**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

SEP 05 2017

**Refer to NMFS No:** WCR-2017-6415

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N. E.
Washington, D.C. 20426

Re: Endangered Species Act Section 7(a)(2) Biological Opinion for the Federal Energy Regulatory Commission's Approval of the Modified Land Resources Management Plan

Dear Secretary Bose:

Thank you for your letter of October 27, 2016, 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 Federal Energy Regulatory Commission's (FERC) approval of the modified Land Resources Management Plan (FERC Project No. 2153-023). Enclosed with this letter is NMFS' biological opinion for the subject proposed action. This biological opinion addresses the effects of the proposed action on the federally endangered Southern California (SC) Distinct Population Segment (DPS) of steelhead (*Oncorhynchus mykiss*) and its designated critical habitat in accordance with section (7)(a)(2) of the ESA.

The biological opinion concludes that the proposed action is not likely to jeopardize the continued existence of the endangered SC steelhead, or destroy or adversely modify designated critical habitat for this species. Because the proposed action is likely to cause incidental take of endangered SC steelhead, the biological opinion includes an incidental take statement with reasonable and prudent measures and non-discretionary terms and conditions that are necessary and appropriate to minimize and monitor incidental take of endangered steelhead.

Please contact Rick Bush at (562) 980-3562 or rick.bush@noaa.gov if you have a question concerning this consultation, or if you require additional information.

Sincerely,

, for

Barry A. Thom
Regional Administrator

Enclosure

cc: Catherine McCalvin, United Water Conservation District, Santa Paula
David Rudisail, FERC, Washington, D.C.
Chris Dellith, USFWS, Ventura
Mary Larson, CDFW, Los Alamitos
Administrative No. 151422WCR2017CC00056

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

Federal Energy Regulatory Commission Approval of the
Modified Land Resources Management Plan

NMFS Consultation Number: WCR-2017-6415
Action Agency: Federal Energy Regulatory Commission

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? |
|---|---|---|---|---|---|
| Southern California steelhead (*Oncorhynchus mykiss*) | Endangered | Yes | No | Yes | No |

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

**Issued By:** _____, for
Barry A. Thom
Regional Administrator

**Date:** SEP 0 5 2017

# 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.

Pre-dissemination review of this document was completed using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The document is available through NMFS' Public Consultation Tracking System (https://pcts.nmfs.noaa.gov/pcts-web/homepage.pcts). A complete record of this consultation is on file at NMFS' California Coastal Area Office, Southern California Branch in Long Beach, California.

On August 28, 2009, United Water Conservation District (United) submitted a Land Resource Management Plan (LRMP) to NMFS and the Federal Energy Regulatory Commission (FERC) in accordance with requirements of their license for operation of the Santa Felicia Hydroelectric Project (Project). NMFS did not provide any comments on the LRMP because no instream maintenance activities were proposed. FERC issued an order approving the LRMP on July 12, 2011. However, the FERC-approved LRMP does not specifically address activities associated with the use and maintenance of the Lower Piru Creek Road Crossing.

## 1.2 Consultation History

The consultation history herein pertains to FERC's potential approval of United's Lower Piru Creek Road Crossing through approval of a modified LRMP, and potential effects on the endangered Southern California (SC) Distinct Population Segment (DPS) of steelhead (*Oncorhynchus mykiss*) and designated critical habitat for this species. FERC's August 24, 2015, letter to NMFS designated United to act as its non-federal representative to conduct informal consultation with NMFS on the proposed action.

United's letter of September 24, 2015, and enclosed revisions to the LRMP, requested NMFS' concurrence with their determination that the use and maintenance of the lower Piru Creek wet crossing was not likely to adversely affect SC steelhead. In an electronic mail correspondence dated October 30, 2015, NMFS requested (1) clarification of how United proposed to discourage the development of steelhead habitat in the portions of the road that cross through Piru Creek, and (2) review of the standard operating procedures (SOP) for use of the road crossing, as referenced in the revised LRMP. United's email of November 2, 2015, outlined the action that would be taken to prevent vegetation establishment and pool formation, and indicated a copy of the SOP would be provided to NMFS for review. During a teleconference on December 10,

2015, NMFS advised United that formal consultation was necessary for the proposed action because adverse effects to SC steelhead and designated critical habitat are expected.

FERC's letter received by NMFS on October 31, 2016, requested formal consultation under Section 7 of the U.S. Endangered Species Act (ESA). FERC's request concerns the modified LRMP that addresses use and maintenance of Project roads, including the road crossing through lower Piru Creek, and related potential effects on endangered steelhead and designated critical habitat for this species. After reviewing FERC's request, and enclosed biological assessment (BA) titled "Lower Piru Creek Road Crossing", NMFS determined the information was sufficient and initiated consultation the same day, October 31, 2016.

NMFS emailed FERC on March 8, 2017, to request a copy of the Vegetation and Noxious Weed Management Plan (Vegetation Plan) to fully develop the effects of the action because vegetation removal adjacent to Project roads is part of the proposed action, as described in section 1.3 of this biological opinion. The Vegetation Plan was not included in the original consultation package submitted to NMFS; however, it was referenced in the modified Roads and Facilities Maintenance Plan section of the LRMP. On March 9, 2017, FERC sent the Vegetation Plan (United 2010) to NMFS via email.

NMFS' review of the Vegetation Plan indicated that it did not provide enough information to evaluate the effects of Project road maintenance activities on steelhead designated critical habitat. Therefore, NMFS emailed FERC and United on April 18, 2017, to request clarification on the type, frequency and species of vegetation removal proposed to occur in the wet crossing. On April 20, 2017, United emailed NMFS and FERC a detailed description of the proposed vegetation management activities.

### 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).

FERC proposes to approve the modified LRMP that addresses use and maintenance of Project roads, including the road crossing through lower Piru Creek (hereafter, referred to as the "wet crossing") and related vegetation management and control in the action area. As a matter of clarification, this consultation considers only the effects from use of the wet crossing, maintenance of Project roads, and related vegetation control, not the entirety of the modified Land and Resource Management Plan. As previously described in Section 1.1, FERC approved the existing LRMP on July 12, 2011.

***Proposed Use of the Piru Creek wet crossing.***—Under the proposed action (United 2016a), United would use the wet crossing to access the dam and locations within the overall action area that need vegetation management, road repair, fence repair, facility repair, and maintenance. The wet crossing is the only access route where heavy equipment can drive to the base of Santa Felicia Dam. No permanent modification to the streambed within the wet crossing is proposed. United indicates use of the wet crossing is necessary for a variety of activities related to the maintenance of Santa Felicia Dam, with instream crossings proposed to occur throughout a given

year (United 2016a). Avoidance and minimization measures are incorporated into the proposed action. The necessary equipment, relative frequency, and variety of tasks that require use of the wet crossing are summarized in Table 1.

**Table 1-1.** Proposed equipment types that would use the wet crossing, the frequency of crossing, and the purpose of use (adapted from United 2016a).

| Equipment | Frequency | Purpose of Use |
|---|---|---|
| Bulldozer & skip loader | ≤8 crossings per year | Weed abatement and dam maintenance |
| Gator/ATV | Variable | Fence repair and herd stray cattle |
| Road grader, excavator, scraper, backhoe, water truck, bulldozer, dump truck | Weather dependent (not required annually) | Road building and repair |
| Crane truck | Rarely (not annually) | Repair of hydropower plant or other facilities |
| Miscellaneous service vehicles (*e.g.* welding truck) | Rarely (not annually) | Service or repair of hydropower plant or other facilities |

***Routine Road Maintenance***.—Activities for routinely maintaining action area roads are proposed on an as-needed basis and include grading exposed dirt and restoring gravel surfaces to ensure proper drainage, paving or patching existing paved roads, cleaning culverts and ditches, and vegetation trimming and clearing along roads. Instream-maintenance activities proposed to occur within the wet crossing include preventing vegetation establishment and pool formation (United 2015b). Vegetation maintenance is proposed using hand tools and herbicides (United 2017). The primary reoccurring vegetation removal activity proposed in the wet crossing is cattail removal using hand tools, while other species that may colonize the area include mulefat, coyote brush, willow and herbaceous grass species (United 2017). Vegetation management associated with road maintenance activities is proposed to comply with the Vegetation and Noxious Weed Management Plan (United 2010) that is required by Article 4(e), Condition No. 18(b) in Appendix A of the Order Issuing the New License dated September 12, 2008. United proposed vegetation clearance distances around Project roads and facilities (see Figure 1) are described in Table 1 of the LRMP to reduce the risk of wildfire, and are conducted on a quarterly frequency (United 2016b). The guidelines that were used to develop fire management for Project roads were derived from the Los Padres National Forest Land Management Plan (USDA 2005) and Ventura County Zoning and Fire Ordinances.

***Road Rehabilitation/Relocation.***—United proposes to rehabilitate unsafe roadway conditions or address other concerns that may affect the integrity of Project roads. Gates or other access control measures may be installed to achieve resource protection or facility security. United will install and maintain traffic controls and road features (*e.g.*, turnouts) to provide adequate warning and protection from hazards associated with use of Project roads. If rehabilitation or relocation of a Project road is necessary, then the road design would conform to the standards and

specifications required by the Ventura County Public Works Agency. The rehabilitation or relocation would also be consistent with requirements contained in any applicable plans and the FERC license. United would obtain FERC approval as well as any other required approvals prior to rehabilitating or relocating any Project roads.

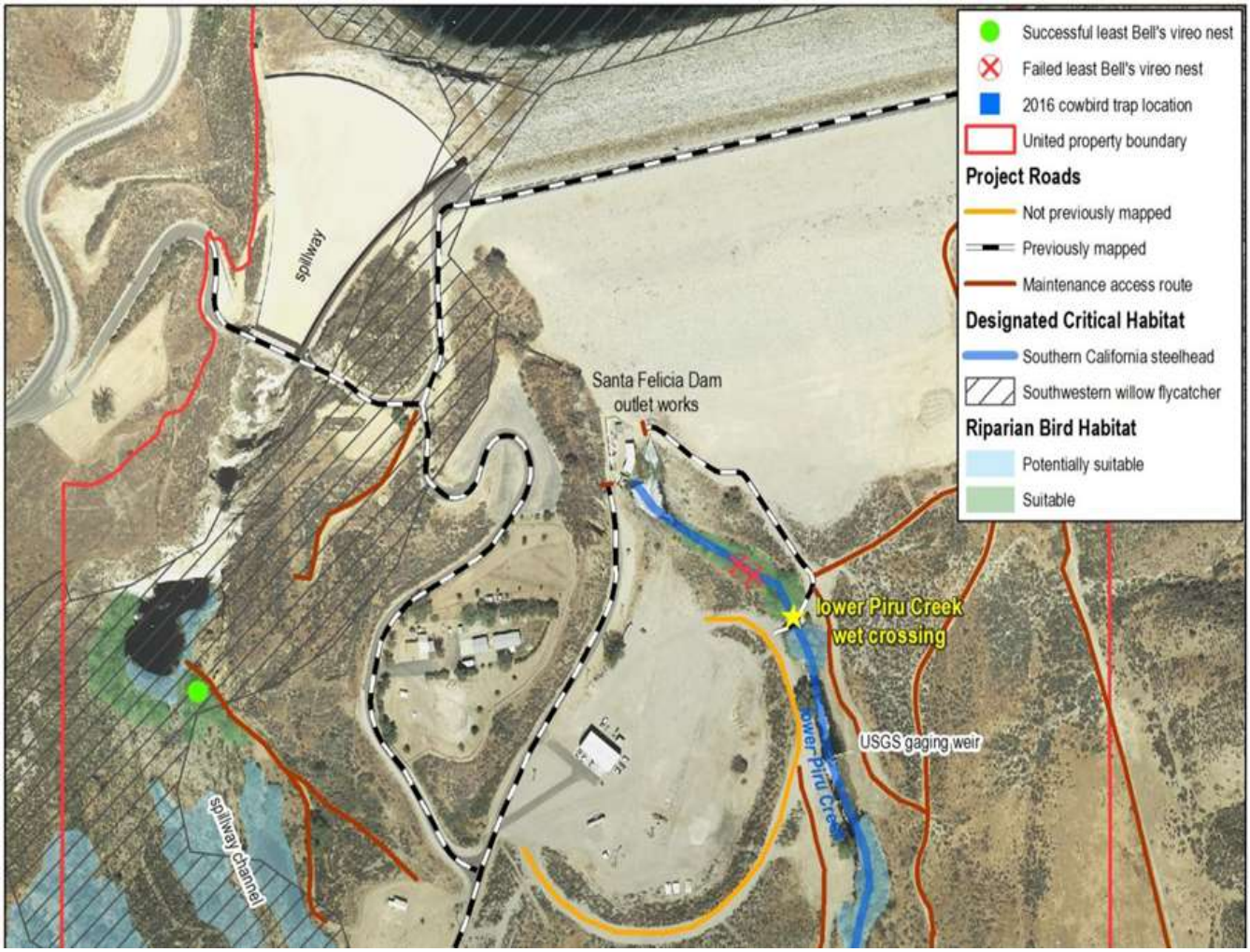


**Figure 1.** Map showing locations of Project roads, the wet crossing and designated critical habitat for endangered steelhead (United 2016a).

***Protection Measures.***—The proposed action incorporates a number of measures that are intended to minimize adverse effects on steelhead. A summary of these measures follows, including a list of proposed revegetation and habitat improvement activities (Table 1-2). Readers wanting additional details regarding the proposed protection measures are referred to the BA.

- When possible, vehicles will not cross the creek between January 1 and May 31 (which the BA described as the steelhead spawning season). When vehicles do need to cross during this time period, a qualified biologist will visually inspect the wet crossing to ensure that no steelhead or redds (*i.e.*, steelhead nest) are in the path of the vehicle. If steelhead are present, the biologist will use seine nets to encourage fish to move out of

the wet crossing area. The wet crossing will not be used if an unavoidable redd is in the crossing.

- If use of the wet crossing is unavoidable during steelhead spawning season and excessive sedimentation is reasonably expected to occur, a qualified biologist will conduct a redd survey on lower Piru Creek between the wet crossing and United's property line downstream. If a redd is observed, and use of the wet crossing is unavoidable, (weed-free) hay bales or other features that allow settling or capture of suspended solids will be deployed and anchored. United staff will monitor the wet crossing for excessive accumulation of fine sediments. The number of crossings made will be minimized as much as possible.
- When multiple repeated crossings are required within a short period of time (*e.g.*, during a week-long project with multiple daily crossings), qualified biologists will use seines to encourage fish to move out of the crossing area, and then deploy exclusion netting upstream and downstream of the wet crossing for the duration of the project. The crossing will be surveyed after deployment of exclusionary fencing, and seines or dip nets will be used to remove fish that may remain within the crossing area.
- Vehicles crossing the creek will travel as slowly as possible to allow any steelhead that may be present on or near the wet crossing to move away from the vehicle.
- Within the width of the creek crossing, United will discourage the establishment of habitat that may encourage steelhead spawning and rearing within the wet crossing itself.
- United will develop and implement SOP for the use of the wet crossing and will inform all employees, contractors, and other potential road-crossing users of the SOP.
- United will install and maintain signs at the wet crossing notifying vehicle operators to follow United's SOP.

**Table 1-2.** Revegetation and habitat improvement measures that are part of the proposed action for the purpose of minimizing vegetation management impacts (United 2010).

| Description of measure | Intent of measure |
|---|---|
| Implement revegetation activities using native plants | Restore native plant populations disturbed by Project operations and reduce erosion |
| Implement soil protection in areas where vegetation management activities occur | Control erosion |
| Use clean, locally collected seed for broadcast seeding and hydroseeding | Establish native, weed-free vegetation that prevents erosion |
| Use pole cuttings or stakes (*i.e.*, willow, cottonwood, mulefat) in riparian areas | Restore Piru Creek riparian vegetation in areas disturbed by vegetation management |
| Use container stock for trees and shrubs (*i.e.*, native trees such as oak or walnut) | Increase likelihood of establishment for species that don't root readily from cuttings |
| Clearly delineate all revegetation areas | Ensure that they are not inadvertently treated with chemical/mechanical controls |
| Conduct revegetation activities in the winter or early spring | Take advantage of natural precipitation to increase plant survival |
| Implement habitat improvement measures where impacts cannot be avoided | Minimize impacts to existing native habitat |

"Interrelated actions" are those that are part of a larger action and depend on the larger action for their justification. "Interdependent actions" are those that have no independent utility apart from the action under consideration (50 CFR 402.02). There is no interrelated or interdependent action associated with the proposed action based on NMFS' review.

## 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. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features" (81 FR 7214; February 11, 2016).

The designation of critical habitat for steelhead uses the term primary constituent element (PCE) or essential features. The new critical habitat regulations (81 FR 7414; February 11, 2016) replace 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.

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

- Identify the rangewide status of the species and critical habitat expected to be adversely affected by the proposed action.
- Describe the environmental baseline in the action area.
- Analyze the effects of the proposed action on both species and their habitat using an "exposure-response-risk" approach.
- Describe any cumulative effects in the action area.
- Integrate and synthesize the above factors by: (1) Reviewing the status of the species and critical habitat; and (2) adding the effects of the action, the environmental baseline, and cumulative effects to assess the risk that the proposed action poses to species and critical habitat.
- Reach a conclusion about whether species are jeopardized or critical habitat is adversely modified.
- If necessary, suggest a reasonable and prudent alternative (RPA) to the proposed action.

Information submitted by FERC and reviewed by NMFS included the following documents: (1) the BA for the proposed action dated September 19, 2016; (2) the modified Land Resources Management Plan dated September 2016; and (3) the Vegetation and Noxious Weed Management Plan dated September 12, 2008. NMFS relied on relevant ecological literature, documented in the official record for the proposed action, to inform the assessment of potential effects on threatened steelhead and designated critical habitat.

## 2.2 Rangewide Status of the Species and Critical Habitat

This opinion examines the status of endangered SC 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. The following information summarizes the status of SC steelhead.

### 2.2.1 Status of the Species

*Oncorhynchus mykiss*, an anadromous or ocean-going form of rainbow trout, are native to Pacific Coast streams from Alaska to California and have decreased significantly from their historic levels (Swift *et al.* 1993). The listed unit of anadromous *O. mykiss* is termed a "distinct population segment" or DPS (NMFS 2006), and the listed unit contains several fish-bearing watersheds. The DPS recognizes only the anadromous *O. mykiss*. In accordance with the listing decision, this biological opinion solely uses the DPS terminology and provides NMFS' conclusion as to the likelihood of jeopardy to the species based only on effects to the listed DPS. This biological opinion analyzes the effects of the proposed action on the following listed DPS and designated critical habitat, which occur in the action area:

| Salmonid Species | ESU/DPS Name | Original Listing | Revised Listing(s) | Critical Habitat Designation |
|---|---|---|---|---|
| Steelhead (*O. mykiss*) | Southern California DPS | FR Notice: 62 FR 43937<br>Date: 08/18/1997 | FR Notice: 71 FR 834<br>Date:01/05/2006 | FR Notice: 70 FR 52488<br>Date: 09/02/2005 |

The geographic range of this DPS extends from the Santa Maria River, near Santa Maria, to the California–Mexico border (NMFS 1997, 2006), which represents the known southern geographic extent of the anadromous form of *O. mykiss*. NMFS described historical and recent SC steelhead abundance and distribution through a population characterization (Boughton *et al.* 2006). Surveys in Boughton *et al.* (2005) indicate between 58 percent and 65 percent of the historical steelhead basins currently harbor *O. mykiss* populations at sites with connectivity to the ocean. Most of the apparent losses of steelhead were noted in the south, including Orange and San

Diego counties (Boughton *et al.* 2005). The majority of losses (68 percent) of steelhead were associated with anthropogenic barriers to steelhead migration (*e.g.*, dams, flood-control structures, culverts, *etc.*). Additionally, the authors found the barrier exclusions were statistically associated with highly-developed watersheds. While 46 drainages support this DPS, only 10 population units possess a high and biologically plausible likelihood of being viable and independent[1] (Boughton *et al.* 2006).

Extremely small (<10 fish) but surprisingly consistent annual runs of steelhead are currently being monitored across a limited but diverse set of drainages within the range of this DPS (Williams *et al.* 2011). A relatively large number of adult steelhead were observed in 2008, two years after an extended wet spring that presumably gave smolts ample opportunity to migrate to the ocean.

The most recent status review of SC steelhead (NMFS 2016a) found little evidence that the biological status of the overall population changed. The extended drought and the recent genetic data documenting the high level of introgression and extirpation of native *O. mykiss* stocks in the southern portion of the DPS has elevated the threats level to the already endangered populations. As a result, the review concluded that the SC steelhead DPS should continue to be listed as an endangered species.

### 2.2.2 General Life History of Steelhead

The major freshwater life-history stages of steelhead involve spawning, incubation of embryos, freshwater rearing, emigration of juveniles, estuary rearing, smoltification, and upstream migration of adults. Steelhead juveniles typically rear in freshwater for 1 to 4 years before migrating to the ocean, usually in the spring, and spend 1 to 3 years in the marine environment before returning to rivers and streams to spawn. Steelhead grow and reach maturity at age 2 to 5 while in the ocean. This ocean-going life history pattern, known as anadromy, leads to more rapid growth than can be accomplished by non-anadromous individuals that spend their entire life in freshwater. The discussion of the steelhead life history below begins with the adult stage entering freshwater to spawn.

In southern California, adult steelhead typically immigrate to natal streams for spawning during December through May. Spawning adults enter freshwater during winter and spring freshets when streamflow is sufficient to breach sandbars that form at river mouths. Adults may migrate several to hundreds of kilometers in some watersheds to reach their spawning grounds. Although spawning may occur during December to June, the specific timing of spawning may vary a month or more among streams within a region. Steelhead exhibit an iteroparous life history type, unlike many of the other Pacific salmon (*Oncorhynchus* spp.), which means adult steelhead are capable of surviving after spawning and have the ability to migrate downstream as post-spawned adults (*i.e.*, kelts) to the ocean and make subsequent spawning migrations. Individual steelhead have been observed repeating their spawning migration up to four times (Shapovalov and Taft 1954).

[1] Independent population: a collection of one or more local breeding units whose population dynamics or extinction risk over a 100-year time period is not substantially altered by exchanges of individuals with other populations (Boughton *et al.* 2006).

Female steelhead select spawning sites based on a variety of factors, including substrate size, water velocity, depth, and temperature. Females dig their nests in the riffle crests that form at the tailouts of complex pools with suitable gravel-cobble substrate and adequate instream cover. Spawning involves courtship between the female constructing the redd and one or more suitable males. Egg pockets are excavated in gravel-cobble substrates at a mean depth of about 20-centimeters (cm) (Sheutt-Hames *et al.* 1996). When the depth of the redd and the coarseness of the gravel meet the female's criteria, and she is courted by an acceptable male, she will release her eggs (Quinn 2005). Successful egg burial occurs immediately following fertilization by the male. In order to cover the embryos with a layer of clean gravel, the female digs a new egg pocket upstream of the pocket containing the fertilized eggs and the excavated, clean gravels and cobbles are swept downstream by the current to bury the embryos. Depending on the size of the female and the number of eggs deposited in each pocket, the spawning pair may continue to excavate new egg pockets in an upstream fashion enlarging the overall size of the redd. The developing embryos incubate in the substrate for a period of 3 to 8 weeks prior to hatching.

Streams are the initial rearing habitats for juvenile steelhead from the time they emerge from the gravel to the pre-smolt stage when juveniles have grown large enough to begin their seaward migration. Alevins, juveniles with an external yolk sac still attached, emerge from redds about 2 to 6 weeks after hatching in the gravel egg pocket. When the yolk sac is fully utilized, juvenile steelhead are classified as fry. Steelhead fry forage along low-velocity channel margins and utilize gravel-cobble substrate and instream vegetation for cover. Juveniles tend to congregate in schools, but as they grow these schools break up and the fish (now called parr) spread throughout the stream, selecting individual territories with access to adequate cover and food (Shapovalov and Taft 1954). Preferred territories are commonly associated with deep pools, instream large woody debris (LWD), boulder clusters, riparian and instream vegetation, undercut stream banks and deeper riffle/run feeding habitats. During the summer and fall low-flow season, parr make seasonal movements in search of perennial stream reaches with suitable water quality and food availability. Habitats formed by scour (*i.e.*, pools) associated with boulders, LWD, and intact rootwads are the preferred areas where SC steelhead parr over-summer (Spina 2003, Spina *et al.* 2005, Boughton and Goslin 2006). During winter high-flow events, juveniles seek low velocity, off-channel habitats such as backwater pools, side channels, and inundated woody riparian vegetation that serve as refugia (Shapovalov and Taft 1954, Solazzi *et al.* 2000).

The physiology of salmonids (salmon and steelhead) prepares them for seaward migration and estuary rearing. Steelhead have the most flexible freshwater life history of any of the Pacific salmonids such that emigration instincts are not obligate. While most steelhead go to sea before maturing, some individuals of both sexes spawn (with anadromous or resident life forms) before going to sea, while others complete their life cycles without going to sea at all (McPhee *et al.* 2007, Christie *et al.* 2011). Transformation of steelhead parr into smolts (*i.e.*, smoltification) is the physiological preparation for ocean residence and includes changes in shape and color, osmoregulation (salt balance) and energy storage (Quinn 2005). Larger individuals in good condition tend to migrate to sea in the spring, whereas smaller individuals are more likely to remain in freshwater or reside in estuarine habitats. Estuaries encompass a wide range of habitat types including riparian edge, brackish-freshwater ecotone, slough, and open water environments. Estuaries play an important role in steelhead life history prior to ocean entry,

providing nutrient rich feeding areas, transition to seawater, and predator avoidance. Some steelhead populations rear in estuaries for months (Bond *et al.* 2008), but patterns of estuarine entry and use likely differ between regional watersheds based on estuary size, habitat complexity, smolt size, tidal influence, water quality and food availability.

### 2.2.3 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, temperature, and chemistry must be appropriate for adult and juvenile migration. Suitable water depth and velocity, and substrate composition are the primary requirements for spawning. Water quality parameters including dissolved oxygen concentration, pH, and water temperature are factors affecting survival of incubating embryos. The presence of spaces between large substrates is important for maintaining water-flow through the redd as well as dissolved oxygen levels within the redd. These spaces can become fouled 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 refugia from predators, such as submerged 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 are often utilized during the seaward migration of steelhead, as these habitats can 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 steelhead physiology begins to change as smolts become acclimated to saltwater.

### 2.2.4 Status of Designated Critical Habitat

Critical habitat for the SC DPS encompasses about 1140-kilometres (km) of stream habitat within part of San Luis Obispo County, and Santa Barbara, Ventura, Los Angeles, Orange and San Diego counties from the Santa Maria River Hydrologic Unit south to the San Juan Hydrologic Unit (70 FR 52488; September 2, 2005).

Habitat for steelhead has suffered destruction and modification, and anthropogenic activities have reduced the amount of habitat available to steelhead (Nehlsen *et al.* 1991, NMFS 1997, Boughton *et al.* 2005, NMFS 2006, NMFS 2012a). In many watersheds throughout the range of the SC DPS, the damming of streams has precluded steelhead from hundreds of kilometers of historical spawning and rearing habitats (*e.g.*, Twitchell Reservoir within the Santa Maria River watershed, Bradbury Dam within the Santa Ynez River watershed, Matilija Dam within the Ventura River watershed, Rindge Dam within the Malibu Creek watershed, Pyramid Dam and Santa Felicia Dam on Piru Creek). These dams create physical barriers and hydrological impediments for adult and juvenile steelhead migrating to and from spawning and rearing habitats. Likewise, construction and ongoing impassable presence of highway and railway projects have rendered habitats inaccessible to adult steelhead (Boughton *et al.* 2005, NMFS 2012a). Within stream reaches that are accessible to this species (but that may currently contain no fish), urbanization (including effects due to water exploitation) have in many watersheds eliminated or dramatically reduced the quality and amount of living space for juvenile steelhead.

The number of streams that historically supported steelhead has been dramatically reduced (Good *et al.* 2005). Groundwater pumping and diversion of surface water contribute to the loss of habitat for steelhead, particularly during the dry season (*e.g.*, NMFS 2005a, see also Spina *et al.* 2006). The extensive loss and degradation of habitat is one of the leading causes for the decline of SC steelhead abundance and listing of the species as endangered (NMFS 1997, 2006).

A significant amount of estuarine habitat has been lost across the range of the DPS with an average of only 22 percent of the original estuarine habitat remaining (NMFS 2016a). The condition of these remaining wetland habitats is largely degraded, with many wetland areas at continued risk of loss or further degradation. Although many harmful practices have been halted, much of the historical damage remains to be addressed and the necessary restoration activities will likely require decades. Many of these threats are associated with the larger river systems such as the Santa Maria, Santa Ynez, Ventura, Santa Clara, Los Angeles, San Gabriel, Santa Ana, San Luis Rey, Santa Margarita, San Dieguito, and San Diego rivers, but they also apply to smaller coastal systems such as Malibu, Topanga, San Juan, and San Mateo creeks. Overall, these threats have remained essentially unchanged for the DPS as determined by the last status review (NMFS 2016a) though some individual, site specific threats have been reduced or eliminated as a result of conservation actions such as the removal of small fish passage barriers.

**Table 2-1.** Physical or biological features critical to the conservation of sites determined essential to support one or more life stages of steelhead (NMFS 2005a).

| Physical or Biological Features | Physical and Biological Characteristics | Essential to Conservation |
|---|---|---|
| Freshwater spawning sites | With water quantity and quality conditions and substrate supporting spawning, incubation and larval development. | Without these features the species cannot successfully spawn and produce offspring. |
| Freshwater rearing sites | With water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; water quality and forage supporting juvenile development; and natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks. | Without these features juveniles cannot access and use the areas needed to forage, grow, and develop behaviors (*e.g.*, predator avoidance, competition) that help ensure their survival. |
| Freshwater migration corridors | Free of obstruction and excessive predation with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival. | Without these features juveniles cannot use the variety of habitats that allow them to avoid high flows, avoid predators, successfully compete, begin the behavioral and physiological changes needed for life in the ocean, and reach the ocean in a timely manner; and steelhead adults in a non-feeding condition cannot successfully swim upstream, avoid predators, and reach spawning areas on limited energy stores. |
| Estuarine areas | Free of obstruction and excessive predation with water quality, water quantity, and salinity conditions supporting juvenile and adult physiological transitions between fresh- and saltwater; natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, and side channels; and juvenile and adult forage, including aquatic invertebrates and fishes, supporting growth and maturation. | Without these features juveniles cannot reach the ocean in a timely manner and use the variety of habitats that allow them to avoid predators, compete successfully, and complete the behavioral and physiological changes needed for life in the ocean; and these features provide a final source of abundant forage for adult steelhead that will provide the energy stores needed to make the physiological transition to fresh water, migrate upstream, avoid predators, and develop to maturity upon reaching spawning areas. |

### 2.2.5 Influence of a Changing Climate on the Species

One factor affecting the rangewide status of SC endangered steelhead, and aquatic habitat at large, is climate change. Within the Southwest region (partially occupied by the SC DPS of steelhead), the average temperature has already increased roughly 1.5°F compared to a 1960-1979 baseline period. High temperatures will become more common, indicating that SC steelhead may experience increased thermal stress even though this species is capable of enduring higher than preferable body temperatures (Spina 2007).

Precipitation trends are also important to consider. The Southwest region showed a 16 percent increase in the number of days with heavy precipitation from 1958 to 2007. Potential impacts to SC steelhead in freshwater streams include redd scour and washing away of incubating eggs due to higher winter stream flow (USGCRP 2009), and poor freshwater survival due to longer and warmer periods of drought (Hanak *et al.* 2011, Mastrandrea and Luers 2012), which may lead to lower host resistance of steelhead to more virulent parasitic and bacterial diseases (McCullough 1999, Marcogliese 2001). Snyder and Sloan (2005) projected mean annual precipitation in central western California to decrease by 1.6 cm (2.8 percent) by the end of the 21st century.

Changes in vegetation patterns for this region will include substantial increases in the amount of grassland and decreases in most other vegetation communities (*e.g.*, chaparral, coastal scrub, oak woodland, and foothill pine). Estuarine productivity is likely to change based on changes in freshwater flows, nutrient cycling, and sediment amounts (Scavia *et al.* 2002). Additionally, upper ocean temperature is the primary physical factor influencing the distribution of steelhead in the open ocean, and a warming climate may result in a northward shift in steelhead distribution (Myers and Mantua 2013).

## 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 Santa Felicia Hydroelectric Project is located on Piru Creek in east-central Ventura County, about 9.7-km upstream of its confluence with the Santa Clara River, and 58 total river km from the ocean. Santa Felicia Dam is a 61-meter (m) high and 384-m long earthen dam. United operates and maintains a variety of access roads and facilities within the action area, including but not limited to: the dam outlet works, a shop, helipads, fueling stations, and a hydropower plant (Figure 2). One section of Project road crosses lower Piru Creek about 92-m downstream of the Santa Felicia Dam outlet works. The wet crossing is about 4.6-m wide and 6.1-m long located entirely within a run habitat type. The wet crossing substrate consists mostly of medium sized cobbles (United 2016a). Riparian and wetland vegetation fringes the upstream and downstream extent of the wet crossing.


**Figure 2.** Map of the action area (United 2016a). Note the action area extends about 100m downstream of FERC boundary. The downstream FERC boundary is where United's property ends and Rancho Temescal's property begins.

The action area encompasses lower Piru Creek and its riparian corridor extending about 500-m downstream of the Santa Felicia Dam outlet works. A United States Geological Survey (USGS) gaging station and concrete weir exist about 223-m downstream of the outlet works. United releases water from Lake Piru via the Santa Felicia Dam outlet works into lower Piru Creek, where it flows downstream to the Santa Clara River. As described in greater detail in Section 2.5, NMFS expects the effects of the action (*i.e.*, elevated turbidity and siltation) to extend no greater than 50-m downstream of the FERC Project boundary because the activities disturbing vegetation and sediment are confined to the Project road maintenance area (see Figure 1).

## 2.4 Environmental Baseline

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 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process (50 CFR 402.02).

### 2.4.1 Status of Designated Critical Habitat in the Action Area

While the reach of Piru Creek extending 500-m downstream of Santa Felicia Dam has the potential to support spawning and rearing steelhead (United 2016a), effects due to past and current dam-related flow alterations in the creek (see NMFS 2008) reduce the functional value of critical habitat. All lower Piru Creek within the action area is designated critical habitat which consists of a meandering pool, riffle and run stream morphology (United 2013a). The dominant riparian plant species that grow within the action area are cattails, willows, cottonwood trees, and mulefat. Figure 2 shows the riparian corridor has been disturbed in the action area owing to dam maintenance and road construction, and is less disturbed and more densely vegetated downstream of the FERC Project boundary. Streambed material throughout the action area is composed of cobble, gravel and fines, and is often covered with a layer of filamentous algae (United 2015a, 2016a). The stream is perennial, with the lowest flows occurring during the summer and fall, except when United conducts "conservation releases" in the fall to recharge the aquifer. Per NMFS' 2008 biological opinion on the issuance of a new license to United for the operation of the Santa Felicia Hydroelectric Project (NMFS 2008), United releases 0.198 – 0.566 cubic meters per second (cms, or 7 – 20 cubic feet per second) year-round to maintain SC steelhead critical habitat in lower Piru Creek and 5.66-cms (200-cfs) during and after large storm events to enhance migration. PBFs of critical habitat for juvenile steelhead rearing (see Table 2-1) exist within the action area, but are of limited quality because Santa Felicia Dam operation has affected critical habitat by attenuating peak winter and spring discharges that are necessary to scour aquatic algae and fines from the substrate, and promote pool development. The PBFs for spawning habitat in the action area are degraded owing to the presence of Santa Felicia Dam and its effect on disrupting the sediment transport regime and moderating downstream streamflow necessary to mobilize the coarse bed material. Pool tailouts are the preferred spawning sites for steelhead, and based on available information there appear to be numerous pool tailouts within the action area where steelhead are most likely to construct redds. Santa Felicia Dam, which is a complete migration barrier to steelhead migration, is situated just upstream of the action area.

A draft Lower Piru Creek Habitat Improvement Plan (HIP) has been developed by United to minimize the geomorphic effects of Santa Felicia Dam and its operations on the quality and quantity of habitat for steelhead in Piru Creek. The HIP is a requirement of the FERC license for the Santa Felicia Hydroelectric Project and RPA 1(c) contained in NMFS' May 5, 2008, biological opinion. The proposed habitat restoration activities in the HIP include gravel augmentation, riparian revegetation, construction of a multi-threaded channel for high-flow refugia, in-channel rootwad installation to increase habitat complexity, wing deflectors to create scour pools, streambank erosion reduction measures and construction of riparian benches to

improve creek shading. Because the HIP is still under development, the benefits to lower Piru Creek and its associated riparian haven't manifested yet.

### 2.4.2 Status of Steelhead in the Action Area

Steelhead abundance and spatial distribution have diminished throughout the Piru Creek action area as a result of anthropogenic activities, including in-channel habitat blockages and operation of water storage-diversion projects (NMFS 2008, NMFS 2012a).

In summer 2015, juvenile *O. mykiss* abundance was surveyed by snorkeling the 0.37-km study reach of the action area (United 2015a). Total number of juvenile *O. mykiss* observed within individual habitat units ranged from 0 to 10 individuals. Of the eight habitat units surveyed, seven had *O. mykiss* (4 pools, 2 runs, 1 riffle), with a total of 38 *O. mykiss* observed. All pools were occupied by *O. mykiss*. The estimated size of individuals observed ranged from about 10.2-cm total length (TL) up to 30+ cm TL, suggesting multiple age/year classes were present including young of the year. United's survey results suggest that there are about 103 *O. mykiss* per kilometer in lower Piru Creek where similar habitat characteristics to the study reach exist. Adult steelhead may occur within the action area during the spawning season when use of the wet crossing is proposed. Although NMFS is not aware of any comprehensive redd count surveys conducted in lower Piru Creek to identify steelhead spawning activity, *O. mykiss* redds have been documented in the action area (United 2013b, United 2015a).

### 2.4.3 Factors Affecting Species Environment in the Action Area

The damming of Piru Creek through construction of Santa Felicia Dam (and Pyramid Dam) blocks steelhead from historical spawning and rearing habitat because the dam was constructed without consideration for fish passage (NMFS 2012a). The amount of historical spawning and rearing habitat rendered unavailable to this species is substantial. Santa Felicia Dam blocks 95 percent of steelhead habitat within the Piru Creek watershed; more than 48-km of stream lies between Santa Felicia Dam and Pyramid Dam alone (NMFS 2008).

Lake Piru and Pyramid Lake within the Piru Creek watershed capture and then store winter and spring runoff and alter the pattern and magnitude of discharge in lower Piru Creek (Bureau of Reclamation and United Water Conservation District 2005). The flow alteration is consistent with other reported effects of dam operation on streamflow (*e.g.*, Richter *et al.* 2003). Altering the pattern and magnitude of discharge reduces PBFs of critical habitat such as freshwater rearing and spawning sites because flows sufficient to scour the streambed and transport spawning gravels from upstream areas do no frequently occur during winter and spring. The impoundment of Lake Piru and its associated recreational facilities and introduction of invasive species into the Piru Creek sub-watershed are ranked by NMFS as very high priority threats to endangered steelhead (NMFS 2012a).

Activities related to agriculture and grazing have contributed to declines in steelhead abundance (Good *et al.* 2005, NMFS 2012b, NMFS 2016a). Within the action area, agriculture occurs along the riverbanks, and within the floodplain, and during the wet season probably contributes sediment-water slurry and residual pesticides to Piru Creek and therefore critical habitat for

steelhead. Cattle grazing observed along Piru Creek is expected to create conditions that are harmful to steelhead and their habitat, given the reported effects of grazing on aquatic habitats (Wohl and Carline 1996). The Southern California Steelhead Recovery Plan lists agricultural effluents as a medium threat to steelhead and their designated critical habitat in lower Piru Creek (NMFS 2012a). Rancho Temescal operates two water pumps in the creek, which reduce the amount and extent of surface flow and impact living space for endangered steelhead (*e.g.*, NMFS 2013).

## 2.5 Effects of the Action

Under the ESA, "effects of the action" means the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR 402.02). Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur.

### 2.5.1 Disturbance to Steelhead

Although vehicles crossing the creek have the potential to injure or kill juvenile (*i.e.*, parr) steelhead by crushing them, United will apply several measures intended to avoid adult and juvenile steelhead and vehicle interactions. United will survey the crossing area for Southern California Steelhead and, if they are present, United will use seine nets to herd steelhead away from the crossing. When multiple crossings are required, United will use seine nets to herd steelhead and establish exclusion netting once steelhead are removed from the crossing area. NMFS expects these measures will be largely successful because little instream cover currently exists in the crossing area owing to maintenance activities, making steelhead herding and exclusion efforts relatively efficient. However, when multiple trips are needed, NMFS anticipates a few juvenile steelhead may return to the crossing area after herding efforts and in-between vehicle crossings.[2] To avoid injury or mortalities in this situation, exclusion netting will be used and any fish trapped within the crossing area by the nets will be captured and relocated. Effects on captured and relocated steelhead are described below.

Implementation of the proposed protection measures to avoid use of the crossing during times when redds are constructed within the wet crossing is expected to reduce the potential for adverse effects to buried (*i.e.*, immobile) steelhead eggs and developing embryos. United proposes that vehicles will avoid use of the wet crossing between January 1 and May 31 to decrease the chances of vehicle interactions with steelhead spawning sites. If a vehicle needs to cross Piru Creek during this time period, United will have a qualified biologist visually inspect the wet crossing to ensure steelhead and redds do not occur in the crossing. The wet crossing will not be used if United's biologist observes a redd in the crossing. Because steelhead begin spawning in December, NMFS expects no more than one redd is likely to be present in the crossing area in December of some years. Our estimate of one redd is based on the small size of the crossing area and the low number of steelhead expected at the beginning of the spawning season. This redd would likely be crushed by any vehicles using the crossing in December.

[2] Adults, because they are much larger than juveniles and no cover exists for them at the crossing site, will be easily seen and herded

Although United proposes to avoid use of the wet crossing during much of the steelhead spawning season, the proposed action does not include a provision to protect steelhead redds constructed during the beginning of the spawning season (*i.e.*, December).

Steelhead relocation efforts are expected to minimize impacts to juvenile steelhead by removing individuals from the wet crossing where vehicle disturbance may cause injury or mortality. As described in Section 1.3 of the proposed action, after the exclusion netting is installed United proposes to remove any fish that remain within the crossing area using seines and dip nets. Exclusion netting will be maintained for the duration of projects anticipated to require multiple daily vehicle crossings.

While the benefits of steelhead relocation can typically outweigh any harm that may be caused to the species, the potential exists that steelhead could be harmed, injured or killed during relocation efforts. For instance, steelhead mortality or injury can result from accidental descaling during capture, entanglement in block nets, transport complications, temperature shock, overcrowding or release into habitat with unsuitable water quality. Based on NMFS' familiarity with past projects that set up exclusionary fences (or block nets) in steelhead-bearing streams, it is not uncommon for juveniles to become impinged by streamflow against the cross-channel structure that is intended to exclude fish from the work area. NMFS anticipates a very small number of juveniles are likely to become impinged, likely 1 percent of those in the area within exclusion netting. The problem of impingement can often be resolved with frequent checks of the exclusionary devices, but the proposed action does not fully describe any measures to ensure the exclusionary devices remain securely anchored in place and do not entangle or impinge juvenile steelhead. Additionally, although United proposes to capture and relocate juvenile steelhead from the action area, the proposed action does not include a provision to notify NMFS of the number of steelhead that are captured, harmed or injured as a result of the proposed action.

Based on United's survey results and anecdotal observations of juvenile *O. mykiss* and redds in the Piru Creek action area, NMFS expects no more than 30 juvenile steelhead will be relocated on an annual basis. NMFS expects that no more than 2 juvenile steelhead may be injured or killed on an annual basis as a result of the proposed action. This estimated mortality is based on NMFS' experience and knowledge gained from similar projects in Ventura County. Potential sources of injury and mortality related to the proposed action included in our analysis are capture-related injury and entanglement and/or impingement against the exclusionary netting. Based on NMFS' familiarity of steelhead abundance in southern California in general, and Ventura 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 species abundance within the overall watershed-specific population and the entire SC DPS of endangered steelhead.

### 2.5.2 Physical Disturbance to the Creekbed due to Crossing Maintenance and Use

Continued use and maintenance of the 4.6-meter wide wet crossing is not expected to diminish the value of the action area as a freshwater migration corridor for steelhead. Because construction of in-channel hard structures (*i.e.*, concrete) are not included as part of the proposed

action, formation of a migration barrier is not expected at the wet crossing. Use of the wet crossing is expected to continue the existing reduction in natural channel roughness owing to the compaction of gravels and cobbles within the crossing, but this alteration is not expected to create a velocity barrier for steelhead or significantly alter the water-column depth.

Proposed heavy equipment use of the wet crossing is expected to continue to compact stream substrates and has the potential to impair steelhead spawning habitat within the 28 square meter (4.6-m wide by 6.1-m long) extent of the wet crossing. The proposed action indicates heavy equipment use of the wet crossing is not required annually; however, the substrate compaction disturbance within the wet crossing has the potential to represent a chronic effect (*i.e.*, lasting 2 years or longer) owing to the infrequency of flushing or channel-shaping flows below Santa Felicia Dam (Cardno 2012). United's surveys (2013a, 2015) and NMFS' observations (R. Bush, personal observation, 2016) indicate additional habitat for steelhead spawning is available elsewhere in Lower Piru Creek, but is not extensive. NMFS anticipates that substrate compaction in the wet crossing will not adversely affect steelhead spawning distribution or success in the action area based on the following: 1) available habitat data indicates the wet crossing is classified as a run (United 2013a), 2) five pool tailouts (*i.e.*, preferred spawning sites) exist within the upper 400-m surveyed portion of the action area (United 2013a), and 3) proposed protection measures require surveying the wet crossing for redds and avoiding use of the crossing if spawning does occur there (United 2016a).

Wet crossing maintenance proposed by United has the potential to modify or eliminate certain steelhead rearing habitat in the action area under certain circumstances. More specifically, in the event of storm scour, United proposes in-channel maintenance in the wet crossing to prevent pool formation that may attract juvenile steelhead (United 2015b). Preventing habitat formation is considered an adverse effect to critical habitat because pools are important rearing areas for juvenile steelhead; pools can provide sufficient depth for escaping predators and inhospitable temperature, and areas of foraging. Preventing pool formation artificially simplifies channel structure, reduces water-column depth, and increases velocity, and thus the diversity of habitat available to different steelhead life history stages (Fausch 1993). Because the proposed maintenance activity would only occur as the result of a large storm, and streamflow below Santa Felicia Dam is regulated, this type of maintenance is expected infrequently. However, the proposed action provides no indication that United has included a measure to minimize the effects of preventing pool formation on steelhead or designated critical habitat for this species.

Wet crossing maintenance is not expected to cause adverse effects to individual juvenile steelhead. Based on recent United (2013a) survey data, there is currently a low density of juvenile steelhead (< 0.1 fish/meter) inhabiting the upper 400-m of the action area, and the steelhead are spread out throughout the action area in pools, riffles and runs. Furthermore, there were no steelhead observed inhabiting the wet crossing run habitat when the survey was conducted. Because there is suitable pool rearing habitat both upstream and downstream of the wet crossing that is under-seeded with juvenile steelhead, NMFS anticipates steelhead will continue to occupy more favorable habitat than what is available in the maintained wet crossing.

### 2.5.3 Alteration of Water Quality

In this section, we describe the anticipated alterations of water quality owing to the proposed action and the related consequences for endangered steelhead and critical habitat for this species. In doing so, we begin with a brief description of the sources of the water-quality alterations. Next, we describe the expected type, amount, and extent of the anticipated alterations. Lastly, we summarize the expected effects of the water-quality alterations on endangered steelhead and designated critical habitat.

***Sources of the water-quality alterations***.—The vehicle crossings (described in Table 1-1) and the proposed road-maintenance activities are the sources of the anticipated water-quality alterations in lower Piru Creek. Vehicle use of the Piru Creek wet crossing will agitate the substrate and release fine sediment into the water column that will be transported downstream. Other action area fine sediment sources that are likely to contribute to increased turbidity owing to vehicle crossings include disturbed soils on the road approaching and exiting the wet crossing, and sediment (fines and mud) that is carried into the creek on equipment. Road-maintenance activities such as road resurfacing or grading are expected to disturb the roadbed and create excess fines that may get washed into the creek in areas where Piru Creek is in close proximity to maintained roads. Lastly, proposed Project road rehabilitation/relocation activities described in Section 6.5 of the LRMP (which lack specific details) are expected to have a beneficial effect on steelhead and their designated critical habitat because these activities, if implemented correctly and maintained, are anticipated to improve road drainage, control vehicle access for the benefit of resource protection, and relocate roads farther from the creekbanks.

***Extent, types, and frequency of the alterations.***—Riparian buffers in portions of the action area are expected to protect Piru Creek from elevated turbidity and sedimentation. Based on existing literature, riparian buffers necessary to protect wetlands and streams should be a minimum of 15 to 30-m in width under most circumstances (Castelle *et al.* 1994), and no less than 76-m to fully protect and restore riparian habitat upon which salmonids depend (Pollock and Kennard 1998). Based on the figures in the BA, the Piru Creek reach extending from the Santa Felicia Dam outlet works downstream to the wet crossing (about 100-m) is not expected to be subject to elevated turbidity and sedimentation resulting from Project operations because this section of the action area is not closely bordered by maintained roads. Similarly, Project road generated sediment is unlikely to affect Piru Creek much beyond the FERC Project boundary because the roads are set back from the channel (up to 55-m) and the riparian and upland buffer for about the lowermost 100-m of the action area appears fully intact on the east bank and nearly contiguous on the west bank. The riparian buffer upstream of the wet crossing consists of riparian and upland vegetation types and is generally as wide or wider than the tallest riparian trees occurring in the area. This riparian buffer width is important to ensure that riparian forests return to as close to 100 percent functionality over the long-term as is reasonably possible, and that the future condition of riparian forests does not contribute significantly to the loss of salmonid populations (Pollock and Kennard 1998). Comparatively, the reach downstream of the wet crossing that is expected to experience elevated turbidity and sedimentation does not have an intact riparian buffer, and lacks both riparian and upland vegetation types in heavily impacted areas. As a

result, Project-related sediment has a higher likelihood of entering Piru Creek in the middle section of the action area where both streambanks lack vegetation and extensive areas of soil are exposed (see Figure 2).

Sediment-related effects due to the proposed action are expected to extend from the wet crossing on Piru Creek to the downstream end of the action area (Figure 2). We expect suspended sediment pulses will enter Piru Creek mainly during the wet-season in the form of sediment-slurry runoff from the wet crossing and nearby roads and will be transported throughout the action area. Turbidity observations in other Ventura County creeks downstream of wet crossings suggest turbidity pulses will be temporary (*i.e.*, last no more than a few minutes) and extend less than 50-m based on NMFS' observations (R. Bush, personal observation, 2010, 2011, 2012). As shown in Figure 2, the downstream extent of the road maintenance activities ends at the FERC Project boundary, hence the reason NMFS anticipates the sediment-related effects will be confined to the action area (Figure 2). The action area habitat that is most likely to experience sedimentation[3] is the pool/glide that exists between the wet crossing and the USGS weir a little more than 100-m downstream. This reach has the potential to experience sedimentation because this is a low velocity area subject to sediment input from the wet crossing and adjacent road-maintenance activities on both streambanks that lack riparian buffers.[4] Also, the existing USGS weir that provides real-time creek discharge data indirectly functions as a low-head dam that widens the channel and impounds sediment.

The types and frequency of water quality alterations resulting from the proposed action have the potential to vary based on the activity generating the fine sediment and time of year. The turbidity changes anticipated from the proposed use of the crossing are expected to be temporary, infrequent and involve small pulses of turbid water generated from a crossing vehicle. The proposed frequency for heavy equipment to travel across the wet crossing depends on the maintenance activity. Review of Table 1-1 indicates about 1 to 2 crossings are proposed to occur annually. According to Section 6.6 of the LRMP and Table 1-1 contained in this opinion, the only maintenance activity that occurs annually is weed abatement. This maintenance activity involves up to 7 crossings for pickup trucks and all-terrain vehicles (*i.e.*, ATV/Gator) and a single crossing for a skip loader. Additional ATV crossings have the potential to occur to repair fences and herd stray cattle if these maintenance activities are necessary. Turbidity levels and associated sedimentation anticipated from proposed maintenance of Project roads are expected to be elevated during wet-season runoff, as the result of fines draining into the creek without filtering through an intact riparian corridor. The frequency for sediment runoff from Project roads is weather-dependent, and this effect has the potential to be chronic during a wet year owing to the large amount of road surfaces in the action area.

***Implications for endangered steelhead and designated critical habitat.***—Increased turbidity in the action area owing to use of the wet crossing is likely to be temporary and intermittent, and as a result we anticipate sediment-related effects will not adversely affect steelhead. Loss of egg

[3] Defined as "suspended sediment particles that settle out on the stream substrate, filling interstitial spaces between gravels and cobbles."

[4] Defined as "any vegetation adjacent to waterbodies, that if removed, could result in a measurable change in the physical, chemical or biological properties of the waterbody." Functions include delivering or regulating substantial material or energy inputs, primarily organic matter (*e.g.* LWD), sediment, and thermal energy to streams.

and alevin due to wet crossing sedimentation is unlikely to occur owing to the proposed sediment control measures discussed in Section 1.3 that minimize the magnitude and extent of suspended sediment impacts in Piru Creek. United developed SOP for use of the wet crossing that will reduce the number of crossings and inform vehicle operators on the prescribed speed and approach to minimize sediment disturbance. These measures, including onsite monitoring, will ensure impacts to steelhead will be avoided and, therefore, injury or other adverse effects are unlikely. Based on NMFS' familiarity with similar use of a wet crossing in the SC DPS of steelhead where greater than 200 vehicle crossings are conducted annually, the effects of increased turbidity in Piru Creek owing to the proposed action are not expected to adversely affect steelhead (NMFS 2005b).

Although use of the wet crossing will disturb the substrate and has the potential to affect designated critical habitat, NMFS does not expect adverse effects because any resulting sedimentation is expected to be confined to a small portion of the action area. The disturbance of the wet crossing substrate, predominantly compacted medium-sized cobble containing limited fines (United 2016a), will likely produce a pulse of suspended sediment downstream. Even though the substrate within the crossing is reported to have few fine sediments, the vehicles crossing the creek are expected to carry sediment into the creek from other work areas and vehicle-generated wave action is expected to disturb the streambanks. Excessive fine sediment accumulation in steelhead critical habitat can result in reduction in habitat space, loss of prey items due to substrate burial, and loss of intergravel flow due to substrate burial. However, sediment levels expected to result from use of the wet crossing are likely to be minor such that any slight reductions in space, intergravel flow, or prey availability would be unlikely to adversely affect the value of critical habitat in the action area for steelhead spawning, rearing, or migrating. Ultimately, NMFS expects the limited proposed use of the crossing and turbidity control protection measures proposed by United, including installing hay bales immediately downstream of the crossing, will prevent adverse effects to designated critical habitat.

The proposed road-maintenance activities are expected to perpetuate the ongoing chronic release of sand and smaller particles during the wet season within the action area, and adversely affect steelhead and their designated critical habitat. Riparian corridors stabilize stream banks by preventing bank erosion which can lead to excessive sedimentation. A healthy riparian corridor serves to buffer and filters storm water as runoff drains from the watershed by acting as a natural sponge to filter sediment that might otherwise enter the stream unimpeded. However, the proposed action would continue to artificially reduce the extent of riparian vegetation to a patchwork of isolated trees in the center of the action area (see Figure 2). Hence, the expectation for continued chronic releases of sand and smaller particles to the creek. Because the proposed road-maintenance activities will prevent the formation of a functional riparian buffer, this element of the proposed action would adversely affect steelhead designated critical habitat. In terms of specific expected effects on designated critical habitats, excessive sedimentation rates could bury benthic macroinvertebrates (Cordone and Kelley 1961), degrade instream habitat conditions (Eaglin and Hubert 1993), and degrade spawning substrate (Lisle and Lewis 1992, Bryce *et al.* 2008).

### 2.5.4 Disturbance to Streamside Vegetation

Generally, proposed maintenance activities that are expected to adversely affect streamside vegetation (an element of designated critical habitat for steelhead) involve maintenance of the wet crossing, and clearance of fire buffers along Project roads (see Figure 1) that remove or preclude the establishment of riparian vegetation. The direct effects involve a discrete reduction in riparian cover and shade. Indirect effects can include increased water temperatures and decreased water quality (Lowrance *et al.* 1985, Welsch 1991, Mitchell 1999, Opperman and Merenlender 2004). The activities and related effects on steelhead and designated critical habitat are described in greater detail as follows.

***Use and maintenance of the wet crossing***.—The loss of riparian and aquatic vegetation as a result of use and maintenance of the wet crossing will be confined to the footprint of the wet crossing that measures 28-square meters. While the amount of actual vegetation removal is expected to vary annually, vegetation could be removed quarterly, but less frequently in years when vegetation growth is slower (United 2010). All proposed herbicide application is expected to be conducted in accordance with applicable regulations (*i.e.*, applied by a licensed contractor, use limited to EPA approved herbicides, and no herbicides will be applied directly within water). Only riparian and wetland vegetation in the immediate vicinity of the wet crossing are expected to be removed. Owing to the limited proposed use for herbicide application, and the avoidance of water application, we don't think herbicides will enter waters in amounts that would adversely affect steelhead. The effects owing to the proposed cattail removal (and other plants including mulefat, coyote brush, willow and herbaceous grass species) on steelhead and designated critical habitat will be minor and localized. Although infrequent pruning of riparian trees roughly once a year (United 2017) has the potential to reduce the amount and extent of shade to the creek, detrimental effects to water quality are not expected because mature riparian trees shade the creek on either side of the crossing, and tree branches extending greater than 4.1-m height are not affected by the proposed action. Overall, the small amount of riparian and aquatic vegetation that is expected to be removed within the proposed wet crossing footprint is not anticipated to diminish the functional value of the migratory corridor, rearing or spawning areas within the action area.

***Use and maintenance of Project roads***.—Proposed clearing of 3-meters (m) of riparian and upland vegetation from the road edge (*i.e.*, fire hazard reduction) and related maintenance is expected to indirectly adversely affect steelhead and reduce the value of designated critical habitat for this species in the action area. The amount of streamside and upland vegetation that would be removed, or continued to be precluded from establishing, is substantial for two primary reasons. First, many of the Project roads are immediately adjacent to the creek (as depicted in Figures 1 and 2) and parallel lower Piru Creek for a distance of greater than 100-m on the east bank and about 200-m on the west bank (see areas labeled as "not previously mapped" and "maintenance access routes" in Figure 1). Second, many of the Project roads bordering Piru Creek appear wider than necessary to allow maintenance vehicles access to the east side of Piru Creek (Figure 2) and therefore result in road maintenance clearing within the riparian corridor. Clearing 3-m on either side of the road plus the width of the road (about 15m) has effectively removed over 20-m of riparian habitat that would otherwise be an intact riparian buffer. Although fire management guidance for the proposed action was adopted from the Los Padres

National Forest and Ventura County, both the USDA (2005) and the Ventura County General Plan (2014) contain policies which strongly protect wetland habitats that recommend riparian stream buffers of 91-m (300-feet) or greater.

The proposed ongoing loss of vegetation overhang and shade to the creek is expected to increase the amount of solar radiation reaching the creek. Because radiant heat is the most important energy source for changing stream temperatures during daytime periods (Beschta 1997), the proposed action increases the potential for elevated water temperature in the creek. High water temperatures and related stress can have deleterious physiological impacts on juvenile anadromous salmonids and their behavior (Holtby and Bothwell 2008, Myrick and Cech 2004). As a result, there is an increased potential that the thermal capability of the freshwater rearing site to promote growth and survival of survival of steelhead would be diminished.

The proposed action would continue to reduce the ability and degree that riparian vegetation in the action area provides habitat and food resources to a freshwater rearing site. With regard to food resources, streamside trees and shrubs provide a significant source of organic material and, therefore, an instream energy supply for building the food chain (Platts 1991, Welsch 1991). Maintaining the food chain in streams is important for preserving the quality of freshwater rearing sites. Streamside trees and shrubs provide food directly to the creek owing to terrestrial insect drop where they may be eaten by fish. With regard to the role of streamside trees and shrubs for creating and maintaining habitat quality and availability (Bryant 1983, Lisle 1986, Platts 1991), riparian vegetation is a source of LWD to the stream. Large pieces of wood in streams have an important role in controlling channel morphology, the storage and routing of organic matter and sediment, and the amount and quality of habitat for fish (Lisle 1986). Therefore, the potential exists that juvenile steelhead could experience a reduction in growth and may be displaced to other areas in the action area where the riparian buffer provides these functions. Based on the amount of streambank not containing riparian trees in the action area, NMFS anticipates that up to 25 percent of the juvenile steelhead rearing in the action area may experience reduced growth or be displaced. Displaced steelhead are often subject to a greater risk of predation. Juvenile steelhead that experience slower growth rates may out-migrate at a smaller size which has been shown to reduce survival to adult stage (smolt-to-adult survival), or delay the onset of smoltification altogether for another year.

Although United proposes general mitigation measures (see Table 1-2) in their Vegetation Plan, the proposed action is lacking sufficient detailed information that would give us confidence that the adverse effects to steelhead and critical habitat owing to vegetation management activities in the action area (United 2010) would be fully minimized. Overall, the proposed action is expected to diminish the natural ability of the riparian corridor to maintain water temperature, provide sources of food and living space for steelhead, and prevent streambank erosion in the impacted portions of the action area (see Figure 2). This is expected to continue causing a reduction in the functional value of designated critical habitat for endangered steelhead, and maintain low abundance of juvenile steelhead in the action area.

## 2.6 Cumulative Effects

"Cumulative effects" are those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation (50 CFR 402.02). 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.

Certain 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 versus cumulative effects. Therefore, all relevant future climate-related environmental conditions in the action area are described in Section 2.2.5.

One additional effect to consider in the cumulative effects analysis is the developing infestation of the Piru Creek watershed by the invasive quagga mussel (*Dreissena rostriformis bugensis*). On December 18, 2013, United discovered quagga mussels in Lake Piru. On January 29, 2014, United confirmed that quagga mussels had become established in Piru Creek below Santa Felicia Dam. On December 12, 2016, NMFS learned that quagga mussels had been detected upstream of Lake Piru in the Angeles Tunnel between Pyramid and Castaic reservoirs. Ecologically, invasive *dreissenid* species can affect a wide variety of changes, such as altering phytoplankton species composition and nutrient dynamics and impacting other organisms by direct colonization or indirect competition for food and/or space (Wong and Gerstenberger 2011). United is working with California Department of Fish and Wildlife on finalizing a Quagga Mussel Monitoring and Control Plan for Lake Piru to prevent the continued downstream spread of the invasive mussel. The cumulative effects resulting from the presence of invasive quagga mussels and climate change on salmonids further hinder steelhead survival and recovery.

## 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.

### 2.7.1 Summary of the Rangewide Status of the Species and Critical Habitat and Environmental Baseline

As discussed in the Rangewide Status of the Species and Critical Habitat section, the Southern California Steelhead DPS is composed of fragmented populations of small size such that it is currently not viable and at high risk of becoming extinct. The population of steelhead in Piru

Creek is very small and its habitat is degraded as a result of man-made manipulations and alterations to the natural hydrology of the Piru Creek watershed. While certain activities are physically located outside the action area, they affect critical habitat and steelhead in the action area (*e.g.*, in the case of land-use activities causing input of sediment slurry runoff to habitats within the action area, or in the case of water storage facilities altering the downstream pattern and magnitude of discharge in the action area). Despite the alterations, steelhead persist in extremely low numbers in lower Piru Creek below Santa Felicia Dam (United 2015). The anthropogenic activities affecting steelhead and critical habitat in the action area are: (1) regulation of streamflow at Pyramid and Santa Felicia Dams, (2) road development, (3) livestock-grazing, and (4) agriculture, including related operations that withdraw water from the creek. As discussed in Section 2.4.1, United is developing a Habitat Improvement Plan that is expected to increase in-channel habitat complexity and establish riparian vegetation along lower Piru Creek that should improve the function of steelhead critical habitat.

### 2.7.2 Summary of the Effects due to the Proposed Action

Juvenile steelhead are expected to be present in the action area during the time the proposed action will be implemented and, therefore, subject to direct and indirect effects associated with aspects of the proposed action. The adverse effects to steelhead include those effects associated with the process of capture and relocation of steelhead from the wet crossing when visual surveys determine avoidance is not probable. Non-lethal take of no more than 30 juvenile steelhead may occur via capture and relocation annually as a result of excluding steelhead from the wet crossing when multiple daily trips across the wet crossing are anticipated. A potential lethal take of no more than 2 out of the 30 is expected. One steelhead redd may be crushed in December during crossing use. Juvenile steelhead (including redds) in the action area make up a very small proportion of the SC DPS of steelhead. Additionally, when frequent crossings are expected to occur within a short period of time, exclusion nets will be utilized at the wet crossing that have the potential to cause injury or death due to entanglement and/or impingement. Precautions will be in place to minimize, if not eliminate, the risk of injury and mortality, and adjacent creek habitat, although degraded, is expected to suitably harbor the relocated steelhead.

With regard to critical habitat, the proposed action is expected to continue to diminish the quantity and quality of substantial portions of the action area as a site of freshwater rearing. Road maintenance activities are expected to suppress the growth and establishment of a large segment of the riparian corridor on both streambanks in the action area, and as a result reduce the quantity and quality of rearing habitat in those areas for juvenile steelhead. Generally, the adverse effects involve altering riparian habitat, and increasing sedimentation and turbidity. Adverse effects to freshwater rearing habitat are expected to be localized because, among other reasons, the action area affects about 0.5-km of more than 9-km of habitat available to the species in lower Piru Creek.

Cumulative effects resulting from climate change and the continued presence and spread of invasive quagga mussels in the Piru Creek watershed are expected to further hinder steelhead survival and recovery. The effects of environmental fluctuations (*e.g.*, sea-level rise and rainfall patterns) and disturbances (*e.g.*, floods, wildfire, and drought) create an added risk to the SC DPS viability. With regard to climate change, information indicates that precipitation in

southern California will exhibit measurable decreases in the future (Hayhoe *et al.* 2004). We also expect that ocean condition cycles and climatic shifts will continue to have both positive and negative effects on the species' ability to survive and recover. Invasive species like quagga mussels may impact benthic macroinvertebrate communities that steelhead rely on as important forage species. The degree to which these factors will continue unabated will depend on several factors including the success of invasive species control plans which are a California Department of Fish and Wildlife requirement, but are beyond the scope of our analysis.

### 2.7.3 Effects on the SC Steelhead DPS and SC Steelhead Critical Habitat

This section determines how aggregate effects to individuals in the action area would affect the viability of their constituent populations, and how the aggregate effects on critical habitat would affect the conservation value of the designated critical habitat in the action area. After determining the effects of the action on population viability, we analyze whether the effects to the population would be likely to jeopardize the continued existence of steelhead at the DPS scale. Similarly, we determine if reductions in the conservation value of the subarea of critical habitat (*e.g.*, action area) are sufficient to appreciably reduce the conservation value of the entire area designated as critical habitat.

Aggregate effects have the potential to subject juvenile SC steelhead rearing in Piru Creek to an elevated exposure risk for a range of direct and indirect effects. The aggregate effects are expected to result in displacement, short term behavioral changes and a minimal amount of juvenile steelhead mortality (including the potential loss of one redd) in the action area. Displaced steelhead are expected to be at a greater risk of predation and/or occupy lower quality habitat where they may experience slower growth rates and reduced smolt-to-adult survival. Changes in climate are expected to amplify the effects on the species discussed within this biological opinion, and create the potential for more frequent drought and lack of streamflow. As described in the Environmental Baseline section, Santa Felicia Dam releases streamflow to form and preserve freshwater rearing sites for steelhead in lower Piru Creek, but the ongoing presence of the dam prevents steelhead from accessing high quality rearing and spawning habitats upstream. The expected reduction in abundance to a segment of the Piru Creek sub-population from the proposed action is small and will not result in a measurable decrease in population-scale abundance and productivity. It is important to note that the habitat flow releases from Santa Felicia Dam create suitable steelhead rearing habitat when the downstream Santa Clara River and upstream portions of middle Piru Creek above Lake Piru seasonally go dry on an annual basis. Additionally, implementation of the reasonable and prudent alternative in NMFS' 2008 Biological Opinion is expected to improve steelhead habitat in lower Piru Creek and eventually provide steelhead passage around Santa Felicia Dam. As a result, we conclude that the effects of the proposed action, when added to the status of the Piru Creek/Santa Clara River population, the environmental baseline, and cumulative effects, are not reasonably expected to appreciably reduce the likelihood of both the survival and recovery of the species by reducing its numbers, reproduction, or distribution. The effects of the proposed action are such that the survival of the SC steelhead DPS will not change and its recovery will not be impeded.

The conservation value of SC steelhead critical habitat within the action area is expected to be somewhat reduced due to the aggregate effects. The proposed action will adversely affect a

number of PBFs, including water quality, physical habitat conditions to support juvenile growth and mobility (*i.e.*, pool depth), natural cover such as submerged and overhanging large wood and contribution of forage resources. The long-term adverse effects to the water quality PBF will be from sedimentation and modest increases in stream temperature from a reduction in shade. Additionally, when adding the continuing effects of past and present activities and the effects due to the proposed action, the result is continued contribution of sand and smaller particles to the stream channel thereby somewhat reducing the amount and extent of PBFs of critical habitat in certain areas within the action area. The establishment of quagga mussels in the action area is anticipated to increase the downstream spread of an invasive species and decrease the abundance of SC steelhead forage. Given that the effects of downstream agriculture and water diversion are expected to extend into the future, it is possible that areas of the Piru Creek watershed that are susceptible to the effects of water withdrawals will experience a decline in the functional value of steelhead critical habitat. Climate change could also contribute to a reduction in the water quality PBF. When the aggregate effects of the action are added to the environmental baseline, there will be some localized degradation of critical habitat PBF quality and function, but these small effects will not impair the ability of any of the affected critical habitat units to play their intended conservation roles. For example, although there will be some reduction in prey availability due to sedimentation, the amount of sedimentation is very small and juvenile steelhead are likely to be able to find enough food items nearby such that their fitness is unlikely to be adversely affected. Hence, the proposed action will not reduce the conservation value of designated critical habitat and the affected critical habitat unit will retain its ability to serve its intended conservation role for SC steelhead.

## 2.8 Conclusion

After reviewing and analyzing the current status of the listed species and critical habitat, the environmental baseline within the action area, the effects of the proposed action, any effects of interrelated and interdependent activities, and cumulative effects, it is NMFS' biological opinion that the proposed action is not likely to jeopardize the continued existence of the endangered SC DPS of steelhead, and is not likely to 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 in association with vehicle and heavy equipment use of the Piru Creek wet crossing and routine road maintenance. During use of the wet crossing, incidental take in the form of injury and/or mortality of juvenile steelhead is anticipated during the herding, collection and relocation of fish by dip netting. During vegetation management associated with routine maintenance of Project roads, incidental take in the form of harm to juvenile steelhead is anticipated. No take is anticipated to occur due to sediment-related effects of the proposed action.

With regard to use of the wet crossing, incidental take is reasonably certain to occur as follows: All steelhead occurring within the Piru Creek wet crossing portion of the action area, expected to be no more than 30 juveniles that are captured, during annual activities under the proposed action. No more than 2 juvenile steelhead are expected to be injured or killed on an annual basis at the wet crossing as a result of relocating and excluding the species during use of the Piru Creek wet crossing. In addition to juveniles, one steelhead redd is expected to be present and crushed in December of some years when conditions conducive for redd construction occur early during the spawning season.

With regard to Project road maintenance activities, NMFS anticipates take, in the form of harm, of rearing SC steelhead will result from a reduction in the quality and quantity of riparian habitat features. This habitat modification will significantly impair essential rearing and feeding behavioral patterns such that fish will be injured or harmed from the summer temperature increases and will experience a reduction in growth and survival. Take caused by this habitat-related effect cannot be accurately quantified as a number of fish because the relationship between habitat conditions and the distribution and abundance of those individuals in the action area is imprecise. Additionally, there is no way to count or observe the number of individuals affected without adding significant additional stress or risk of injury to these fish. In such circumstances, NMFS cannot provide an amount of take that would be caused by the proposed action and instead uses an indicator of the extent of take. Therefore, NMFS will not identify the amount of take, but will identify a surrogate that will serve as an extent of take.

Here the best available surrogate for the extent of take from riparian vegetation disturbance and associated elevated summer water temperatures is a maximum riparian clearing distance. Based on the BA and the LRMP, total reductions in riparian habitat are expected to extend up to 70 linear meters (combined both streambanks) where take is anticipated to occur. This surrogate is proportional to the incidental take associated with elevated summer stream temperatures brought on by the removal of trees or maintenance activities which prevent riparian establishment, which reduces stream shade and increases stream temperature. The maximum clearing distance will function as an effective reinitiation trigger, because it can be measured and delineated prior to the beginning of maintenance activities, and as routine road maintenance is carried out, and will therefore function as a readily discernable indicator throughout the maintenance season.

Anticipated incidental take may be exceeded if Project activities exceed the extent of incidental take described above.

### 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 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 effect analysis provide the basis for the following reasonable and prudent measures:

1. Track and report vehicle usage of the Piru Creek wet crossing and any associated steelhead observations.

2. Minimize harm to steelhead from temporary and permanent changes in the quality and quantity of habitat for steelhead.

3. Avoid and minimize harm and mortality of steelhead during use of the Piru Creek wet crossing and relocation activities.

### 2.9.4 Terms and Conditions

The terms and conditions described below are non-discretionary, and FERC or any applicant must comply with them in order to implement the RPMs (50 CFR 402.14). FERC 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 term and condition implements reasonable and prudent measure 1:

    A. United must track and report all use of the Piru Creek wet crossing undertaken as part of the proposed action, including vehicle type using the crossing, date of crossing, number of crossings per day, purpose of each crossing and what protection measures were implemented during the crossing. Observations of steelhead or steelhead redds in the action area (per monitoring described in the proposed protection measures) should be included in the report. FERC shall ensure that the monitoring report is provided to Rick Bush (NMFS, 501 W. Ocean Blvd., Suite 4200, Long Beach, California 90802) no later than June 30 of each year.

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

    A. United must develop a plan to minimize the amount and extent of harm to steelhead in the action area from vegetation removal activities. The plan must minimize Project road

widths consistent with any applicable safety standards (or relocate roads consistent with the proposed action) in areas adjacent to Piru Creek in the action area. The plan must establish a minimum 15-m road setback from Piru Creek to protect the floodplain. If safety pullouts need to be incorporated into the road network, they must be constructed on the side of the road furthest from the streambank to avoid unnecessary disturbance to streamside vegetation. FERC shall ensure that a complete plan is provided to Rick Bush (NMFS, 501 W. Ocean Blvd., Suite 4200, Long Beach, California 90802) no later than 6-months from the date of FERC's approval of the modified LRMP.

B. United must develop a sediment management plan, consistent with the proposed protection measures, to minimize sediment runoff from Project roads from entering Piru Creek. In addition to standard sediment control measures (*e.g.*, silt fence, coconut roll, sediment berms), United must incorporate revegetation of riparian tree and understory plant species for the purpose of stabilizing streambank sediment and serve as a buffer to filter storm runoff. The sediment management plan must be enclosed with the plan described in term and condition 2(A), and FERC shall ensure that the plan is provided to Rick Bush (NMFS, 501 W. Ocean Blvd., Suite 4200, Long Beach, California 90802) no later than 6-months from the date of issuance of FERC's approval of the modified LRMP.

C. In the event United shapes/grades the wet crossing channel resulting in the loss of pool habitat, United must install channel forcing features in the action area channel outside of the wet crossing to promote pool development. Installation of channel forcing features shall require NMFS review and concurrence, occur during the summer low-flow season immediately following the storm season that scoured the wet crossing, and occur prior to United's fall conservation release.

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

A. When vehicles need to cross the creek between December 1 and May 31, a qualified biologist will visually inspect the wet crossing to ensure that no steelhead or redds (*i.e.*, steelhead nest) are in the path of the vehicle. If steelhead are present, the biologist must use seine nets to encourage fish to move out of the wet crossing area if they are not exhibiting spawning behavior (*e.g.*, redd building). The wet crossing will not be used if an unavoidable redd is in the crossing. Similarly, if steelhead are actively digging redds or spawning, the crossing must not be used until spawning has finished and there are no unavoidable redds.

B. United's biologist must closely monitor all exclusion netting deployed in the action area to make sure it is effectively keeping steelhead out of the wet crossing and to make sure steelhead are not becoming impinged on, or entangled in, the netting. The exclusion netting must be checked at a minimum 3 times per day, morning, midday and late afternoon. Under no circumstance will the exclusion netting remain in the creek overnight when the wet crossing is not in use.

C. FERC must ensure that a written steelhead-relocation report is provided to NMFS no later than June 30 of each year that describes whether relocation/exclusion activities

under the proposed action were carried out and the efficacy of the activities for avoiding or minimizing effects on endangered steelhead. The report must 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 all steelhead exclusion activities; 4) a description of any problem encountered during the proposed action or when implementing terms and conditions; and, 5) any effect of the proposed action on steelhead that was not previously considered. The report shall be sent to Rick Bush, NMFS, 501 W. Ocean Blvd., Suite 4200, Long Beach, California 90802.

D. United's biologist must contact NMFS (Rick Bush, 562-980-3562) immediately if one or more steelhead are found dead or injured. The purpose of the contact is to review the activities resulting in take and to determine if additional protective measures are required. All steelhead mortalities must 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 must be retained by the biologist until additional instructions are provided by NMFS. Subsequent notification must also be made in writing to Rick Bush, NMFS, 501 W. Ocean Blvd., Suite 4200, Long Beach, California 90802 within five days of noting dead or injured steelhead. The written notification must 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 who found the specimen.

## 2.10 Conservation Recommendations

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

1. NMFS is generally aware of United's future plans to upgrade the Santa Felicia Dam spillway and outlet works (construction tentatively proposed to begin 2020) in order to achieve compliance with California Division of Safety of Dams. NMFS recommends that if United anticipates the spillway project will result in increased heavy equipment traffic across the Piru Creek wet crossing then United should investigate a temporary or permanent bridge option to minimize instream impacts to steelhead and designated critical habitat in lower Piru Creek.

2. United's HIP required by NMFS' 2008 Santa Felicia Biological Opinion has the potential to add side channel habitat and widen the Piru Creek floodplain. United's Plan described in term and condition 2(A) of this biological opinion should make use of information being developed for the HIP to plan the road setbacks in areas that will not preclude lateral floodplain connectivity and development of a healthy, mature riparian corridor.

In order for NMFS to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, NMFS requests notification of the implementation of any conservation recommendations.

## 2.11 Reinitiation of Consultation

This concludes formal consultation for FERC. As 50 CFR §402.16 states, re-initiation 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 incidental take statement 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 to 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 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.

## 5.1 Utility

Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users. The intended users of this opinion are FERC and United. Other interested users could include the California Department of Fish and Wildlife and U.S. Fish and Wildlife Service. Individual copies of this opinion were provided to FERC and United. This opinion will be posted on the Public Consultation Tracking System web site (https://pcts.nmfs.noaa.gov/pcts-web/homepage.pcts). The format and naming adheres to conventional standards for style.

## 5.2 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.

## 5.3 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.

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