



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

MAY 05 2008

In response refer to:  
2007/07793:DHW

Lieutenant Colonel Craig W. Kiley  
District Engineer  
U.S. Department of the Army  
San Francisco District, Corps of Engineers  
1455 Market Street  
San Francisco, California 94103-1398

Dear Colonel Kiley:

This document transmits the NOAA's National Marine Fisheries Service (NMFS) biological opinion (Enclosure 1) based on our review of the City of Santa Cruz Department of Public Work's proposed San Lorenzo River Gravity Outlet Valve Replacement Project and Channel Maintenance Activities in the City of Santa Cruz, Santa Cruz County, California and its effects on threatened Central California Coast (CCC) steelhead (*Oncorhynchus mykiss*) Distinct Population Segment (DPS), endangered Central California Coast (CCC) coho salmon (*O. kisutch*) Evolutionary Significant Unit (ESU), and designated critical habitat for CCC steelhead and CCC coho salmon in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*). In addition, this letter transmits the result of NMFS' Essential Fish Habitat (EFH) consultation pursuant to section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (Enclosure 2).

#### Endangered Species Act Consultation

NMFS concludes in the biological opinion that the proposed action will not jeopardize the continued existence of CCC steelhead nor adversely modify designated critical habitat for CCC steelhead and CCC coho salmon. Repeated surveys in the San Lorenzo River and its tributaries have not found the presence of juvenile coho salmon. Therefore, NMFS did not evaluate any project effects on the CCC coho salmon ESU in this biological opinion. However, we anticipate that take of listed CCC steelhead DPS as a result of the valve replacements will occur, and therefore, an incidental take statement with non-discretionary terms and conditions is included.

#### Essential Fish Habitat Consultation

The projects are located within an area identified as EFH for coho salmon managed with the Pacific Salmon Fishery Management Plan (FMP) under the Magnuson-Stevens Fishery Conservation and Management Act (MSA). NMFS has evaluated the proposed projects for adverse effects to EFH pursuant to Section 305 (b)(2) of the MSA. Potential adverse effects to





EFH from the proposed projects include an increase in suspended sediment concentrations during construction activities, which can result in higher than normal turbidity levels.

Maintenance and construction activities associated with the projects, such as channel ripping and the placement and removal of cofferdams, are expected to increase the concentration of suspended sediments within the water column. Effects of suspended sediment are expected to be minimal due to Best Management Plans incorporated into the project description, and the short duration and small area associated with construction and maintenance activities. In addition, the enclosed biological opinion also contains non-discretionary terms and conditions that will minimize adverse effects to EFH. Therefore, NMFS has not provided EFH Conservation Recommendations for this project.

If you have any questions about this section 7 and EFH consultation, or if you require additional information, please contact Mr. Dave Walsh at (707) 575-6016.

Sincerely,

  
 Rodney R. McInnis  
Regional Administrator

Enclosures (2)

cc: Jane Hicks, ACOE  
Russ Strach, NMFS  
Korie Schaeffer, NMFS  
Siobhan O'Neill, Chris Cave, City of Santa Cruz Department of Public Works  
Gary Kittleson, Kittleson Environmental Consulting  
Holly Costa, Army Corps of Engineers  
Copy to file: 141522SWR2007SR00550

## BIOLOGICAL OPINION

**ACTION AGENCY:** U.S Army Corps of Engineers (Corps), San Francisco District

**ACTION:** Issuance of a Clean Water Act Section 404 permit and Section 10 Rivers and Harbors Act permit for the San Lorenzo River Channel Maintenance Activities and the San Lorenzo River Gravity Outlet Valve Replacement Project in Santa Cruz County, California.

**CONSULTATION CONDUCTED BY:** National Marine Fisheries Service, Southwest Region

**TRACKING NUMBER:** SWR/2007/07793

**DATE ISSUED:** May 5<sup>th</sup>, 2008

### I. CONSULTATION HISTORY

NOAA's National Marine Fisheries Service (NMFS) will be reporting the results of consultation on two separate project activities in this biological opinion; both occurring within the San Lorenzo River. The former is San Lorenzo River Maintenance Activities (maintenance activities) that have been performed in the past and require a NMFS' consultation, as per the U.S. Army Corps of Engineers' (Corps) regulations, every two years, and the latter is the San Lorenzo River Gravity Outlet Valve Replacement Project (valve replacement(s)), which is slated for one construction season and will require dewatering and relocation of fish.

#### A. Past Consultations with NMFS

On July 17, 1997, August 9, 1999, August 19, 2002, and January 11, 2006, NMFS completed informal consultation with the Corps for the maintenance activities. The Corps made a "may affect/not likely to adversely affect" determination for the maintenance activities impacts on endangered Central California Coast (CCC) coho salmon (*Oncorhynchus kisutch*) Evolutionary Significant Unit (ESU), threatened CCC steelhead (*O. mykiss*) Distinct Population Segment (DPS), and CCC coho salmon habitat with which NMFS concurred.<sup>1</sup> The Corps' last two-year permit to the City of Santa Cruz Department of Public Works (City) expired in 2007. These maintenance activities consist of channel ripping and thinning prescriptions to promote scour in the river channel for flooding control. All the work for this project was performed in dry portions of the channel.

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<sup>1</sup> Critical habitat for steelhead was under evaluation during this time period.

## **B. Present Consultation with NMFS**

By letter dated February 20, 2007, the Corps requested initiation of consultation pursuant to section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C 1531 *et seq.*) with NMFS for the maintenance activities and the valve replacements to be conducted in Santa Cruz County, California. At the time, the Corps determined the valve replacements may affect, but were not likely to adversely affect threatened CCC steelhead DPS, endangered CCC coho salmon ESU, and their respective designated critical habitat. The valve replacements included the proposal to capture and relocate listed salmonids.

Based on conversations with NMFS staff who reminded the Corps that capturing listed salmonids triggers formal consultation, the Corps revised their determination to may affect, likely to adversely affect CCC coho salmon, CCC steelhead, and their respective designated critical habitat on March 21, 2007. On April 24, 2007, NMFS received Kittleson Environmental Consulting's April 23, 2007, *Supplemental Fisheries Impact Assessment and Estimate of Potential Incidental Take of Listed Fish Species* for the valve replacements (Kittleson Environmental Consulting is a consultant for the City of Santa Cruz Department of Public Works). Based on our review of this document and Kittleson Environmental Consulting's January 24, 2007, *Biotic Assessment and Suggested Mitigation Measures* for the valve replacements, formal consultation was initiated.

On January 9, 2008, NMFS staff met with the City of Santa Cruz Department of Public Works staff to further discuss and view the locations of the valve replacements and maintenance activities in the San Lorenzo River.

Telephone and electronic communications with Corps representatives and the applicant, and other sources of information were considered in the biological opinion. A complete administrative record of this consultation is on file in the NMFS Santa Rosa Area Office.

## **II. DESCRIPTION OF THE PROPOSED ACTION**

The Corps proposes to authorize, pursuant to Section 404 of the Clean Water Act of 1972 (33 U.S.C. 1344) and Section 10 of the Rivers and Harbors Act (33 U.S.C. 403), the City to replace five to six of the original 1960-era slide/flap gates at the levee system gravity outlet sites (outlet sites) on the San Lorenzo River.<sup>2</sup> The original outfall gates, used to discharge the City's storm flows into the San Lorenzo River, have outlived their service life and will be replaced with updated outflow valves. This portion of the San Lorenzo River flows through downtown Santa Cruz and is leveed. The Nationwide Permit #7: Outfall Structures and Maintenance, would be valid for two years. Construction is estimated to take approximately three months and is scheduled to begin in May 2008 and finish in July 2008 to take advantage of low river flows and possible open lagoon conditions.

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<sup>2</sup> In 1959, the Corps constructed a flood control channel on the lower 2.5 miles of the San Lorenzo River to protect the City of Santa Cruz from flooding.

The Corps proposes to authorize, pursuant to Section 404 of the Clean Water Act of 1972 (33 U.S.C. 1344) and Section 10 of the Rivers and Harbors Act (33 U.S.C. 403), the City to disk the channel bottom sediments (channel ripping) and to thin the riparian habitat in an effort to reduce flooding frequency by maintaining channel capacity. The Nationwide Permit #31: Maintenance of Existing Flood Control Facilities, would be valid for two years. The channel ripping and riparian thinning operations will be accomplished over a one to two week period between August 1 and October 15, over the two-year permit in 2008 and 2009; conducting one channel ripping treatment per year and only during the low-flow period in the San Lorenzo River (with possible extension to October 31, weather permitting).

## **A. Description of the Proposed Work**

### **1. Maintenance Activities**

Maintenance activities will be performed in accordance with the Corps' guidelines for the Treatment of Vegetation within Local Flood-Damage-Reduction Systems (Corps 2007). The guidelines include selective removal of riparian vegetation that could possibly undermine the stability of the levees. Riparian vegetation thinning prescriptions will vary by reach and retain a five-foot vegetated buffer between the wetted channel and the sandbar areas to be ripped, and a 10-foot vegetated buffer on the toe of the levee slopes. Willows up to three inches in diameter at breast height (dbh) and alders up to six inches dbh will be retained and thinned to favor overhanging cover to the low-flow channel. Both hand thinning and mechanized thinning techniques will be employed.

Disking (down to six inches deep) will be used for ripping the roots of riparian vegetation on the dry in-channel islands. Only dry islands will be ripped. Mechanical equipment will not enter wetted channels. A bulldozer will cross the river at one of three pre-selected sites; two of these sites will be dry at the time of the operation. If the third site is used, the City proposes installing a temporary crossing consisting of a culvert with gravel fill (crossing) to provide access for heavy equipment to reach the in-channel islands. Approximately 20-to- 40 cubic yards of gravel and a culvert will be placed in a side channel at this location.

Prior to the placement of materials, blocknets will be placed upstream and downstream of the crossing to move all fish from the area. The two blocknets will be placed together then slowly moved in separate directions (one moving upstream and one moving downstream) for a sufficient distance to move fish from the area. This area is a side channel on the east side of an island. The main channel in the reach runs on the west river bank, on the opposite side of the island. After channel ripping activities are complete, the crossing will be removed from the area. Any flowing water in the area will pass through culverts, sized at a minimum of 12 inches in diameter. The culverts will be placed in the smaller of the channels for a maximum of ten days, based on previous experience managing vegetation on the mid-channel island, although five days is the likely duration. The method used for channel ripping of the mid-channel islands is selective, occurring only in dry area to loosen large vegetative roots. Although the total distance of the maintenance activities covers approximately 4,350 lineal feet between the Highway 1 and Soquel Avenue bridges, the actual area of channel ripping will occur along approximately from 1,000 to 2,000 lineal feet.

## 2. Valve Replacements

The proposed action includes light construction within and around the six outlet sites.<sup>3</sup> One outlet site will be repaired at a time. The outlet sites are submerged in the main channel or in standing water at the toe of the levee and have been affected by accumulated sediments. Activities at each outlet site will consist of a constructed cofferdam, dewatering of concrete apron structures, removal of sediment from existing concrete apron surfaces, excavation of existing rip-rap levee slopes around the existing outfall structures, and the installation of a modern outflow valve. Dewatering will be required at each outlet site to isolate the work area from the river during construction. Aquatic species will be captured and relocated from the six outlet sites during the incremental water drawdowns within the cofferdams. Water will be slowly pumped from the cofferdam in small increments, then stopped for fish to be captured and relocated. The pumps will be installed with fish screens and standing water within the cofferdam will be pumped onto the adjacent riprap slopes. The pumped water will eventually reenter the river after percolating through the riprap bank slope. This process will continue until the cofferdam has been completely dewatered and free of fish. The outlet site, located near a bank stabilization wall, will require the relocation and dewatering activities to be performed simultaneously due to difficulties with creating a watertight seal between the cofferdam and the wall. Each cofferdam will enclose an approximately 20-foot by 20-foot area around each outlet site and will require seven days to dewater the area to completion. Cofferdams will be constructed from wood, sand bags, and plastic sheets, depending on the site conditions and depth of standing water and/or potential tidal influence.

A total of 120-linear feet of creek bank will be affected by the valve replacements; however, the actual area of disturbance will be limited to 20-foot lengths since each outlet site will be dewatered one at a time. The total estimated cumulative area of stream to be dewatered is approximately 2,400 square feet or 0.055 acres. The most upstream outlet site is located near the Water Street Bridge and most downstream outlet site is located near the Riverside Bridge.

### **C. Best Management Plans (BMPs)**

The following BMPs will be incorporated:

1. containment of site runoff throughout construction activities;
2. installation of temporary erosion and sedimentation control devices;
3. location of equipment and spoils in designated staging areas;
4. control of the water release in dewatered areas to minimize turbidity; and
5. maintain construction equipment in proper operating condition to prevent leaks of oil or grease.

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<sup>3</sup> The biological assessment assumes that there will be funding to complete construction at five of the outlet sites, however, NMFS has considered all six outlet sites in this biological opinion in order to assess impacts to listed salmonids should funding become available for work at the sixth outlet site before construction commences.

## **D. Description of the Action Area**

The action area includes all areas affected directly and indirectly by the project. The action area for this project is located in the San Lorenzo watershed between the Highway 1 Bridge and the mouth of the San Lorenzo River – a distance of approximately two miles. In addition, the action area extends up into and through the riparian zones of both banks for a total width of approximately 70 feet. The bankfull channel bottom of the San Lorenzo River at the locations where the maintenance and valve replacement activities will occur is approximately 50 feet in width. There is perennial flow within the action area. NMFS determined from the site visit on January 9, 2008, that the locations in the river for relocated fish would be no more than 100 feet from the dewatered outlet sites.

## **III. STATUS OF THE SPECIES AND CRITICAL HABITAT**

This biological opinion analyzes the effects of the proposed maintenance activities and valve replacements on threatened CCC steelhead (62 FR 43937) DPS, their designated critical habitat (70 FR 52487), and designated critical habitat for CCC coho salmon (64 FR 24049) ESU.

In 2005, sampling efforts in Bean Creek (a tributary of the San Lorenzo River) found two adult coho salmon and was the first evidence of successful spawning for this species since 1981 (D.W. Alley and Associates 2005). The 1981 observations were in Zayante Creek (a tributary of the San Lorenzo River) and also in the San Lorenzo River (Smith 1982).

These observations, however, do not justify a stable coho salmon population within the San Lorenzo watershed. At the present time the CCC coho salmon ESU is not supported by the San Lorenzo River (Smith 1982, Alley *et al.* 2004), and is also considered to be extirpated from this river system (Jon Ambrose, NMFS, personnel communication, March 17, 2008).

It is unlikely that any remnant coho salmon would utilize the action area during the valve replacements (occurring in May through July) or the maintenance activities (late summer) due to poor habitat conditions in the action area and the would likely remain in the higher quality habitats of the upper reaches and tributaries of the San Lorenzo River. Therefore, adverse effects to CCC coho salmon are not expected for channel maintenance and valve replacement activities. Impacts to CCC coho salmon are not considered further in this biological opinion.

### **A. Steelhead Description and Life History**

Steelhead are anadromous fish, spending some time in both fresh- and saltwater. The older juvenile and adult life stages occur in the ocean, until the adults ascend freshwater streams to spawn. Eggs (laid in gravel nests called redds), alevins (gravel dwelling hatchlings), fry (juveniles newly emerged from stream gravels), and young juveniles all rear in freshwater until they become large enough to migrate to the ocean to finish rearing and maturing to adults.

General reviews for steelhead in California document much variation in life history (Shapovalov and Taft 1954, Barnhart 1986, Busby *et al.* 1996, McEwan 2001). Although variation occurs in

coastal California, steelhead usually live in freshwater for two years, then spend one or two years in the ocean before returning to their natal stream to spawn. Steelhead may spawn one to four times over their life. Steelhead typically immigrate to freshwater between October and April, peaking in January and February and emigrate to sea between February and early May. Given the proposed in-channel construction period – May to July – and the life history of steelhead, only juvenile steelhead and late migrating steelhead smolts are likely to be present in the action area during valve replacements and channel maintenance activities. The steelhead smolts, however, would likely remain in the main channels and not be found in the side channel area that is designated for dewatering.

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

## **B. Status of the Species**

In this biological opinion, NMFS assessed the status of CCC steelhead by examining four types of information, all of which help to understand a population's ability to survive. These population viability parameters are: abundance, population growth rate, spatial structure, and diversity (McElhaney *et al.* 2000). While there is insufficient information to evaluate these population viability parameters in a quantitative sense, NMFS has used existing information to determine the general condition of the DPS. Factors responsible for the current status of the DPS are also described.

Historically, approximately 48 populations of steelhead existed in the CCC steelhead DPS (Bjorkstedt *et al.* 2005). Many of these populations (about 20) were independent, or potentially independent, meaning they had a high likelihood of surviving for 100 years absent anthropogenic impacts. The remaining populations were dependent upon immigration from nearby CCC steelhead DPS populations to ensure their viability (Bjorkstedt *et al.* 2005, McElhaney *et al.* 2000).

While historical and present data on abundance are limited, CCC steelhead numbers are substantially reduced from historical levels. A total of 94,000 adult steelhead were estimated to spawn in the rivers of this DPS in the mid-1960s, including 50,000 fish in the Russian River - the largest population within the DPS (Busby *et al.* 1996). Recent estimates for the Russian River are on the order of 4,000 fish (NMFS 1997). San Lorenzo River steelhead are thought to number approximately 1,000 to 2,000 fish (Alley 2000) including hatchery fish which are considered part of the listed population in the river. Abundance estimates for smaller coastal streams in the DPS indicate low but stable levels with recent estimates for several streams (Lagunitas, Waddell,

Scott, San Vicente, Soquel, and Aptos creeks) of individual run sizes of 500 fish or less (62 FR 43937). For more detailed information on trends in CCC steelhead abundance, see: Busby *et al.* 1996, NMFS 1997, and Good *et al.* 2005.

Some loss of genetic diversity has been documented and attributed to previous among-basin transfers of stock and local hatchery production in interior populations in the Russian River (Bjorkstedt *et al.* 2005). Reduced population sizes and fragmentation of habitat in San Francisco streams has likely also led to loss of genetic diversity in these populations.

CCC steelhead have experienced serious declines in abundance, and long-term population trends suggest a negative growth rate. This indicates the DPS's may not be viable in the long term. DPS populations that historically provided enough steelhead strays to support dependent populations may no longer be able to do so, placing dependent populations at increased risk of extirpation. However, because CCC steelhead have maintained a wide distribution throughout the DPS, roughly approximating the known historical distribution, CCC steelhead likely possess a resilience that is likely to slow their decline relative to other salmonid species in worse condition. The most recent status review concludes that steelhead in the CCC steelhead DPS remain "likely to become endangered in the foreseeable future" (Good *et al.* 2005). On January 5, 2006, NMFS issued a final determination that the CCC steelhead DPS is a threatened species, as previously listed (71 FR 834).

### **C. Status of the Critical Habitat**

In designating critical habitat, NMFS considers the following requirements of the species: (1) space for individual and population growth, and for normal behavior, (2) food, water, air, light, minerals, or other nutritional or physiological requirements, (3) cover or shelter, (4) sites for breeding, reproduction, or rearing offspring and generally, and (5) habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of this species (50 CFR 424.12(b)). In addition to these factors, NMFS also focuses on known physical and biological features (primary constituent elements or "PCEs") within the designated area that are essential to the conservation of the species and may require special management considerations or protection. These essential features may include, but are not limited to, spawning sites, food resources, water quality and quantity, and riparian vegetation.

Critical habitat for coho salmon is defined as: "all waterways, substrate, and adjacent riparian zones (in an ESU/DPS) below longstanding, naturally impassable barriers (*i.e.*, natural waterfalls in existence for at least several hundred years) (64 FR 24049)." NMFS has excluded from critical habitat designation all tribal lands in northern California and areas above certain dams blocking access to historical habitats of listed salmonids. Waterways include estuarine areas and tributaries. Riparian areas are defined as "the area adjacent to a stream that provides the following functions: shade, sediment, nutrient, or chemical regulation, stream bank stability, and input of large woody debris (LWD) or organic matter" (64 FR 24049). In other words, riparian areas are those areas that produce physical, biological, and chemical features that help to create stream habitat for salmonids.

Critical habitat for the CCC steelhead DPS is described as the “width of the stream channel defined by the ordinary high-water line as defined by the Corps in 33 CFR 329.11” (FR 69 71880). Riparian areas were excluded because their inclusion without a specific lateral extent in coho salmon critical habitat (see above) has resulted in difficulty for Federal agencies in determining the specific acreage of critical habitat across landscapes.<sup>4</sup> Activities in riparian areas may impact CCC steelhead critical habitat, because the “quality of aquatic habitat within stream channels is intrinsically related to the adjacent riparian zones...” (69 FR 71880).

#### I. CCC Coho Salmon Critical Habitat

On May 5, 1999, NMFS designated critical habitat for the CCC coho salmon ESU (64 FR 24049). The designation includes all accessible reaches of rivers between Punta Gorda and the San Lorenzo River in Santa Cruz County, California; this designation also includes two rivers entering San Francisco Bay: Arroyo Corte Madera Del Presidio and Corte Madera Creek.

The condition of CCC coho salmon critical habitat, specifically its ability to provide for their conservation, has been degraded from conditions known to support viable salmonid populations. NMFS has determined that present depressed population conditions are, in part, the result of the following human-induced factors affecting critical habitat<sup>5</sup>: logging, agricultural and mining activities, urbanization, stream channelization, dams, wetland loss, and water withdrawals and unscreened diversions for irrigation.

Numerous studies have demonstrated that land use activities associated with logging, road construction, urban development, mining, agriculture, and recreation, have significantly degraded coho salmon critical habitat quantity and quality in the CCC coho salmon ESU. Impacts of concern include alteration of stream bank and channel morphology, alteration of water temperatures, loss of spawning and rearing habitat, fragmentation of habitat, loss of downstream recruitment of spawning gravels and LWD, degradation of water quality, removal of riparian vegetation resulting in increased stream bank erosion, increases in erosion entry to streams from upland areas, loss of shade (higher water temperatures), and loss of nutrient inputs (61 FR 56138).

Depletion and storage of natural river and stream flows have drastically altered natural hydrologic cycles in many of the streams in the ESU. Alteration of flows results in migration delays, loss of suitable habitat due to dewatering and blockage, stranding of fish from rapid flow fluctuations, entrainment of juveniles into poorly screened or unscreened diversions, and increased water temperatures harmful to salmonids (61 FR 56138).

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<sup>4</sup> NMFS chose not to provide a lateral extent in riparian areas to avoid under or over estimating the actual extent of riparian habitat essential to aquatic habitat (69 FR 71880).

<sup>5</sup> Other factors, such as over-fishing and artificial propagation, have also contributed to the current population status of these species. All these human-induced factors have exacerbated the adverse effects of the natural environmental variability from such factors as drought and poor ocean conditions.

## 2. CCC Steelhead Critical Habitat

On September 2, 2005, NMFS designated critical habitat for the CCC steelhead DPS. The designation includes nearly all steelhead-inhabited reaches of rivers between Russian River southward to and including Aptos Creek, as well as drainages of San Francisco and San Pablo Bay eastward to, but excluding the Sacramento-San Joaquin Delta. Major coastal watersheds occupied by this DPS include the Russian River, Lagunitas Creek, and San Lorenzo River.

In designating critical habitat, NMFS identified several factors potentially responsible for adversely affecting habitat for this DPS. Assessment of CCC steelhead designated critical habitat is included in NMFS (2005), which addresses critical habitat for several salmonid species including CCC steelhead. In general forestry, urban and rural residential development, water development, flood control, and agricultural activities have contributed to excessive sedimentation, low woody debris abundance and recruitment, elevated water temperature, chemical toxicity, and atypical stream hydrology throughout the streams designated as critical habitat for the CCC steelhead DPS. These factors likely limit production and recovery of the CCC steelhead DPS. Numerous anthropogenic migration barriers (dams and culverts) in the streams of the CCC steelhead DPS impede access to potential habitat, affect sediment transport, and affect water flow and temperature.

## 3. Conservation Value of Critical Habitat

NMFS created Critical Habitat Analytical Review Teams (CHART) to describe and assess potential critical habitat for CCC steelhead (NMFS 2005). The CHART identified 46 occupied CALWATER Hydrologic Sub-Areas (HSAs) within the freshwater and estuarine range of the DPS. Fourteen HSAs were rated low, 13 were rated medium, and 19 were rated high in conservation value. Essential features of spawning, rearing, and migration are contained in approximately 1,832 miles of occupied stream habitat within these HSAs.

The San Lorenzo River is included in the San Lorenzo HSA as critical habitat for CCC steelhead. The NMFS CHART rated the San Lorenzo HSA as having high conservation value to CCC steelhead (NMFS 2005). Because quality of habitat was only one of the rating factors used to determine conservation value, and habitat quality was considered at the geographic scale of an HSA, specific stream reaches within an HSA may, or may not, contain high quality of habitat, regardless of the HSAs overall rating for conservation value.

Although the CHART did not review critical habitat value for CCC coho salmon, the conservation value of coho salmon critical habitat throughout the San Lorenzo River HSA is likely "High" due to generally good habitat conditions found throughout the watershed, and by comparison to the generally poor habitat conditions found in some neighboring watersheds, and the high degree of isolation experienced by CCC coho salmon populations throughout the ESU.

## 4. Critical Habitat Trend

With the listing of these salmonid species and the designation of critical habitat, the provisions of the Federal ESA took effect to prevent Federal actions from authorizing, funding, or carrying out

actions that would jeopardize the long-term survival and recovery of the species and/or taking actions that would adversely modify critical habitat. In addition, both the State and Federal government are providing funding for habitat restoration projects in this ESU and DPS. However, Federal agency actions affect only a subset of many of the critical habitat areas and/or elements. Funding for restoration has been increased since the late 1990s, but it may not affect a significant portion of degraded critical habitat for several decades. Thus, it is unknown whether State management of land use, Federal agency responsibilities under the ESA, and State/Federal restoration efforts are likely to reverse the overall trend of continued habitat degradation in the near future.

#### **D. Status of the Species and Habitat in the San Lorenzo River Watershed**

##### **1. Status of Species**

Johnson (1964) estimated there were 20,000 adults in the San Lorenzo River before 1965. Recent data for the San Lorenzo River watershed suggested this basin has a steelhead population smaller than 15 percent (< 3,000) of the size it had 30 years previously. This basin was thought to have originally contained one of the two largest steelhead populations in the ESU (NMFS 2003).

Since 1994, the County of Santa Cruz, the City of Santa Cruz, and the San Lorenzo Valley Water District have collaboratively funded surveys in the San Lorenzo River and its tributaries to ascertain population levels of steelhead. These surveys have been more rigorous than past efforts and provide the best available estimate of year-to-year status of steelhead in the San Lorenzo River watershed. In 2002, estimated juvenile steelhead abundance extrapolated to the mainstem of the San Lorenzo River and all sampled tributaries was 168,278, the highest since 1998, which had similar abundance estimates (H.T. Harvey & Associates 2003). Two of these sample sites, near the Water Street Bridge, were sampled and juvenile steelhead abundances were estimated at 3.0/100- to- 3.9/100 feet, with all captured steelhead measuring ≥85 millimeters (mm) in length.

##### **2. Factors Affecting Steelhead, and Steelhead and Coho Salmon Critical Habitat, in the San Lorenzo River**

A variety of factors, both anthropogenic and natural, have played a role in the decline of steelhead and coho salmon in the San Lorenzo River watershed. Natural events, such as floods, droughts, and ocean productivity cycles, have depressed population numbers when these events occur. However, the more recent anthropogenic destruction and degradation of essential freshwater habitats have reduced the resiliency of these populations to natural disturbances.

Excessive erosion, sedimentation, and turbidity (Santa Cruz County Planning Department (SCCPD) 1979), diminished streamflows (SCCPD 1979, NMFS 2001a, Denise Duffy & Associates, Inc. 1999) channelization (Mount 1995), and summer dams (NMFS 2001b) have degraded designated critical habitat for CCC steelhead and coho salmon with losses of PCEs for spawning and rearing throughout the San Lorenzo River. These effects caused by on-going

activities such as urbanization and water diversions are expected to continue to occur in the San Lorenzo River.

### 3. Watershed Importance for Coho Salmon

The San Lorenzo River is located near the southern boundary of the CCC coho salmon ESU and the southernmost range of coho salmon in the western United States. Coho salmon used the San Lorenzo River for spawning and rearing. In 1954-55, the estimated adult coho salmon run in the San Lorenzo River ranged between 7,000 and 14,000 (State Water Resources Control Board 1982). This watershed's value as critical habitat is high for coho salmon, given its location near the southernmost extent of their range and the relatively large coho population it supported historically. Recovering coho salmon to the full extent of their former range will likely require restoring important components of critical habitat in the San Lorenzo River, such as spawning and rearing areas.

## **IV. ENVIRONMENTAL BASELINE**

The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process.

The action area is heavily urbanized, and drains the City's stormwater runoff in the alluvial floodplain section of the 138-square-mile San Lorenzo watershed. The San Lorenzo River suffers from poor water quality, loss of connectivity with its historic flood plain, loss of native riparian habitat, and reduced stream flows due to water extraction for increased urban uses. Many of the channels running along the east bank of the river are braided; forming multiple shallow stream channels that provide less than optimum habitat for native fish and potentially subject them to increased instream temperatures and predation. The main channel runs near the west bank of the river and moves closer to the middle of the river downstream, passing under the street bridges and away from the outlet sites, where the valve replacements are to occur. The main channel composition downstream provides adequate depths and riffle/pool habitat access for steelhead juveniles and smolts in this area just upstream of the Water Street Bridge before reaching the grade break between from river reach to estuarine reach. Aquatic habitats in the San Lorenzo River have deteriorated considerably from historic conditions (Santa Cruz Planning Department 1979) due to increased rates of sediment input (two to four times background levels) (Swanson Hydrology 2001) into the river. The high rates of sediment input have impaired salmonid spawning, feeding, and rearing habitats by burying spawning gravels and disrupting invertebrate (salmonid prey items) life cycles.

The major modification to the San Lorenzo River over the past 50 years is the levee on the lower 2.5 miles that has channelized the reach and contributed to the loss of habitat complexity in the action area. The City was responsible for maintenance of the levee, after its completion in 1959, and did so by annually dredging the channel bottom 5-8 feet below sea level and removing

vegetation along the banks (City of Santa Cruz 2003). The channel ripping applications have replaced the dredging for achieving flood control and maintaining the existing channel capacity. The levee height was also increased by an additional two feet in the early 2000's to provide the City with 100-year flood protection. Presently the San Lorenzo River is receiving attention from state and local governments with the intentions of restoring the river for fish and wildlife; and local governments, along with water purveyors, are also managing the conflicting needs of urban water use with wildlife protection.

## **A. Previous Consultations Completed in the Action Area**

### **1. San Lorenzo River Channel Maintenance Activities**

On July 17, 1997, August 9, 1999, August 19, 2002, and January 11, 2006, NMFS completed informal consultations with the Corps (San Francisco District) for San Lorenzo River Channel Maintenance activities. On July 17, 1997, NMFS concurred with the Corps that the maintenance activities may affect, but were not likely to adversely affect CCC steelhead or CCC coho salmon. On August 9, 1999, NMFS concurred with the Corps that the maintenance activities may affect, but were not likely to result in the destruction or adverse modification of proposed critical habitat for CCC steelhead or designated critical habitat for CCC coho salmon. On August 19, 2002, and January 11, 2006, NMFS concurred with the Corps that the maintenance activities may affect, but were not likely to adversely affect CCC steelhead, CCC coho salmon, and designated critical habitat for both species, as well as Essential Fish Habitat (EFH) under the Pacific Coast Salmon Fishery Management Plan.

### **2. San Lorenzo River Bank Stabilization Project**

On December 11, 2003, NMFS issued a biological opinion to the Corps (Sacramento District) for their construction of the San Lorenzo River Bank Stabilization Project. In the biological opinion, NMFS concluded that the bank stabilization project would not jeopardize listed salmonids or adversely modify their critical habitats. The Corps designed and constructed a bank stabilization wall and restored wildlife habitat along 900-feet of eroding river bank on the lower San Lorenzo River. This action enhanced instream habitat conditions in the lower San Lorenzo River; stabilizing the river bank, and reducing erosion. The project required the capture and relocation of juvenile steelhead. The Incidental Take Statement for this project anticipated 43 juvenile steelhead would be captured and relocated, with a three percent mortality associated with capture and relocation activities. The EFH consultation for Pacific salmon determined that EFH would only be temporarily adversely affected, and in this case, EFH recommendations were not necessary.

Initial fish capture and relocation activities began on May 11, 2004. In June 2004, unanticipated events occurred at the active project site which resulted in the incidental take exceeding numbers authorized in the biological opinion and the need for an additional fish relocation action at the work site. Therefore, on June 29, 2004, NMFS issued a non-jeopardy, non-adverse modification supplemental biological opinion to the Corps (Sacramento District). The supplemental biological opinion concluded that the capture and relocation of additional steelhead would not result in jeopardy to listed steelhead, nor adversely modify their critical habitat. The

supplemental biological opinion also provided a new incidental take statement which anticipated the capture and relocation of juvenile steelhead based on the size of the area to be dewatered as a surrogate for the relatively small number of steelhead that would need relocation.

## **B. Status of the Species and Habitat in the Action Area**

### **1. Status of Steelhead in the Action Area**

Steelhead adults and juveniles use the action area as a migration corridor and as rearing habitat, respectively. Adult steelhead are not expected to be present when the valve replacements are scheduled to occur based on the timing of adult migration (winter/spring). The valve replacements are slated for May when some late migrating steelhead smolts may still be in the area. However, their presence at any of the valve replacement sites is unlikely, because based on steelhead migration preferences in water depth and attraction flows NMFS expects these outmigrating steelhead smolts will use the main channel running near the middle of the river when swimming downstream, and hold in the adjacent pools of the main channel (where the relocated fish will be placed) rather than meander out to the banks and use the scoured pool areas near the outlet sites. Maintenance activities will commence in the summer when only juvenile steelhead are expected in the area. Based on 14 seining samples each covering 100 feet of stream length, the estimated juvenile steelhead density in the San Lorenzo River between the mouth of the San Lorenzo River to the Water Street Bridge averaged 4.4 steelhead per 100 feet of stream (H.T. Harvey & Associates 2003). The City has also used this estimate to predict an incidental take of 4.4 steelhead for five outlet sites having a combined length of 100 feet, from Highway 1 downstream to the river mouth, and also predicted that one steelhead would be encountered at each dewatered site. NMFS has adjusted this estimate to 5.3 steelhead per 120 feet to include the additional dewatered site.

### **2. Aquatic Habitat Conditions in the Action Area**

The action area is influenced by the sandbar conditions at the mouth of the San Lorenzo River. During most summer and fall months, deep-water conditions occur due to development of a sandbar; forming a lagoon at the river mouth that converts to freshwater. The San Lorenzo River lagoon has been reduced in size due to urban encroachment by the City of Santa Cruz and channelization practices. This alteration and subsequent degradation of critical habitat in the lagoon has also likely reduced salmonid carrying capacity. The sandbar closes the mouth of the river and forms a seasonal summer lagoon; in wetter years it appears that the sandbar self-breaches when the lagoon fills and spills over the sandbar. The sandbar across the mouth of the river forms naturally through wave action in late spring and summer. Typically, the sandbar forms during June and holds back water until November. In most years, water levels in the river are lowest in May because the sandbar has not built up enough to hold back water to create a lagoon setting (Don Lash, Corps, personnel communication, October 9, 2003) which is when valve replacements activities are usually proposed within the San Lorenzo River. The current rain year (2007 – 2008) is below the average compared with the past years, having current rain levels below 100% of average throughout the state.<sup>6</sup> Higher flows keep the mouth of the San

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<sup>6</sup> As of April 23, 2008.

Lorenzo River from closing and forming the lagoon which would be less common to occur in a dry year.

Salmonid habitat in the vicinity of the outfall structures is generally poor for a variety of reasons. The outfall structures have concrete aprons, and the area is periodically maintained by removing sediment, there is little emergent vegetation or cover, the river substrate is sandy or comprised of organic detritus, and the vicinity is littered with solid waste and garbage. Salmonid habitat within the channel maintenance activities provides a migration corridor to more suitable habitat upstream.

## **V. EFFECTS OF THE PROPOSED ACTION**

In general, the effects of the action are associated with dewatering of portions of aquatic habitat, temporary increases in turbidity levels, and reduction in riparian vegetation. These impacts, their associated effects on steelhead and salmonid critical habitat, as well as the beneficial impacts of the valve replacement project, are described in detail below.

### **A. Sedimentation and Turbidity Increases**

As described above, the San Lorenzo River experiences higher sediment input compared with recorded historic levels. The precise levels are currently evaluated by the U.S. Geologic Survey's efforts to gauge the sediment transport flowing from upstream (Siobhan Nolen, personal communication, City of Santa Cruz, 2008). During the maintenance activities, temporarily high levels of turbidity are expected from substrate disturbances during: the installation of the temporary culvert crossing to access the mid-channel island at the third maintenance site, and the channel ripping; both of which will leave behind loosened substrate in the channel.

Research with salmonids has shown that high turbidity concentrations can: reduce feeding efficiency, decrease food availability, reduce dissolved oxygen in the water column, result in reduced respiratory functions, reduce tolerance to diseases, and also cause fish mortality (Berg and Northcote 1985, Gregory and Northcote 1993, Velagic 1995, Waters 1995). Mortality of very young coho salmon and steelhead fry due to increased turbidity has been reported by Sigler *et al.* (1984). 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.

For the valve replacements activities, NMFS anticipates that increases in sediment and turbidity in aquatic habitat in the action area will occur during the proposed ground disturbances from excavation, construction of cofferdams, removal of the old gravity outflow valves, and the installation of the new valves. The ultimate distance downstream of the cofferdams effects (*i.e.*, sedimentation, turbidity, and steelhead relocation activities) cannot be precisely quantified. However, NMFS expects these effects to be minor, because the workspace will be dewatered and no vehicles or heavy equipment will work in wetted channels outside of the coffer dams.

Although ripping activities in side channel areas will be performed in the dry, sediment, and turbidity may result when flows enter these areas during the first few late fall or winter storm events. The amount of sediment and turbidity mobilized by streamflow in the ripped areas cannot be precisely quantified. Observations made by City staff indicate that the water clarity does not visibly change when flow from the ripped areas is added to the sediment load moving down from reaches and tributaries farther up in the watershed (S. Nolen, 2008). The City's use of an adaptive management approach to selectively choose islands for channel ripping also minimizes the amount of sediment disturbance and in conjunction with BMPs. NMFS expects the added sediment load will be minimized.

Therefore, NMFS anticipates that rearing juvenile steelhead downstream of the action area may be affected by short-term increases in turbidity caused during the construction of the cofferdams, dewatering, and following early storm events. NMFS does not anticipate pulses of turbidity from the proposed project will reach lethal levels. However, pulses of increased turbidity may result in juvenile steelhead temporarily vacating preferred habitat, including some individuals inhabiting the lagoon, and/or temporarily reducing their feeding efficiency. Due to the timing of project impacts (summer and during the first higher flow events), only low numbers of juvenile steelhead are anticipated to be affected. The minimal and temporary nature of the turbidity levels are not expected to have a detectable impact on the survival of individual fish in the action area. For example, NMFS expects the temporary duration of turbidity from valve replacement work will allow any juvenile steelheads displaced from preferred habitat to return well before any reduction in feeding has reduced their survival chances.

## **B. Fish Relocation Activities**

### **1. Maintenance Activities**

NMFS expects that moving fish with block nets out of the area where the temporary culvert will be installed will be successful because: 1) few fish are likely to be present, and 2) no cover is available for them to avoid the movement of the nets. Steelhead are more likely to utilize the main channel on the west bank than the limited habitat in the side channels found along the east bank. The crossing reach between the east bank and the mid-channel sandbar is devoid of suitable pools that could be used for rearing. The habitat available consists of shallow water without large enough substrate or other cover elements such as woody debris or live trees that could provide hiding places for steelhead to avoid block net movement.

### **2. Valve replacements**

Fish relocation efforts will take place in between the incremental drawdowns of standing water within the cofferdams. No dewatering or removal and relocation of fish will occur prior to May 2007. The outlet site near the Water Street Bridge will require concurrent dewatering and fish removal efforts because of poor sealing conditions between the cofferdam wall and the bank stabilization wall constructed in 2004.

Each 2-to-5 foot band of aquatic habitat at the outlet sites consist of a deep pool with a silt/sand substrate and little habitat complexity. This condition makes the collection of steelhead a

thorough and efficient process that will result in minimal stress to fish. The higher salinity concentrations of the lower five pools will negate the use of an electrofisher, therefore, all collection of fish will be made with seines and dip nets.

NMFS assumes that the population of steelhead in the action area to be 5.3 fish for every 120-linear feet of river, or approximately one fish for each 20-linear feet of dewatered outlet site. This estimate is based on the size of the habitat, the number of outlet sites, and the numbers of fish visually observed from H.T. Harvey and Associate survey efforts (adjusted to 5.3 fish/120 feet for the six outlet sites where the valve replacements will occur). A qualified fishery biologist will take appropriate precautions during fish relocation activities to minimize adverse affects to the juvenile steelhead. Captured fish are planned to be moved to a nearby pool with suitable and comparable habitat that will be located no more than 100 feet from each outlet site.

### 3. Adverse Effects to Steelhead from Relocation Efforts

Relocated fish may endure stress from crowding at the relocation sites and increased competition for available resources such as food and habitat. Some of the fish at the relocation sites may leave the site, and move either upstream or downstream that have greater availability of habitat and less fish density. As each fish moves, competition remains either localized to a small area or quickly diminishes as fish disperse. NMFS cannot accurately estimate the number of fish adversely affected by competition, but does not believe this impact will cascade through the creeks' watershed population of steelhead based on the small area that will likely be affected. The survival chances of individual fish are unlikely to be adversely affected.

Fish relocation efforts are expected to minimize project impacts to steelhead by removing them from areas where they would have experienced high rates of injury and mortality. Fish will be relocated to areas that possess similar habitat and water quality parameters (*e.g.*, temperature) to their original locations, and will be distributed appropriately to prevent overcrowding.

## **C. Dewatering**

### 1. Maintenance Activities

The flow along the east bank of the mid-channel island will be channeled through a culvert during the maintenance activities and is not expected to inhibit movement for salmonids in the area. The high-flow channel along the west bank of the mid-channel island is the preferred passage by steelhead through this reach and will remain open. The maintenance timeframe on the mid-channel island is expected to last less than one week for each year in the permit, during which time the culvert and gravel bar will remain in place. The water level in this reach of the San Lorenzo River is expected to be much lower than those levels at the outflow sites. Based on the lack of habitat complexity and flow in the footprint of the 20-foot length culvert, NMFS staff concluded that no more than one juvenile steelhead is expected in the area at the time of the gravel bar installation. At the request of U.S. Fish and Wildlife Service, the City will remove all culvert and gravel bar materials upon completion of the ripping activities (Gary Kittleson, personal communication, 2008).

## 2. Valve Replacements

A cofferdam will be in place at one of the six outlet sites over the duration of the valve replacement activities at that site, which will result in a temporary and periodic net habitat loss of 400 square feet for each dewatered site. Constructing one cofferdam at a time is intended to disperse project impacts over time, rather than concentrating them during one time period.

Temporary cofferdams will be installed in order to dewater the outlet site and will remove water through incremental drawdowns using pumps installed with fish screens. Standing water within the cofferdam will be pumped onto adjacent rip-rap slopes along the river banks. Eventually the water pumped from the cofferdam will percolate through the rip-rapped bank slopes and return into the river. These activities with the mentioned BMPs for dewatering minimize fish stranding and loss within the confines of the cofferdam and will not result in any harm to salmonids passing outside of the cofferdam where flow will neither impede nor interrupt their movement.

Streamflow diversion and work space dewatering is expected to cause a temporary loss, alteration, and reduction of aquatic habitat within the action area. Stream flow diversions could harm individual steelhead by concentrating or stranding them in residual wetted areas (Cushman 1985) before they are relocated, or causing them to move to adjacent habitats (Clothier 1953, Clothier 1954, Kraft 1972, Campbell and Scott 1984).

Benthic macroinvertebrates may be temporarily lost or their abundance reduced when individual organisms are stranded or when creek habitats are dewatered (Cushman 1985). Effects to macroinvertebrates resulting from stream flow diversions and dewatering will be temporary because construction activities will be relatively short-lived, and rapid recolonization (about one to two months) of disturbed areas by macroinvertebrates (Cushman 1985, Thomas 1985, Harvey 1986) is expected following rewating. In addition, the effect of macroinvertebrate loss on juvenile steelhead is likely to be negligible because food from upstream sources (via drift) would be available downstream of the dewatered areas since stream flows will be maintained outside of the cofferdam. Based on the foregoing, the loss of aquatic macroinvertebrates as a result of dewatering activities is not expected to adversely affect steelhead.

Steelhead that failed to be relocated from the outlet site will die during dewatering activities. For the combined dewatering activities NMFS anticipates no more than one juvenile steelhead will be killed as a result of stranding or crushing during dewatering activities.<sup>7</sup> This is due to the size of the area affected, prior to relocation efforts, and the low numbers of steelhead expected to be present within the action area. A qualified fishery biologist will be on site to remove and relocate all juvenile steelhead that may become stranded during the dewatering drawdowns.

### **D. Loss of Riparian Vegetation from Maintenance Activities**

Part of the City's maintenance prescription includes removal and thinning of riparian vegetation within the action area. The historic riparian vegetation in this reach was eradicated as part of the levee construction by the Corps, and the City has maintained the area to prevent the

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<sup>7</sup> This estimate is based on projects with similar scenarios that were analyzed by NMFS, where a 3% mortality rate was determined.

accumulation of sediment and further aggregation of vegetation into the wetted channel. Through restoration and maintenance efforts made by the City, a small concentration of riparian vegetation persists in the action area that contributes to shading and lowering water temperatures.

There are future restoration plans in and around the action area that will result in the plantings of new riparian vegetation along the levee and the river banks. Maintaining a five-foot vegetated buffer between the wetted channel and the sandbar areas and another ten-foot buffer on the toe of the levee slopes aids in bank stabilization, while providing shade and cover to migrating and rearing steelhead. The thinning prescriptions are not expected to reduce the value of the critical habitat in the action area since the BMPs will provide buffered areas along the islands and the levee toe that will provide channel shading and habitat refuge.

## **E. Beneficial Effects from the Maintenance Activities and Valve Replacements**

### **1. Maintenance Activities**

The channel maintenance portion of this activity is required to encourage scour and reduce flooding frequency. As the San Lorenzo River flow recedes during the late spring months, a braided stream channel tends to form between Highway 1 and Soquel Avenue because of a low stream gradient and channel sediment accumulation. The growth of vegetation in the channel dissipates the flows and inhibits scour, contributing to the development of braided channel conditions between the levees. These braided channels dissipate summer flows across several shallower channels with resulting higher water temperatures. The annual clearing of excess sediment and vegetation, through maintenance activities, reduces the amount of braided channels in the area. This is likely to increase pool depths. Water temperature may also improve, although improvement is likely to be limited because temperatures in nearby non-braided channel areas are relatively high.

### **2. Valve Replacements**

Replacing the levee slide/flap gates at each outflow site with updated valves will eliminate the possibility of trapping steelhead. The current gates that have been in service since the levee construction in 1959 are rusted open and leak from the sand accumulation in the outfall apron structures. The replacement valves are a “pinch” type that are tapered at the outflow end and are engineered to open and shut at specific stormwater water pressure behind the levee. When stormwater pressure is high, the valves open and allow stormwater through the levee into the river. The outward water pressure and the pinch design of the valve end prevent any material, including fish, from flowing in reverse through the valves and out of the river. Once the water pressure behind the levee drops, the valve closes shut. The replacement valves are of 100% elastomer construction, making them practically maintenance free with a long operation life span, making repair and maintenance needs minimal.

## **E. Interrelated and Interdependent Activities**

NMFS does not anticipate any interdependent or interrelated actions associated with the proposed action.

## **VI. CUMULATIVE EFFECTS**

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA. Impacts from urbanization, such as increased runoff from new areas of impervious surfaces, and sediment and turbidity associated with road repair and construction, are likely to continue to occur in the action area. The pace of such development fluctuates based on economic conditions, and has currently slowed. In recent years, additional aquatic habitat protections have been applied by State and Federal agencies when developing projects. Based on these factors, NMFS concludes that the level of habitat degradation in the action area resulting from cumulative effects is expected to remain fairly constant or somewhat reduced during the next several years after the channel maintenance and valve replacement activities are implemented.

## **VII. INTEGRATION AND SYNTHESIS OF EFFECTS**

The maintenance activities will result in the removal of sediment and vegetation to encourage scour and reduce flooding frequency. The disking process will rip root systems from the islands in select areas of the lower San Lorenzo River using adaptive management approach. The work will be conducted during the summer low-flow period between August 1 and October 15 in 2008 and 2009, and have one channel ripping application for each year. One area in the river may require a crossing made from gravel with a 12-inch culvert. All steelhead will be moved from the area, using block nets, prior to the crossing installation. Small pulses of turbidity are expected as a result of the gravel installation and removal and also during the first storm events of the following season. The turbidity levels are undetectable from the other turbidity sources moving through the watershed and should not cause long term impacts to steelhead or habitat.

The valve replacements will update the existing gravity outlet valves with modern day valves that will require less maintenance and prohibit the entrainment of fish. The related construction for the valve replacements will result in the dewatering of approximately 2,400 square feet (120 linear feet) of the San Lorenzo River. An estimated 5.3 juvenile steelhead are expected to be encountered at all six outlet sites being dewatered and will be subject to capture and relocation. No more than one juvenile steelhead is likely to be killed as a result from the combined dewatering activities. Any late migrating steelhead smolts continuing through the action area into May would be using the main channel and are not likely to be encountered in the small confined outlet sites that are located along the river banks. Turbidity levels will likely increase from the building and removal of cofferdams but is expected to be temporary without having adverse effects on steelhead.

The population of steelhead in the San Lorenzo River is considerably depressed from historical numbers. The valve replacements are engineered to prevent backflow and will have no long term detrimental impacts on steelhead habitat and will not restrict the amount of juvenile rearing space in future years. Beneficial effects to steelhead passage and rearing habitats are expected from the channel maintenance and valve replacement projects. Based on the estimated 1,000 to 2,500 adult steelhead in the San Lorenzo River and the relocation efforts of qualified biologists using NMFS approved techniques, a loss of one juvenile steelhead is unlikely to have a detectable effect on this population's abundance or viability in future years because the remaining population is large enough to be resilient to this small, one-time loss. Spawning in subsequent years is expected to produce enough juveniles to repopulate any habitat areas that may become vacant by the loss of these fish. As noted, the survival chances of juveniles in these areas in future years are likely to improve. Thus, survival and recovery of this population, or the DPS in general, is not likely to be appreciably reduced.

The attributes for the PCEs in the designated critical habitat for CCC steelhead and CCC coho salmon include water and water quality, foraging habitat, natural cover including large substrate and aquatic vegetation, and migratory corridors free of obstructions. CHART's overall conservation value for the San Lorenzo HSA was determined as high, although the habitat conditions in the action area are generally poor, consisting of migration corridors that are marginal; primarily due to elevated stream temperatures and management for flood control. Overwinter and outmigration habitat conditions are also poor because the channel lacks habitat complexity and velocity refuge.

The effects from the maintenance activities will be temporary and result in higher turbidity levels. The effects from the valve replacements will result in temporary impacts (*e.g.*, turbidity increase, dewatering, and loss of macroinvertebrates) to critical steelhead and coho salmon habitat. These impacts will last no more than a few weeks based on the impact minimization measures and conservation measures proposed. The area of the channel disturbed for the instream work is expected to return to pre-project conditions following completion of construction. The effects from the maintenance activities and valve replacements are expected to be beneficial and long-lasting to CCC steelhead and designated critical habitat for CCC steelhead and CCC coho salmon.

## **VIII. CONCLUSION**

After reviewing the best available scientific and commercial information, the current status of the species and critical habitat, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is NMFS' biological opinion that the San Lorenzo River Valve Replacement Project and Channel Maintenance Activities are not likely to jeopardize the continued existence of the CCC steelhead DPS.

After reviewing the best available scientific and commercial information, the current status of critical habitat, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is NMFS' biological opinion that the San Lorenzo River Valve

Replacement Project and Channel Maintenance Activities are not likely to destroy or adversely modify designated critical habitat for CCC steelhead or CCC coho salmon.

## **IX. 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 measures described below are nondiscretionary, and must be undertaken by the Corps, the City, and their designees for the exemption in section 7(o)(2) to apply. The Corps and the City have a continuing duty to regulate the activity covered by this incidental take statement. If the Corps or the City: (1) fails to assume and implement the terms and conditions, or (2) fails to require any designee to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to any permit, grant document, or contract, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Corps or the City 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 or Extent of Take**

Incidental take of threatened CCC steelhead juveniles during construction for the valve replacements is expected to occur due to dewatering and subsequent fish relocation efforts during the construction season. The majority of this take will be non-lethal take. Some injury and mortality of juvenile steelhead is anticipated as fish are collected by seining, dip netting, and other relocation-related activities. It is anticipated that most fish will be removed from the outlet sites with these collection methods prior to dewatering activities and, therefore, based on the results from past surveys and valve replacement activities, it is estimated that no more than a total of 5.3 juvenile steelhead will be found and relocated during the dewatering at all outlet sites. One juvenile steelhead could be injured or killed if stranded in the dewatered zone and perish as a result of crushing or desiccation. It is anticipated that no fish will be taken as a result of the crossing placement due to proper blocknetting technique if conducted for both or either year during the 2008-2009 maintenance activities. This activity will be conducted in a low-flow channel that fish are not expected to use.

## **B. Effect of the Take**

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

## **C. Reasonable and Prudent Measures**

Pursuant to section 7(b)(4) of the ESA, the following reasonable and prudent measures are necessary and appropriate to minimize incidental take of threatened CCC steelhead:

1. Measures shall be taken to minimize injury and mortality to listed salmonids from fish relocation activities.
2. Prepare and submit a report to document effects of construction and relocation activities and performance.

## **D. Terms and Conditions**

In order to be exempt from the prohibitions of section 9 of the ESA, the City and their designee(s) must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are nondiscretionary.

Monitoring requirements are included below, as per 50 CFR 402.12(i)(3): “In order to monitor the impacts of incidental take, the Federal agency or any applicant must report the progress of the action and its impact on the species to the Service [NMFS] as specified in the incidental take statement.”

The following terms and conditions implement Reasonable and Prudent Measure 1.

1. The City shall provide NMFS with a “Dewatering and Fish Relocation Plan” for review 30 days prior to the start of dewatering and fish relocation activities. This plan shall outline cofferdam construction, dewatering, and fish relocation methods. The plan shall be submitted to NMFS Santa Rosa Area Office (see address below).
2. The City shall retain a qualified biologist with expertise in the areas of anadromous salmonid biology, including handling, collecting, and relocating salmonids; salmonid/habitat relationships; and biological monitoring of salmonids. The City shall ensure that all biologists working on the valve replacements are qualified to conduct fish collections in a manner which minimizes potential risks to listed salmonids. Electrofishing, if used, shall be performed by a qualified biologist and conducted according to the “NOAA Fisheries Guidelines for Electrofishing Waters Containing Salmonids Listed under the Endangered Species Act”, June 2000. A Statement of Qualifications for all biologists who will be employed on the valve replacements shall be provided to NMFS for review 30 days prior to any dewatering and fish relocation activities.

3. The biologist shall monitor the construction site during placement and removal of cofferdams and channel diversion-related activities to ensure that any adverse effects to salmonids are minimized. The biologist shall be on site during all dewatering events to ensure that all listed salmonids are captured, handled, and relocated safely. The biologist shall notify NMFS biologist Dave Walsh (707) 575-6016 or dave.walsh@noaa.gov, one week prior to relocation activities in order to provide an opportunity for NMFS staff to observe the activities.
4. Listed salmonids shall be handled with extreme care and kept in water to the maximum extent possible during relocation activities. All captured fish shall be kept in cool, shaded, aerated water protected from excessive noise, jostling, or overcrowding any time they are not in the stream and fish shall not be removed from this water except when released. To avoid predation, the biologist shall have at least two containers and segregate young-of-year salmonids from older salmonids and other potential aquatic predators. Captured salmonids shall be relocated, as soon as possible, to a location at least 100 feet downstream of the outlet site which has suitable habitat conditions, and which allows for maximum survival of the transported salmonids.
5. Pumps used to dewater the outlet site shall be equipped with screens that meet the following NMFS fish screening criteria:
  - a. perforated plate: screen openings shall not exceed 3/32 inches (2.38mm), measured in diameter;
  - b. woven wire: screen openings shall not exceed 3/32 inches (2.38 mm measured diagonally);
  - c. screen material shall provide a minimum of 27% open area; and
  - d. approach velocity shall not exceed 0.33 feet per second.
6. The City shall provide NMFS with an annual summary report within 90 days of the completion of fish relocation and monitoring the valve replacement activities. The report shall include the methods used during the fish relocation and monitoring efforts, location, number and species captured, number of mortalities by species, and other pertinent information related to the monitoring and fish relocation activities. Reports shall be submitted to the NMFS Santa Rosa Area Office (see address below).

The following terms and conditions implement Reasonable and Prudent Measure 2.

1. The City shall provide written notification to NMFS at least fourteen days prior to commencement of in-channel crossing construction and removal. Written notification shall be sent to the NMFS Santa Rosa Area Office (see address below).
2. The City or their contractors shall allow any NMFS employee(s) or any other person(s) designated by NMFS, to accompany field personnel to visit the valve replacement and maintenance activities locations while the construction and activities are being carried out.

All reports or plans required for the above terms and conditions shall be sent to:

NMFS Santa Rosa Area Office  
Supervisor, Protected Resources Division  
Southwest Region  
National Marine Fisheries Service  
777 Sonoma Avenue, Room 325  
Santa Rosa, California 95404

## **X. REINITIATION NOTICE**

This concludes formal consultation on the proposed San Lorenzo River Gravity Outlet Valve Replacement Project and Channel Maintenance Activities. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental 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; (3) the identified action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in the biological opinion; or (4) a new species is listed or critical habitat designated that may be affected by the identified action. In instances where the amount or extent of incidental take is exceeded, formal consultation shall be reinitiated immediately.

## **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 the threatened and endangered species. Conservation recommendations are discretionary measures suggested to minimize or avoid adverse effects of a proposed action on listed species, to minimize or avoid adverse modification of critical habitat, or develop additional information.

1. NMFS recommends the Corps work with the City of Santa Cruz to develop a city-wide plan on how to further minimize the turbidity impacts on salmonids from placing gravel bar crossings in the San Lorenzo River watershed, or design alternative free-spanning crossings that do not make contact with the stream bed.
2. NMFS recommends the Corps work with the City of Santa Cruz, other agencies, and stakeholders to develop and implement a program for protection and restoration of salmon and steelhead habitat in the San Lorenzo River.
3. The City has indicated that there will be a need to replace more valves along the levees in upcoming years. NMFS recommends the Corps work with the City of Santa Cruz to develop a city-wide plan on how to further minimize impacts to riparian habitats for any future valve replacements that will be permitted by the Corps.

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. LITURATURE CITED**

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#### **A. Federal Register Notices**

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- 62 FR 43937: National Marine Fisheries Service. Final Rule: Listing of Several Evolutionary Significant Units of West Coast Steelhead. Federal Register 62:43937-43954. August 18, 1997.
- 64 FR 24049: Designated Critical Habitat; Central California Coast Coho Salmon and Southern Oregon/Northern California Coasts Coho Salmon. National Marine Fisheries Service, National Oceanic and Atmospheric Administration, United States Department of Commerce. Final Rule and Correction. Federal Register, Volume 64, No. 86, May 5, 1999. Pages 24049-24062.
- 69 FR 71800: National Marine Fisheries Service. Proposed Rule: Endangered and Threatened Species; Designation of Critical Habitat for Seven Evolutionarily Significant Units of Pacific Salmon (*Oncorhynchus tshawytschd*) and Steelhead (*O. mykiss*) in California. Federal Register, Volume 69 p. 71800-72107. December 10, 2004.
- 70 FR 52488: Endangered and Threatened Species; Designation of Critical Habitat for Seven Evolutionarily Significant Units of Pacific Salmon and Steelhead in Californra. National Marine Fisheries Service, National Oceanic and Atmospheric Administration, United States Department of Commerce. Final Rule. Federal Register, Volume 70, NO. 170, September 2, 2005. Pages 52488-52586.
- 71 FR 834. National Marine Fisheries Service. Final rule: Listing Determinations for 10 Distinct Population Segments of West Coast Steelhead. Federal Register 71:834-862. January 5, 2006.

## **B. Personal Communications**

Jon Ambrose, Fishery Biologist, NMFS, 2008.

Gary Kittleson, Kittleson Environmental Consulting, 2008.

Don Lash, Army Corps of Engineers, October 9, 2003.

Siobhan O'Neil, City of Santa Cruz, April 24, 2008.

## **Enclosure 2**

The San Lorenzo River Gravity Outlet Valve Replacement Project and San Lorenzo River Channel Maintenance activities in Santa Cruz County, California.

Magnuson-Stevens Fishery Conservation and Management Act (MSA) Essential Fish Habitat Comments

### EFH Consultation

As described in the above effects analysis, NMFS has determined that the proposed action would adversely affect EFH for Federally-managed coho within the Pacific Salmon FMP. However, the anticipated adverse effects are so minimal in nature that no EFH Conservation Recommendations are necessary to avoid, minimize, mitigate, or otherwise offset the adverse effects to EFH. This concludes EFH consultation for the City of Santa Cruz Department of Public Work's proposed San Lorenzo River Gravity Outlet Valve Replacement Project and Channel Maintenance Activities to be conducted in the City of Santa Cruz, Santa Cruz County, California. Pursuant to 50 CFR 600.920(l), the Corps must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a way that may adversely affect EFH or other fish and wildlife resources, or if new information becomes available that affects the basis for NMFS' EFH Conservation Recommendations.