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

November 4, 2022 **Refer to NMFS No:** WCRO-2022-00847

Paul Andreano
Associate Biologist, Environmental Stewardship Branch
California Department of Transportation, District 5
50 Higuera Street
San Luis Obispo, California 93401

Re: Endangered Species Act Section 7(a)(2) Biological Opinion for the Traffic Way Bridge Replacement over Arroyo Grande, San Luis Obispo County, California (BRLS 5199(028) and BRLS 5199(030))

Dear Mr. Andreano:

Thank you for your letter of April 7, 2022, requesting initiation of consultation with NOAA's National Marine Fisheries Service (NMFS) pursuant to section 7 of the Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531 et seq.) for the Traffic Way Bridge Replacement Project. Caltrans is the lead federal agency as assigned by the Federal Highway Administration, pursuant to Memoranda of Understanding 23 USC 326 and 327. The proposed action is within range of the threatened South-Central California Coast (S-CCC) Distinct Population Segment (DPS) of steelhead (*Oncorhynchus mykiss*) and designated critical habitat for the species.

On July 5, 2022, the U.S. District Court for the Northern District of California issued an order vacating the 2019 regulations that were revised or added to 50 CFR part 402 in 2019 ("2019 Regulations," see 84 FR 44976, August 27, 2019) without making a finding on the merits. On September 21, 2022, the U.S. Court of Appeals for the Ninth Circuit granted a temporary stay of the district court's July 5 order. As a result, the 2019 regulations are once again in effect, and we are applying the 2019 regulations here. For purposes of this consultation, we considered whether the substantive analysis and conclusions articulated in the biological opinion and incidental take statement would be any different under the pre-2019 regulations. We have determined that our analysis and conclusions would not be any different.

The biological opinion concludes that the proposed action is not likely to jeopardize the continued existence of the threatened S-CCC DPS of steelhead 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 terms and conditions to minimize and monitor incidental take of threatened steelhead.

Please contact Jess Fischer at (562) 533-6813 or jessica.fischer@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: E-file FRN 151422WCR2022CC00080

**Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion**
Traffic Way Bridge Replacement

NMFS Consultation Number: WCRO-2022-00847
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? |
|---|---|---|---|---|---|
| South-Central California 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
California Coastal Office

**Date**: November 4, 2022

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# 1. INTRODUCTION

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

## 1.1. Background

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

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

## 1.2. Consultation History

On April 7, 2022, NMFS received from the California Department of Transportation (Caltrans) a written request for formal consultation under section 7 of the ESA for the Traffic Way Bridge Replacement Project. Caltrans is the lead federal agency as assigned by the Federal Highway Administration (FHWA), pursuant to two Memoranda of Understanding, 23 USC 326 and 327, which allows Caltrans to approve Categorical Exclusions and Environmental Assessments. The City of Arroyo Grande (City) is the applicant. Caltrans' written request included a biological assessment (BA) describing the effects of the proposed action on the threatened South-Central California Coast Distinct Population Segment of Steelhead (*Oncorhynchus mykiss*), and designated critical habitat for the species in Arroyo Grande Creek.

Following review of the consultation request and BA, NMFS determined the information received was inadequate to initiate formal consultation, and in a letter to Caltrans dated April 28, 2022, requested the specific information that was necessary to initiate formal consultation. On May 12, 2022, NMFS received Caltrans' response letter with only a portion of the requested information necessary to initiate consultation. NMFS sent Caltrans another letter dated June 2, 2022, outlining the missing information. Following that letter, NMFS and Caltrans had several exchanges of information regarding the placement of abutments. On June 28, 2022 NMFS determined that Caltrans had provided the necessary information to begin the formal consultation, and began the subject consultation on the same day.

On July 5, 2022, the U.S. District Court for the Northern District of California issued an order vacating the 2019 regulations that were revised or added to 50 CFR part 402 in 2019 ("2019 Regulations," see 84 FR 44976, August 27, 2019) without making a finding on the merits. On September 21, 2022, the U.S. Court of Appeals for the Ninth Circuit granted a temporary stay of the district court's July 5 order. As a result, the 2019 regulations are once again in effect, and we are applying the 2019 regulations here. For purposes of this consultation, we considered whether the substantive analysis and conclusions articulated in the biological opinion and incidental take statement would be any different under the pre-2019 regulations. We have determined that our analysis and conclusions would not be any different.

## 1.3. Proposed Federal Action

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

### 1.3.1. Overview of Proposed Action

Caltrans proposes to replace the Traffic Way Bridge over Arroyo Grande Creek with a shorter, wider single-span bridge. Construction will be completed in one season with a work window confined to June 1 – October 31. Best management practices (BMP) are incorporated into the proposed action and will be implemented when construction activities are undertaken.

### 1.3.2. Proposed Activities to Prepare the Work Area for Construction

To prepare for construction, vegetation below and adjacent to the bridge will be cleared, an access route will be graded underneath the Hwy-101 bridge on the creek bank, utilities will be relocated, and the work area within Arroyo Grande Creek will be dewatered. This will result in 5.61 acres of temporary impacts. The stream diversion will be 190 ft long with the upper cofferdam or berm placed 80 feet upstream of the existing Traffic Way bridge and the lower cofferdam or berm placed 44 ft downstream of the bridge. Clean, imported gravel will be used if the berm is constructed with bags and dams may be lined with visqueen to keep them water tight. A reinforced concrete box or 36-in pipe will be installed with the diversion to direct streamflow though the work area and maintain fish passage. Pumps screen with wire mesh no larger than 0.2 in (5 mm) will be used to dewater the work area and pump the water into a baker-tank system to allow water-borne sediments to settle before discharged downstream of the work area. Pumps will be checked at least once a day during the dewatering process.

Fish biologists experienced with handling steelhead will continuously monitor placement and removal of the stream diversion and will capture and then relocate stranded steelhead to suitable habitat. The biologists will 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. However, Caltrans' proposed action does not describe the methods to be used for steelhead capture or define suitable habitat.

The dewatered creekbed may be leveled and clean weed-free soil or washed rock material may be added on top of the diversion pipe for protection. All temporary material will be removed prior to removing the diversion. Falsework will also be installed to construct the new bridge. 0.37 acres of creek will be subject to temporary impacts.

Caltrans proposes to implement the following BMP as part of the proposed action:

- Prior to construction, all personnel will participate in an environmental-awareness training that will include a description of aquatic resources and designated critical habitat for steelhead within the action area and the boundaries for the proposed action.
- A qualified biologist will monitor construction and ensure compliance with avoidance and minimization measures. At a minimum, monitoring will occur during initial ground disturbance activities and vegetation removal within the Arroyo Grande Creek corridor. Monitoring may be reduced to once per week once initial disturbance and vegetation removal activities are complete.

### 1.3.3. Proposed Construction Activities

The existing bridge, abutments, and piers will be broken into smaller pieces and removed from the creekbed. The existing five piers (40 piles) will be removed 3-5 feet below the ground line, resulting in 71.1 $ft^2$ of steelhead critical habitat being restored and less debris wracking in the channel.

The new bridge will be a single-span cast-in-place/pre-stressed box girder design and will be 198 ft long and 59 ft 4 in wide (11,748 $ft^2$); 7ft wider and 30 feet shorter than the existing bridge. The new abutments will each be 14'9" closer to the creek banks, with the east side abutment placed 14 feet 9 inches from the top of the creek bank, and the new west abutment placed 14 ft from the top of the creek bank. Twelve 48-in cast-in-drill-hole (CIDH) piles will be used for each abutment. Casings will be used for the CIDH piles and the drilling slurry will be pumped into baker tanks and disposed offsite. The bridge replacement will require creek-slope excavation, backfill, and rock-slope protection (RSP) to protect the abutments.

Approximately 1200 cubic yards of ungrouted RSP will be placed immediately below the bridge abutments, extending 25 ft north and south of the structures (0.20 acre/8,712 $ft^2$ total). Construction will result in 0.30 acres of permanent impacts to the riparian corridor. The top of the RSP will be above the 100-year water surface elevation and the toe will be keyed into the existing bank 6 ft below grade, above the ordinary high-water mark. Willow stakes will then be used to vegetate the RSP. The low-flow channel will continue to have a natural bottom.

Following construction of the bridge, the 18-in reinforced concrete-pipe-drain system on the west side of bridge that drains directly into the creek will be modified. There are two inlets just past the end of the bridge; the north inlet will be modified or replaced and the south outlet will be impacted by grading and RSP changes. A larger storm drain to the east of the bridge drains straight into creek via a concrete lined apron that runs down to the low-flow channel, of which portions will be rebuilt and realigned. Current drainage patterns will be maintained, though Caltrans has not included any measures to address contaminants in stormwater runoff that are harmful to threatened steelhead.

Caltrans proposes to implement the following construction-related BMP as part of the proposed action:

- Equipment refueling will occur at least 60 ft from the creek banks. Equipment and vehicles will be checked and maintained daily to ensure proper operation and avoid leaks or spills.
- Prior to construction, a Hazardous Materials Response Plan will be prepared to allow for a prompt and effective response to any accidental spills.
- During construction, erosion control measures (e.g., silt fencing, fiber rolls, and barriers) will remain available on-site and will be utilized to prevent erosion and sedimentation into the creek. Erosion-control measures will be checked and maintained daily throughout the duration of construction. Dust-control techniques, such as site watering, will be used during construction to protect water quality.
- During construction, water quality will be monitored for turbidity while water is flowing.

### 1.3.4. Proposed Post-Construction Activities

Following construction, the stream diversion and falsework will be removed and stream contours returned to pre-construction conditions. Caltrans will prepare a habitat mitigation and

monitoring plan (HMMP) prior to construction that will include in-kind mitigation at a 1:1 ratio for temporary riparian impacts and 3:1 for permanent impacts. The HMMP will also include restoring non-vegetated areas of the creek to preconstruction contours. Prior to construction, a Storm Water Pollution Prevention Plan will also be prepared for the project. Provisions of this plan will be implemented during and after construction to avoid and minimize erosion and stormwater pollution in and near the work area.

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

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

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

### 2.1. Analytical Approach

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

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

The designation(s) of critical habitat for threatened S-CCC steelhead uses the term primary constituent element (PCE) or essential features. The 2016 final rule (81 FR 7414; February 11, 2016) that revised the critical habitat regulations (50 CFR part 424) replaced this term with physical or biological features (PBFs). The shift in terminology does not change the approach used in conducting a "destruction or adverse modification" analysis, which is the same regardless of whether the original designation identified PCEs, PBFs, or essential features. In this biological opinion, we use the term PBF to mean PCE or essential feature, as appropriate for the specific critical habitat.

The ESA Section 7 implementing regulations define effects of the action using the term "consequences" (50 CFR 402.02). As explained in the preamble to the final rule revising the

definition and adding this term (84 FR 44976, 44977; August 27, 2019), that revision does not change the scope of our analysis, and in this opinion, we use the terms "effects" and "consequences" interchangeably.

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

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

## 2.2. Rangewide Status of the Species and Critical Habitat

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

### 2.2.1. Status of the Species

The threatened S-CCC 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 S-CCC DPS of steelhead as threatened on August 18, 1997 (62 FR 43937) and a revised listing on January 5, 2006 (71 FR 834). The status of the S-CCC 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 S-CCC 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 S-CCC 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 S-CCC DPS and expressed particular concern for the DPS's connectivity and spatial structure. NMFS' latest 5-year status review for the S-CCC 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 S-CCC 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 S-CCC 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 S-CCC 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 S-CCC 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 S-CCC 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 S-CCC 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, pollution (NMFS 2016), and increased exposure to highway runoff. 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.

Published work has identified storm water 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 (Brinkmann et al. 2022). Recent publications have identified a degradation product of tires (6PPD-quinone) as the causal factor in this mortality at concentrations of less than a part per billion (Peter et al. 2018; Tian et al. 2021, 2022; Brinkmann et al. 2022). This contaminant is widely used by multiple tire manufacturers and the tire dust and shreds that produce it have been found to be ubiquitous where both rural and urban roadways drain into waterways (Feist et al. 2018; Sutton et al. 2019).

## 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 proposed action will take place in Arroyo Grande Creek, which is designated critical habitat for S-CCC steelhead. The action area includes the linear extent (upstream and downstream) of the Traffic Way Bridge over Arroyo Grande Creek and encompasses the riparian corridor to the top of bank. The action area extends about 80-feet upstream where the upper extent of the water diversion will be placed and 294-feet downstream of the Traffic Way Bridge where temporary sedimentation effects are anticipated to cease. The approximate length of Arroyo Grande Creek within the action area is about 440-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 Aquatic Habitat in the Action Area

Aquatic habitat within the action area consists of shallow pools, glides, and short riffles. The active channel within the action area is approximately 12-to 18-feet wide with streambed material composed of cobble and gravel. Riparian vegetation within the action area mainly consists of arroyo willow (*Salix lasiolepis*). The stream is perennial, with flows being lowest in the summer and fall months. Water quality and habitat area/volume diminish within the lower stream reaches of Arroyo Grande Creek due to reduced flow (DPR 2007). 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 (i.e., spawning gravels of appropriate size) in the action area exist. Finally, the PBFs for migration are considered suitable through the action area, as there is no obvious barrier to adult or juvenile steelhead migration.

### 2.4.2. Status of Steelhead in the Action Area

Juvenile steelhead abundance was surveyed in the immediate vicinity of the action area in October 2006 (Swanson Hydrology and Morphology 2006), and a total of 50-juvenile steelhead were observed via snorkeling. This provided a combined (sample units 5-9) steelhead density of 16.2 (Age 1 + and 2+ steelhead per 100 linear feet sampled) within the section of Arroyo Grande Creek between Garden Street and Cienaga Street. Based on the habitat conditions (i.e., pools/runs and streamflow) of the sampled units, the number of steelhead in the project area is expected to be similar. In May and June 2020, 55 juvenile steelhead were captured and relocated for the Bridge Street Bridge replacement, just upstream of the Traffic Way Bridge (Rincon Consultants 2021). NMFS had estimated 50 juveniles would be captured or harassed during the

proposed Bridge Street work window (June 1 to October 31), of which 45 of the 55 steelhead were captured during, while the other 10 were captured outside of, the analyzed timeframe. Because construction of the proposed action will occur during the rearing season juvenile steelhead are expected to be present. Adult steelhead are not expected to be present within the action area during the time of the proposed action (June 1 to October 31).

### 2.4.3. Factors Affecting Species Environment in the Action Area and Vicinity

#### Agricultural Development

Downstream of the action area, Arroyo Grande Creek is bordered by a restricted 100-year floodplain that has been converted to agriculture (HCP 2004). Cultivated fields and open farmlands are located on the north and south side of Arroyo Grande Creek immediately downstream of the action area. Agricultural conversions of floodplains including levees, 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).

Physical features of instream habitat that support steelhead life-history needs include the ability of the creek to meander while maintaining connection to the floodplain. Levees located downstream of the action area have reduced the ability of the creek to meander and the connection to the historical floodplain has been eliminated. Channelization restricts the extent and distribution of riparian vegetation, while also influencing sediment transport, water depth and streamflow velocity through lower Arroyo Grande Creek (Montgomery and Buffington 1998). The levee system downstream of the action area can decrease the frequency of floodplain inundation and eliminate side-channel processes (i.e., floodplain connectivity) that would sustain steelhead living space, thus artificially confining the available living space for the species to the active channel.

In addition, demands on groundwater occur from upstream and downstream agricultural activities. Recent investigations indicate that the sustained yield of the San Luis Obispo Valley groundwater basin is estimated at 5,900 acre-feet per year (AFY) and that agricultural demands may range from 12,400 to 16,500 AFY (HCP 2004). Winter peak flows are stored in Lopez Reservoir for release for groundwater recharge typically occur between April and October (Dvorsky 2010) and average 2,330 acre-feet annually for downstream agricultural use. The extent that water demands may affect the quantity and extent of surface water and essential features of steelhead habitat within the action area is unknown to NMFS. Lowered streamflow or stream drying could result in a significant reduction or loss of habitat and even mortality to steelhead (Spence et al. 1996). In 2008, mismanagement of groundwater resources downstream of the action area resulted in dewatering of the creek and the death of adult steelhead (CA State Parks 2017). These impacts if occurring in the action area have the potential to adversely impair steelhead survival within lower Arroyo Grande Creek.

Road Encroachment and Residential Development

Traffic Way Bridge, Bridge Street Bridge, and Highway 101 traverse the creek within the action area or immediate vicinity. Within the action area, residential developments exist along the north and south banks. The location of the roads and homes likely results in runoff from the road surfaces entering the creek during rainstorms, which reduces the water quality within the action area to an unknown degree. Sources of nonpoint pollution, such as sediments washed from the urban areas and runoff from roadways, contain a complex mixture of contaminants such as heavy metals (e.g. copper, cadmium, zinc, lead) and hundreds to thousands of organic contaminants both identified and unidentified (e.g. polycyclic aromatic hydrocarbons (PAHs), petroleum products, pesticides, 6PPDquinone) (Caltrans 2000; 2003a, 2003b; Feist et al. 2018; Peter et al. 2018, 2020, 2022; Chow et al. 2019; Sutton et al. 2019; Harding et al. 2020; Brinkmann et al. 2022; French et al. 2022). These toxic substances contaminate drainage waters and harm aquatic life necessary for anadromous salmonid survival (Spence et al. 1996). Past and present development of lands often results in an increase of impervious surfaces which can lead to increased potential for runoff of pollutants to surface water. Increased runoff may not necessarily be confined to the wet season, but may extend into the dry season as a result of people washing streets, parking lots, vehicles, and other elements of the urban environment. Once in surface water, pollutants of sufficient concentration may impair water quality and alter the characteristics of the channel bed. Long-term urbanization effects have been associated with lower fish species diversity and abundance (Weaver and Garman 1994). Additionally, residential developments located along the creek within the action area have contributed to the confinement of the stream channel and diminished riparian vegetation.

Operation of Lopez Dam

Located upstream of the action area, Lopez Dam is operated to supply water to municipal and agricultural users downstream. 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. In 1999, a reduction of flow releases caused a section of Arroyo Grande Creek to become dewatered, interrupting stream habitat connectivity, which resulted in two adult steelhead becoming stranded. The lack of channel flushing flows has resulted in a narrow channel lacking complexity (Close and Smith 2004).

In addition, Lopez 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, and thereby decreased the viability of the steelhead population in Arroyo Grande 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 (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. Effects of the Action on Critical Habitat

#### 2.5.1.1 Temporarily Altering Aquatic Habitat

Installing cofferdams or berms and dewatering the work area is expected to temporarily prevent a portion of Arroyo Grande Creek from serving as a freshwater rearing site for threatened steelhead during approximately 5 months during the dry season (June 1 through October 31). The temporary loss of habitat is expected to have at least a few effects, 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. The effect of macroinvertebrate loss as a food source is expected to be negligible because food from upstream sources would be available upstream and downstream of the isolated area via drift. Consequently, the temporary loss of access to aquatic macroinvertebrates as a result of isolation activities is not expected to adversely affect forage opportunities within the area over the long term.

The temporary loss of habitat due to dewatering a portion of the creek represents an adverse effect to habitat for steelhead, for at least a few reasons. First, the loss of habitat translates into a loss of a freshwater rearing area, which is 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, the habitat cannot fulfill the intended conservation role for the species. Second, the quality and availability of habitat in the action area has already been diminished and reduced due to anthropogenic factors. Therefore, the loss of habitat due to isolation represents further loss of habitat. However, the area impacted by the cofferdams and dewatering is relatively small compared to the amount and extent of habitat available elsewhere in Arroyo Grande Creek and, perhaps more importantly, the cofferdams will be removed following completion of the proposed action and the creek banks will be restored to pre-project conditions. Freshwater rearing habitats 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 dewatering 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, review of the proposed action indicates the placement of the water diversion in Arroyo Grande Creek are not expected to result in any change to channel morphology. The creekbed will be temporarily disturbed by the presence of falsework, though these will be removed following construction as well. In addition, 71.1 $ft^2$ of creek habitat will be restored with the removal of the existing bridge piers. This will decrease the frequency of debris wracking in the creek and improve flows for steelhead. The new abutments will be closer to the creek banks than the existing which may further limit the creek to naturally meander, though each abutment will remain approximately 14 ft from the existing creek banks. As a result, the habitat characteristics and conditions that are important to sustain steelhead migration and rearing through this reach are expected to remain the same. The proposed action is not anticipated to appreciably reduce the functional value of the action area as a site of freshwater migration or rearing.

#### 2.5.1.3 Alteration of Water Quality

The alterations in water quality we initially consider here involve those related to the introduction of fine sediment (sand and smaller particles) to waterways as a result of the proposed action. The input of fine sediment can lead to acute and chronic surficial sedimentation of the channel bed and increases in turbidity concentrations of the receiving waters.

First and foremost, the proposed action has incorporated BMP that reduce the likelihood that fine sediment would be extensively introduced into the waterway during construction. The practices include confining work in Arroyo Grande Creek to the dry season, and stabilizing disturbed areas to reduce the likelihood that sediment-laden runoff from the disturbed site would be observed. The potential impacts of construction activities on water quality are also limited in scale. For instance, the footprint of the proposed action is discrete and small in area; the amount of fine sediment that could be mobilized is therefore anticipated to be limited within a given work area.

In addition to the measures for guarding against input of fine sediment, the proposed action includes measures that are intended to preclude equipment leaks from reaching the creek channel are expected to be efficient in this regard. As a result, we don't expect water-quality alterations due to equipment leaks. Although accidental spills of chemical contaminants are speculative, Caltrans incorporates measures to prevent a spill reaching the creek channel should one occur.

Post-construction stormwater discharges, the pollutants they can carry and the effects on listed salmonids and critical habitat are indirect effects of the action. Caltrans did not propose any measures to prevent impacts from these contaminant discharges. A recent update to the California statewide National Pollutant Discharge Elimination System (NPDES) permit requires Caltrans to treat a portion of volume of stormwater generated by a project or its associated infrastructure and encourages Caltrans to treat stormwater both from new construction and from existing infrastructure (SWRCB 2022). Therefore, it is likely that the proposed action may result in contaminated stormwater discharged to critical habitat.

### 2.5.2. Effects of the Action on Threatened Steelhead

#### 2.5.2.1 Effects of Habitat Isolation on Juvenile Steelhead

Habitat isolation is expected to have two principal consequences: (1) a loss of service to juvenile steelhead through the loss of living space, and (2) stresses related to handling and crowding owing to the capture and relocation. Each of these is explained for more fully as follows.

*Loss of Living Space*—The temporary loss of habitat owing to isolation could translate into an adverse effect 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 the number of steelhead experiencing a loss of service will be small. Movement between the upstream and downstream portions of the action area will be possible during instream construction via the 36-in pipe between cofferdams. Overall, we anticipate the presence of the diversion would affect only a small number of steelhead for a few months during the dry season. The effect of macroinvertebrate loss on juvenile steelhead is expected to be negligible because food from upstream sources would be available downstream of the action area via drift. The 1,185 $ft^2$ increase in shading over Arroyo Grande Creek due to the wider bridge could translate to a

decrease in primary productivity and in turn a decrease to macroinvertebrates. However, any decrease is expected to be negligible owing to macroinvertebrate abundance outside the action area.

*Capture and Relocation*—Although isolating a portion of Arroyo Grande Creek has the potential to harm or kill rearing juvenile steelhead, the proposed action includes precautions to reduce the likelihood of harm and mortality. Prior to dewatering, biologists will capture and relocate steelhead to the nearest suitable habitat upstream or downstream of the diversion area. Caltrans proposes that biologists will be experienced with steelhead handling, and will continuously monitor the placement of the cofferdams or berms to capture and relocate stranded steelhead.

Stress from crowding, including increased competition for food among juvenile steelhead in the relocation areas, is expected to be temporary, if experienced, because when the proposed action is finished steelhead will be able to colonize the area that had been isolated. In addition, the available information indicates abundance of juvenile steelhead in the action area is quite low and not likely to produce crowding effects.

Based on steelhead survey results and previous project reports of juvenile steelhead in the vicinity of the action area in Arroyo Grande Creek, NMFS expects no more than 60 juvenile steelhead will be within the action area needing to be relocated during the construction season (June 1 to October 31). NMFS expects that 6 juvenile steelhead may be injured or killed as a result of the proposed action. 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 S-CCC DPS of threatened steelhead. Therefore, the effects of the relocation on steelhead are not expected to give rise to population-level effects.

#### 2.5.2.2 Effects of Water Quality Alterations on Steelhead

Water quality alterations from the input of fine sediment to work areas are likely, as described in Section 2.5.1. High concentrations of suspended sediment may affect fish by a variety of mechanisms including disruption of feeding (Cordone and Kelley 1961; Bjornn et al. 1977; Berg and Northcote 1985), reduction in growth rates (Crouse et al. 1981), and increased plasma cortisol levels (Servizi and Martens 1992). High turbidity can reduce dissolved oxygen in the water column, resulting in reduced salmonid fitness, and can cause mortality (Sigler et al. 1984; Berg and Northcote 1985; Gregory and Northcote 1993; Velagic 1995; Waters 1995). Although chronic elevated turbidity may affect steelhead, the temporary increases of sedimentation and turbidity resulting from the proposed action are not expected to rise to levels sufficiently high enough to adversely affect steelhead due to proposed BMP.

Pollutants in untreated post-construction runoff are expected to include oil, grease, polycyclic aromatic hydrocarbons (PAH), heavy metals (copper, zinc, etc.) and other toxic substances associated with tires and vehicles (6PPD-quinone). Exposure to stormwater runoff from roadways has been found to cause mortality and disruption of behaviors needed for survival (i.e., lethargy, surface respiration, loss of equilibrium, immobility) in several salmonid species, including steelhead (Scholz et al. 2011; McIntyre et al. 2018; Chow et al. 2019; Brinkmann et al. 2022; French et al. 2022). 6PPD-quinone was identified at the causal factor (Tian et al. 2021;

2022) with mortality of 50% of juvenile steelhead trout in tests occurring at concentrations of 1 µg/L (parts per billion) (Brinkmann et al. 2022). The parent compound (6PPD) is widely used by multiple tire manufacturers and the tire particles 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; DTSC 2022). Tire-derived products used by Caltrans and others, such as asphalt rubber paving, fill for overpass construction or surface area covers for porous walkways, paths and bike trails, may also contribute 6PPD-quinone to waterways (DTSC 2022). Copper, zinc, and PAHs in stormwater have been found to adversely affect salmonid health as well (Hansen et al. 1999a; Hansen et al. 1999b; Johnson et al. 1999; Karrow et al. 1999; Johnson 2000; Stehr et al. 2000; Collier et al. 2002; Johnson et al. 2002; Baldwin et al. 2003; Sherry et al. 2006; Hecht et al. 2007; McIntyre et al. 2008; Department of Toxic Substances Control (DTSC) 2021; Lall and Kaushik 2021).

Concentration levels and toxicity will be seasonally affected by rainfall patterns and proximity to a discharge point. 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 periods of no rain will also have higher concentrations of pollutants although many developed areas exhibit elevated pollutant levels throughout storm systems due to the continued mobilization of contaminant mass across the entire storm hydrograph (i.e. the contaminant load is not mass limited due to traffic volumes but its transport may be limited by the size of the storm) (Feist et al. 2018; Peter et al. 2020).

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 (McIntyre et al. 2015; Spromberg et al. 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; McIntyre et al. 2015). Without post-construction measures to treat or infiltrate stormwater from the Traffic Way crossing, steelhead in the action area and downstream will be exposed to contaminated stormwater runoff originating from Caltrans projects and infrastructure. Pollutants associated with vehicular traffic are expected to originate from the 11,748 $ft^2$ impervious surface of the bridge deck.

For the Traffic Way Bridge over Arroyo Grande Creek, we cannot estimate the number of individual S-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 steelhead (juvenile and adult) will experience sublethal effects such as stress, impaired olfactory performance, and reduced prey consumption. Additional effects to some 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 Arroyo Grande as far as 4 miles to the creek's mouth at the Pacific Ocean. When mixed with ocean water, contaminant

levels originating from the Traffic Way crossing in Arroyo Grande Creek are likely to be diluted to levels that no longer pose a risk to steelhead.

## 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 earlier in the discussion of 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 effect is 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 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.

Juvenile steelhead are expected to be present in the Arroyo Grande Creek action area during the time the proposed action will be implemented and, therefore, subject to effects of the proposed action. The adverse effects include potential injury or mortality during the process of capture and relocation, but precautions are in place to partly minimize the risk of injury and mortality, and upstream and downstream habitats are expected to suitably harbor the relocated steelhead. The expected effects associated with the habitat alteration due to the temporary diversion 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 60 juvenile steelhead that may be captured and relocated during the proposed action as a result of isolating the action area, with a potential lethal take of no more than 6 out of the 60, thus the risk of mortality is low. Any juvenile steelhead present in the action area likely make up a small proportion of the S-CCC DPS of steelhead.

Post-construction stormwater runoff from the bridge and adjacent roadway is expected to directly discharge into Arroyo Grande 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. 2022). 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 the creek with stormwater runoff during periods of precipitation. We expect that every year some S-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, impair essential behaviors related to successful rearing and migration, cellular trauma, physiological trauma, reproductive failure, and mortality.

Overall, the impacts to habitat are expected to be temporary and not translate into a reduction in the functional value of the habitat in the long term. Vegetation trimming is not expected to appreciably decrease the function of the riparian zone. The impacts from disturbing the streambed in Arroyo Grande Creek are not expected to adversely affect the quality or quantity of aquatic habitat; rather, the proposed action is expected to slightly improve conditions by removing 71 $ft^2$ of structure from the creek. Maintained passage conditions are expected to favor the viability of the threatened S-CCC DPS of steelhead.

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 higher creek temperatures and longer dry periods. 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 are expected to have completely elapsed prior to these climate-change effects.

## 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 S-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: All steelhead with in the action area of Arroyo Grande Creek during the time of the proposed action (June 1 – October 31), expected to be no more than 60 juveniles that are captured or harassed during relocation activities. No more than 6 juvenile steelhead are expected to be injured or killed as a result of relocating the species.

Steelhead in Arroyo Grande 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 the creek during intermittent stormwater runoff events. Steelhead (juvenile and adult) downstream of the Traffic Way bridge 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 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, 11,748 $ft^2$ 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 Arroyo Grande 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 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 a meaningful reinitiation trigger.

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 or destruction or adverse modification of critical habitat.

2.9.3. Reasonable and Prudent Measures

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

1. Avoid and minimize mortality of steelhead during proposed activities.

2. Implement measures to reduce direct delivery of runoff from hard surfaces to salmonid habitat.

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

2.9.4. Terms and Conditions

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

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

    a. Caltrans shall contact NMFS (Jess Fischer, 562-533-6813 or jessica.fischer@noaa.gov) 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. The information Caltrans provides at that time 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. 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.
    b. Caltrans' biologist shall identify and evaluate the suitability of downstream and/or upstream steelhead relocation habitat(s) prior to undertaking the dewatering activities. Potential relocation sites should be evaluated based on attributes such as adequate water quality (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).
    c. Captured fish shall be handled with extreme care and kept in water during relocation activities. All captured fish shall be kept in cool, shaded, aerated water protected from excessive noise, jostling, or overcrowding any time they are not in the stream, and fish shall not be removed from this water except when released. To avoid predation, the biologist shall have at least two containers and segregate young-of-year fish from larger age classes and other potential aquatic predators. Captured salmonids will be relocated, as soon as possible, to a suitable instream location in which habitat conditions are present to allow for adequate survival of transported fish and fish already present.

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

    a. Caltrans shall develop and implement measures to treat post-construction stormwater runoff from hard surfaces to reduce contaminant load entering salmonid habitat. All stormwater runoff from the project area must be treated to remove contaminants from at least the 24-hour storm size (based on analyses supporting the NPDES permit). This may be accomplished by treating stormwater from existing infrastructure in addition to the new infrastructure. If this level of on-site treatment of the proposed project is not possible, treatment at other sites (preferably within the same watershed) can be discussed as a minimization measure. Measures shall be designed to avoid or minimize the effects of road-generated runoff to the creek by diverting surface flow through vegetated areas for infiltration and treatment, or through similar constructed 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. No rubberized asphalt or rubber crumb may be used due to loading of zinc and 6PPD/6PPD-quinone from the recycled tires used to produce the product.

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 the construction season. The report shall be sent to Jess Fischer, jessica.fischer@noaa.gov. The reports shall 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 fish relocated during the proposed action; (2) the date and time of the collection and relocation; (3) a description of any 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 following completion of the project. 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 Caltrans' Traffic Way Bridge Replacement Project over Arroyo Grande Creek.

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

## 3. Data Quality Act Documentation and Pre-Dissemination Review

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

### 3.1. Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended users of this opinion is Caltrans. Other interested users could include the City of Arroyo Grande, the California Department of Fish and Wildlife, and U.S. Fish and Wildlife Service. Individual copies of this opinion were provided to Caltrans. The document will be available within 2 weeks at the NOAA Library Institutional Repository [https://repository.library.noaa.gov/welcome]. The format and naming adhere to conventional standards for style.

### 3.2. Integrity

This consultation was completed on a computer system managed by NMFS in accordance with relevant information technology security policies and standards set out in Appendix III, 'Security

of Automated Information Resources,' Office of Management and Budget Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

### 3.3. Objectivity

Information Product Category: Natural Resource Plan

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

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

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

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

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