress even though this species has shown to tolerate higher water temperatures than preferred by the species as a whole (Spina 2007). Conservation of existing steelhead populations will rely on identifying and providing unimpeded passage to the highest quality over-summering and spawning habitats which are expected to buffer habitat against changing climatic and hydrologic conditions. Habitat connectivity becomes as important as habitat quantity and quality when populations decrease and habitat is fragmented (Isaak et al. 2007).

2.2.2 Designated Critical Habitat

Critical habitat for the SCCC DPS of steelhead was designated on September 2, 2005, and consists of the stream channels listed in (70 FR 52488). Critical habitat has a lateral extent defined as the width of the channel delineated by the ordinary high-water line as defined by the Corps in 33 CFR 329.11, or by its bankfull elevation, which is the discharge level on the streambank that has a recurrence interval of approximately 2 years (70 FR 52522). PBFs are components of stream habitat that have been determined to be essential for the conservation of the SCCC DPS of steelhead, and are specific habitat components that support one or more steelhead life stages and in turn contain physical or biological features essential to steelhead survival, growth, and reproduction, and conservation. These include:

1) Freshwater spawning sites with sufficient water quantity and quality and adequate accumulations of substrate (i.e., spawning gravels of appropriate sizes) to support spawning, incubation and larval development.

2) Freshwater rearing sites with sufficient water quantity and floodplain connectivity to

form and maintain physical habitat conditions and allow salmonid development and mobility; sufficient water quality and forage to support juvenile development; and natural cover such as shade, submerged and overhanging large wood, log jams, beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.

3) Freshwater migration corridors free of obstruction 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.

4) Estuarine areas that provide uncontaminated water and substrates; food and nutrient sources to support steelhead growth and development; and connected shallow water areas and wetlands to cover and shelter juveniles.

5) Marine areas with sufficient water quality to support salmonid growth, development, and mobility; food and nutrient resources such as marine invertebrates and forage fish; and near-shore marine habitats with adequate depth, cover, and marine vegetation to provide cover and shelter.

Designated critical habitat for the SCCC DPS includes 1,249-miles of stream habitat and 3-square miles of estuary habitat within Monterey, San Benito, Santa Clara, Santa Cruz, and San Luis Obispo counties from the Pajaro River Hydrologic Sub-area south to the Estero Bay Hydrologic Unit (to but not including the Santa Maria River Hydrologic Unit). There are 30 occupied hydrologic sub-unit watersheds within the freshwater and estuarine range of the DPS. Critical habitat has a lateral extent as defined by the bankfull discharge, also known as a 2-year flood event.

2.2.2.1 Status of Designated Critical Habitat

Streams designated as critical habitat in the SCCC DPS have the above PBF attributes to varying degrees, depending on the stream location and the impacts associated with the watershed. NMFS' most recent status reviews for SCCC steelhead (NMFS 2016) identified habitat destruction and degradation as serious ongoing risk factors for this DPS. Urban development, flood control, water development, and other anthropogenic factors have adversely affected the proper functioning and condition of some spawning, rearing, and migratory habitats in streams designated as critical habitat. Urbanization has resulted in some permanent impacts to steelhead critical habitat due to stream channelization, increased bank erosion, riparian damage, migration barriers, and pollution (NMFS 2016). Many streams within the DPS have dams and reservoirs that reduce the magnitude and duration of flushing stream flows, withhold or reduce water levels suitable for fish passage and rearing, physically block upstream fish passage, and retain valuable coarse sediments for spawning and rearing. In addition, some stream reaches within the DPS' designated critical habitat may be vulnerable to further perturbation resulting from poor land use and management decisions.

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 includes the linear extent (upstream and downstream) of the Old Creek Bridge along southbound State Route 1 at Old Creek and encompasses the riparian corridor to the top of bank. The action area extends from the upstream-most end of the temporary gravel pad and about 500 feet downstream of the downstream end of the gravel pad where temporary sedimentation effects due to the proposed action are anticipated to cease. The approximate length of Old Creek within the action area is about 700 feet.

2.4 Environmental Baseline

The "environmental baseline" refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultations, and the impact of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline (50 CFR 402.02).

2.4.1 Status of Steelhead in the Action Area

Although no estimate of total steelhead abundance in Old Creek is available, there is anecdotal information confirming historical presence of steelhead within the creek (Caltrans 2017). Existing environmental characteristics and conditions, including the presence and ongoing operation of Whale Rock Dam, preclude the establishment of a viable population of steelhead in Old Creek. However, adult steelhead may enter Old Creek during periods of surface flow that occur when water is spilled from the dam. In 1998, a steelhead survey was performed when Whale Rock Reservoir spilled and 37 young-of-the-year steelhead were observed immediately upstream of the SR-1 Bridge (URS 2006). NMFS estimates that up to 50 juvenile steelhead may be present in the action area. Adult steelhead are not expected to be present within the action area during the time of construction activities (June 1 to October 31).

2.4.2 Status of Critical Habitat in the Action Area

Aquatic habitat within the action area consists of glides, pools, and short-riffles. The active channel within the action area is approximately 30 to 60-feet wide and the banks underneath the bridge are lined with sacked concrete slope protection. Riparian vegetation within the action area mainly consists of arroyo willow, *Salix lasiolepis* and western sycamore, *Platanus racemosa*. Old Creek appears to have surface flow only during exceptionally wet years when Whale Rock Dam spills, however a few perennial pools exist in the vicinity of the Old Creek Bridge. Overhanging branches and emergent freshwater marsh species provide instream cover within the action area. Within the action area, it is estimated that there is spawning gravel available for only 9 spawning pairs of steelhead (URS 2006), though this observation is probably an effect of the dam on creek geomorphology. Overall the PBFs of critical habitat for juvenile steelhead rearing (i.e., natural cover, shelter, water quality/quantity, and riparian) exist within the action area. The PBFs for spawning habitat in the action area are degraded based on the lack of suitable substrate, no doubt a geomorphic effect of the dam. In the action area, the threat to SCCC steelhead from

climate change is likely to include a continued increase in summer air temperatures, more extreme heat waves, and an increased frequency in drought (McClure et al. 2003). Finally, the PBFs for migration are considered suitable through the action area, as there is no obvious barrier to adult or juvenile steelhead migration downstream of the dam.

2.4.3 Factors Affecting Species Environment in the Action Area and Vicinity

2.4.3.1 Road Encroachment

Highway 1 traverses the creek and a few residential developments exist along the west streambank within the action area. The location of the roads and homes likely results in runoff from the road surfaces entering the creek during rainstorms, and a related reduction in water quality within the action area to an unknown degree. Runoff from road surfaces can contain dirt, oils, automotive fluids, and petro chemicals that are harmful to aquatic life, including steelhead (Spence et al. 1996). Road and the limited urban development located along the creek within the action area have contributed to the confinement of the stream channel and diminished the breadth of riparian vegetation.

2.4.3.2 Agricultural Development

Cultivated fields and open farmlands are located upstream of the action area on Old Creek. Agricultural conversions of floodplains are recurring sources of threats to instream habitat. There is potential for increased turbidity or nutrient loading due to runoff from agriculture areas adjacent to the creek. High turbidity concentrations can cause fish mortality, reduce fish feeding efficiency and decrease food availability (Berg and Northcote 1985; McLeay et al. 1987; Gregory and Northcote 1993; Velagic 1995). Agricultural runoff can transfer nutrients and pesticides to the creek, which can in turn lower dissolved oxygen levels by increasing algae growth in streams and decreasing forage for steelhead (Spence et al. 1996).

2.4.3.3 Operation of Whale Rock Dam

Located upstream of the action area, Whale Rock Dam is operated to supply water for municipal and agricultural users. Water-regulating activities outside of the action area influence the current habitat characteristics and conditions within the action area. Effects to steelhead and critical habitat from these activities include alteration of the natural pattern and magnitude of flows, and redirecting flows outside of the natural waterway course, and loss and degradation of habitat from regulated flow releases. Water spills when Whale Rock Dam fills to maximum capacity, however the dam has not spilled since 2004/2005 and has only spilled 12 times since it was built in 1961 (URS 2006). Inconsistent surface flow and effects of the dam have, among other impacts, resulted in a narrow channel lacking complexity and hydrologic connectivity.

In addition, Whale Rock Dam prevents upstream steelhead passage and thereby reduces opportunities for steelhead to access historical spawning and rearing areas higher in the watershed. As a result, overall steelhead productivity and rearing capacity has been reduced, decreasing the viability of the steelhead population in Old Creek including the action area.

2.5 Effects of the Action

Under the ESA, "effects of the action" are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. 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 50 CFR 402.17(a) and (b).

2.5.1 Effects of the Action on Critical Habitat

2.5.1.1 Temporarily Altering Aquatic Habitat

Installing the gravel pad in the work area is expected to temporarily prevent about 200ft of Old Creek from serving as a freshwater rearing area and freshwater migration area for threatened steelhead for up to four months, over the two years of construction, during the dry season (June 1 through October 31). The temporary loss of habitat is expected to have at least a few consequences, described as follows.

The temporary loss of habitat is expected to translate into temporary loss of aquatic macroinvertebrate forage within the action area. Aquatic insects provide a source of food for instream fish populations and may represent a substantial portion of food items consumed by juvenile steelhead. Effects to aquatic macroinvertebrates resulting from the presence of the gravel pad and related infrastructure will be temporary because construction activities will be temporary, and rapid recolonization (about one to two months) of the restored channel area by macroinvertebrates is expected following removal of the gravel pad (Cushman 1985; Thomas 1985; Harvey 1986). Only a discrete section of the creek will be occupied by the gravel pad and aquatic insects in reaches of the creek upstream and downstream of the action area are no doubt exceedingly abundant. In addition, the effect of macroinvertebrate loss as a food source is expected to be negligible because food from upstream sources would be available downstream of the gravel pad area via drift. Consequently, the temporary loss of aquatic macroinvertebrates as a result of the presence of the gravel pad and structures is not expected to adversely affect forage opportunities within the area.

The temporary loss of habitat due to installation and maintenance of the gravel pad represents an adverse effect to designated critical habitat for steelhead, for at least a few reasons. First, the loss of habitat translates into a loss of a freshwater migration corridor and freshwater rearing area, which are essential for the growth and survival of juvenile steelhead (the life stage expected to be present at the time the proposed action is implemented). Without freshwater rearing areas and freshwater migration corridors, the habitat cannot fulfill the intended conservation role for the species. Second, the quality and availability of designated critical habitat in the action area has already been diminished and reduced due to a number of anthropogenic factors. Therefore, the loss of habitat due to the gravel pad represents further loss of habitat. However, the area impacted by the gravel pad is relatively small compared to the amount and extent of critical habitat available elsewhere in Old Creek and, perhaps more importantly, the gravel pad will be removed following completion of the proposed action and the creekbed will be restored to pre-

project conditions. Freshwater rearing areas and freshwater migration corridors upstream and downstream of the action area will be unaffected by the proposed action and, therefore, continue providing the intended conservation role for the species. Overall, the loss of aquatic habitat associated with the gravel pad will be temporary, and no long-term diminishment is anticipated from the proposed action in the physical capacity of the habitat to serve the intended functional role for steelhead.

2.5.1.2 Disturbance to the Creekbed

Although manipulation and disturbance of the creekbed can result in changes to channel morphology and hydraulic conditions that may create impediments to steelhead migration or alter juvenile rearing conditions, review of the proposed action indicates the footprint and alignment of the new bridge are not expected to result in any substantive changes to channel morphology. Removal of the existing bridge includes a reduction in the number of pilings, which is expected to promote a more natural and unimpeded flow through this section of stream. As a result steelhead-migration conditions through this reach are expected to improve. The increase of RSP on the streambanks below the OHWM will result in a loss of 400 ft^2 of designated critical habitat. The existing rearing conditions are expected to remain the same because the proposed grading of the streambed is expected to retain the existing substrate size, slope and thalweg. Therefore, the small, discrete loss of critical habitat located along the creekbanks is not expected to diminish the overall functional value of rearing habitat within the action area. Based on these findings, the proposed action is not anticipated to appreciably reduce the functional value of the action areas as sites of freshwater migration or rearing.

2.5.1.3 Alteration of Water Quality

NMFS does not expect acute or chronic effects on aquatic habitat or steelhead in Old Creek because increases in sedimentation and turbidity levels resulting from construction activities are expected to be minimal and temporary, for a few reasons. First, the proposed action includes a number of sediment and erosion-control measures to reduce the likelihood that sediment would be introduced to the wetted area. These measures involve straw-gabions, straw-fiber rolls, silt-fencing, hay bales, settling basins, and filter bag, which will be installed prior to the beginning of construction activities would be expected to minimize the effects of sedimentation and turbidity on water quality. Second, the success of these measures has been documented during other similar projects (J. Ogawa, NMFS, 2019, personal communication). NMFS expects that the disturbance on the streambanks will not result in increases in sedimentation or turbidity concentrations that would adversely affect designated critical habitat.

Although the proposed action has the potential for temporary chemical contamination of Old Creek from machinery (e.g., fuels, oils, etc.) and drilling mud, such contamination is discountable due to BMPs. For instance, the BMPs require that all equipment is free of leaks, and that refueling, maintenance, and staging occur at least 100-feet from the creek. Additionally, the BMPs require all hazardous material spills be cleaned up immediately.

2.5.1.4 Disturbance to Streamside Vegetation

The proposed action has the potential to temporarily cause a discrete loss of some shade and cover along Old Creek. This loss has the potential to translate into increased water temperatures

(Mitchell 1999; Opperman and Merenlender 2004) and decreased water quality (Lowrance et al. 1985; Welsch 1991). However, the loss of vegetation as a result of the proposed action is expected to be confined to a small localized area and temporary, because riparian vegetation will be replanted throughout the disturbed areas to minimize impacts from project construction. Based on NMFS' experience observing the response of riparian vegetation to human-made disturbances (J. Ogawa, NMFS 2019, personal communication), the riparian zone is expected to recover from the project one to two years following the completion of construction. Although Caltrans proposes to monitor replanted areas within the action area following completion of the project, the proposed action does not include a provision to notify NMFS of the success of the proposed plantings over time. Overall, the small amount of riparian vegetation temporarily affected by the proposed action is not expected to diminish the overall functional value of the migratory corridor and rearing site within the action area.

2.5.2 Effects of the Action on Threatened Steelhead

The expected effects of the action on threatened steelhead are related to the proposed installation of a temporary gravel pad in Old Creek within the action area to facilitate construction on a dry work platform. Although a general work window is proposed, there is no clear proposed reporting to keep NMFS up to date on actual construction time frames and effects to steelhead. What follows is a discussion of these effects, including discussion of the expected effects due to the proposed capture and relocation of steelhead.

Although the installation of the temporary gravel pad has the potential to harm or kill rearing juvenile steelhead, the proposed action includes precautions to reduce the likelihood of harm and mortality to juvenile steelhead within the gravel pad area. Prior to creating the gravel pad, the workspace will be isolated with block-nets and then biologists will capture and relocate steelhead to the nearest suitable habitat upstream or downstream of the work space, though suitable habitat is not described by Caltrans. Sites selected for relocating juvenile steelhead should have ample habitat, but relocated fish may compete with other fish, potentially increasing competition for available food and habitat (Keeley 2003). Stress from crowding, including increased competition for food among juvenile steelhead in the relocation areas, is expected to be temporary, because when the proposed action is finished steelhead will be able to colonize the area that had been harboring the gravel pad. The proposed action does not include a description of how suitable relocation sites would be identified or evaluated, or a provision to address the potential effects of crowding on steelhead.

In the event one or more steelhead are missed by the biologists and stranded in the area where the temporary gravel pad will be created, steelhead mortality is likely. However, Caltrans proposes that biologists will be approved by NMFS, and will continuously monitor the placement of the temporary gravel work pad and its associated infrastructure in order to capture and relocate any stranded steelhead. Although Caltrans will document the capture and relocation of juvenile steelhead within the gravel pad installation area, the proposed action does not include a provision to notify NMFS of the number of steelhead that may be harmed or injured as a result of the proposed action.

The temporary loss of habitat owing to the gravel pad could translates into an adverse effects on juvenile steelhead, chiefly through the short-term loss of a freshwater rearing area and

displacement of steelhead, presuming presence of this species. This could increase densities of steelhead in neighboring reaches of the creek outside the action area. However, based on our observations of the creek upstream and downstream of the action area, and our general familiarity of steelhead abundance, we anticipate that freshwater rearing areas exist in sufficient abundance outside the action area to support displaced juvenile steelhead, without causing crowding. In addition, the pipes underneath the gravel pad will allow steelhead movement between habitats upstream and downstream of the gravel pad, which appear to be similar quality as the affected area. The gravel pad would be removed and the site restored to pre-project conditions following completion of the proposed action. Overall, we anticipate the presence of the temporary gravel pad would affect only a small number of steelhead for a relatively short period of time during two dry seasons, with the effect primarily limited to an increased potential for crowding in neighboring reaches.

The effect of macroinvertebrate loss on juvenile steelhead is expected to be negligible because food from upstream sources would be available downstream of the gravel pad area via drift. Consequently, the temporary loss of aquatic macroinvertebrates as a result of the presence of the gravel pad and structures is not expected to adversely affect steelhead

Based on steelhead survey results and anecdotal observations of juvenile steelhead in the vicinity of the action area on Old Creek, NMFS expects no more than 50 juvenile steelhead will need to be relocated from the gravel pad installation area each construction season (no more than 100 juveniles over two seasons). NMFS expects that 5 juvenile steelhead may be injured or killed as a result of the proposed action (no more than 10 juveniles over two construction seasons). This estimated mortality is based on NMFS' experience and knowledge gained on similar projects in San Luis Obispo County during the last several years. Based on NMFS' general familiarity of steelhead abundance in south-central California in general, and San Luis Obispo County streams in particular, the anticipated number of juvenile steelhead that may be injured or killed as a result of the proposed action is likely to represent a small fraction of the overall watershed-specific populations and the entire SCCC DPS of threatened steelhead. Therefore, the effects of the relocation on steelhead are not expected to give rise to population-level effects.

Additionally, take of steelhead is expected as a result of installing the gravel pad. It is not practical to quantify or track the amount or number of individuals that are expected to be incidentally taken as a result of the gravel pad placement due to difficulty in observing injured or dead fish. However, it is possible to estimate the extent of incidental take by designating ecological surrogates, and it is practical to quantify and monitor the surrogates to determine the extent of incidental take that is occurring. The most appropriate threshold for incidental take is an ecological surrogate of temporary habitat disturbance expected to occur during installation of the gravel pad. NMFS anticipates incidental take will be in the form of temporary loss and degradation of riparian and river channel habitat, as well as injury or death of steelhead within up to 8,300 ft^2 occupied by the gravel pad.

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). 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).

NMFS is generally familiar with activities occurring in the action area, and at this time is unaware of such actions that would be reasonably certain to occur. Consequently, no cumulative effects are likely, beyond the continuing effects of present land uses that are reasonably certain to occur into the future.

2.7 Integration and Synthesis

The Integration and Synthesis section is the final step in our assessment of the risk posed to species and critical habitat as a result of implementing the proposed action. 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 diminishes the value of designated or proposed critical habitat for the conservation of the species.

Juvenile steelhead are expected to be present in the action area during the time the proposed action will be implemented and, therefore, subject to effects of the proposed action. The main risk to individual steelhead involves effects due to capture and relocation. The adverse effects include potential injury or mortality during the process of capture and relocation during gravel pad installation activities, but precautions are in place to minimize, if not eliminate, the risk of injury and mortality, and adjacent instream habitats are expected to suitably harbor the relocated steelhead. The expected effects associated with the habitat alteration due to gravel-pad placement will be short lived and localized.

Based on steelhead surveys and observations described in the environmental baseline section, NMFS concludes non-lethal take of no more than 50 juvenile steelhead that may be captured and relocated each construction season as a result of gravel pad placement within the action area (no more than 100 juveniles over two seasons), with a potential lethal take of no more than 5 out of the 50 (total of 10 of the 100 individuals), thus the risk of mortality is low. Any juvenile steelhead present in the action area likely make up a small proportion of the SCCC DPS of steelhead.

Overall, the impacts to critical habitat are expected to be temporary and not translate into a reduction in the functional value of the habitat in the long term. The replanted areas are expected to create a functional riparian zone that provides cover for steelhead within the action area of Old

Creek. Additionally, the MMP will provide sufficient mitigation and enhancement of sensitive habitats to mitigate for permanent loss due to the proposed action. The impacts from disturbing the streambed are not expected to adversely affect the quality or quantity of aquatic habitat; rather, the proposed action is expected to maintain steelhead passage and rearing conditions in the localized area. Maintained passage conditions and rearing habitat are expected to favor the viability of the threatened SCCC DPS of steelhead and avoids reducing the value of critical habitat for the species within the action area of Old Creek.

The action area could be subject to higher average summer temperatures and lower precipitation levels in the future as a result of climate change, which would lead to warmer creek temperatures. Reductions in the amount of precipitation would reduce the amount and extent of flow. For this project, the above effects of climate change are unlikely to be detected by the time construction is completed. The short-term effects of the proposed action would have completely elapsed prior to these climate change effects. The long-term changes in the channel at the bridge sites are confined to small areas and are unlikely to significantly magnify the likely climate change impacts.

2.8 Conclusion

After reviewing and analyzing the current status of the listed species and critical habitat, the environmental baseline within the action area, the effects of the proposed action, any effects of 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 the threatened SCCC DPS of 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). "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: All steelhead in the action area, expected to be no more than 50 juveniles that are captured or harassed during project activities each construction season (100 juvenile steelhead total). No more than 5 juvenile steelhead are expected to be injured or killed as a result of gravel pad placement in the action area and relocating the species each construction season (10 juvenile

steelhead total). No other incidental take is anticipated as a result of the proposed action. The accompanying biological opinion does not anticipate any form of take that is not incidental to the proposed action.

2.9.2 Effect of the Take

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

2.9.3 Reasonable and Prudent Measures

"Reasonable and prudent measures" are 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 and monitor incidental take of steelhead. The results of the analysis provide the basis for the following reasonable and prudent measures:

1. Avoid and minimize harm and mortality of steelhead during relocation and gravel placement activities.

2. Avoid and minimize impacts to steelhead and designated critical habitat from construction activities.

3. Prepare and submit a post-construction report regarding the effects of fish relocation and construction activities.

2.9.4 Terms and Conditions

The terms and conditions described below are non-discretionary, and Caltrans or any applicant must comply with them in order to implement the RPMs (50 CFR 402.14). Caltrans or any applicant has a continuing duty to monitor the impacts of incidental take and must report the progress of the action and its impact on the species as specified in this ITS (50 CFR 402.14). If the entity to whom a term and condition is directed does not comply with the following terms and conditions, protective coverage for the proposed action would likely lapse.

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

    a. Caltrans' biologist shall identify and evaluate the suitability of steelhead relocation habitat(s) prior to undertaking the gravel-pad installation activities that are required to create a work area within the creek. The biologist shall evaluate potential relocation sites based on attributes such as adequate water quality (a minimum dissolved oxygen level of 5 mg/L and suitable water temperature), cover (instream and over-hanging vegetation or woody debris), and living space. Multiple relocation habitats may be necessary to prevent overcrowding of a single habitat depending on the number of steelhead captured, current number of steelhead already occupying the relocation habitat(s), and the size of the receiving habitat(s). One or more of the following methods shall be used to capture steelhead: seine, dip net, minnow trap, or by hand.

b. Captured salmonids will be relocated as soon as possible to an instream location in which suitable habitat conditions are present to allow for adequate survival for transported fish and fish already present. Fish will be distributed between multiple pools if biologists judge that overcrowding may occur in a single pool.

c. Caltrans' shall contact NMFS (Jess Adams, 562-980-4013) immediately if one or more steelhead are found dead or injured. The purpose of the contact shall be to review the activities resulting in take and to determine if additional protective measures are required. All steelhead mortalities shall be retained, frozen as soon as practical, and placed in an appropriate-sized sealable bag that is labeled with the date and location of the collection and fork length and weight of the specimen(s). Frozen samples shall be retained by the biologist until additional instructions are provided by NMFS. Subsequent notification must also be made in writing to Jess Adams, NMFS, 501 W. Ocean Blvd., Suite 4200, Long Beach, California 90802 within five days of noting dead or injured steelhead. The written notification shall include 1) the date, time, and location of the carcass or injured specimen; 2) a color photograph of the steelhead; 3) cause of injury or death; and 4) name and affiliation of the person whom found the specimen.

2. The following term and condition implement reasonable and prudent measure 2:

   a. Caltrans shall notify NMFS when the proposed action will take place 14 days prior to the beginning of construction so NMFS, at its discretion, may periodically observe project construction and other activities. These observations may help in devising ways to reduce adverse impacts to steelhead and their habitat for this project and for future projects of similar nature.

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

   a. Caltrans shall provide a written report to NMFS by January 15 of the year following each construction season. The report shall be sent to Jess Adams, NMFS, 501 W. Ocean Blvd., Suite 4200, Long Beach, California 90802. The reports will contain, at a minimum, the following information:

      i. **Construction related activities** -- The report will 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 project construction; and photographs taken before, during, and after the activity from photo reference points.

      ii. **Fish Relocation** – The report will include (1) the number and size of all steelhead relocated during the proposed action; (2) the date and time of the collection and relocation; (3) a description of an problem encountered during the project or when implementing terms and conditions; and (4)

any effect of the proposed action on steelhead that was not previously considered.

iii. **Revegetation** – The report will include a description of the locations seeded or planted, the area revegetated, proposed methods to monitor and maintain the revegetated area, criteria used to determine the success of the plantings, and pre-and post-planting color photographs of the revegetated area. Caltrans shall provide the results of the vegetation monitoring by January 15 following completion of each annual site inspection for up to five years following completion of the project as described in the proposed action. Each report shall include color photographs taken of the project area during each inspection and before implementation of the proposed action.

2.10 Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Specifically, conservation recommendations are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02).

NMFS has no conservation recommendation related to the proposed action considered in this biological opinion.

2.11 Reinitiation of Consultation

This concludes formal consultation for the Old Creek Bridge Replacement Project on Highway 1. As 50 CFR 402.16 states, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained or is authorized by law and if: (1) The amount or extent of incidental taking specified in the ITS is exceeded, (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion, (3) the agency action is subsequently modified in a manner that causes an effect on the listed species or critical habitat that was not considered in this opinion, or (4) a new species is listed or critical habitat designated that may be affected by the action.

3 DATA QUALITY ACT DOCUMENTATION & PRE-DISSEMINATION REVIEW

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

3.1 Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended users of this opinion is Caltrans. Other interested users could include California Department of Fish and Wildlife and U.S. Fish and Wildlife. Individual copies of this opinion were provided to Caltrans. The format and naming adheres to conventional standards for style.

3.2 Integrity

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

3.3 Objectivity

Information Product Category: Natural Resource Plan

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

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

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

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

4 REFERENCES

Battin, J., M. W. Wiley, M. H. Ruckelshaus, R. N. Palmer, E. Korb, K. K. Bartz, and H. Imaki. 2007. Projected impacts of climate change on salmon habitat restoration. Proceedings of the national academy of sciences 104(16):6720-6725.

Behnke, R. J. 1992. Native Trout of Western North America (Afs Monogroph: No 6). American Fisheries Society, Bethesda, Maryland.

Berg, L., and T. G. Northcote. 1985. Changes in territorial, gill-flaring, and feeding-behavior in juvenile coho salmon (*Oncorhynchus kisutch*) following short-term pulses of suspended sediment. Canadian Journal of Fisheries and Aquatic Sciences 42(8):1410-1417.

Boughton, D. A., P. B. Adams, E. C. Anderson, C. Fusaro, E. A. Keller, E. Kelley, L. D. Lentsch, J. L. Nielsen, K. Perry, and H. Regan. 2007. Viability criteria for steelhead of the south-central and southern California coast. NOAA Tech Memo NOAA-TM-NMFS-SWFSC-407.

Boughton, D. A., P. B. Adams, E. C. Anderson, C. Fusaro, E. A. Keller, E. Kelley, L. D. Lentsch, J. L. Nielsen, K. Perry, H. Regan, J. Smith, C. C. Swift, L. Thompson, and F. G. R. Watson. 2006. Steelhead of the south-central/southern California coast population characterization for recovery planning. NOAA Tech. Memo. NMFS-SWFSC-394.

Boughton, D. A., and H. Fish. 2003. New data on steelhead distribution in southern and south-central California. National Marine Fisheries Service, Santa Cruiz, CA.

Busby, P. J., T. C. Wainwright, G. J. Bryant, L. J. Lierheimer, R. S. Waples, F. W. Waknitz, and I. V. Lagomarsino. 1996. Status review of west coast steelhead from Washington, Idaho, Oregon, and California. NOAA Tech Memo (NMFS-NWFSC-27).

California Department of Transportation (Caltrans). 2017. Biological assessment: Old Creek Bridge project. Caltrans, District 5, San Luis Obispo, CA June 2017. Administrative file: 151422WCR2017CC00240.

Cayan, D. R., E. P. Maurer, M. D. Dettinger, M. Tyree, and K. Hayhoe. 2008. Climate change scenarios for the California region. Climatic Change 87(1):21-42.

Crozier, L. G., R. W. Zabel, and A. F. Hamlet. 2008. Predicting differential effects of climate change at the population level with life-cycle models of spring Chinook salmon. Global Change Biology 14(2):236-249.

Cushman, R. M. 1985. Review of ecological effects of rapidly varying flows downstream from hydroelectric facilities. North American Journal of Fisheries Management 5(3A):330-339.

Dettinger, M. D., and D. R. Cayan. 1995. Large-scale atmospheric forcing of recent trends toward early snowmelt runoff in California. Journal of Climate 8(3):606-623.

Ebersole, J., W. Liss, and C. Frissell. 2001. Relationship between stream temperature, thermal refugia and rainbow trout *Oncorhynchus mykiss* abundance in arid-land streams in the northwestern United States. Ecology of freshwater fish 10(1):1-10.

Girman, D., and J. C. Garza. 2006. Population structure and ancestry of *O. mykiss* populations in South-Central California based on genetic analysis of microsatellite data. Final Report for California Department of Fish and Game Project No. P0350021 and Pacific States Marine Fisheries Contract No. AWIP-S-1.

Good, T. P., R. S. Waples, and P. B. Adams. 2005. Updated status of federally listed ESUs of West Coast salmon and steelhead. NOAA Tech. Memo. NMFS-NWFSC-66.

Gregory, R. S., and T. G. Northcote. 1993. Surface, planktonic, and benthic foraging by juvenile chinook salmon (*Oncorhynchus tshawytscha*) in turbid laboratory conditions. Canadian Journal of Fisheries and Aquatic Sciences 50(2):233-240.

Harvey, B. C. 1986. Effects of Suction Gold Dredging on Fish and Invertebrates in Two California Streams. North American Journal of Fisheries Management 6(3):401-409.

Hayhoe, K., D. Cayan, C. B. Field, P. C. Frumhoff, E. P. Maurer, N. L. Miller, S. C. Moser, S. H. Schneider, K. N. Cahill, and E. E. Cleland. 2004. Emissions pathways, climate change, and impacts on California. Proceedings of the national academy of sciences 101(34):12422-12427.

Helmbrecht, S., and D. A. Boughton. 2005. Recent efforts to monitor anadromous *Oncorhynchus* species in the California coastal region: a compilation of metadata. NOAA Tech Memo (NOAA-TM-NMFS-SWFCS-381).

Intergovernmental Panel on Climate Change (IPCC). 2007. Climate change 2007: the physical science basis. Contuibution of Working Group I to the Fourth Assessment Report of the IPCC. Cambridge University Press, New York.

Isaak, D. J., R. F. Thurow, B. E. Rieman, and J. B. Dunham. 2007. Chinook salmon use of spawning patches: relative roles of habitat quality, size, and connectivity. Ecological Applications 17(2):352-364.

Katz, J., P. B. Moyle, R. M. Quiñones, J. Israel, and S. Purdy. 2013. Impending extinction of salmon, steelhead, and trout (Salmonidae) in California. Environmental Biology of Fishes 96(10-11):1169-1186.

Keeley, E. R. 2003. An experimental analysis of self-thinning in juvenile steelhead trout. Oikos 102(3):543-550.

Kelly, A. E., and M. L. Goulden. 2008. Rapid shifts in plant distribution with recent climate change. Proceedings of the national academy of sciences 105(33):11823-11826.

Lowrance, R., R. Leonard, and J. Sheridan. 1985. Managing riparian ecosystems to control nonpoint pollution. Journal of Soil and Water Conservation 40(1):87-91.

McCarty, J. P. 2001. Ecological consequences of recent climate change. Conservation Biology 15(2):320-331.

McClure, M. M., E. E. Holmes, B. L. Sanderson, and C. E. Jordan. 2003. A large-scale, multispecies status, assessment: Anadromous salmonids in the Columbia River Basin. Ecological Applications 13(4):964-989.

McElhany, P., M. H. Rucklelshaus, M. J. Ford, T. C. Wainwright, and E. P. Bjorkstedt. 2000. Viable salmonid populations and the recovery of evolutionarily significant units. NOAA Tech. Memo. NMFS-NWFSC-42.

McLeay, D. J., I. K. Birtwell, G. F. Hartman, and G. L. Ennis. 1987. Responses of arctic grayling (*Thymallus arcticus*) to acute and prolonged exposure to yukon placer mining sediment. Canadian Journal of Fisheries and Aquatic Sciences 44(3):658-673.

Mitchell, S. 1999. A simple model for estimating mean monthly stream temperatures after riparian canopy removal. Environmental Management 24(1):77-83.

Mote, P. W., E. A. Parson, A. F. Hamlet, W. S. Keeton, D. Lettenmaier, N. Mantua, E. L. Miles, D. W. Peterson, D. L. Peterson, and R. Slaughter. 2003. Preparing for climatic change: the water, salmon, and forests of the Pacific Northwest. Climatic Change 61(1-2):45-88.

National Marine Fisheries Service (NMFS). 1997. Endangered and threatened species: listing of several evelutionary significant units (ESUs) of west coast steelhead. Federal Register 62(159):43937-43953.

National Marine Fisheries Service (NMFS). 2005. Endangered and threatened species: designated critical habitat for seven evolutionary significant units of Pacific salmon and steelhead in California. Federal Register 70(170):52488-52586.
National Marine Fisheries Service (NMFS). 2006. Endangered and threatened species: Final listing determinations for 10 distinct population segments of west coast steelhead. Federal Register 71(834-862).
National Marine Fisheries Service (NMFS). 2016. 5-year review: Summary and evaluation of south-central California coast steelhead distinct population segment. National Marine Fisheries Service, West Coast Region. California Coastal Office. Santa Rosa, California.
National Marine Fisheries Service (NMFS). 2017. Biological Opinion for the Old Creek Bridge replacement project issued September 25, 2017.
Opperman, J. J., and A. M. Merenlender. 2004. The effectiveness of riparian restoration for improving instream fish habitat in four hardwood-dominated California streams. North American Journal of Fisheries Management 24(3):822-834.
Snyder, M. A., and L. C. Sloan. 2005. Transient future climate over the western United States using a regional climate model. Earth Interactions 9(11).
Spence, B. C., G. A. Lomnicky, R. M. Hughes, and R. P. Novitzki. 1996. An ecosystem approach to salmonid conservation. TR-4501-96-6057. ManTech Environmental Research Services Corp., Corvallis, OR. (Available from the National Marine Fisheries Service, Portland, Oregon).
Spina, A. P. 2007. Thermal ecology of juvenile steelhead in a warm-water environment. Environmental Biology of Fishes 80(1):23-34.
Thomas, V. G. 1985. Experimentally determined impacts of a small, suction gold dredge on a Montana stream. North American Journal of Fisheries Management 5(3B):480-488.
URS Corporation (URS). 2006. Draft environmental assessment/habitat conservation plan for issuance of an endangered species section 10(a)(1)(b) permit for the incidental take of the south-central California distinct population segment (DPS) of steelhead trout (*Oncorhynchus mykiss*) for operation and maintenance of Whale Rock Dam on Old Creek (HAS 331017). San Luis Obispo County, California. October 5, 2006.
USACE (U. S. Army Corps of Engineers). 1986. Definition of navigable waters of the United States. Federal Register 51:41251.
USGCRP (U.S. Global Change Research Program). 2009. Global climate change impacts in the United States: a state of knowledge report from the U.S. global change research program. Cambridge University Press, New York.
Velagic, E. 1995. Turbidity study: a literature review. Prepared for Delta planning branch, California Department of Water Resources by Centers for Water and Wildland Resources, University of California, Davis.
Welsch, D. J. 1991. Riparian forest buffers: function and design for protection and enhancement of water resources. USDA Forest Service, NA-PR-07-91, Radnor, Pennsylvania.
Westerling, A. L., and B. P. Bryant. 2008. Climate change and wildfire in California. Climatic Change 87:S231-S249.
Williams, T. H., S. T. Lindley, B. C. Spence, and D. A. Boughton. 2011. Status review update for Pacific salmon and steelhead listed under the Endangered Species Act: Southwest. NOAA's National Marine Fisheries Service, Southwest Fisheries Science Center, Santa Cruz, CA.

Williams, T. H., B. C. Spence, D. A. Boughton, R. C. Johnson, E. G. R. Crozier, N. J. Mantua, M. R. O'Farrell, and S. T. Lindley. 2016. Viability assessment for Pacific salmon and steelhead listed under the Endangered Species Act: Southwest. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-SWFSC-564.

Zimmerman, C. E., and G. H. Reeves. 2000. Population structure of sympatric anadromous and nonanadromous *Oncorhynchus mykiss*: evidence from spawning surveys and otolith microchemistry. Canadian Journal of Fisheries and Aquatic Sciences 57(10):2152-2162.

Zwiers, F. W., and X. Zhang. 2003. Toward regional-scale climate change detection. Journal of Climate 16(5):793-797.