UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

February 9, 2012

In response refer to:
2011/05073:BMW-S

William Metz
U.S. Forest Service
Cleveland National Forest SO
10845 Rancho Bernardo Road, Suite 200
San Diego, CA 92127-2107

Dear Mr. Metz:

Enclosed with this letter is NOAA's National Marine Fisheries Service's (NMFS) Biological Opinion for the Trabuco Ranger District, Cleveland National Forest based on NMFS' review of the proposed crossing removals and reconstruction of Los Alamos crossing located in Riverside, California. This Biological Opinion addresses the effects of the proposed action on the endangered Southern California Coast Distinct Population Segment of steelhead (*Oncorhynchus mykiss*) in accordance with section (7)(a)(2) of the Endangered Species Act of 1973 (ESA), as amended (16 U. S. C. 1531 *et seq.*). Your letter of September 29, 2011, requesting formal consultation was received on October 5, 2011.

The Biological Opinion concludes that the proposed action is not likely to jeopardize the continued existence of the Federally-endangered steelhead. NMFS believes the proposed action is likely to result in incidental take of steelhead, and therefore the incidental take statement includes reasonable and prudent measures and non-discretionary terms and conditions that NMFS believes are necessary and appropriate to minimize and monitor incidental take of steelhead. Please call Brittany White-Struck at (562) 432-3905 if you have any questions concerning the Biological Opinion or if you would like additional information.

Sincerely,

for Rodney R. McInnis
Regional Administrator

Enclosure

cc: Kirsten Winter, USFS, Trabuco Ranger District
Michael Kellett, USFS, Vallejo
Karen Goebel, USFWS, Carlsbad
Mary Larson, CDFG, Los Alamitos

Enclosure

BIOLOGICAL OPINION

AGENCY: U.S. Forest Service

ACTION: The U.S. Forest Service's Cleveland National Forest, Trabuco Ranger District proposes to remove the San Mateo Creek crossing and replace the Los Alamos Creek crossing, both within San Mateo Creek Watershed in Riverside County, California.

CONSULTATION CONDUCTED BY: National Marine Fisheries Service, Southwest Region

FILE NUMBER: **151422SWR2011PR00426**

DATE ISSUED: **February 9, 2012**

I. CONSULTATION HISTORY

In October 2010, the U.S. Forest Service, Cleveland National Forest (CNF), Trabuco Ranger District (District), coordinated with NOAA's National Marine Fisheries Service (NMFS) to conduct a visit of the San Mateo Creek and Los Alamos Creek crossings under review in this consultation. After the site visit, NMFS requested project description details on October 15, 2010, through electronic correspondence, for the proposed road crossing/passage improvement projects. In response to this request, NMFS received a summary report including existing conditions of the Los Alamos crossing and the rationale for the proposed action. In a letter of November 17, 2010, NMFS communicated support for the proposed crossing removals in San Mateo Creek watersheds, as removing barriers and impediments to improve passage conditions for the endangered Southern California Distinct Population Segment of steelhead (*Oncorhynchus mykiss*) is identified as a critical recovery action in the Southern California Steelhead Recovery Plan (January 2012). NMFS communicated that early coordination would facilitate further collaboration and streamline interagency consultation under the ESA. Throughout December 2010, NMFS continued to work with CNF on strategizing an approach to incorporate the ESA Section 7 consultation process into the project-planning process. In letter of March 18, 2011, CNF describes the proposed action for Los Alamos Creek and San Mateo Creek crossings, including a purpose and need statement. In June 2011, CNF provided the project proposal (activities in both San Juan Creek and San Mateo Creek watersheds) and alternatives for passage projects. In July 2011, NMFS received from the CNF a draft biological assessment (BA) with a determination of no adverse effects but long-term beneficial effects on steelhead from the reconstruction of road and trail crossings at Los Alamos and San Mateo Creeks, respectively. In letter of August 12, 2011, CNF requested NMFS to concur with a no effect determination for the

San Mateo and Los Alamos projects[1]. Upon further clarification about the project crossings, specifically short- and long-term effects from the proposed activities, on September 29, 2011, through electronic correspondence, NMFS provided the rationale for supporting the mechanized removal (mechanical option) as the preferable alternative to manual removal of the San Mateo Creek crossing within the designated San Mateo Wilderness. In letter of September 29, 2011, to NMFS, the CNF withdrew the previous request for concurrence and submitted a request for formal consultation on the mechanized removal of the San Mateo Creek and Los Alamos Creek crossings and replacement for Los Alamos Creek crossing only. The formal consultation package included a revised BA and a determination that due to the presence of steelhead habitat at or adjacent to the project areas at San Mateo and Los Alamos Creeks, the project may affect and is likely to adversely affect endangered southern California steelhead. The CNF's determination triggered formal consultation with NMFS to remain in compliance with provided ESA regulations (50 CFR § 402.14), and on October 5, 2011, consultation was initiated.

This Biological Opinion is based on the best scientific and commercial data available, including information provided by CNF to NMFS in the consultation package received on October 5, 2011, along with an additional analysis concerning the San Mateo Creek crossing (Minimum Requirements Decision Guide) sent electronically to NMFS on October 20, 2011. Other major sources of information include the September 28, 2011 BA, the Trabuco Aquatic Organism Passage Restoration BA of September 2011, the March 18, 2011 description of the project proposal, electronic correspondence referenced in the consultation history, NMFS field site visits in October 2010 and December 2011 (Appendix A) including field photographs and observations, and applicable literature on the ecology and biology of steelhead. A complete administrative record of this consultation is on file at the NMFS Southwest Regional Office (Southern California Office) in Long Beach, California (501 West Ocean Blvd., Suite 4200, Long Beach, CA 90802).

II. DESCRIPTION OF THE PROPOSED ACTION

The Federal action under review in this section 7 consultation is the proposal by the USFS, CNF, Trabuco Ranger District, to replace one road crossing on Los Alamos Creek with a new bridge structure that will allow for passage of fish and other aquatic species, as well as the removal of one concrete trail crossing on San Mateo Creek, which currently impedes fish passage. The proposed work sites on Los Alamos and San Mateo Creeks are in the upper portion of San Mateo Creek watershed (SMCW).

The Los Alamos Creek crossing is used as a primary transportation corridor within CNF. This crossing often floods after heavy rainfall. The crossing consists of a concrete slab over a concrete base with culverts that allow for water flow. However, these culverts frequently become obstructed with debris, damming the stream and causing water to flood across the roadway. The hardened crossing on Los Alamos Creek (apart of South Main Divide Road) will be removed and replaced with a bridge that will accommodate a 100-year flood event. Los

[1] NMFS does not concur with Federal Action Agency no effect determinations, thus NMFS did not respond with a no-effect concurrence in writing or email as directed by NMFS Southwest Region (SWR) Protected Resources Division Memorandum of March 25, 2010, from Chris Yates, Assistant Regional Administrator for Protected Resources.

Alamos Creek is classified as an intermittent stream, which typically has no surface flow in the action area during summer and fall.

The current trail crossing on San Mateo Creek (apart of the Teneja Falls Trail) is within the San Mateo Canyon Wilderness. San Mateo Creek is classified as a perennial stream. Eventually after the proposed removal, a new structure on San Mateo Creek may be put in place to support foot and horse traffic, however, if this action is considered further, the structure or "trail bridge" (as termed by the District) will be addressed in a separate Section 7 consultation as appropriate.

Removal of the crossing and construction of the new bridge at Los Alamos Creek is expected to take six months. To the extent possible, construction activities will occur only when the creek is dry, which the District anticipates to be during the proposed construction work window of June 1-November 30. The removal of the concrete trail crossing on San Mateo Creek will take approximately two weeks, pending the approval for mechanized removal of the crossing within designated Wilderness. The District is currently seeking approval from the USFS National Headquarters, Washington, D.C. office. If mechanized removal for the San Mateo Creek trail crossing is not approved, CNF estimated the manual removal project timeline to be ten years (ten summer seasons). Additionally, CNF has determined manual removal would result in adverse effects to steelhead, requiring a separate Section 7 consultation. CNF anticipates construction for the Los Alamos Creek crossing to commence in 2012. Proposed Best Management Practices (BMPs) from the 2000 Forest Service BMP Handbook (Appendix B), standards, guides, and the project design standards developed to minimize effects to fisheries resources are designed to accommodate site-specific conditions (USFS BA 2011). The project will follow BMPs for road and crossing construction (USFS EA 2011) and would be in accordance with Caltrans Storm Water Quality Handbook, Construction Site Best Management Practices Manual (November 2000). Specifically, the USFS has proposed to wash all construction equipment prior to commencing the proposed action to minimize the spread of non-invasive species in accordance with NS-8 Vehicle and Equipment Cleaning, Caltrans Storm Water Quality handbooks, Construction Site Best Management Practices Manual. Additionally, exclusion fencing will be established around the work site to protect sensitive species. The USFS has proposed to minimize temporary changes in riparian cover through revegetation of project areas as needed via plantings of willow and sycamore.

The District has determined these current crossings are fish passage barriers and that they impede anadromous fish access to available upstream spawning and rearing habitat (USFS BA 2011). The District will use the stream simulation[2] technique during the removal of both crossings and reconstruction of the Los Alamos Creek crossing. Stream simulation is used for aquatic organism passage. The goal of stream simulation is to create within the structure a channel as similar as possible to the natural channel in both structure and function. The approach, methods, and requirements for this design approach will be discussed in further detail. The stream simulation manual (Parts IX – XII) includes general instructions for using stream simulation (through the *FishXing* software) to analyze passage conditions at a stream crossing and interpret results after modeling is complete. For the purposes of the proposed action, stream simulation

[2] Stream Simulation: An Ecological Approach to Providing Passage for Aquatic Organisms at Road-Stream Crossings. http://stream.fs.fed.us/fishxing/aop_pdfs.html

and modeling techniques will be used to restore fish passage rather than ranking or assigning a score to a present barrier for treatment (USFS BA 2011).

The following are details of the proposed action organized by crossing:

- At both Los Alamos Creek and San Mateo Creek crossings
    - Stream simulation is proposed to ensure that the design of the stream channel shape and gradient at each crossing is similar to the natural channel structure occurring along typical unmodified segments of the stream. Design of the crossing using stream simulation will avoid and minimize the adverse effects of temporary changes in channel morphology and hydraulics. Stream simulation will be used for planning maintenance or restoration of natural channel shape, substrate, and function.
    - In-channel work to remove the crossings will disturb vegetation. All disturbed areas—including equipment storage and staging areas, disturbed stream banks, and spoils disposal sites—would be revegetated with native grass, forbs, and tree species immediately after project construction (USFS EA 2011).
    - A water pollution control plan will be implemented to maintain water quality at pre-construction levels downstream of the Los Alamos Creek and San Mateo Creek crossings (USFS EA 2011). Specifically, permanent and temporary spoils would be stored in a manner to prevent sediment delivery to any watercourse during and after project construction.
    - Exclusion fencing is proposed to be installed around the site perimeter, including access roads, as a precautionary measure. Exclusion fencing will be made of water permeable material and shall be used to delineate the limits of the project area and, if needed, the project footprint (USFS EA 2011).
- At Los Alamos Creek only
    - Placement of riprap or gabions is proposed for use to protect bridge abutments. Approximately 40 linear feet of reinforcement would be needed per bridge abutment.
    - The current structure would be removed after the proposed bridge structure is in place and usable.
    - Width and length of the proposed bridge structure would conform to current hydrologic design standards and meet Forest Service Transportation Structure Handbook requirements for designing a “long-term structure” to last a minimum of 50 years. The bridge construction and replacement process will utilize techniques and modeling results from the stream simulation method.
    - Road re-alignment will be necessary with the amount of footage between 50 and 100 feet on each end of the proposed new structure.
- At San Mateo Creek only
    - Temporary dewatering is proposed prior to the removal of crossing for approximately one week. USFS will install temporary coffer dams and diversions to isolate the instream work area during crossing deconstruction. Sandbag berms are proposed to be placed upstream to temporarily redirect the flow of water away from the footings and abutments while they are under construction (USFS EA 2011).

- Sediment removal of approximately 50 cubic yards is proposed prior to the removal of the crossing due to the accumulation of sediment behind the crossing.

Action Area

The action area refers to all areas to be affected directly or indirectly by the proposed action and not merely the immediate area involved in the action (50 CFR § 402.02). Direct effects include those resulting from interdependent or interrelated actions[3]. Indirect effects are defined as those effects that are caused by or will result from the proposed action and are later in time, but still reasonably certain to occur (50 CFR § 402.02). NMFS describes the action area in the following way: all immediate project and associated construction zone areas for each crossing as described in the provided USFS BA (2011). Specifically, the action area includes downstream habitat from the current crossings (Figure 1) to approximately 400 feet due to expected direct and indirect effects. Thus, the action area includes the immediate proposed project site and extended areas likely affected by direct and indirect effects. The action area includes engineering boundaries, which are approximations to allow for minor realignments to achieve the most appropriate, fish-passage engineering design for both crossing sites. The proposed engineering boundary for San Mateo Creek crossing is approximately 67, 417 square feet. Likewise, the proposed engineering boundary for the Los Alamos Creek crossing is approximately 69,056 square feet. These areas combined make up the action area depicted in Figure 2. The action area does not include designated critical habitat (NMFS 2005b), which is approximately 8 miles downstream of proposed work areas for Los Alamos and San Mateo Creeks (Figure 3). NMFS believes direct and indirect adverse effects to critical habitat will be insignificant and discountable.

The footprint of the reconstructed crossing in Los Alamos Creek is expected to be slightly larger than that of the existing crossing (USFS BA 2011). Total area to be permanently occupied by the reconstructed road is approximately one-half acre. NMFS determined there are no interdependent or interrelated actions associated with the proposed action.

III. STATUS OF THE LISTED SPECIES

A. Description of the Species

Oncorhynchus mykiss is one of seven Pacific salmon in the genus *Oncorhynchus* that are native to the North American coast. The natural history of this species dictates the terminology fisheries biologists and resource managers use when discussing *O. mykiss*, its habitat, and distribution. If the species remains in freshwater throughout their entire life cycle, they are referred to a "resident" trout (non-anadromous), or rainbow trout. The anadromous or ocean-going form of *O. mykiss*, and its progeny, is referred to as steelhead, as the life history allows the species to utilize both freshwater and saltwater depending on the timing within the life cycle. Steelhead typically grow much larger than the rainbow trout (NOAA OPR 2011). Globally, steelhead are found in the Western Pacific through the Kamchatka peninsula in Asia, east to Alaska, south to southern California, and even reported in Baja California del Norte (Ruiz-Campos and Pister 1995).

[3] Definitions from 50 CFR § 402.02: Interdependent actions are those that have no independent utility apart from the action under consideration. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification.

The southern California steelhead DPS remains the most southern extent of the anadromous form of *O. mykiss* and was listed as endangered in 2006 (NMFS 2006). In general, the southern California steelhead DPS contains several individual or fish-bearing watersheds (NMFS 2006; Boughton *et al*. 2006). The geographic range of this coastal steelhead DPS was determined to extend from Santa Maria River, near Santa Maria, California to the U.S. – Mexican border (NMFS 1997, 2002, and 2006). In general, adult steelhead spawn in upstream reaches within coastal watersheds, and the progeny rear in freshwater or estuarine habitats prior to migrating to the sea. Additional details on life history follows.

1. Life History

O. mykiss is considered to have the most complexity and variation of all species in the genus in terms of the time and location spent at each life-history stage (Behnke 1992). Distinctly different than other Pacific salmon, steelhead adults can survive their first spawning and return to the ocean to reside until the next year to reproduce again. For returning adults, the specific timing of spawning can vary by a month or more among rivers or streams within a region, occurring in winter and early spring. The spawning time frames depend on physical factors such as the magnitude and duration of run-off and sand bar breaching. Once they reach their spawning grounds, females will use their caudal fin to excavate a nest (redd) in streambed gravels where they deposit their eggs. Males will then fertilize the eggs and afterwards, the females cover the redd with a layer of gravel, where the embryos (alevins) incubate within the gravel. Hatching time can vary from approximately three weeks to two months depending on surrounding water temperature. The young fish (fry) emerge from the redd/gravel two to six weeks after hatching. As steelhead begin to mature, juveniles or "parr," will rear in freshwater streams anywhere from 1-3 years. Juvenile steelhead can also rear in seasonal coastal lagoons or estuaries of their natal creek, providing over-summering habitat. This life history strategy is called "lagoon-anadromous." Benefits to steelhead while rearing in lagoons include faster growth rates compared to fish coming from the freshwater portion of the stream system (Bond 2006; Hayes *et al*. 2008). Large size increases chances for survival upon entering the ocean; consequently, lagoon-reared fish may be disproportionately represented in the adult spawning population (Bond 2006). Residence time in the lagoon can be from 1-2 years. Factors that can cause delays in arrival times at either spawning areas or entry into estuaries, resulting in reduced fitness and ultimately low production of young, include low flows, high water temperature, physical barriers, low dissolved oxygen, and high levels of turbidity.

Juvenile steelhead emigrate to the ocean (as smolts) usually in late winter and spring and grow to reach maturity at age 2-4 but can reside in ocean waters for an additional 2-3 years before returning to spawn. The timing of emigration is influenced by a variety of parameters such as photoperiod, temperature, breaching of sandbars at the river's mouth and streamflow. Research on juvenile residency has shown that residency can be greatly influenced by the hydrologic cycle in southern California. Extended droughts can cause juveniles to become land-locked, unable to reach the ocean (Boughton *et al*. 2006, 2007). These events underscore the importance of stream restoration in not only mainstem portions of creeks but tributaries as well. Ocean behaviors while in the ocean such as movement patterns, trends, and spatial distribution are still poorly understood and have not been extensively studied. Current knowledge from available studies

suggests that the species does not generally congregate in large schools as other Pacific salmon of the genus *Oncorhynchus* (Groot and Margolis 1991; Burgner *et al*. 1992), making it difficult to study their movement patterns. However, some steelhead remain in coastal waters in proximity to their natal rivers as opposed to others that may have a wider range in the North Pacific (Quinn 2005).

Through scientific research studying the otolith (small ear bones) microchemistry of *O. mykiss*, researchers have come to further understand the complex and intricate life history of steelhead. Specifically, rainbow trout can have steelhead as progeny; likewise, steelhead can have rainbow trout as progeny (Zimmerman and Reeves 2000). Additionally, there is evidence of which indicates that switching between freshwater and anadromous life cycles is likely occurring. Examples include inland resident fish exhibiting smolting characteristics and river systems producing smolts with no regular access for adult steelhead. This evidence suggests the ecological importance of the resident form to the viability of steelhead, which can translate into management implications for fish passage in upper portions of watersheds where migration barriers exist.

2. Habitat Requirements

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

NMFS has designated critical habitat for steelhead throughout the lower portion of San Mateo Creek (NMFS 2005b). Within the process of designating critical habitat, NMFS developed a list of Primary Constituent Elements (PCEs) (NMFS 2005a) for habitat sites essential to support one or more life stages of the DPS (sites for spawning, rearing, migration and foraging). These sites in turn contain physical or biological features essential to the conservation of the DPS (for example, spawning gravels, water quality and quantity, side channel, forage species). The proposed action and anticipated effects (direct and indirect) are not expected to reach designated

critical habitat, and an effects analysis on critical habitat will not be included when NMFS analyzes effects of the proposed action.

3. Population Dynamics

Results of recent surveys show that out of the 46 drainages that historically contained steelhead, *O. mykiss* (both resident and steelhead) occupy less than half with a range between 37% and 43% (Boughton *et al*. 2003). Additionally, this distributional survey determined that *O. mykiss* was present in two systems, one of them being San Mateo Creek, where it was previously reported to be extinct (Nehlsen *et al*. 1991). Another study showed that the southern California steelhead population size has reduced dramatically, numbering less than one percent of their historical population size (Stoecker and Conception Coast Project 2002).

B. Natural Presence of Steelhead in San Mateo Creek Watershed

NMFS has described historical and recent steelhead abundance and distribution for the southern California coast through a population characterization (NOAA 2006). San Mateo Creek, which is a part of the Southern California Steelhead DPS, had extant *O. mykiss* (see Table 2, pg. 21 in NOAA 2006). Surveys in Boughton *et al*. (2005) indicate between 58% and 65% 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%) of steelhead were associated with anthropogenic barriers to fish migration (*e.g.*, dams, flood-control structures, culverts, etc.). Additionally, authors found the barrier exclusions were statistically associated with highly-developed watersheds. This is important to note for the purposes of this consultation because in the upper reaches of San Mateo Creek watershed, there is extensive development of rural residential housing (USFS BA 2011). Specifically, large areas have been cleared for construction, and the upper watershed contributes a significant amount of sediment to Tenaja Creek and to a lesser degree, Los Alamos Creek.

There is a well-documented steelhead population in San Mateo Creek, one of the smaller coastal basins in a series of elongated basins draining Orange and western San Diego Counties (NOAA 2006). Historically, the total available spawning area of the stream and its tributaries was approximately 25 miles or more (DFG 1939). In 1999, spring surveys revealed a small *O. mykiss* population, which was the first observation in over fifty years (DFG 2000). Additional surveys by DFG confirmed the presence of over-summering *O. mykiss*, with a distribution within the mainstem from near the upper gauging station upstream to approximately four km upstream of the Devil Canyon Creek confluence and in Devil Canyon Creek (DFG 2000). More recently in 2004, estimated size of the breeding population was thought to be less than 70 adults (Hovey 2004), and there have been observations of steelhead recolonizing San Mateo Creek during years with abundant rainfall (Good *et al*. 2005).

When considering the effects of migration barriers on small coastal populations, understanding the extent of the effects in terms of genetic isolation between the populations is important. Researchers investigating genetic differences between populations below and above introduced anthropogenic migration report that barriers were not associated with greater genetic distances

between populations (see Table 4 in NOAA 2006). Populations that reside above current barriers in the study area and surrounding habitat are most likely the land-locked descendants of steelhead populations, since most of the areas analyzed in this study have historic accounts of steelhead populations prior to construction of barriers (Clemento *et al*. 2008). Likewise, the current fish passage barrier in San Mateo Creek may be creating a similar situation for current steelhead populations. Research has also revealed that the genetic potential for smolting can become dormant or be maintained for decades despite the complete selection against the phenotype (Thrower *et al*. 2004). From genetic research in Alaska, Thrower *et al*. (2004) found that marine mortality of smolts from land-locked steelhead in a lake was about double the marine mortality of smolts from the anadromous population in the creek suggesting land-locked populations may be losing certain other adaptations (other than retaining the ability to smolt) to the marine environment (NOAA 2006). These studies are important to consider when analyzing the effects of current barriers and the possible recovery implications after removal of barriers, allowing fish passage throughout segments of creeks within the action area.

C. Regional Climatic Variation and Trends

Climate conditions and the likely influence climate will have on steelhead and available habitat will offer a more complete, comprehensive description for the current status of the species. In southern California's Santa Rosa Mountains, the average elevation of the dominant plant species rose by approximately 65 meters between 1977 and 2007 (Kelly and Goulden 2008). Authors concluded that a change in climate would be expected to shift plant distribution as species expand in newly favorable areas and decline in increasingly hostile locations. When climate interacts with other stressors such as habitat fragmentation, additional threats to natural resources will likely emerge (McCarty 2001), including threats to the viability of steelhead populations.

Through the proposed action, the District is addressing fragmented steelhead habitat by proposing to remove instream passage barriers. When considering impacts of climate on the species, one challenge is managing forested ecosystems under the assumption that future environments will vary from present conditions. Miller *et al*. (2007) offer a conceptual framework that addresses this challenge. Within the framework are resilience options, which improve the capacity of the ecosystems to return to desired conditions after disturbance. Passage barrier removal would be an example of a resilience option for steelhead populations.

For the Southwest region (southern Rocky Mountains to the Pacific Coast), the average temperature has already increased roughly 1.5^{o}F compared to a 1960-1979 baseline period. By the end of the century, average annual temperature is projected to rise approximately 4°F to 10°F above the historical baseline, averages over the entire region (U.S. Global Change Research Program (USGCRP) 2009). The southern California region is also experiencing an increasing trend in droughts, measured by the Palmer Drought Severity Index from 1958 to 2007 (USGCCRP 2009). Precipitation trends are also important to consider. The Southwest region, including the state of California, showed a 16% increase in the number of days with very heavy[4] precipitation from 1958 to 2007. In general, for most areas of the country, the fraction of precipitation falling as rain versus snow has increased during the last 50 years (USGCCRP 2009). Climate variability in the western United States has also been observed through spring

[4] Defined as the heaviest one percent of all events.

indicators such as lilacs, honeysuckles, and streamflow (Cayan *et al*. 2001). All three indicators exhibited trends toward earlier spring timing since the mid-1970s. Spring climate variability will continue to be an important factor in evaluating how the status of the species is influenced by a changing climate.

Addressing climate trends and projections on an *ecoregional* scale within southern California provides a focused summary of expected trends (PRBO Conservation Science 2011). Regional climate models[5] project mean annual temperature increases of 1.7 to 2.2^{o}C (35.06^{o}F to 35.96^{o}F) by 2070. For regional prediction of rainfall, current regional models show large variation between outputs; the sensitivity of the regional results to the variability indicates substantial uncertainty in precipitation projections (PRBO Conservation Science 2011). Although there is relatively little consensus about projected effects of climate change on precipitation patterns, Snyder and Sloan (2005) projected mean annual precipitation in southwestern California to decrease by 2.0 cm (4.0%) by the end of the 21st century. The occurrence of wildfires, frequency, duration, and extent, are all important parameters to consider when considering a changing climate and associated impacts to steelhead and their habitat. Wildfires periodically burn large areas of chaparral and adjacent woodlands in autumn and winter in southern California (Westerling *et al*. 2004). Wildfire risk in this regions was evaluated (Westerling and Bryant 2008), where the probability of large (>200-ha) fires in southern California ranged from a decrease of 29% to an increase of 28%. The variation in range is due to the type of model used to make forecasts. Finally, changes in vegetation have also been considered (PRBO Conservation Science 2011). The area of chaparral/coastal scrub was projected to decrease 38-44% by 2070, which has strong implications for current and future threats to wildlife. The predominant effect of climate change in wildlife populations, as authors explain, will likely result from changes in vegetation communities. In addition to vegetation changes, high temperatures will become more common, indicating that southern California steelhead may experience increased thermal stress even though this species has shown to endure higher than preferable body temperatures (Spina 2007).

V. THE ENVIRONMENTAL BASELINE

The environmental baseline is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species. The environmental baseline includes the past and present impacts of all federal, state, or private actions and other human activities in the action area (50 CFR § 402.02). Within this section, NMFS discusses the historical conditions of the action area under which steelhead evolved and the events of past human activities, including road construction and crossings throughout Forest managed lands. Over time, road conditions decline, consequently altering riparian habitat. The proposed action of removing fish passage barriers and restoring fish habitat is in response to current road crossing conditions and related effects on endangered steelhead.

NMFS has identified passage barriers in the Southern California Steelhead Recovery Plan (NMFS 2012) as one type of threat to endangered steelhead. Another review highlights additional threats on a broader scale including urbanization, dams, stream habitat loss, estuarine habitat loss, species interactions, hatcheries, drought and climate change, and wildfire (Moyle *et*

[5] See page 43 of PRBO Conservation Science (2011) for summary of all models referenced, emission scenario and outputs.

al. 2008). NMFS will discuss attributes of the environmental baseline within the action area in SMCW.

CNF lies within a bioregion considered by Conservation International to be one of the world's 25 biodiversity 'hotspots.' Specifically for management challenges relating to wildlife and plants, the USFS has focused on long-term conservation and recovery of at-risk and listed species, while addressing the needs of the public and associated human use activities, including a sustainable flow of goods and services for a growing, diverse population. Historically, San Mateo Creek was a major fishery for steelhead trout. Most relevant to the proposed action, would be the challenge of restoring freshwater habitat in riparian areas where streams are now impounded or blocked for human use.

The present condition of vegetation within the Forests has been influenced by a century of fire management (mostly fire suppression), as well as by other land use practices such as logging, grazing, and mining. Invasive, nonnative species cause additional impacts by significantly changing ecosystem composition, structure, and function. Specifically, these species can prey upon, consume, harm, or displace native species. Exotic, nonnative fish (bass, goldfish, sunfish) and bullfrogs have been found in San Mateo Creek (USFS BA 2011). In addition to fish, exotic plants can disrupt the diversity of a riparian community and reduce the overall biodiversity within an ecosystem (D'Antonio and Chambers 2006). It is also important to note that the movement of humans, vehicles, and equipment, among other things, can spread seed and reproductive plant parts. Traditionally, managed recreation within the Forests has been low-key with minimal regulation of use patterns. Generally, recreation is naturally confined to areas that are relatively flat with roads providing access and where water is easily accessible to view. Over time, there has been a growing emphasis on natural resource protection through increased regulation of recreational use to improve resource conditions. One way in which CNF has made steps to improve resource conditions is to design recreational infrastructure to direct use away from sensitive areas or, where this is not possible, minimize likely adverse effects. However, as a consequence of a multi-use land use plan, the USFS has observed a continual increase in road acres over time through road density analyses. Conversely, when facilities or infrastructures are no longer being used or needed, they are removed and sites are restored to natural conditions.

The habitat protection goal for the Forests includes conserving habitats for federally listed species and recovering populations of listed species. Goals for the conditions within Wilderness areas are also relevant to this consultation as portions of the San Mateo Creek are located within San Mateo Canyon Wilderness. The desired condition requires that ecological processes not be trammeled or impacted by human influences. Management activities are prescribed for the enhancement and recovery of threatened and endangered species. When considering biological resource conditions, the USFS has integrated the goal for sufficient flow regimes in streams that provide habitat for threatened, endangered, proposed candidate, and/or sensitive aquatic and riparian-dependent species, to allow the species to persist and complete all phases of their life cycles. Additionally, there is a focus on maintaining fish habitat functions or improving these functions, including spawning and rearing areas, and upstream and downstream migration, where possible. SMCW supports southernmost populations of southern California steelhead. Steelhead have been primarily observed in the lower reaches of San Mateo Creek corridor and in Devil Canyon (Knight 1998).

The Place-Based Program Emphasis is included under the Land Management Plan Strategy – Suitable Land Uses (LMPSSLU). CNF has been divided into a series of geographical units referred to as 'Places.' Each unit or Place has a theme, setting, desired condition and Program Emphasis section. The Program Emphasis identifies and prioritizes activities that CNF continues to emphasize since 2005 (USFS 2005).

San Mateo Creek is within the San Mateo Place, which is primarily an undeveloped landscape. This creek is currently eligible for a wild river designation under the Wild and Scenic Rivers program. The Place also includes the San Mateo Creek Wilderness. Within the Wilderness, there is one entire grazing allotment and part of a second allotment. Grazing has the potential to impact steelhead and its habitat by trampling redds, impacting stream temperature through reduction in plant shading, reducing complex bank structures by shearing overhanging banks, and increasing sediment in the stream gravel through bank degradation. Additionally, infrequent wildfires occur in the Wilderness (USFS 2005). Prescribed fires in the Wilderness are conducted only to meet wilderness fire management objectives. Specifically, they may be used to retain wilderness values or where community protection needs exist due to development on private lands near the Wilderness. San Mateo Creek is one of the few remaining free-flowing streams in southern California. San Mateo Canyon contains water for most of the year, and within the Place, major drainages include San Juan Creek, Los Alamos Creek, and Hot Springs Creek. Chaparral and coastal sage scrub habitats are characteristic of the San Mateo Creek landscape.

The San Mateo Place contains the most extensive designated trail system on the CNF. Morgan Train and Tenaja Falls are popular day-use destinations. Most of the recreation use that occurs within the Wilderness occurs within the first five miles of the boundary, with Tenaja Trail, among others, being one of the most frequently used trails (USFS 2005). Aspects of the Program Emphasis include maintaining the undeveloped, primitive and semi-primitive character of the Place. Additionally, the unique diversity of plant and animal species, and their habitat are to be protected, while controlling or limiting the spread of invasive, noxious, or undesirable nonnative plant and animal species. The current proposed crossing removals in this Place include the hardened crossing on Los Alamos Creek and one hardened crossing on the Tenaja Falls trail that crosses San Mateo Creek. Currently, sediment has accumulated behind the San Mateo Creek crossing requiring the removal of sediment (50 cubic yards) from the upstream side of the crossing prior to removal of the concrete structure. Within San Mateo Creek, southern California steelhead have historically been observed as far upstream as Fisherman's Camp, which is about two miles downstream from the project area. In 2001 and 2002, after unusually dry winters, steelhead were not observed in San Mateo Creek (USFS BA 2011). Most recent sightings of steelhead have been in Devil Creek (a tributary to San Mateo Creek) or in pools near the Camp Pendleton/CNF boundary (USFS BA 2011).

Previous restoration efforts, similar to the current proposed action, help to inform how past similar exposures will affect steelhead and available habitat. In 2007, the Forest replaced a culvert crossing with a bridge in Holy Jim Creek, a tributary to Trabuco Creek (San Juan watershed), and restored the stream to its natural grade. This bridge allows passage for native fish including arroyo chub, a Regional Forester's sensitive list species that is resident in Trabuco and Holy Jim Creeks. The Forest replaced an unimproved crossing at Pine Creek in 2001,

installing a bridge to allow safe passage for an endangered species, arroyo toad. These projects have been very successful in improving habitat conditions for the target species (USFS 2010).

The steelhead population within the action area is potentially susceptible to any activity within the watershed, including activities related to continued use and development of non-Federal lands and urbanization of the watershed, based on NMFS' experience in the watershed and information provided by the District to NMFS. Two communities (Rancho Carrillo and Rancho Capistrano) are located in and nearby San Mateo Place. Rancho Capistrano is located on the National Forest boundary and Rancho Carrillo is surrounded by the wilderness in the southwestern part of the Place. Several other private inholdings are also located within the wilderness or adjacent to the wilderness boundary. Upper reaches of San Mateo Creek watershed experience extensive development of rural residential housing, which contributes a significant amount of sediment to Tenaja Creek and to a lesser degree Los Alamos Creek (USFS BA 2011).

After reviewing available information describing activities which contribute to the environmental baseline, the baseline condition has not been degraded to the extent where recovery is no longer possible. Although, multi-use land management plans have impacted the status of steelhead in terms of habitat alterations for human use (*e.g.*, roads, trails, grazing allotments, and prescribed fires), the proposed action will likely elevate the baseline to more ideal conditions for the continued recovery of steelhead in San Mateo Creek watershed. The overall impact of the environmental baseline has altered steelhead distribution and range to some extent.

VI. EFFECTS OF THE ACTION

A. Approach to the Assessment

Under section 7(a)(2) of the ESA, Federal agencies are directed to ensure that their activities are not likely to jeopardize the continued existence if any listed species or result in the destruction of adverse modification of critical habitat. The proposed action under review in this biological opinion does not occur within designated critical habitat and is not likely to have negative effects on critical habitat located approximately eight miles downstream, owing to elements of the proposed action, including proposed BMPs, and instream conditions and characteristics that are expected at the time the proposed action is implemented. Below, NMFS outlines the conceptual framework and key steps and assumptions utilized in the jeopardy analysis for Southern California steelhead.

Section 7(a)(2) of the ESA, implementing regulations (50 CFR Part 402), and associated guidance documents (*e.g.*, USFWS/NMFS Consultation Handbook, 1998) require biological opinions to present: (1) a description of the proposed federal action; (2) a summary of the status of the affected listed species and designated critical habitat; (3) a summary of the environmental baseline within the action area; (4) a detailed analysis of the effects of the proposed action on the affected species and critical habitat; (5) a description of cumulative effects (future non-federal actions that are reasonably certain to occur); and (6) a conclusion as to whether it is reasonable to expect the proposed action is not likely to jeopardize the listed species or result in the destruction or adverse modification of the species designated critical habitat. By regulation

(50 CFR § 402.02), the "effects of the action" include 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. To evaluate whether an action is not likely to result in jeopardy to a listed species or result in the destruction or adverse modification of designated critical habitat, NMFS considers the combination of the status of the species and critical habitat, the "effects of the action," and the cumulative effects of reasonably certain to occur future non-federal actions. An action that is not likely to jeopardize the continued existence of the listed species is one that is not likely to appreciably reduce the likelihood of both the survival and recovery of the species in the wild by reducing its numbers, reproduction, or distribution (50 CFR § 402.02).

NMFS must evaluate the effects of a proposed action within the context of the current condition of the species and critical habitat including other factors affecting the survival and recovery of the species, as well as the function and value of critical habitat. Additionally, the risk assessment conducted should consider the effects of climate change on the species and critical habitat and on our prediction of the impacts from a proposed action. However for this biological opinion, effects on San Mateo Creek designated critical habitat are expected to be insignificant and discountable due to the distance between critical habitat and the action area, therefore will not be addressed. Lastly, NMFS evaluates the proposed action's effect on a species' likelihood of both survival and recovery (the "jeopardy standard" at 50 CFR § 402.02) by evaluating the species' risk of extinction. This approach, its relationship to the legal standard "likelihood of both survival and recovery," and the best available scientific information relating to viable salmonid populations (McElhany *et al*. 2000), are further described in terms of how they will be applied to the ecological conceptual framework for analysis of the proposed action.

1. Viable Salmonid Populations

NMFS uses a conceptual model of the species to evaluate the impact of the proposed action. For this consultation, the conceptual model will be structured around the listed southern California steelhead. The model is based on a hierarchical organization of individual fish, population unit, and the DPS. The guiding principle behind this conceptual model is that the likelihood of survival and recovery of a species is dependent on the likelihood of survival and recovery of populations which comprise the species, specifically the San Mateo Creek population within the Santa Catalina Gulf Coast Biogeographic Population Group (BPG) in the Southern California Steelhead Recovery Planning Area. The second principle is that the likelihood of survival and recovery of each population unit is dependent upon the fitness (growth, survival, or reproductive success) of the individuals that comprise that population.

Before NMFS can evaluate the effects of a proposed action on a population and a species, an understanding of the condition of the population and species in terms of their chances of survival and recovery is needed and critical for the effects analysis. NMFS will evaluate the current condition of the species and assess their chances of survival and recovery given their current condition and the existing and future threat regime. NMFS uses the guidance provided in the Viable Salmonid Populations (VSP) document by McElhany *et al*. (2000) to assist in the evaluation of populations. McElhany *et al*. (2000) concluded that assessing the independence and viability of individual populations is critical to a viability evaluation. Additionally, for a

focused population evaluation, NMFS will rely on both the Southern California Steelhead Recovery Plan (NMFS 2012) and NOAA's Technical Memorandum (2006), *Steelhead of the South-Central/Southern California Coast: Population Characterization for Recovery Planning*, to provide the best available scientific information on steelhead populations including abundance, productivity, and spatial structure information, within the southern California endangered steelhead DPS range, including the determined action area for the proposed action.

NMFS equates the risk of extinction of the species with the "likelihood of both the survival and recovery of the species in the wild" for purposes of conducting jeopardy analyses under section 7 (a)(2) of the ESA. The rationale for this logic resides in how NMFS defines survival and recovery and when these two conditions may be indistinguishable within a population. A species with a high risk of extinction does not equate to a species that lacks the potential to become viable. Furthermore, a high risk of extinction indicates that the species faces significant risks from internal and external processes and threats that can drive a species to extinction. The NMFS jeopardy assessment, therefore, focuses on whether a proposed action appreciably increases extinction risk, which is equivalent to appreciable reductions in the likelihood of survival and recovery.

2. Assessment Method (Exposure, Response, and Risk)

As described above, the regulations implementing section 7(a)(2) of the ESA direct NMFS to assess proposed project impacts on species and critical habitat to ensure that the proposed action is not likely to jeopardize the listed species or result in the destruction or adverse modification of critical habitat. In biological opinions, NMFS conducts two separate but related analyses to make these determinations. To conduct these assessments, NMFS uses a basic exposure-response-risk framework adapted from other accepted risk analysis frameworks such as those used by the Environmental Protection Agency (*e.g.*, EPA 1992 and 1998). The assessment will include observations of how past similar exposures have affected the species and habitat as described in the *Environmental Baseline*. Since habitat restoration represents the primary mechanisms by which the proposed action has potential effects on individual steelhead, the second approach NMFS utilizes is a habitat-based assessment.

The assessment method used in this biological opinion will include addressing exposure including extent, duration, and magnitude of direct and indirect effects on steelhead, expected responses by steelhead to adverse effects, and risk of exposure to steelhead (*i.e.*, the likelihood that individual steelhead will be affected). Within the exposure analysis, common stressors (physical, chemical, or biotic) directly or indirectly caused by the proposed action to which steelhead may be exposed will be identified and considered in terms of steelhead distribution and habitat distribution. Analysis will also include evaluating the nature of any exposure and the life stages or essential habitat features that will be exposed. Other factors that will be considered include: transport of disturbed sediment (persistence and concentration) within steelhead habitat. The evaluation as to the extent and duration of exposure to stressors, either on steelhead or habitat features, serves as the exposure profile provided in this biological opinion.

Within the response analysis, the best available science on common stressors and their effects on steelhead and their habitat will be referenced. Specifically, the analysis includes evaluating the

individual steelhead response and the habitat response to anticipated stressors as the proposed action occurs. Furthermore, this includes the effects on the individual steelhead and the effects on habitat. These effects will also be evaluated on a larger scale by considering the impact on steelhead populations within the entire DPS. This approach will serve to complete the response profile.

The risk analysis will include a problem formulation, risk examination and risk characterization. Risk characterization includes the effects on individual steelhead and the effects on habitat, while also considering potential impacts on the DPS. In this section, NMFS evaluates the likely effects of the proposed action to steelhead within the action area based on the exposure and response framework described above. NMFS will determine how the proposed action, when added to the environmental baseline conditions, will affect the fitness of individual steelhead. The final steps in NMFS' jeopardy risk assessment are to evaluate whether these fitness consequences, in combination with cumulative effects and including future environmental variation, are reasonably likely to result in changes in the risk of extinction of the San Mateo Creek steelhead population. In addition, NMFS considers the effects of ocean conditions on the species. Completion of the assessment relies on the information available about the species and the specific population units in terms of current levels of abundance, productivity, diversity, and spatial structure characteristics, as presented in the *Status of the Species* and *Environmental Baseline* sections. Because NMFS' opinion as to whether an action is or is not likely to jeopardize a species is based on the species-as-listed scale (DPS for steelhead), the southern California steelhead diagnosis presented in the *Status of the Species* section of this biological opinion provides a point-of-reference that NMFS uses in its final steps in the jeopardy analysis within the *Integration and Synthesis* section.

Throughout the assessment method, NMFS has a responsibility to use the best scientific and commercial data available for producing a biological opinion, in particular analyzing the effects of the proposed action. While the information provided in the USFS BA (2011) helps to describe the proposed action among other things (see 50 CFR § 402.12 for details), NMFS strongly relies on relevant ecological literature, resource and guidance documents from both agencies, and past information, collected in previous years, documented in the official record for the proposed action. Specifically, NMFS will describe the concept of stream simulation, which is one outcome from the proposed action in the action area. NMFS will consider the scope and duration of the project in terms of the type, amount, and extent of likely adverse effects. Furthermore, when evaluating and assessing both short- and long-term effects, NMFS can determine and identify any net benefits for steelhead from the proposed action. The action area does not include critical habitat so the destruction or adverse modification risk assessment will not be included in this biological opinion, but effects to endangered steelhead in the context of impacts to habitat for this species will be assessed.

3. Information Review, Synthesis, and Key Assumptions

NMFS is consulting on the proposed action, which involves the mechanical removal of two stream crossings, and NMFS will assume that this method will be approved by the Washington Office of the USFS for the crossing on San Mateo Creek within the designated Wilderness boundaries. The analysis of the effects for the action will be based on this assumption.

To evaluate the effects of the proposed sediment removal on endangered steelhead, which will be required at San Mateo Creek before the proposed crossing removal occurs, NMFS will rely on the *Sediment Removal from Freshwater Salmonid Habitat* guidance document (2004). The U.S. Department of the Interior, Bureau of Reclamation's Erosion and Sedimentation Manual (2006)[6], River Processes and Restoration (Chapter 7), specifically New Channel Designs and Relocations will be referenced to provide general information on the likely short-term adverse effects of sediment disturbance considering the scope and nature of the proposed action. NMFS will partially rely on information within the California Salmonid Stream Habitat Restoration Manual[7] for evaluating the proposed action and the methods which the District plans to use for conducting the proposed action. This evaluation would ensure consistency with state and federal protocols and methods for removing crossings and engaging in riparian-habitat restoration. An additional guidance document that served to be informative is the Riparian Area Management: Process for Assessing Proper Functioning Condition (DOI and BLM 1998). The proposed action will improve access to available habitat for endangered steelhead, and in turn, promote the restoration of steelhead in San Mateo Creek watershed. Additionally, the proposed action will increase access to historical spawning grounds and provide unimpeded and volitional[8] migration upstream and downstream as adult and juvenile steelhead complete their life cycle.

B. Altering Background Sedimentation and Turbidity Levels

There will be in-channel work for removals. Any in-channel work creates unnatural disturbance to the riparian habitat in which steelhead rely on during migration. An increased input of sediment into creeks is a major stressor during road re-alignment activities and vegetation removal. As a result, increased turbidity in creeks can reduce spawning or rearing habitat. Even small pulses of turbid water will cause salmonids to disperse from established territories (Waters 1995), which can displace fish into less suitable habitat and/or increase competition and predation, decreasing chances of survival. Prolonged exposure to elevated concentrations of inorganic sediment can cause decreased growth in salmonids (Shaw and Richardson 2001). The magnitude and degree of the potential water-quality alteration is unknown because the specific sedimentation and turbidity rates have not been predicted, however potential flushing of fine sediment stored upstream of the existing structures is possible. Additionally, increases in pH (creating a more basic solution) from concrete dust entering the water during bridge construction on Los Alamos Creek may occur.

The implementation of the design, erosion control, and BMPs would minimize the risk of significant surface erosion and would prevent even minor erosion from affecting the stream channel (USFS EA 2011). As a result, increases in turbidity and sedimentation rates, in particular during installation of the temporary diversion for San Mateo Creek, along with changes in pH levels in Los Alamos Creek during bridge construction, are not expected by NMFS to be sufficient to diminish the functional value of habitat for steelhead. The impacts are expected to be localized. Furthermore, the effects are of less magnitude than steelhead can

[6] http://www.usbr.gov/pmts/sediment/kb/ErosionAndSedimentation/index.html
[7] http://www.dfg.ca.gov/fish/resources/habitatmanual.asp
[8] A form of fish passage whereby the opportunity to move freely past some impediment is continuously available, and the aquatic conditions are within the swimming ability of the target life stage and species intended for passage, such that all healthy individuals of the population can pass at will, " or..."of their own volition." (personal communication, Richard Wantuck, NMFS)

experience as part of natural storm flow events at other times of the year, and of less magnitude in other areas of the watershed as San Mateo Creek approaches more highly developed areas closer to the coastline.

The removal of accumulated sediment on the upstream side of the San Mateo Creek crossing and the actual removal of the concrete crossing itself will likely result in sediment disturbance and increased turbidity levels within the creek. Responses to increased turbidity can include fish mortality, reduced fish feeding efficiency, and a decrease in food availability (Berg and Northcote 1985; Velagic 1995; Thompson and Larson 2004). However, the District proposes to avoid or minimize impacts on steelhead through the implementation of BMPs. With approximately 30 linear feet of cover temporarily removed in San Mateo Creek, steelhead that may be present will have less shaded, cool areas for resting and avoiding predators. Specifically, shaded areas are important for minimizing heat and maintaining water temperatures that support the life stages present, especially during warmer months (USFS BA 2011). In Los Alamos Creek, bridge construction would temporarily remove up to 100 linear feet of cover. Cover is an important component of adult holding and juvenile rearing habitat (USFS BA 2011). The adverse effects of temporary changes in cover will be minimized through revegetation of project areas as needed via plantings of willow and sycamore.

Overall, through incorporating numerous protective measures into the proposed action, NMFS believes the amount and extent of potentially adverse effects that may result from altering background sedimentation rates and turbidity levels will be minimized to a level where adverse effects are minor and temporary. The associated risks to steelhead from the proposed action are expected to result in habitat improvements that will benefit the listed species, because the removal of fish passage barriers will ultimately provide access to suitable upstream habitat while restoring stream reaches to more natural conditions. For all other in-stream activities, the District has also proposed to include BMPs to reduce the likelihood of bank erosion and sediment transport from entering the stream. Therefore, NMFS assumes any short-term impacts associated with turbidity during implementation of the proposed action to be insignificant.

C. Risk of Harm and Temporary Loss of Habitat

Temporary de-watering of San Mateo Creek will be required resulting in diversion of flow for approximately one week. NMFS expects the dewatering process to cause temporary loss of aquatic habitat, a temporary barrier to upstream migration, and increase the risk that steelhead would be harmed. Before dewatering occurs, steelhead will be relocated to suitable habitat downstream if found to be present in the action area. The process of capture and relocation can have physiological impacts including inducing stress and temporary disorientation. During the dewatering process, steelhead may become trapped if not observed, identified and caught before the process begins. Direct injury and mortality result from physical trauma, which can be caused by direct and indirect contact with humans or machinery. Specifically, direct injury may impair fish movement, feeding, and survival. Fish collecting gear, whether passive (Hubert 1996) or active (Hayes *et al.* 1996), has some associated risk to fish, including stress, disease transmission, injury, or death. The amount of unintentional injury and mortality attributable to fish capture varies widely depending on the method used, the ambient conditions, and the expertise and experience of the field crew.

If fish relocation activities are necessary, they will be conducted by qualified fisheries biologists with experience in handling and relocating salmonid species so direct effects to and mortality of steelhead during capture will be minimized. Based on an evaluation of previous relocation events during similar activities[9] further north within the steelhead DPS range, NMFS believes the maximum amount of mortality likely from possible fish relocation during the proposed action should be no more than one steelhead. Past relocation efforts had very low mortality with one out of 249 steelhead observed dead during the dewatering process (Santa Barbara County, Quiota and El Jaro Creeks (2008-2011)). NMFS does not believe relocation activities will significantly reduce the fitness of individual fish.

Although the action area is within the historical winter distribution (San Mateo Creek crossing) and range (Los Alamos Creek crossing) for steelhead (Figure 4), past observations have reported steelhead at Fisherman's Camp on San Mateo Creek (USFS BA 2011), which is about two miles downstream of the action area. It is reasonable to assume that steelhead may have existed further upstream in past years, where survey studies or observations were not conducted. Suitable steelhead habitat is present within the action area and steelhead may be utilizing available shelter habitat in the form of pool depth, boulders, and terrestrial vegetation. Additionally, main channel pools can contribute significantly to over-summer rearing habitat for juvenile steelhead. Considering the timing of the proposed action, juvenile steelhead presence is more likely than adult presence in San Mateo Creek. The crossing on Los Alamos Creek is upstream of historical distribution and construction activities will take place during the summer when the stream is dry, however, steelhead may be located further downstream of the crossing within the action area, thus NMFS must consider indirect effects on steelhead such as changes in downstream turbidity as a result of changes in sediment transport and deposition patterns in the action area after bridge construction is complete. NMFS does not expect the anticipated changes to significantly reduce the fitness of individual steelhead in the action area. The crossing on San Mateo Creek will be removed during summer months when juvenile steelhead presence is more likely than adult presence. NMFS expects a higher steelhead encounter rate at San Mateo Creek based on the hydrology of the stream and available in-stream habitat prior to dewatering activities. The removal process is expected to take approximately two weeks; however NMFS considers it prudent to anticipate delays which could extend the work period up to one month when configuring the project timeline and anticipating the encounter rate of steelhead. The removal process is expected to take approximately two weeks; however NMFS considers it prudent to anticipate delays which could extend the work period up to one month when configuring the project timeline and anticipating the encounter rate of steelhead.

D. Effects on Riparian Habitat from Removal and Construction Activities

Stream riparian zones include the area of living and dead vegetative material adjacent to a stream. They extend from the edge of the ordinary high water mark of the wetted channel upland to a point where the zone ceases to have an influence on the stream channel. Riparian zones

[9] Similar projects occurred in San Luis Obispo, Santa Barbara, and Ventura Counties, including a tributary of Lower Santa Ynez River. Relocation evaluation came from monitoring reports for the following: El Jaro Creek – Rancho San Julian Fish Ladder (2009), El Jaro Creek – Cross Creek Ranch Fish Passage Project (2009), Quiota Creek Crossing 2 – Bottomless-Arched Culvert Project (2011), and Quiota Creek Crossing 6 Bottomless-Arched Culvert (2009).

provide hydraulic diversity and structural complexity to the stream channel, buffer runoff energy from storm events, moderate water temperatures through shading, protect water quality, and provide a source of food and nutrients. Specifically in terms of habitat complexity, pool structures in streams provide refuge from predators and high-flow events for juvenile salmon specially steelhead that are known to rear for extended periods in freshwater.

This portion of the effects analysis will focus on habitat changes or alterations being made through the proposed action. Some effects will impact not only steelhead but available habitat as well (*e.g.*, dewatering and sediment deposition). Activities previously discussed may be expanded upon in this section. However, the major effects on stream habitat within the action area will be beneficial in terms of providing restored in-stream habitat and create access to upstream habitat for migration and spawning while contributing to properly functioning conditions for the riparian ecosystem. Specifically, with the Los Alamos Creek barrier removal, approximately five miles of stream habitat will be accessible for fish passage. For San Mateo Creek, stream flow diversion and dewatering are expected to temporarily reduce and alter aquatic habitat. However, only small reaches of subject stream habitat within the action area will be dewatered for in-channel excavation activities, representing a very minor portion of habitat that may be currently utilized by steelhead within San Mateo Creek watershed. The new bridge in Los Alamos Creek is expected to have a longer and wider center span which requires larger abutments. The footprint of the reconstructed crossing is expected to be slightly larger than that of the existing crossing that will be replaced. Consequently, vegetation may need to be removed, but exact quantities of permanent vegetation removal have not been quantified. Rip-rap or gabions will be used to protect the abutments, preventing scour. A larger bridge span will reduce river constriction and associated erosion in the action area, and in turn, potentially reduce fine sediment input.

NMFS reviewed the Sediment Removal Guidelines (NMFS 2004) in response to the proposed action of sediment removal on San Mateo Creek. NMFS believes this removal will not impair the ability of steelhead to survive and recover. The scope of the guidelines (NMFS 2004) is much larger than the proposed sediment removal for this consultation; however the guidelines are also appropriate for stream excavation for flood control. Specifically, sediment removal may also drive more widespread instability because the discontinuity in the sediment transport-supply balance tends to migrate upstream as the bed is eroded to make up the supply deficiency (NMFS 2004). Additionally, trees and riparian vegetation structure increase hydraulic boundary roughness resulting in relatively lower velocities near the flow-substrate interface. These low-velocity zones provide refuge habitat to salmonids during high flow events. A summary of effects for removal of sand and gravel as well as vegetation from a bank can be found in Table 1. NMFS anticipates the temporary and permanent impacts associated with the proposed action will not result in permanent adverse impacts to habitat or steelhead population recovery because (1) the effects from the project are not expected to impact critical habitat; (2) the area of riparian habitat impacted (permanently and temporarily) represents a small fraction of the total amount of riparian habitat in the vicinity; and (3) the District will employ various BMPs and minimization measures to ensure impacts to the channel and the species will be avoided or minimized.

Table 1. Summary of effects of instream sediment removal, and implications for salmonid habitat (taken from NMFS 2004).

Element of Instream Sediment Removal	Physical Effect	Possible Consequence for Salmonid Habitat
Removal of sand and gravel from a location or from a limited reach.	Propogates stream degradation both upstream and downstream from removal site.	Loss or reduction in quality of pool and riffle habitats.
	Scour of upstream riffles.	Lower success of spawning redds.
	Reduced pool areas.	Loss of spawning and rearing habitat.
	Bed surface armoring.	Lower quality of spawning and rearing habitat; changes to invertebrate community.
	Scour or burial of armor layer.	
	Surface caking or pore clogging.	
Removal of vegetation and woody debris from bar and bank.	Reduce shade.	Increase water temperature in inland, narrow rivers.
	Decrease channel structure from wood.	Possibly reduce cover; reduce number and depth of pools; reduce area of spawning gravel; limit channel stability.
	Decrease drop-in food, nutrient inputs.	Decrease stream productivity.

During bridge construction on Los Alamos Creek, permanent changes in channel morphology[10] will be guided by stream simulation techniques (USFS BA 2011). The purpose, methods, and expected outputs and outcomes from stream simulation will be discussed in this section. Channel morphology, along with flow, affects stream hydraulics, which refers to a stream depth, surface elevation, velocity, and turbulence. Together, channel morphology and hydraulics influence the conditions that support fish migration and movement as well as provide holding, rearing and spawning habitat. As discussed previously, removal of riparian and aquatic vegetation and removal of sediment and debris from the stream channel could temporarily alter channel morphology and hydraulic conditions that support fish movement; however these effects are thought to be minimal considering the beneficial output of crossing removals and likely outcomes from stream simulation.

E. Insignificant, Discountable, or Wholly Beneficial Effects (Riparian Habitat Restoration)

Recovery of steelhead populations within Forest lands is one of the major motivations for the proposed action. Recovery should focus on rehabilitating stream systems so that existing *O. mykiss* populations can express the anadromous life-history trait while inhabiting natural habitats (Boughton 2010). As NMFS must consider the regional climate variability and the predicted trends for future climatic regimes, it is important to note there still remains structural uncertainty in the climate system. One way to manage for this uncertainty is for social-ecological systems to design for resiliency to whatever comes (Boughton 2010). Furthermore, the resiliency paradigm suggests that ecological scientists should consider the idea of being designers versus predictors. NMFS believes the stream simulation method qualifies as a design method for achieving resiliency in riparian habitat on Forest lands. Improving the quality of existing habitats, or

[10] Channel morphology describes the linear, aerial, and volumetric features of a channel, including depth, length, width, and the shape or configuration of the channel (e.g. the characteristics of secondary channels, riffles, runs, pools, backwaters, and sloughs).

increasing freshwater carrying capacity, as well as making areas accessible to listed species is critical for recovery (Zabel *et al*. 2006; Seavy *et al*. 2009). Additionally, restoring habitats with PCEs is one way to prepare for potential shifts in the geographical range of endangered species due to changing climate conditions.

The intent or goal of stream simulation[11] is to create within the structure a channel as similar as possible to natural channel conditions in both structure and function. Specifically, the general objective of the simulation is for the simulated channel to be no more of an obstacle to aquatic animals than the adjacent natural channel. It is also important to note that this method does not target specific fish or other species for passage because it creates diverse water depth and velocities, hiding and resting areas, and moist-edge habitat that different species need for movement.

Generally, stream simulation crossings are larger than traditional crossings, therefore less prone to debris plugging. The proposed bridge construction will be designed to accommodate a 100-year flood. The width and length of the structures would conform to current hydrologic design standards and meet the Forest Service Transportation Structure Handbook requirements for designing a "long-term structure" to last a minimum of 50 years (USFS BA 2011). The vision of stream simulation is to have the simulated channel adjust to accommodate a range of flood discharges and sediment/debris inputs, without compromising aquatic organism passage and without having detrimental effects on up- or downstream reaches.

Within the methodology of this approach is the working criterion to ensure that the channel inside the structure is at least as wide as bankfull width in the reference reach[12]. Limitations of this approach also need to be addressed. Stream simulation is not an exact replication of a real stream channel, meaning it cannot recreate some aspects within the crossing structure including: natural light, cohesive soils, channel spanning or embedded wood, debris jams, bankline vegetation, channel bends, or flood-plain functions. Stream simulation projects are expected to have low maintenance needs due to the larger size, which decreases the probability of plugging and overtopping. These projects can also differ in some respects from stream-crossing projects. Specifically, the way the streambed is treated inside the structure as well as upstream and downstream of the crossing is different in terms of the structure infill. The proper construction of the infill is vital to its performance. Stream simulation construction also includes BMPs[13]. These BMPs provide guidance for protecting the construction site, the stream and aquatic organisms during construction, as well as for proper construction of the stream-simulation channel inside the structure. Maintaining water quality throughout the proposed stream simulation projects will be accomplished by preventing erosion and preventing sediment and pollutants from entering streams. Sediment control mechanisms proposed by the District include stream bank stabilization (slopes will be tiered to minimize rock falls/slides), exclusion fencing around project areas, and dewatering project sites, where needed. The proposed activities would also include utilizing rip-rap or gabions to protect bridge abutments, where approximately 40 linear feet of reinforcement will be needed per bridge abutment. These precautions are being

[11] Stream simulation: http://stream.fs.fed.us/fishxing/aop_pdfs.html
[12] The reference reach is a natural stable reach preferably upstream near the project area. For more details on the criteria of a reference reach, see Chapter 5: Site Assessment, http://stream.fs.fed.us/fishxing/aop_pdfs.html.
[13] All of the items in the BMP list are discussed in Chapter 7 (http://stream.fs.fed.us/fishxing/aop_pdfs.html).

proposed to avoid sediment deposition that will adversely alter channel morphology, changing the composition of gravel and other substrates. Increased sediment input can eventually lead to reducing the size of interstitial spaces further influencing habitat availability. However, NMFS believes one of the outcomes from a stream simulation approach is improved steelhead passage and PCEs for steelhead habitat, supporting the recovery of endangered southern California steelhead.

The approach for recovery actions is described in the NMFS final Southern California Steelhead Recovery Plan (2012), and within the proposed objectives, one objective is to at least maintain current distribution of steelhead and, when possible, restore distribution to previously occupied areas. Progress towards this objective is accomplished through the proposed action. Furthermore, NMFS' experience as well as the available information regarding fish passage at man-made structures indicate implementation of barrier recovery actions is feasible and would be successful (NMFS 2012). Previous work, on a National level, similar to the proposed action is commonly undertaken to restore habitat characteristics and condition for populations of stream fish (*e.g.*, Smith *et al*. 2000, The Heinz Center 2002). Through the proposed action, the District is effectively increasing breeding and living space for the species. Due to the extensive amount of stream network within the San Mateo watershed, NMFS expects historical habitats to be capable of producing a large number of steelhead (NMFS 2012). One DPS-wide recovery action that aligns with the proposed action includes the inventory and assessment of impediments to fish passage, resulting in identifying and providing appropriate fish passage opportunities in watersheds historically supporting anadromous populations within the southern range extension, specifically the Santa Catalina Gulf Coast BPG.

VII. CUMULATIVE EFFECTS

Cumulative effects include effects of future State, local or private actions (hereafter *future actions*) that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the project action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA, as amended. The method used to determine cumulative effects involved identifying the perceived effects of the proposed action (previous section of this biological opinion), the potential effect of future actions that are reasonably certain to occur in the action area and qualitatively evaluating the combined effects of the proposed action and future actions.

NMFS searched for information concerning future actions in the action area, and there are no future actions that are reasonably certain to occur. The cumulative effects provided in the USFS BA (2011) to NMFS have been evaluated as factors in the *Environmental Baseline* section of this biological opinion.

VIII. INTEGRATION AND SYNTHESIS

This section integrates the current conditions described in the environmental baseline with the effects of the proposed action and the cumulative effects of future actions. The purpose of this synthesis is to develop an understanding of the likely short-term and long-term responses of listed species to the proposed action.

The presence of steelhead is possible considering the available habitat within the action area; however juvenile encounter rates will likely be higher at San Mateo Creek than Los Alamos Creek. Thus, exposure risk to direct and indirect effects will likely be higher at San Mateo Creek. NMFS also considered the hydrologic classification of San Mateo Creek as a perennial stream and past relocation efforts in other watersheds during similar activities to the proposed action. Where increased turbidity levels are likely to occur, minimization measures include specific project design considerations, such as dewatering and implementation of BMPs. Additionally, future long-term projections in precipitation and potential improved passage further downstream, may contribute to increased observations of steelhead over time. However, on a shorter timescale, when considering the El Niño/La Niña weather cycles, the steelhead DPS can experience highly variable rainfall (NMFS 2012). Finally, NMFS considered the timeline and work window for the proposed action and expects the overall, combined steelhead encounter rate to be low. NMFS concludes that non-lethal take during relocation and dewatering activities is likely to equal 20 or fewer steelhead juveniles (for both project sites), with a total of one lethal take out of the 20, thus the risk of mortality to any encountered steelhead is extremely low.

The long-term improvement to fish passage in the action area will benefit the steelhead population as they gain access to upstream habitat that is considered suitable and important for the recovery of the endangered steelhead DPS. The crossing design will meet NMFS' fish passage criteria to ensure new structures do not delay migrating steelhead or result in the harm, injury, or death of listed species. Ultimately, the proposed action would help to restore ecological conditions that specifically promote the abundance of steelhead. One ecological condition is the restoration of migration corridors during upstream and downstream migration periods. Los Alamos, an intermittent creek, can provide a migration corridor to perennial creeks (*e.g.*, San Mateo Creek) during the wet season. The corridor role increases the amount of accessible perennial habitat, and thus the size of the steelhead population that can be supported. The proposed action works in concert with the CNF strategic program emphasis, which explains that the USFS plans to implement provisions of recovery plans for listed species appropriate to National Forest System lands.

IX. CONCLUSION

After reviewing the best scientific and commercial data available, the recent status of the steelhead, the environmental baseline, and expected effects of the stream restoration activities, including crossing removals and bridge construction, it is NMFS' biological opinion that the proposed action is not likely to jeopardize the continued existence of the endangered southern California steelhead DPS.

X. INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without 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 NMFS as an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation

which actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including breeding, spawning, rearing, migrating, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not the purpose of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this incidental take statement. The USFS will adhere to the Term and Conditions detailed in this section of the Biological Opinion and other BMPs discussed in the biological assessment for the entirety of the project.

The measures described below are nondiscretionary, and must be undertaken by the USFS, for the exemption in section 7(o)(2) to apply. The USFS has a continuing duty to regulate the activity covered by this incidental take statement. If the USFS (1) fails to assume and implement the terms and conditions or (2) fails to require their designee(s) to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the USFS must report the progress of the action and its impact on the species to NMFS as specified in the incidental take statement (50 CFR § 402.14(i)(3)).

A. Amount and Extent of Take

The installation/removal of cofferdams and fish relocation during the proposed action is expected to result in minimal incidental take of endangered southern California steelhead. The number of ESA-listed steelhead that may be incidentally taken during proposed activities is expected to be very small. Steelhead present during the construction window or stranded in residual wetted areas as a result of streamflow division and workspace dewatering will need to be relocated to a suitable instream location immediately downstream of the workspace. NMFS assessed the anticipated amount of take based on past relocation trends during similar projects elsewhere in northern watersheds within the southern California steelhead DPS and specific proposed action information (*i.e.*, action area and timeline). Therefore, take is quantified as: No more than 20 steelhead juveniles. NMFS anticipates out of the potential steelhead encountered during project activities, no more than 1 juvenile steelhead will be killed during relocation and dewatering efforts. If more than 20 juvenile steelhead are captured for relocation, or more than 1 juvenile steelhead is killed during relocation or dewatering activities, incidental take will have been exceeded and consultation will need to be reinitiated.

B. Effect of Take

In the accompanying opinion, NMFS determined this level of anticipated take is not likely to result in jeopardy to the species.

C. Reasonable and Prudent Measures

The following reasonable and prudent measures are necessary and appropriate to minimize and monitor the anticipated incidental take of steelhead and associated impacts from take. The

results of the effects analysis provide the basis for the following reasonable and prudent measures:

1. Undertake measures to avoid harm and mortality to steelhead resulting from fish relocation;

2. Undertake measures to maintain water quality at pre-construction levels to avoid or minimize harm to steelhead;

3. Prepare and submit a report to document the effects of relocation activities and monitoring efforts during the proposed action; and

4. The USFS shall avoid or minimize adverse effects of the proposed action by providing all bridge design plans for review by NMFS and conducting post-construction evaluations and assessments to verify channel slope and bed-load are functioning as predicted in the design model to allow for fish passage.

D. Terms and Conditions

In order to be exempt from the take prohibitions of the ESA, the USFS must comply with the following terms and conditions, which implement the reasonable and prudent measures, described above and outline required reporting/monitoring conditions. These terms and conditions are non-discretionary:

1. The following terms and conditions implement reasonable and prudent measure No. 1.

   A. USFS shall provide a list of all BMPs and the terms and conditions of this biological opinion to their employees and contractors that are involved with implementation of the proposed action, and ensure these terms and conditions are followed for the duration of the project. The biologists shall monitor the construction sites during placement and removal of cofferdams and during construction within the channel to ensure that any adverse effects to steelhead are minimized. The biologist shall be on site during all dewatering events to capture, handle, and safely relocate juvenile steelhead. The biologist shall note and document the number of steelhead collected/observed in the action area, the number of steelhead relocated, and the date and time of collection and relocation. Juvenile steelhead shall be relocated to a suitable instream location immediately downstream of the workspace. One or more of the following preferred methods shall be used to capture steelhead: dip net, seine, throw net, minnow trap, or by hand. Electrofishing is prohibited. Project activities shall only be conducted when steelhead are least likely to be present or affected by the proposed action (June 1-November 30). The project biologist shall have a high level of expertise in the areas of salmonid biology and ecology, biological monitoring, and handling, collecting, and relocating salmonid species. The biologist shall report the above information to NMFS (Brittany White-Struck, 501 W. Ocean Blvd., Suite 4200, Long Beach, California 90802), including information on the dewatered areas - dimensions of area dewatered (width, length, average depth).

B. Dead steelhead shall be collected and placed in an appropriately sized whirl-pack or zip-lock bag, labeled with the date and time of collection, weight, fork length, location of capture, condition of the individual, suspected cause of injury or death, and then frozen as soon as possible. If any steelhead are injured or fatally wounded, the USFS biologist will immediately notify NMFS (Brittany White-Struck, 562-432-3905). The purposes of the contact shall be to review the activities resulting in lethal take, to determine if additional protective measures are required, and to discuss handling procedures for injured or dead steelhead. If a steelhead mortality does occur, the project biologist shall coordinate with NMFS (Brittany White-Struck, 562-432-3905) to ship the carcass as soon as possible on dry ice through overnight express mail to NMFS (Brittany White-Struck, 501 W. Ocean Blvd., Suite 4200, Long Beach, California 90802).

2. The following terms and conditions implement reasonable and prudent measure No. 2.

A. The project biologist shall monitor in-channel activities and performance of sediment control or detention devices for the purpose of identifying and reconciling any condition that could result in take of steelhead. Additionally, the project biologist shall monitor water quality in San Mateo Creek by taking samples at 50, 100 and 300 feet above and below the project construction area prior to implementing the proposed action (to establish background turbidity levels/baseline NTU level) and during in-channel work activities (twice every day). These samples will be taken to continue to assess turbidity levels during the removal of the crossings. When turbidity levels below the crossing rise above 20 percent greater than background turbidity levels taken at the same distance above the crossing, the biologists shall halt work activity to recommend measures for avoiding adverse effects to steelhead and their habitat and ensure sediment control mechanisms are properly working. When the turbidity level at 300 feet downstream, falls below 20 percent of the baseline, work can re-commence. Turbidity measurements shall be documented and compiled into a report to NMFS' Southern California Office (501 W. Ocean Blvd., Suite 4200, Attn: Brittany White-Struck, Long Beach, California 90802).

B. The USFS shall provide NMFS with a copy of the proposed action's site specific *Sediment Control Plan* or applicable plan(s), which specify BMPs to control mobilization of sediment from the action area for both Los Alamos and San Mateo Creek crossings. The plan should provide minimization measures to the same extent as in the *California Salmonid Stream Habitat Restoration Manual* (DFG 2003, pg. 50-53). The plan shall be submitted no fewer than 30 days prior to implementing the proposed action (*i.e.*, on or before May 15 of the year to be implemented if beginning on June15). The USFS must receive NMFS agreement for the final *Sediment Control Plan* prior to implementing the *Sediment Control Plan*. If BMPs must be modified, or when additional BMPs are implemented, the submitted plan will be updated to reflect needed changes. Documents shall be submitted to NMFS' Southern California Office (501 W. Ocean Blvd., Suite 4200, Attn: Brittany White-Struck, Long Beach, California 90802).

C. Construction work shall not create conditions that mobilize sediment or concentrate over-land flow from construction areas into the creek, or other channels leading directly to the creek. Specifically, any sandbags to be used during the construction of the coffer dam for the water diversion shall only be filled with clean/washed sands or gravels. Also, any new concrete that is poured shall be cured for five days before being allowed to contact flowing water. No fresh concrete shall be poured if any rain is forecast to occur within five days. All fill material for cofferdams or access ramps shall be completely removed from the channel by November 30.

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

A. The USFS shall provide NMFS (Brittany White-Struck, 501 W. Ocean Blvd., Suite 4200, Long Beach, California 90802) with a summary report by January 15 of the year following the completion of fish relocation and monitoring activities. The report shall include the methods used during the steelhead relocation and monitoring efforts, location and description of the habitat where steelhead were relocated, number of steelhead captured due to being stranded in residual wetted areas as a result of streamflow division and workspace dewatering, number of steelhead mortalities, and other pertinent information related to the monitoring and fish relocation activities (*e.g.*, color photographs taken during, before and after work activity, age class/length of captured steelhead). Additionally, the report shall document any effect of the proposed action on steelhead that was not previously considered, thus triggering the requirement for reinitiation of consultation.

B. The USFS shall allow any NMFS employee(s) or any other person(s) designated by NMFS, to access the action area during the construction period for the purpose of observing monitoring activities, evaluating fish and stream conditions, monitoring performance of the USFS' BMPs, monitoring water quality, collecting fish samples, or perform other monitoring/studies. NMFS will notify the USFS 48 hours prior to planning a site visit and will contact USFS personnel prior to entering the construction site.

4. The following terms and conditions implement reasonable and prudent measure No. 4.

A. The USFS shall provide NMFS with a copy of all bridge construction design plans from 30% to 100% design phase for review. The USFS must receive NMFS agreement for the final Los Alamos Creek bridge design plan. Upon receipt of final NMFS agreement, the USFS shall commence implementation of the NMFS-agreed bridge design plan.

B. Detailed reports of the pre-, on-going, and post-construction evaluation and assessment of channel function will be required for submission to NMFS (Brittany White-Struck, 501 W. Ocean Blvd., Suite 4200, Long Beach, California 90802). The pre-construction report shall include a site diagram, site photographs, and report summary showing the placement of the exclusion fencing and documenting its effectiveness. This report shall be submitted to NMFS at least, seven days prior to the

actual implementation of removals and construction. On-going and post-construction reports shall have information such as slope, channel transport, and habitat type after the removal of the crossings and after placement of the bridge, explaining how the construction design incorporates *Guidelines for Salmonid Passage at Stream Crossings* (NMFS 2001). The first of these reports shall be submitted to NMFS within the first three months once the proposed action commences. Since the proposed action timeline is seven months (combined crossing sites), the second report will be submitted once the proposed action is complete. For an additional five years following completion of the proposed action, annual evaluation reports shall give the flow, slope of the channel bed, and habitat data such as new habitat typing information with substrate information and edge data information.

C. A restoration plan, for the temporarily impacted areas, shall be submitted to NMFS (Brittany White-Struck, 501 W. Ocean Blvd., Suite 4200, Long Beach, California 90802), at least, seven days prior to the actual implementation of the proposed action. The restoration plan shall include, but is not limited to, techniques used to restore native habitats, success criteria, monitoring parameters and schedule, and remedial measures in the event success criteria are not achieved. The plan shall also include re-vegetation monitoring protocols, a description of the locations that will be planted or seeded, the area (ft^2) planned to be re-vegetated, a plant palette, planting or seeding methods, proposed methods to maintain the re-vegetated areas, and pre-planting color photographs of the pre-construction areas. Annual monitoring reports (five total yearly reports) shall be submitted to NMFS documenting the progress and success of restoration and enhancement efforts through post-planting color photographs.

XI. CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, or to develop information.

1. The USFS should continue to work cooperatively with other State and Federal agencies, private landowners, governments, and local watershed groups to identify opportunities for cooperative analysis and funding to support salmonid habitat restoration projects within San Mateo Creek watershed.

2. The USFS should continue to update NMFS as to the designs, construction methods, and work progress on the removal of four low-water hardened crossings and three small grouted-stone dams in Trabuco Canyon (Trabuco Creek, San Juan Creek watershed).

3. The USFS should continue to work with the other State and Federal agencies, private landowners, government and local watershed groups to develop forestry conservation and restoration strategies to help prevent catastrophic wildfires as well as reduce sedimentation from forest roads on State, Private and Federal lands.

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.

XII. REINITIATION OF CONSULTATION

This concludes formal consultation for the proposed replacement of the Los Alamos Creek crossing and the removal of the San Mateo Creek trail crossing in the San Mateo Creek Watershed, within the CNF, Trabuco Ranger District, in Riverside, California. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered in this opinion; (3) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, formal consultation shall be reinitiated immediately.

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Figure 1.
Coordinates for Crossings (provided by CNF on 10/27/2011)

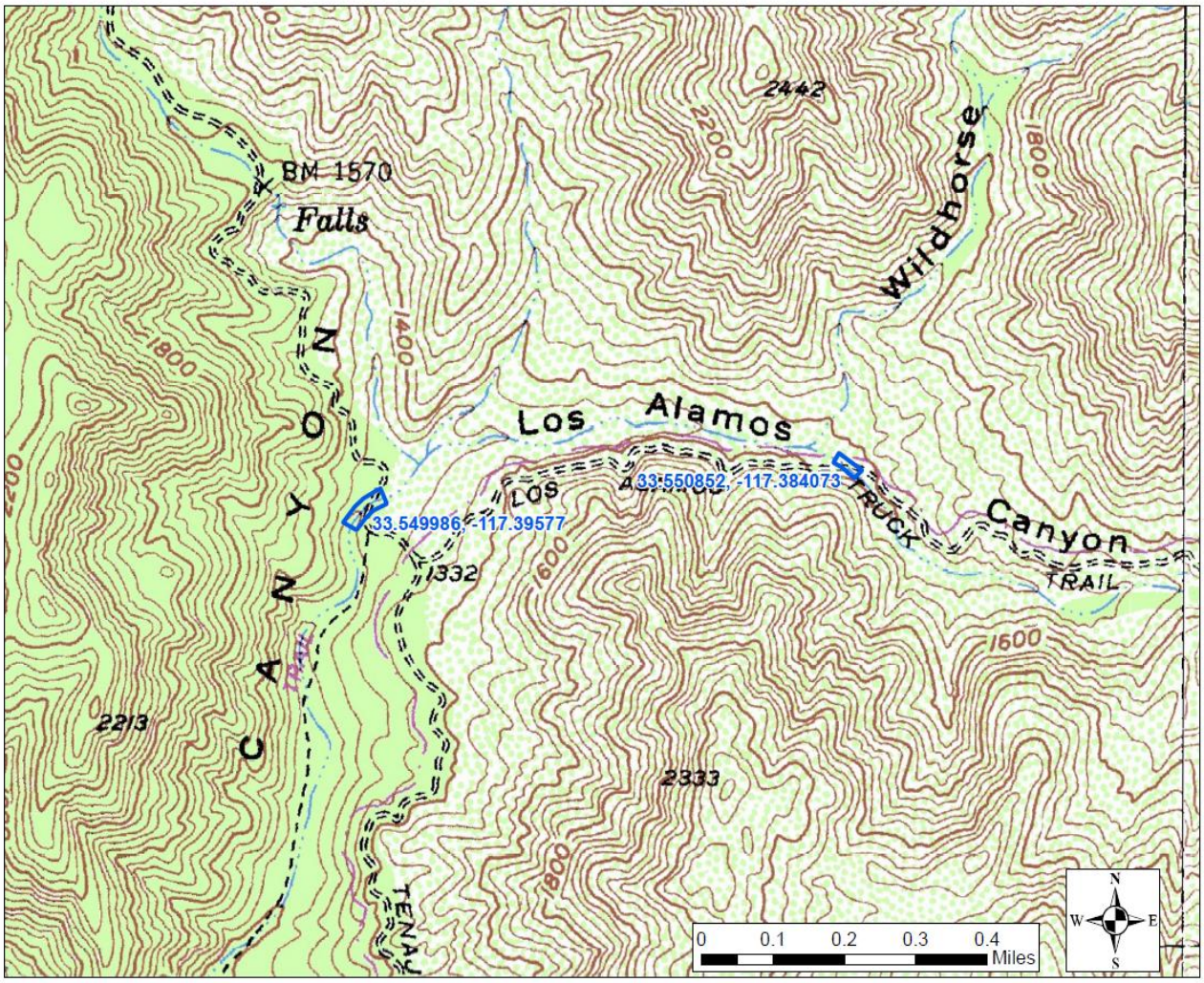


Figure 2.
Action Area (depicted by orange highlighted areas)

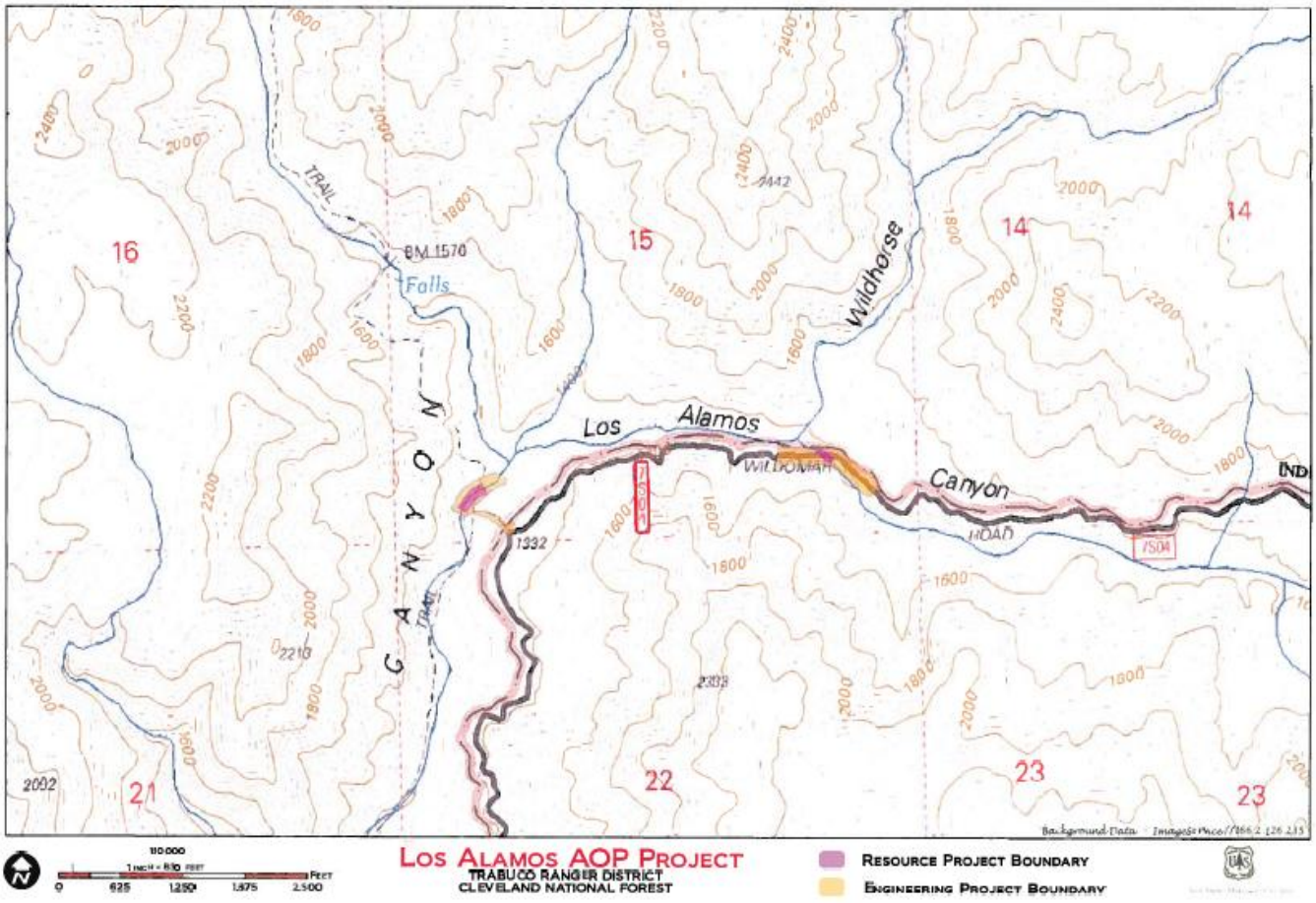
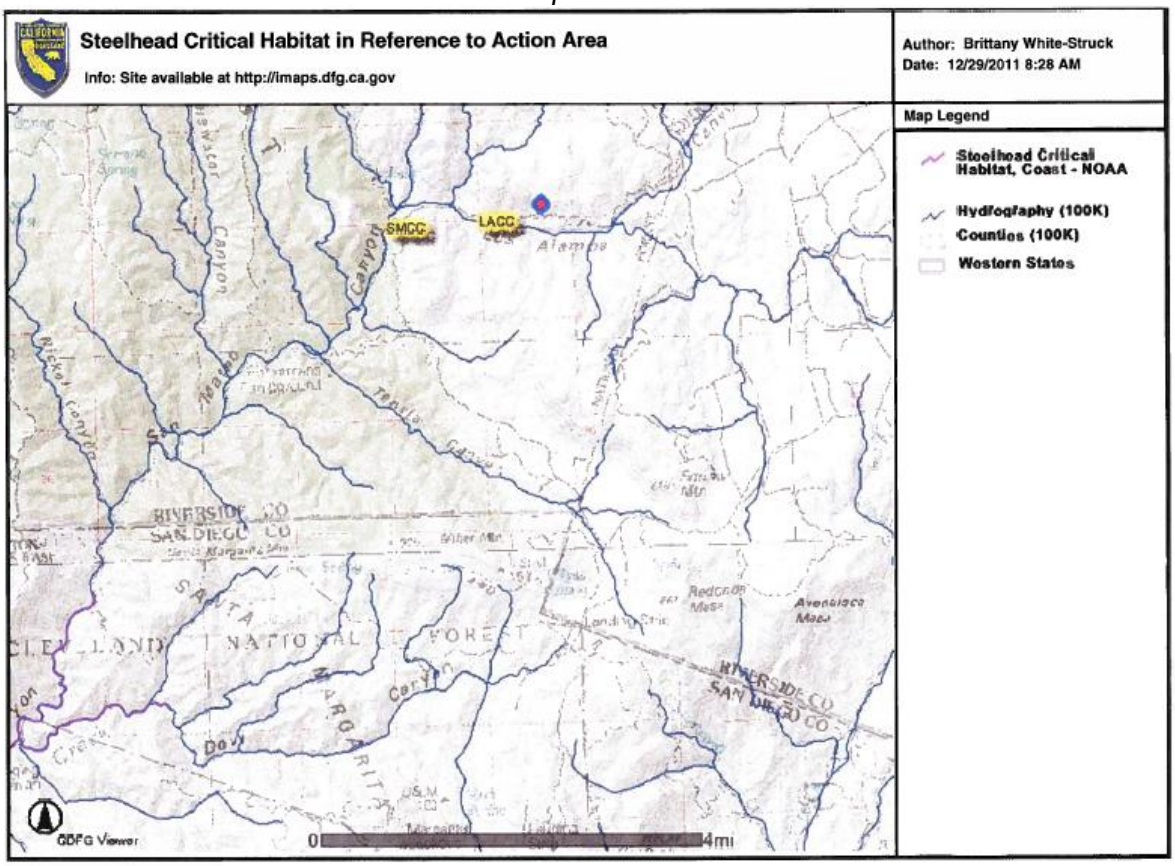


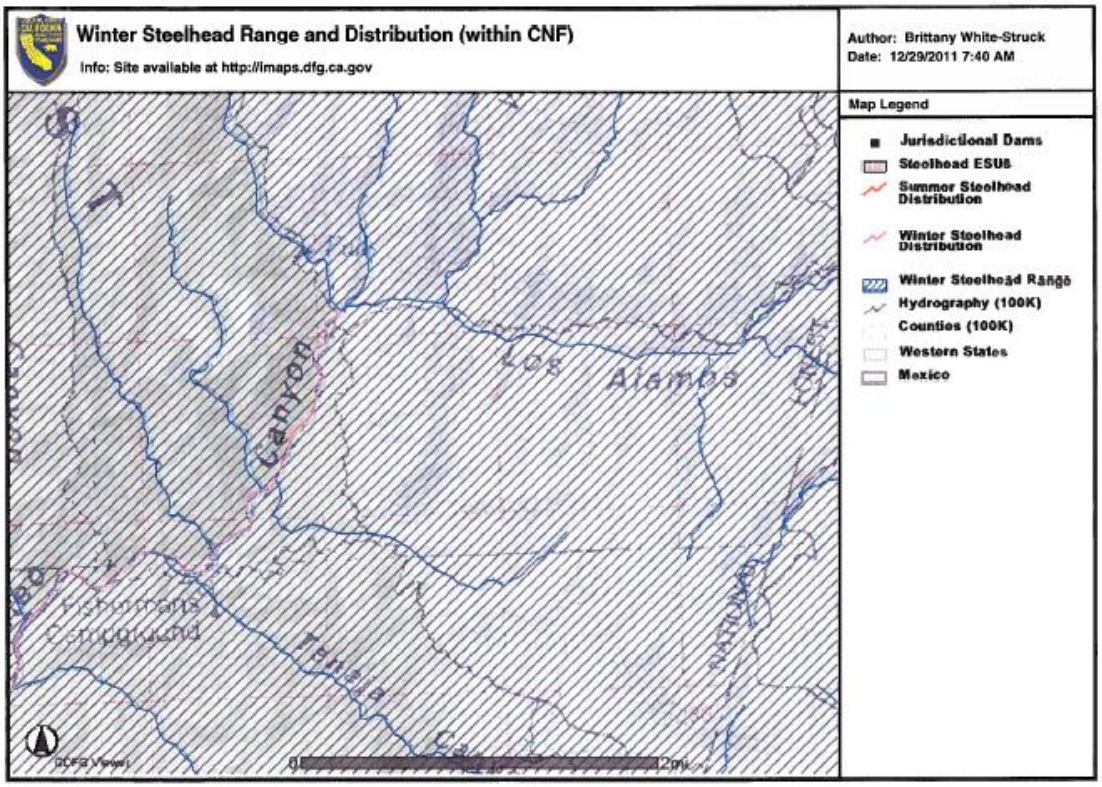
Figure 3.
Critical Habitat in Reference to Action Area



Key: SMCC = San Mateo Creek Crossing (approximate location), LACC = Los Alamos Creek Crossing (approximate location); Critical habitat is highlighted by a light purple in the bottom left hand corner.

Link to map: http://imaps.dfg.ca.gov/viewers/calfish/app.asp?zoomtoBookmark=3094
Link to map output: http://imaps.dfg.ca.gov/viewers/viewer4.18/printMap.asp

Figure 4.
Winter Steelhead Range and Distribution via CalFish[14] Maps[15]



Link to map in *CalFish* v. 4.18:
http://imaps.dfg.ca.gov/viewers/calfish/app.asp?zoomtoBookmark=3060
Link to map output: http://imaps.dfg.ca.gov/viewers/viewer4.18/printMap.asp

[14] Maintained by the California Department of Fish and Game: http://www.calfish.org/ (A California Cooperative Anadromous Fish and Habitat Data Program)
[15] DISCLAIMER: The data represented on this site vary in accuracy, scale, completeness, extent of coverage and origin. It is the users responsibility to use these data consistent with their intended purpose and within stated limitations. We highly recommend reviewing available metadata files prior to interpreting these data.

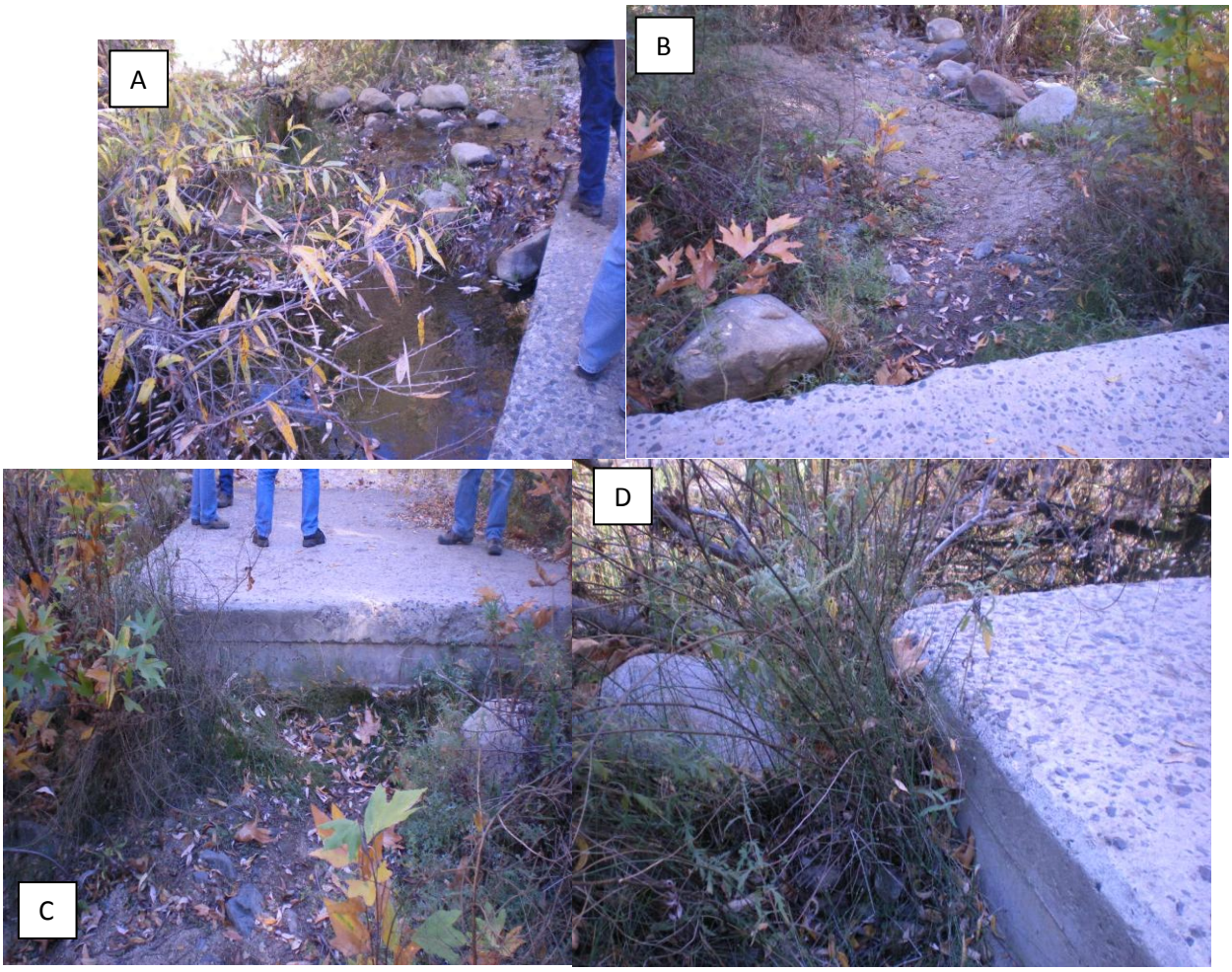
Appendix A:
Site Visit Photos[16] *(December 2011): Los Alamos Creek Crossing*

A: Downstream of crossing; boulder rock distribution
B: Condition of crossing
C: Pool habitat available above crossing
D: Condition of existing culverts on downstream end

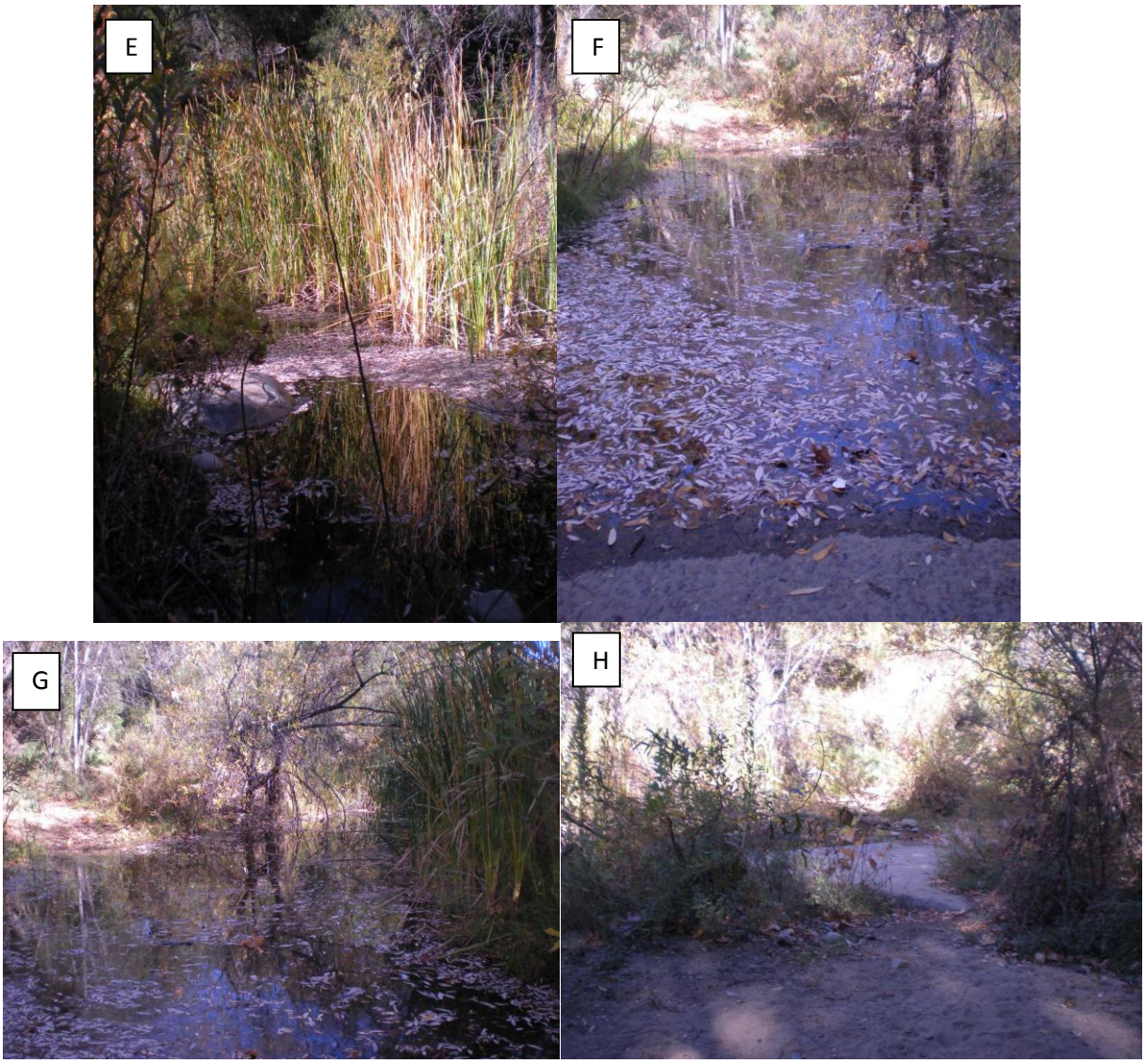
[16] Photos taken by Brittany White-Struck during site visit.

E: Instream habitat leading up to crossing
F: Current road alignment
G: Upstream end of culverts
H: Above crossing; in stream habitat

Site Visit Photos (December 2011): San Mateo Creek Crossing (San Mateo Wilderness)



A: Available instream habitat; boulders present
B: Walking trail leading up to the crossing
C: Non-flooded and flooded portions of the crossing
D: Corner of crossing (downstream side)



E: Downstream habitat
F: Partial flooding of crossing on upstream end
G: Upstream habitat (crossing is present but unseen due to flooding)
H: Approaching view of the crossing

Appendix B:

Best Management Practices Proposed by CNF (from August and revised September 2011 BA)

BEST MANAGEMENT PRACTICES

Forest Management and associated road building in the rugged terrain of National Forest system lands have long been recognized as sources of nonpoint water pollution. Nonpoint pollution is not, by definition, controllable through conventional treatment plant means. Nonpoint pollution is controlled by containing the pollutant at its source, and thus, precluding delivery to surface water. Sections 208 and 319 of the Federal Clean Water Act, as amended, acknowledge land treatment measures as being an effective means of controlling nonpoint sources of water pollution and emphasizes their development.
Working cooperatively with the California Water Resources Control Board, the Forest Service has developed and documented nonpoint pollution control measures applicable to National Forest System lands. Following evaluations of the control measures by State Water Resources Control Board personnel as they were applied on site during management activities, an assessment of monitoring data, and the completion of public workshops and hearings, the Forest Service's measures were certified by the State and approved by the Environmental Protection Agency as the most effective means the Forest Service could implement to control nonpoint source pollution. These measures were termed "Best Management Practices" (BMPs). Best Management Practice control measures are designed to accommodate site-specific conditions. They are tailor-made to account for the complexity and physical and biological variability of the natural environment. In the 1981 Management Agency Agreement between the State Water Resources Control Board and the Forest Service, the State agreed that; "The practices and procedures set forth in the Forest Service document constitute sound water quality protection and improvement on National Forest System lands". The implementation of BMPs is the performance standard against which the success of the Forest Service's nonpoint pollution water quality management efforts are judged.

The following is a list of the BMPs planned for application in the assessment area from the September 2000 Forest Service BMP Handbook (USDA 2000e). Following each BMP is a brief description of how the practice will be accomplished.

A. APPROPRIATE ROAD BUILDING SITE CONSTRUCTION BMPs

The following BMPs will be implemented on all roads:

BMP 2.12 Servicing and Refueling of Equipment

All fueling will be in a designated area, typically on roads. Equipment will have ongoing inspections for fuel leaks. Straw and/or absorbent material will be used on all drips. All contaminates (soil) will be taken off site in the event of leaks or spills.

BMP 2.13 Control of Construction and Maintenance Activities Adjacent to SMZs

Riparian buffer areas have been established for the project area and no fire line construction will occur within riparian buffer areas. Activities will not take place during the wet season, therefore, roads will not be used or maintenance activities will not occur on roads during wet weather.

BMP 2.21 Water Source Development Consistent with Water Quality Protection

There will be no water source use within the project area.