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

September 27, 2012

In response, refer to:
2012/02186:AH

Antal Szijj
Senior Project Manager
Department of Army
Los Angeles District, Corps of Engineers
Ventura Field Office
2151 Alessandro Drive, Suite 110
Ventura, California, 93001

Dear Mr. Szijj:

Enclosed with letter is NOAA's National Marine Fisheries Service (NMFS) Biological Opinion for the Army Corp of Engineer's issuance of a Section 404 Permit of the Clean Water Act to United Water Conservation District for the proposed geotechnical investigation in support of the development of the new fish passage facility at the Vern Freeman Diversion in the Santa Clara River, Ventura County, California. The Biological Opinion describes the effects of the proposed action on endangered Southern California Distinct Population Segment (DPS) of steelhead (*Oncorhynchus mykiss*) and designated critical habitat for the species in accordance with Section 7 of the US endangered Species Act (ESA), as amended (16 U.S.C. 1531 *et seq.*).

The Biological Opinion concludes the proposed action is not likely to jeopardize the continued existence of Southern California steelhead, or result in the destruction or adverse modification of the designated critical habitat for this species. However, NMFS anticipates take of Southern California steelhead as a result of the proposed action, thus an incidental take statement with non-discretionary reasonable and prudent measures and terms and conditions is included with the Biological Opinion.

Please contact Armin Halston at (562) 980-3264 or Armin.halston@noaa.gov, if you have a question or concern with this ESA Section 7 consultation, or if you require additional information.

Sincerely,

For Rodney R. McInnis
Regional Administrator

Enclosure

cc: David Simmons, USFWS, Ventura
Dan Blankenship, CDFG, Ventura
Jeff Humble, CDFG, Ventura
Sara Dowey, United Water
Copy to Administrative File: 151422SWR2012PR00257

BIOLOGICAL OPINION

ACTION AGENCY: U.S. Army Corps of Engineers

ACTION: Issuance of a Section 404 Permit of the Clean Water Act to United Water Conservation District for Geotechnical Investigation at the Vern Freeman Diversion

CONSULTATION CONDUCTED BY: National Marine Fisheries Service, Southwest Region

TRACKING NUMBER: 2012/02186

DATE ISSUED: **September 27, 2012**

I. CONSULATATION HISTORY

On November 9, 2011, NOAA's National Fisheries Service (NMFS) received a request for informal consultation under Section 7 of the U.S. Endangered Species Act (ESA) from the Army Corps of Engineers (Corps). The request pertained to the potential issuance of a Section 404 of the Clean Water Act permit to United Water Conservation District's (United) for proposed geotechnical investigation at the Vern Freeman Diversion Dam (VFDD) on the lower Santa Clara River, near the City of Saticoy, California. In a letter of December 6, 2011, to the Corps, NMFS requested clarification on the proposed work schedule, which differed between the Corps' request and the information received from United. Additionally, because dewatering of the action area would be necessary, and based on the expectation that endangered steelhead (*Oncorhynchus mykiss*) would be present in the action area, NMFS recommended in the letter that the Corps request formal Section 7 consultation for the proposed action if dewatering of the action area would be necessary.

On June 4, 2012, NMFS received the Corps' request for formal Section 7 consultation for the proposed permit authorizing United's geotechnical investigation. The Corps determined the proposed action may affect the endangered Southern California Distinct Population Segment (DPS) of steelhead and designated critical habitat for this species. Receipt of the Corps' request was followed by a June 7, 2012, teleconference involving the regulatory agencies (i.e. NMFS, Corps and USWFS) and United. In a letter of June 13, 2012, NMFS notified the Corps that formal consultation had been initiated.

In a letter of August 9, 2012, the Corps submitted an amendment to the project description because United determined that installation of a temporary surface water diversion would not be required due to their ability to dewater the area via VFDD operations. The Corps also provided a current approximation of the amount of pool habitat in the action area that would require dewatering.

II. DESCRIPITION OF THE PROPOSED ACTION

This biological opinion recognizes the Corps as the Federal agency and United as the applicant, defined by 50 CFR 402.02. United has proposed to perform a geotechnical investigation of the underlying substrate of the Santa Clara River immediately upstream of the VFDD. The findings from this investigation are necessary to inform the design of a new fish-passage facility at the VFDD. In this regard, the geotechnical investigation will provide information about the strength of the existing substrate, depth to bedrock and identification of the type of substrate materials. To complete this geotechnical investigation, United is proposing to drill up to six holes in the upstream streambed adjacent to the VFDD and withdraw sediment samples to analyze the underlying substrate. The proposed action is expected to take a maximum of 21 working days; however NMFS' experience and familiarity with similar instream construction projects suggests delays could extend the work period to 30-working days. The work window has been defined as late September to October 2012 to reduce impacts and avoid main migratory seasons for steelhead. The work window for this project is set for the driest part of the year in Southern California, when steelhead could be holding and rearing in pool habitats (Leider et al. 1986).

A. Site Preparation

To prepare the site for construction activities, United proposes to dewater 3.8-acres of the action area. By scheduling the proposed construction of the project for October, the pool in the work area is expected to be at the lowest water level of the year. At the time that the dewatering is scheduled, Santa Felicia Dam, about 26 miles upstream of the VFDD is expected to have concluded the annual "conservation releases" of water, which will have reduced incoming flows drastically to the work area. The operators of the VFDD would open the flushing channel "roller" gate allowing the remainder of the water retained in the forebay to be released downstream. United expects this operation of the facility to dewater the construction area.

B. Construction Activities

To conduct the proposed action, use of heavy equipment will be necessary and will be authorized to enter only after the construction area has been thoroughly dewatered. The equipment will enter the site on a dirt road on the Todd Barranca County Jail Property adjacent to the north bank of the Santa Clara River. Equipment will then access the site along the dam crest from the northwest abutment, travel about 1,200 feet on top of the cement dam to the point of entry into the dewatered section of river. Construction and restoration will be accomplished with a D8T Bulldozer, two 345 Excavators and two 930K Loaders.

The first aspect of the proposed project is to build a firm flattened surface to act as a drilling pad for the heavy equipment that will withdraw the sediment samples. The materials needed to create the drilling pad would be borrowed from the streambed in the dewatered area using an excavator. United has proposed to excavate up to 3,500-cubic yards of substrate to create the drilling pad which would measure about 80-feet wide by 350-feet long with an average height of 3.5 feet. The borrowed area adjacent to the drilling pad would be about 115-feet wide by 420-feet long. The equipment may develop a narrow pathway into the borrowed area to access materials not reachable from the dam crest or drilling pad.

The field exploration is the second aspect of the proposed action. The mud-rotary wash drill rig would be used to drill up to 6-boring holes to depths extending to 20-feet into the bedrock, entire depth of the boring holes will be about 40-70 feet. These holes will then be filled with bentonite chips and topped with drill spoils. The equipment that may be utilized for sampling is a Mud-Rotary Wash Drill (CME 75), 416 Backhoe Bucket, Becker Hammer, Bucket Auger and a Sonic Drill.

United will implement the following best management practices to minimize and avoid effects to the natural environment during this proposed action:

1. Proper management of equipment to avoid spills of equipment fluid and drilling mud. Equipment will be well maintained prior to site entry and drill mud will be entirely confined to the sampling hole and the circulation tank. It will then be hauled off-site for disposal. Any spilled drilling mud will be collected and removed from the stream to the extent feasible.

2. The work site will be flagged and excavation work will be monitored to ensure that the footprint is minimized and does not extend outside the boundaries of the site.

3. A qualified biological monitor will be on-site to survey the area for any aquatic sensitive or other native species prior to and during the proposed action.

4. Work will not occur during any rain events. If rain does occur, all work will be halted until conditions return to pre-rain conditions.

5. Native streambed material will be used to build the pad from the adjacent borrow site. After the geotechnical survey is completed, the site will be returned, roughly, to original lines and grades. Only native streambed material will be used to fill in the excavated areas.

C. Clean Up / Site Restoration

Upon completion of the substrate sampling, the heavy equipment will restore the dewatered area. The materials utilized to construct the drilling pad will be contoured back into river. The post site conditions will be returned, as closely as possible, to pre-project conditions. On completion of riverbed restoration, the heavy equipment will exit the site via the same route used for entering the site. No riparian vegetation is expected to be affected by the proposed project.

D. Interrelated and Interdependent Activities

Interrelated actions are those actions that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the proposed action (50 CFR § 402.02). NMFS is not currently aware of actions that may be interrelated or interdependent with the proposed action.

E. Action Area

The "action area" refers to "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" and includes effects due to interrelated and interdependent activities (50 CFR §402.02). The action area for the proposed geotechnical investigation is 600-feet upstream and 600-feet downstream of the VFDD on the mainstem of the Santa Clara River. The dewatered action area will be confined to 3.8-acres of riverbed directly above the VFDD. The upstream terminus of the action area lies at about RM 11 on the mainstem Santa Clara River near the City of Saticoy below the Santa Paula Creek outlet. The downstream terminus of the action area is at about RM 10.

III. STATUS OF THE LISTED SPECIES AND CRITICAL HABITAT

This biological opinion analyzes the effects of the proposed action on the following species and its designated critical habitat:

Endangered Southern California Steelhead *(Oncorhynchus mykiss)*
Listing determination: 62 FR 43937, Aug.18, 1997, Jan. 5, 2006.
Critical habitat designation: 70 FR 52488; September 2, 2005.

A. Steelhead Life History

Steelhead are the anadromous form of the species *O. mykiss* migrating between fresh and salt water. The resident form of this species are commonly known as rainbow trout. *O. mykiss* is considered to have the most complex and variable life history of all species in the genus (Behnke 1992). Diifferent 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 timing of migration is influenced by a variety of parameters such as photoperiod, temperature, and the arrival of suitable river discharge for migration. Once they reach their spawning grounds, females will use their caudal fin to excavate a nest to deposit their eggs, known as a redd, which are comprised of suitable gravels, with appropriate water quality and current velocities (Reiser and Bjornn 1979). Males will then fertilize the eggs and afterwards the females will cover the redd with a layer of gravel where the embryos incubate. Hatching time can vary from about three weeks to two months depending on surrounding water temperature.

As steelhead mature from embryos to yearlings to juveniles, they will rear 1-3 years in freshwater streams, seasonal coastal lagoons or estuaries of their natal creeks and rivers, that provide over-summering habitat. Research on juvenile steelhead shows that the hydrologic cycle of southern California can influence residency. For instance, extended rain-free periods can cause juveniles to become land-locked, unable to reach the ocean (Boughton et al. 2006, 2007). Juvenile steelhead emigrating to the ocean, usually in late winter and spring, are known as smolts.

While in the ocean, behaviors 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). They will spend the next 2 to 4 years in the ocean while reaching maturity and can occasionally reside in the ocean for an additional 2 to 3 more years before returning to spawn in the cool, clear and well oxygenated freshwaters of the rivers and creeks of the Pacific Coast.

Through scientific research studying the otolith (small ear stone) 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). Genetic research indicates that there is no genetic basis for the division of populations in the southern California region into two distinct biological groups, contrary to current classification under the US and California Endangered Species Acts (Clemento et al. 2008). Additionally, evidence indicates that switching between freshwater and anadromous life cycles is likely occurring (Zimmerman and Reeves 2000). 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 watersheds where migration barriers exist.

B. Habitat Requirements

Habitat requirements of steelhead generally depend on the life history stage (NMFS 2005). Steelhead encounter several distinct habitats during 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 (Reiser and Bjornn 1979). Furthermore, dissolved oxygen concentration, pH, and water temperature are factors affecting survival of incubating embryos. The presence of interspatial spaces between large substrate particle types is important for maintaining water flow with dissolved oxygen through the nest. Juvenile steelhead require living space (different combinations of water depth and velocity), shelter from harsh environmental conditions, food sources, and suitable water quality and quantity, for growth and survival during summer and winter (Moyle 2002). Habitat must also provide refuge from predators, such as under logs, root wads and boulders in the stream, and beneath overhanging vegetation.

Steelhead habitat in southern California is directly affected by the Mediterranean climate and corresponding sporadic rain events and hot and dry summers. Steelhead seek refuge from periodic winter high-flow events in side channels and off channel areas, and from summer desiccation events by relocating to deep, cool pools fed by springs or seeps. 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 the physiology begins to change while steelhead become acclimated to a saltwater environment.

C. Status and Population Dynamics

Steelhead in southern California were defined as a Distinct Population Segment (DPS) under the ESA on January 5, 2006 (71 FR 834). This designation identifies this range of steelhead as a separate species, therefore ecologically discrete. The southern California steelhead DPS encompasses populations from Santa Maria River to the Tijuana River. Steelhead populations in this region have declined dramatically from 32,000 and 46,000 adults to fewer than 500 total adults, based on combined estimates for the Santa Ynez, Ventura, and Santa Clara rivers, and Malibu Creek (Busby et al. 1996). The small estimated run sizes suggest the southern California steelhead DPS is not likely to be viable over lengthy temporal scales because the risk of extinction increases with decreasing population size and the extinction factors can operate more effectively on small populations as compared to large populations (Pimm et al. 1988, McElhany et al. 2000). Adequate assessment of population variability requires long-term data sets, which are unavailable for this population. Population abundance fluctuates greatly in southern California and depends on the availability of suitable freshwater habitat and the frequency and magnitude of annual rainfall which creates and sustains suitable habitat for steelhead. Steelhead abundance can vary substantially over time. Such population variability is expected to increase the risk of species' extinction because risk increases with variation (fluctuation) in population size (Pimm et al. 1988).

Reviews of the DPS status (Busby et al. 1996, Good et al. 2005, NMFS 2006, NMFS 2011a) note that the number of individuals throughout much of the species' historical geographic range has declined and have concluded (and reaffirmed) the species is at risk of extinction. While the estimates of historical run sizes have been criticized for lacking adequate support (Good et al. 2005), there is recent evidence indicating that the number of streams currently supporting the southern California DPS of steelhead (46 drainages) has been reduced to less than 50 % and may be as low as 37 % of streams that historically supported steelhead (Good et al. 2005). The Santa Clara River system is the largest steelhead-bearing watershed within the SC DPS of steelhead, with a drainage basin over 1,600 square miles. Up to the mid-1940s, this system was estimated to support an annual run of 9,000 adult steelhead (Moore 1980b). Furthermore, recent information for some of the larger river systems (such as the Santa Clara River watershed) which are presumed to have been the historical foundation for the DPS, suggest small run sizes. For instance, a few estimates have been obtained from the Vern Freeman diversion on the Santa Clara River, which possesses a fish ladder and trap, allowing individuals to be counted. A total of five upstream migrating adult steelhead have been detected each year during monitoring activities conducted at this facility from 1991 through 2011 (Annul 2007-2011).

D. Status of Critical Habitat

Critical habitat for this species was designated in September 2, 2005. Critical habitat has a lateral extent as defined by the bankfull discharge or 2-year flood event. Estuarine areas of listed streams are also included in the designation, but the riparian zone is not included in the designation. A critical habitat designation identifies required features called Primary Constituent

Elements (PCEs). Critical Habitat PCEs for steelhead consists of physical or biological features essential to the conservation of the DPS. PCE's specific to steelhead are further explained in 50 C.F.R. 226.211 and summarized in Table 1 on the following page.

Table 1. Primary constituent elements of designated critical habitat for steelhead (NMFS 2005b).

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

Streams designated as critical habitat in the southern California DPS have the above PCE attributes to varying degrees, depending on the stream location and the impacts associated with the watershed. NMFS' most recent status review updates for West Coast Steelhead (Good et al. 2005, NMFS 2011a) identified habitat destruction and degradation as serious ongoing risk factors for this DPS. Urban development, flood control, water development, and other anthropogenic factors have adversely affected the proper functioning and condition of some spawning, rearing, and migratory habitats in streams designated as critical habitat. Urbanization has resulted in some permanent impacts to steelhead critical habitat due to stream channelization, increased bank erosion, riparian damage, migration barriers, and pollution (Good et al. 2005). Many streams within the DPS have dams and reservoirs that mute flushing streamflows, withhold or reduce water levels suitable for fish passage and rearing, physically block upstream fish passage, and retain valuable substrates for spawning and rearing. In addition, some stream reaches within the DPS' designated critical habitat may be vulnerable to further perturbation resulting from improper land use and management decisions.

As part of the process to gather and analyze information to finalize this most recent designation of critical habitat, NMFS' critical habitat review teams (CHARTs) compiled all available information regarding the distribution and habitat use of steelhead within the Southern California DPS, as well as habitat condition. The CHARTs performed conservation assessments for all occupied watersheds, including riverine reaches and estuarine areas within each DPS. Essential features of critical habitat for steelhead spawning, rearing, and migration were found in 741 miles (1,186 km) of occupied stream habitat within the 32 Hydrologic Subwatershed Areas of the Southern California Steelhead DPS. Streams with high conservation value were found to have most or all of the PCEs of critical habitat and extensive areas that were suitable for steelhead spawning, rearing, and migration, despite negative effects of human factors. Streams with medium or low conservation value were less suitable for steelhead in terms of spawning, rearing, and migration, and had less of the PCEs necessary for steelhead survival growth and reproduction, generally due to anthropogenic factors. The Santa Clara River watershed has a high conservation value for the survival and recovery of the Southern California DPS of steelhead. While many streams in the DPS have been found to have high conservation value for survival and recovery of the species, the spawning, rearing, and migratory habitat within the DPS are heavily impacted by dams, diversions, and human development. As a result, much of the available habitat has become severely degraded, and habitat degradation has been a main contributing factor to the current endangered status of the DPS (Good et al. 2005). The most recent status review found that these threats have remained essentially unchanged (NMFS 2011a).

Critical habitat does not include occupied habitat areas on Indian tribal lands, or on specific lands owned or controlled by the Department of Defense where a natural resources management plan has been prepared. Riverine areas above major dams that are presently inaccessible to steelhead are excluded from the critical habitat designation but are currently being evaluated, based on their potential benefit for future recovery efforts.

E. Regional Climatic Variation and Trends

The interaction of changing climate conditions with other stressors such as habitat fragmentation is likely to result in additional threats to natural resources (McCarty 2001), including threats to the viability of steelhead populations. In the southwest region (southern Rocky Mountains to the Pacific Coast), the average temperature has already increased roughly 1.5 °F compared to a 1960-1979 baseline period. By the end of the century, average annual temperature is projected to rise approximately 4 to 10 °F above the historical baseline (Karl *et al*. 2009). The southern California region is also experiencing an increasing trend in droughts, as measured by the Palmer Drought Severity Index from 1958 to 2007 (Karl *et al*. 2009). Precipitation trends are also important to consider. The Southwest region, including California, showed a 16% increase in the number of days with very heavy 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 (Karl *et al*. 2009). Climate variability in the western United States has also been observed through spring 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 eco-regional scale within southern California provides a focused summary of expected trends (PRBO Conservation Science 2011). Regional climate models project mean annual temperature increases of 1.7 to 2.2 °C (3.1 to 4.0 °F) by 2070. Current regional models predicting changes in rainfall show large variation in results; 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). Westerling and Bryant (2008) evaluated wildfire risk in this region and found that the probability of occurrence of large (>200-hectare) 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 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).

F. Santa Clara River Watershed

The Santa Clara River watershed, including Santa Paula Creek, Sespe Creek, Sisar Creek, Hopper Creek, and Piru Creek, contains about 180 miles of currently accessible spawning, rearing, and migratory habitat for steelhead, and represents a substantial proportion of critical habitat within the Southern California DPS of steelhead (NMFS 2005). Steelhead juveniles continue to occupy the tributaries, and have recently been observed in Santa Paula Creek, Sisar Creek, Sespe Creek, and Piru Creek (S. Glowacki, NMFS, 2006-2009 and K. Mull, NMFS, 2011-2012, pers. obs.). Historically, the Santa Clara River mainstem was likely used by adult steelhead for migration into the upstream tributaries (*i.e.*, Sespe Creek) and could have been used by juvenile steelhead for rearing because past accounts indicate water was present within sections of the mainstem during the dry season (Outland 1971, Mann 1975). The steelhead run on the Santa Clara River prior to 1940 is estimated to have had thousands of fish and to have been one of the largest steelhead runs in southern California (Moore 1980b). Today, the Vern Freeman Diversion and Santa Felicia Dam have impeded or completely blocked steelhead access to vast amounts of habitat within the mainstem and tributaries (NMFS 2008a, b). Dams, water diversions, and groundwater pumping have also altered the timing, frequency, magnitude, duration, and rate-of-change of surface flow in the mainstem. Impacts from agriculture, flood-control facilities, highways, bridges, and urbanization have cumulatively reduced the functional value of critical habitat in the Santa Clara River watershed, and in some portions some functions may have been eliminated (*i.e.*, summer rearing may no longer occur in portions of the mainstem).

Recently, the NMFS Technical Recovery Team (TRT) identified the Santa Clara River steelhead population as a "Core 1" population essential for the successful recovery of the endangered Southern California Steelhead DPS due to the watershed's large size, availability of spawning habitat, and relatively reliable winter river discharge (Boughton et al. 2006). The Santa Clara River watershed is one of the largest watersheds in southern California (about 1,236 mi^2) and contains substantial amounts of spawning, rearing, and migratory habitat for steelhead (NMFS 2005). Steelhead utilization of the watershed has changed as the quality and quantity of suitable habitats has decreased by threats detailed in the NMFS 2011 Southern California Steelhead Recovery Plan (NMFS 2011b). The steelhead population in the Santa Clara River has been evaluated by the TRT as having a high potential for being independently viable, and was ranked second among southern California steelhead watersheds for overall viability, based on watershed habitat conditions, reliable flows, and amount of habitat present.

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

A. Status of the Species and Critical Habitat within the Action Area

Data collected from 1991 to 2011 at the VFDD indicate that downstream migration of juvenile steelhead can occur annually, with many juveniles observed during January to June (United Annual Report 2011). In general, upstream migration of adult steelhead on the Santa Clara River can be observed between November and June (Fukushima and Lesh 1998).

Recent information about the abundance of steelhead in the action area is limited to monitoring, fish trapping and stranding surveys. Upstream adult monitoring activities at the VFDD include video cameras, Passive Integrated Transponder (PIT tag reader) and Didson sonar-based imagery. There are uncertainties with this data due to gaps in adult monitoring efforts caused by environmental factors of the Santa Clara River (i.e. extreme turbidity during migration season). Fish trapping of steelhead is conducted when flows below the diversion at critical riffles do not meet the minimum flow thresholds for downstream migration. The downstream trapping provides an annual count of the steelhead traveling through the area. United annual reports documented an average annual number of 124 steelhead migrated downstream through the fish trap from 2007 to 2011 (Table 2).

The actual number of steelhead in the action area at the time of dewatering is expected to be between the density of comparable rivers within the DPS and real-time observations of the Santa Clara River during drier months. The steelhead average density calculated by Thomas R. Payne & Associates in 2008, for the mid-section of the Ventura River is 0.10 (±0.05) fish/100ft^2, provides an estimate of juvenile steelhead that may be encountered in the mid-section of the Santa Clara River. Using this density ratio, dewatering 3.8-acres of the action area should necessitate the relocation of about 165 juvenile steelhead. This density is reasonable to assume for the environmental conditions found in the action area during the winter months corresponding with the emigration period (124 average number of trapped juvenile smolts at the VFDD). The estimated density of juvenile steelhead (165 per 3.8 acres) can be refined further by reviewing the stranding surveys conducted by United that have occurred in the previous years during similar time periods as the proposed work window (i.e. outside the emigration window).

Table 2. Number of steelhead adults and smolts captured at the Vern Freeman diversion or observed in the Santa Clara River downstream of the Vern Freeman Diversion (sources: Bureau of Reclamation and United Water Conservation District 2004, United 2007, 2008, 2009, 2010, and 2011, Kelley 2008).

Year	Adults	Smolts
1994	1	81
1995	1	111
1996	2	82
1997	0	414
1998	Na	2
1999	1	3
2000	2	839
2001	2	119
2002	0	3
2003	0	41
2004	0	2
2005	Na	Na
2006	0	13
2007	Na	14
2008	2	133
2009	0	160
2010	0	72
2011	0	19

VFDD operations occasionally result in dewatering in areas harboring steelhead and prompt the need for stranding surveys. These surveys are performed to rescue stranded steelhead from the dewatered areas. United biologists survey the dewatered area using seines, and steelhead are relocated by lifestage to corresponding habitats in the watershed. Some juvenile steelhead rear in the forebay above the dam (United Annual 2010). On July 14, 2009, United released water stored in the forebay, thus dewatering the area and revealed a total number of 14 juvenile *O. mykiss*, of which 7 required relocation and 7 died from heat stress (S. Howard, United, July 2009, pers. comm.). On June 17, 2010, a sediment flush was conducted at the facility that revealed a total number of 13 juvenile *O. mykiss*, 6 required relocation and 7 died (United Annual Report 2010). United biologists have documented the number of steelhead rescued during stranding surveys to range from a minimum of 4 to a maximum of 58 (United Annual Reports 2007-2011).

B. Factors affecting species environment within the action area

Operation of the existing VFDD continues to eliminate migration opportunities (i.e., alter the pattern and reduce the magnitude of river discharge) for endangered steelhead in the lower Santa Clara River, preclude the species from completing its life history, and result in injury and death to steelhead individuals (e.g., NMFS 2008b, VFDD Fish Panel 2010).

Diversion of surface water alone has altered the timing, frequency, duration, magnitude, and rate-of-change of surface water in the action area (e.g., Harrison et al. 2006). The VFDD facility is second largest water diversion on the Santa Clara River, diverting surface water to the Oxnard Plain for agricultural irrigation.

Steelhead in vicinity of the VFDD are directly affected by maintenance of the facility. In order to reduce the buildup of sediment behind the VFDD, water is released through the flushing channel, which mobilizes accumulated sediment in the river channel in the forebay of the VFDD. This action maintains a deep channel toward the entrance of the diversion. During these operations the irrigation canal/fish screen bay dewaters quickly along with the forebay, potentially stranding steelhead located in these areas and increasing turbidity concentrations. During these events United biologists perform stranding surveys with the intention of relocating at-risk steelhead.

V. EFFECTS OF THE PROPOSED ACTION

This section describes potential effects of the proposed action on southern California steelhead and critical habitat. To identify the potential effects, NMFS reviewed the ecological literature concerning the effects of habitat changes on steelhead and aquatic habitat, and carefully considered the type, amount and extent of habitat changes that are expected to result from the proposed action. A general knowledge of physical and biological processes, population dynamics, and the life history and habitat requirements of steelhead supplemented the literature review, particularly where there was little or no information concerning effects of an impact on steelhead or the aquatic environment. This biological opinion does not rely on the regulatory definition of "destruction or adverse modification" of the critical habitat at 50 C.F.R. § 402.2, which was invalidated by Gifford Pinchot Task Force v. USFWS, 378 F.3d 1059 (9th Cir. 2004), amended by 387 F.3d 968 (9th Cir. 2004). Instead, we have relied upon the statutory provisions of the ESA to complete the following analysis with respect to critical habitat.

A. Alteration of Freshwater Site of Rearing Resulting from Dewatering

NMFS expects the dewatering process to cause temporary loss of aquatic habitat, and potentially harm steelhead in the action area. The loss of habitat would be confined to the Santa Clara River above the VFDD, and would be temporary because the affected workspace would be re-watered after the proposed action is complete. Due to the extent of pool habitat within the proposed work area and factors discussed in the Environmental Baseline, NMFS expects rearing juvenile steelhead will be present in the action area at the time of dewatering. Due to the timing of this proposed action, alteration of surface water is expected to temporarily eliminate a discrete area of a freshwater rearing site (see Table 1). No adult steelhead are expected to be found in the action area during timing of instream project activities (late September to October 31).

With regard to the consequences of altering the freshwater rearing area for steelhead, this species requires suitable living space for growth and survival combined with free movement for development. Dewatering the action area could harm individual steelhead by concentrating or stranding them in residual wetted areas that are predisposed to dewatering or desiccation,

increased water temperature, decreased dissolved oxygen concentration and predation (Cushman 1985) or by causing them to migrate to adjacent less suitable habitats (Campbell and Scott 1984). During the dewatering process the applicant proposes to capture and relocate steelhead that are stranded in the residual wetted area. Any steelhead relocated during the dewatering process will be moved to suitable habitat identified the day before construction begins. While capturing and relocating steelhead is expected to reduce the number of steelhead that may become stranded, injured, and killed owing to the dewatering activity, the proposed action includes no provision to ensure that dewatering the action area will not transport steelhead into reaches downstream of the VFDD that are susceptible to instream drying. To minimize impacts from dewatering, the pool habitat in action area should be dewatered at a rate that will not transport steelhead to reaches downstream of the VFDD.

NMFS expects the maximum of 165 juvenile steelhead could be adversely affected during the dewatering activity, based on the number of steelhead observed during trapping efforts, flush and turnout operations and the approximate acres of habitat to be dewatered (3.8-acres). NMFS believes no more than ~3 percent (5) of juvenile steelhead encountered would be killed or injured as a result of the dewatering activities. The potential loss of 5 juvenile steelhead as a result of the proposed action is of concern due to the fact the species is classified as endangered by the ESA. If lethal take occurs, NMFS does not anticipate the potential loss of 5 juvenile steelhead would translate into adverse effects at the watershed-specific or DPS scales because the Santa Clara River watershed is the largest in the entire DPS, and the loss of 5 individuals is relatively small fraction of the steelhead in the watershed and entire DPS.

B. Alteration of Water Quality

Dewatering activities are expected to alter water quality in the action area, including downstream of the VFDD, which is of concern because water quality is an important aspect of maintaining the functionality of critical habitat. The release of sediment from behind the VFDD as it is flushed, may threaten water quality because lighter weight, sand and smaller particles typically stay suspended longest in water resulting in excess turbidity. Increased turbidity owing to the flushing of sediments has the potential to affect steelhead whether residing upstream or downstream of the VFDD within the action area. High turbidity concentrations can cause fish mortality, reduce fish feeding efficiency and decrease food availability (Berg and Northcote 1985, McLeay et al. 1987, Gregory and Northcote 1993, Velagic 1995). While NMFS expects that flushing of the VFDD would cause the concentration of suspended sediment to increase over background concentrations, the magnitude and degree of the potential water-quality alteration resulting from flushing the diversion is unknown because the specific sedimentation and turbidity rates have not been analyzed.

Increases in sedimentation and turbidity owing to construction activities are not likely because the applicant's proposal to implement and maintain erosion control measures and conduct construction activities in dry streambed. NMFS expects that increases in sedimentation and turbidity owing to construction activities are likely to be negligible.

NMFS expects that turbidity and sedimentation rates will increase downstream of the VFDD owing to the dewatering activity. These increases are not expected to be sufficient to diminish

the functional value of the action area as a freshwater migration corridor for steelhead because the increases are expected to be temporary, within the range of concentrations that are observed naturally, and not sufficient to materially alter the existing characteristics and condition of the channel bed.

VI. CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. NMFS is generally familiar with activities occurring in the action area, and at this time is unaware of such actions that would be reasonably certain to occur, beyond the continuing effects of actions described in the Environmental Baseline. 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. Consequently, NMFS believes no cumulative effect is likely.

VII. CONCLUSION

After reviewing the best scientific and commercial information available, the recent status of steelhead, the environmental baseline for the action area, and expected effects of the proposed action, it is NMFS' Biological Opinion that the proposed action is not likely to jeopardize the continued existence of the Federally endangered Southern California DPS of steelhead or destroy or adversely modify designated critical habitat for this species.

VIII. INCIDENTAL TAKE STATEMENT

Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or to attempt to engage in any such conduct. Harm is further defined by NMFS to 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 of listed animal species that results from, but is not the purpose of, carrying out 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 a prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary and must be undertaken by Corps for the exemption in section 7(o)(2) to apply. Corps has a continuing duty to regulate the activity covered by this incidental take statement. If Corps (1) fails to assume and implement the terms and conditions or (2) fails to adhere to the terms and conditions of this 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, Corps 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

NMFS believes the proposed action on the Santa Clara River in Ventura County, California, will result in the incidental take (capture, injury, and mortality) of steelhead when individual work areas are dewatered, and when juvenile steelhead are captured for relocation to suitable habitats outside work area. NMFS anticipates during the defined work period (late September thru October 2012) that no more than 165 juvenile steelhead will be relocated during project activities and that no more than 5 of the encountered juvenile steelhead may be killed or injured. The Biological Opinion does not anticipate any other form of take incidental to the proposed action.

B. Effect of Take

In the accompanying Biological Opinion, NMFS concludes that the anticipated level of take associated with the proposed action is not likely to jeopardize the continued existence of the federally endangered Southern California DPS of steelhead.

C. Reasonable and Prudent Measures

NMFS believes Reasonable and Prudent Measures are necessary and appropriate to minimize and monitor incidental take of steelhead. The results of the effects analysis provide the basis for the following Reasonable and Prudent Measures:

1. The applicant will retain a biologist skilled in salmonid biology and ecology to handle all fish relocation.

2. Dewater the action area in manner to minimize impacts to the species.

3. Report to NMFS the progress of the action and its impact on the species.

D. Terms and Conditions

In order to be exempt from take prohibitions of the ESA, United must comply with the following Terms and Conditions, which implement the Reasonable and Prudent Measures described above and outline required reporting/monitoring conditions. The Terms and Conditions are non-discretionary.

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

A. The applicant shall retain a fishery biologist with expertise in the areas of resident or anadromous salmonid biology and ecology, fish-habitat relationships, biological monitoring, and handling, collecting and relocating salmonid species.

B. The biologist will identify suitable relocation habitat in the Santa Clara mainstem the day before construction is slated to begin.

C. The biologist shall capture steelhead in residual wetted areas as a result of dewatering the workspace, then relocate steelhead to the suitable habitat relocation site. The biologist shall note

the number of steelhead observed in the affected area, the number of steelhead relocated, and the date and time of the collection and relocation.

D. One or more of the following methods shall be used to capture steelhead: dip net, seine, throw net, minnow trap, or by hand only if all other techniques are deem unfeasible. Electrofishing is not authorized.

E. The applicant's biologist shall continuously monitor construction activities for the purpose of identifying and reconciling any condition that could adversely affect steelhead or their habitat. The biologist shall be empowered to halt work activity and to recommend measures for avoiding adverse effects to steelhead and their habitat.

F. The applicant's biologist shall contact NMFS (POC Armin Halston, 562-980-3264) immediately if one or more steelhead are found dead or injured. The purpose of the contact shall be to review the activities resulting in take and to determine if additional protective measures are required. The biologist shall collect and freeze with dry ice any dead steelhead as a result of this proposed project, followed by shipping of those steelhead to NMFS (address listed below) in a insulated box.

Shipping Address:

National Oceanic and Atmospheric Administration
C/O Armin Halston
501 West Ocean Blvd.
Long Beach, California 90804

2. The following term and condition implements reasonable and prudent measure No. 2

A. Prior to dewatering the action area, the applicant shall install one or more block nets for the purposes of isolating the action area, and precluding steelhead from migrating or being transported in a downstream direction past the VFDD during and shortly after the dewatering activity. The net mesh size shall not exceed ¼ inch in diameter. The net(s) shall be maintained for the duration of the proposed action and longer if necessary to minimize the potential adverse effects of the dewatering activity on endangered steelhead.

B. To dewater the action area, the applicant will release the water held behind (upstream of) the VFDD at a rate not to exceed 1 cubic foot per second.

3. The following term and condition implements reasonable and prudent measure No. 3

A. The applicant shall provide a written monitoring report to NOAA Fisheries (shipping address listed above) within 30 working days following completion of the proposed action. The report shall include the number of steelhead killed or injured during the proposed action and biological monitoring; the number and size of steelhead relocated; any effect of the proposed action on steelhead that was not previously considered (reinitiation of consultation would be

required, see section IX (2) of the biological opinion); and, photographs taken during, before and after work activity.

IX. REINITIATION OF CONSULTATION

This concludes formal consultation on the actions outlined in the project proposal. 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 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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