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

In response reply to:
SWR/2007/06563

MAY 23 2008

Aaron O. Allen, Ph.D.
United States Department of the Army
Corps of Engineers, Los Angeles District
P.O. Box 532711
Los Angeles, California 90053-2325

Dear Dr. Allen:

Enclosed is NOAA's National Marine Fisheries Service's (NMFS) biological opinion for the U.S. Army Corps of Engineers (Corps) proposal to permit California Department of Fish and Game salmonid fisheries restoration projects in selected steelhead streams within Southern California (File No. 200301123-BAH). The biological opinion addresses the effects of the proposed action on the threatened South-Central California Distinct Population Segment (DPS) of steelhead (*Oncorhynchus mykiss*) and the endangered Southern California DPS of steelhead, and designated critical habitat for these species within these areas in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U. S. C. 1531 *et seq.*).

NMFS' biological opinion concludes that the Corps' proposed action is not likely to jeopardize the continued existence of the threatened South-Central California steelhead DPS or the endangered Southern California steelhead DPS, or adversely modify critical habitat for this species within these regions. Incidental take is anticipated to occur as a result of the proposed action and, therefore, an incidental take statement is included with this biological opinion. The incidental take statement includes reasonable and prudent measures necessary and appropriate to minimize incidental take of this species.

Mr. Stan Glowacki is the lead biologist for this project. Please contact him at (562) 980-4061 or via email at Stan.Glowacki@noaa.gov if you have any questions regarding the enclosed biological opinion or if you would like additional information.

Sincerely,

for Rodney R. McInnis
Regional Administrator

Enclosure

cc: Kit Krump, NOAA Restoration Center
Mary Larson, CDFG Grants Program Coordinator

BIOLOGICAL OPINION

ACTION AGENCY:	United States Army Corps of Engineers, Los Angeles District
ACTION:	Issuance of a Regional General Permit to the California Department of Fish and Game for the NOAA sponsored Salmonid Fisheries Restoration Grants Program.
CONSULTATION CONDUCTED BY:	National Marine Fisheries Service, Southwest Region
FILE NUMBER:	SWR/2007/06563
DATE ISSUED:	MAY 23 2008

I. CONSULTATION HISTORY

On June 26, 2007, the Los Angeles District of the United States Army Corps of Engineers (Corps) requested formal section 7 consultation with the National Marine Fisheries Service (NMFS) for the effects of a proposed Regional General Permit (RGP) to be issued to the California Department of Fish and Game (CDFG). The RGP involves steelhead restoration activities and projects designed to restore steelhead habitat for threatened and endangered steelhead habitat within the threatened South-Central California Distinct Population Segment (DPS) of steelhead (*Oncorhynchus mykiss*) and the endangered Southern California DPS of steelhead, and designated critical habitat for these species in non-tidal reaches of rivers and streams within South-Central and Southern California. All projects subject to the RGP are within the Los Angeles Corps District, and are part of CDFG's cooperative Fisheries Restoration Grants Program (FRGP).

An RGP from the Corps' San Francisco District and a corresponding biological opinion from NMFS was issued in 2004 for FRGP projects in Northern, Central and portions of South-Central California, but an RGP for restoration projects for coastal portions of South-Central California and for all of Southern California has never been issued. As with its northern counterpart, the proposed RGP for the Southern California region would be issued for a period of five years and would allow for placement of fill material associated with the implementation of various salmonid habitat restoration projects that will be funded by the FRGP. The general purpose of the FRGP projects as stated by CDFG is "to restore salmon and steelhead trout habitats that have been lost or degraded as a result of past land use practices." The restoration projects are expected to improve habitat conditions within watersheds which have steelhead, and subsequently improve migration, survival, growth and reproduction of Southern California steelhead populations. Projects which are typically funded through the FRGP include the following restoration project types: (1) instream habitat improvements; (2) instream barrier removal and modification for fish passage; (3) stream bank stabilization; (4) riparian restoration and revegetation; (5) upslope protection and road removal; (6) educational programs. All restoration activities will follow the CDFG's *California Salmonid Stream Habitat Restoration Manual, Third Edition January 1998, Volume II,* including the three new chapters *(Part IX: Fish Passage Evaluation at Stream Crossings, Part X: Upslope Assessment and Restoration Practices, and Part XI: Riparian Habitat Restoration)* added in 2003 and 2004 (Flosi *et al.* 1998, hereafter referred to as "CDFG Manual"). After reviewing the Corps' June 26, 2007, consultation request, NMFS determined that enough information was included to begin consultation.

II. DESCRIPTION OF THE PROPOSED ACTION

The Corps proposes to issue a five-year Department of the Army RGP to CDFG pursuant to section 404 of the Federal Clean Water Act for the placement of fill material into and stream channel work within the waters of the United States to annually implement South-Central and Southern California steelhead habitat restoration projects as managed by the CDFG FRGP. An RGP is a type of Corps permit which permits a large number of activities that are similar in objective, related, and occur in a programmatic nature. This alleviates the need to issue a large number of individual permits for activities which are similar in nature. The proposed RGP will apply to portions of the following coastal counties that are within the regulatory jurisdictional boundaries of the Corps' Los Angeles District: coastal San Luis Obispo County, Santa Barbara County, Ventura County, Los Angeles County, Orange County, and San Diego County. Restoration activities will typically occur in watersheds that have been subjected to significant levels of development, road building, urbanization, mining, grazing, and other activities that have reduced the quality and quantity of instream habitat available for native anadromous salmonids. Only projects that receive funding through the FRGP will be authorized through the RGP.

The FRGP has an annual grant cycle, and projects typically take place within the period of June through November of each year. Each grant proposal goes through a rigorous review process by the CDFG Technical Review Team, which includes members from CDFG, NMFS, and the California Coastal Conservancy. Regional field evaluators, the California Coastal Salmonid Restoration Grants Peer Review Committee, the NMFS Southern California Steelhead Recovery Coordinator, and the Director of CDFG are also involved in the selection of Salmonid Restoration Projects which will be funded through the FRGP. During the review process, reviewers evaluate the biological soundness, technical feasibility, and the cost effectiveness of each proposal and make recommendations for funding based on coast-wide and regional goals and priorities, including recommendations identified in the *Steelhead Restoration and Management Plan for California* (CDFG 1996).

Projects selected for funding are typically announced in January of each year. Not all projects that get announced in January will necessarily be implemented in the following low-flow season. Implementation is dependent upon the scope and scheduling of individual projects, but projects must be implemented within two to five years of receiving the grant. The CDFG manages the contracts for each project that receives funding and coordinates with each applicant for permitting and implementation.

The RGP for the FRGP will not authorize all projects that are funded through the grant program. Authorization will be limited to projects that are within the Corps' jurisdiction, which is generally within the "ordinary high water mark" in streams, and definitively ceases at the 100-year flood elevation. On an annual basis, prior to the summer low-flow construction season, CDFG will provide the Corps notification and a list of the scheduled restoration projects that fall within the scope and coverage of the RGP.

All restoration projects authorized through the proposed RGP will conform to mandates of the California Legislature in the Fish and Game Code and Public Resources Code, and will be consistent with the procedures described in the CDFG Manual. The CDFG Manual provides guidance on the proper implementation and methodologies for correctly carrying out restoration projects, and includes multiple measures to minimize impacts to salmonids and salmonid habitat during implementation of habitat restoration projects. In addition, the habitat restoration projects funded by the FRGP are required to adhere to current CDFG and/or NMFS guidelines and criteria as identified and referenced in the CDFG Manual.

A. Description of Restoration Project Types

The proposed RGP will authorize minor fill discharges of earth, rock, and wood associated with the implementation and construction of individual habitat restoration projects. Projects authorized through the RGP that require instream restoration activities will be implemented annually during the summer low-flow period, typically between June 1 and November 30. Based on the number of projects that have occurred within these 2 DPSs historically, the number of projects expected on a yearly basis is expected to be 10 or less (M. Larson, 2008, CDFG, personal communication) The CDFG Manual provides information, guidance, and techniques for proper implementation of various types of salmonid restoration projects. For this consultation, restoration projects have been grouped together by type and are summarized below. A more detailed description of restoration projects is provided by the referenced chapters of the CDFG Manual.

Dam removal projects, fish ladder projects, fish hatchery/fish stocking projects, watershed stewardship training, salmon in the classroom, obstruction blasting (with explosives) projects, and projects that would dewater or disturb more than 500 feet of contiguous stream reach are not within the scope of the FRGP and are not analyzed in this opinion.

1. Instream Habitat Improvements

Instream habitat structures and improvements are designed to provide refuge from predators, resting cover, increase spawning habitat, provide resting areas in migration corridors, improve pool-to-riffle ratios, and increase habitat complexity and diversity. Implementation of these types of projects may require the use of heavy equipment (*i.e.*, self-propelled logging yarders, mechanical excavators, backhoes, *etc.*), however, hand labor will be used when possible. Specific techniques for instream habitat improvements are described in Part VII of the CDFG Manual, entitled *Project Implementation*, and may include: placement of wood structures (divide logs; digger logs; spider logs; and log, root wad, and boulder combinations), boulder structures (boulder weirs, vortex boulder weirs, boulder clusters, and single and opposing log wing-deflectors), and log-wood combination structures (log-rock weirs, upsurge weirs, single and opposing log wing-deflectors, and Hewitt ramps). As specified in the CDFG Manual, logs and root-wads selected for placement will have a minimum diameter of 12 inches and a minimum length 1.5 times the mean bankfull width of the stream channel reach type at the deployment site. Root-wads will have a minimum root bole diameter of 5 feet and a minimum length of 15 feet and a least half the channel type bankfull width.

2. Instream Barrier Modification for Fish Passage Improvement

Instream barrier modification projects are expected to improve steelhead adult and juvenile passage and access to areas that have limited access or are inaccessible to steelhead. Techniques for evaluating steelhead migration barriers and improving fish passage are described in Part VII and IX of the CDFG Manual. Fish passage improvement projects include removing low-flow barriers, installing rock weirs to deepen low-flow impediments, notching grade control structures, placing baffles within concrete-lined sections of channel and installing fishways on small dams and on flood-control structures such as debris basins. Implementing these types of projects may require the use of heavy equipment (*i.e.*, mechanical excavators, backhoes, cranes, *etc.*), however, hand labor will be used when possible. While the CDFG Manual recommends the use of small explosives to modify a fish passage barrier in some cases, this activity will not be analyzed in this opinion due to additional effects associated with using explosives that are impossible to analyze without project-specific information. Thus, projects that utilize explosives will not be authorized through the RGP or through this opinion.

3. Fish Passage Improvement at Stream Crossings

Like the steelhead barrier modification projects above, fish passage improvement projects at stream crossings will improve or restore steelhead migratory habitat at or near road crossings where steelhead passage is impeded or blocked by (1) undersized or perched culverts; (2) concrete culverts where depths and water velocities are impassable to steelhead; and (3) "Arizona" type low-flow crossings where flows are too shallow for fish passage. Fish passage improvement projects at road crossings include removing low-flow crossings or culverts and installing bridges, modifying low-flow crossings for fish passage by notching, installing rock weirs to backwater culvert entrances, replacing culverts that are fish passage impediments with "fish-friendly" culverts, and placing baffles inside culverts. Due to the complex and site specific nature of stream crossing remediation projects, the CDFG Manual does not provide design protocols for constructing individual replacement structures. However, part IX of the CDFG Manual, entitled *Fish Passage Evaluation at Stream Crossings*, provides methods for evaluating fish passage through culverts at stream crossings, and will aid in assessing fish passage through other types of stream crossings, such as "Arizona" low-flow crossings, and concrete sections of channel beneath bridges. Projects that are authorized through the RGP must be designed and implemented consistent with the CDFG *Culvert Criteria for Fish Passage* (Appendix IX-A of the CDFG Manual) and NMFS Southwest Region *Guidelines for Salmonid Passage at Stream Crossings* (Appendix IX-B of the CDFG Manual). In addition, all fish passage projects that are authorized through the RGP will require field review, design review, and design approval from a CDFG fish passage engineer and/or a NMFS fish passage engineer prior to project implementation.

4. Stream Bank Stabilization

The main objectives of stream bank stabilization are the reduction of erosion along banks and the reduction of instream sedimentation which occurs from eroding stream banks. Streambank stabilization projects are designed to increase bank stability and reduce stream scour and bank failures during high flow events, thus decreasing fine sediment ratios within streams and stream substrates. The reduction in sedimentation and fine sediment ratios within stream substrates typically results in improved steelhead spawning habitat and increased survival of steelhead eggs and alevins within spawning gravels, reduced gill injury to steelhead caused by high concentrations of suspended sediment, reduced loss of, or reduction in size of pools from excess sediment deposition, and a more diverse and suitable macroinvertebrate forage base for juvenile steelhead. Stream bank stabilization projects typically involve environmentally appropriate bio-engineered and site specific techniques including: boulder stream bank stabilization structures, log stream bank stabilization structures, tree revetment, native plant material revetment, willow wall revetment, willow siltation baffles, brush mattresses, coconut-fiber rolls, riparian vegetation checkdams, water bars, and exclusionary fencing. Guidelines for stream bank stabilization techniques are described in Part VII of the CDFG Manual, entitled *Project Implementation*. Implementation of these types of projects may require the use of heavy equipment (*i.e.*, mechanical excavators, bulldozers, backhoes, *etc.*), however, hand labor will be used when possible.

5. Riparian Habitat Restoration

Riparian restoration projects are designed to improve salmonid habitat through increased stream shading which lower stream temperatures, as well as increase future recruitment of woody debris to streams, increase bank stability and increase invertebrate forage production. Riparian habitat restoration projects will improve riparian habitat by increasing the number of plants and plant groupings per unit area, and typically include the following types of projects: natural regeneration, livestock exclusionary fencing, bioengineering, and revegetation projects. In some cases, riparian revegetation is incorporated into streambank stabilization projects. Part XI of the

CDFG Manual entitled *Riparian Habitat Restoration*, provides guidance for riparian restoration projects and is intended to encourage and facilitate the stewardship and restoration of riparian habitat in California watersheds. In addition to providing basic information about riparian corridors, this chapter is designed to assist agencies, landowners, schools, and community groups with planning, implementing, and managing native plant revegetation projects. A plant identification section at the end of the chapter provides detailed descriptions and photographs of riparian plants commonly found along South Coast California rivers and streams.

6. Upslope Watershed Restoration

Upslope watershed restoration projects are designed to reduce excessive delivery of sediment to anadromous salmonid streams. Part X of the CDFG Manual, entitled *Upslope Assessment and Restoration Practices*, describes methods for identifying and assessing erosion problems, evaluating appropriate treatments, and implementing erosion control treatments in salmonid watersheds. In many cases these projects involve dirt roads in the upper watersheds since silt laden runoff is associated with dirt roads. Road-related upslope watershed restoration projects can include road decommissioning, road upgrading, and storm proofing roads.

7. Fish Screens

Screens will be used to prevent entrainment of juvenile salmonids into water diversions which withdraw water from streams for agriculture, power generation, or domestic use. Screens are needed on both gravity flow and pump diversion systems. Current fish screen design standards specify the following screening criteria: 1) perforated metal plate, or mesh material, with openings sized to prevent entrainment of juvenile salmonids; 2) debris cleaning devices, typically brushes, water jets, or compressed air, to prevent plugging; and 3) bypass routes return fish to the stream channel. Normally, a flow measuring device and head gate are also required to monitor and control diversion flows.

Screen designs are complex and site specific, and many require professional engineering, therefore, specific screen designs are not included within the CDFG Manual. However, Appendix S in the CDFG Manual provides guidelines and criteria for designing functional downstream-migrant fish passage facilities at water withdrawal projects, including guidance on structure placement, approach velocity, sweeping velocity, screen openings, and screen construction. Projects that are authorized through the RGP must be designed and implemented consistent with the most current versions of the CDFG *Fish Screen Criteria* and the NMFS' Southwest Region *Fish Screening Criteria for Salmonids* as discussed and referenced in Appendix S in the CDFG Manual.

B. Fish Relocation and Dewatering Activities

Depending on restoration site conditions, the following project activities authorized through the proposed RGP may require steelhead relocation and/or dewatering activities: Instream Habitat Improvements (Part VII, CDFG Manual), Instream Barrier Modification for Fish Passage

Improvement (Part VII, CDFG Manual), Stream Bank Stabilization (Part VII, CDFG Manual), Fish Passage Improvements at Stream Crossings (Part IX, CDFG Manual), and Fish Screen Projects (Appendix S, CDFG Manual).

CDFG personnel or designated biologists will capture and relocate steelhead away from the restoration project work site to avoid direct impacts, and minimize take of steelhead. Steelhead capture techniques will include dip netting, seining, by hand, and in rare cases the implementation of electrofishing may be needed. Electrofishing within the endangered Southern California Steelhead DPS will only be allowed to prevent unavoidable death of steelhead which cannot be caught by other methods. For example, if steelhead are hiding in inaccessible areas (*i.e.*, beneath boulders or undercut banks) and the fish will certainly die by desiccation if they are not removed from the action area. Steelhead relocation activities will be consistent with the measures presented below, which are excerpted from *Measures to Minimize Impacts to Aquatic*

Habitat and Species During Dewatering of Project Sites, on pages IX-51 and IX-52 of the CDFG Manual:

When construction work must occur within a channel that contains flowing water, the work site must be dewatered. Dewatering can result in the temporary loss of aquatic habitat, and the stranding, displacement, or crushing of fish and amphibian species. Increased turbidity may occur from disturbance of the channel bed. Following these general guidelines will minimize impacts.

- Prior to dewatering, determine the best means to bypass flow through the work area to minimize disturbance to the channel and avoid direct mortality of fish and other aquatic vertebrates.

- Coordinate project site dewatering with a fisheries biologist qualified to perform fish and amphibian relocation activities.

- Minimize the length of the dewatered stream channel and duration of dewatering.

- Bypass stream flow around the work area, but maintain the stream flow to channel below the construction site.

- The work area must often be periodically pumped dry of seepage. Place pumps in flat areas, well away from the stream channel. Secure pumps by tying off to a tree or stake in place to prevent movement by vibration. Refuel in an area well away from the stream channel and place fuel absorbent mats under pump while refueling. Pump intakes should be covered with 1/8 inch mesh to prevent entrainment of fish or amphibians that failed to be removed. Check intake periodically for impingement of fish or amphibians.

- Discharge wastewater from construction area to an upland location where it will not drain sediment-laden water back to the stream channel.

In order to minimize injury and mortality of steelhead during fish relocation and dewatering activities, additional measures are presented below which are excerpted from *Measures to Minimize Injury and Mortality of Fish and Amphibian Species During Dewatering*, on pages IX-52 and IX-53 of the CDFG Manual:

Prior to dewatering a construction site, fish and amphibian species should be captured and relocated to avoid direct mortality and minimize take. This is especially important if listed species are present within the project site.

- Fish relocation activities must be performed only by qualified fisheries biologists, with a current CDFG collectors permit, and experience with fish capture and handling. Check with your local CDFG biologist for assistance.

- In regions of California with high summer air temperatures, perform relocation activities during morning periods.

- Periodically measure air and water temperatures. Cease activities when water temperatures exceed temperatures allowed by CDFG and NOAA.

- Exclude fish from reentering the work area by blocking the stream channel above and below the work area with fine-meshed net or screens. Mesh should be no greater than 1/8 inch diameter. It is vital to completely secure the bottom edge of net or screen to the channel bed to prevent fish from reentering the work area. Exclusion screening should be placed in areas of low water velocity to minimize fish impingement. Screens should be checked periodically and cleaned of debris to permit free flow of water.

- Prior to capturing fish, determine the most appropriate release location(s). Consider the following when selecting release site(s):

    a. Similar water temperature as capture location
    b. Ample habitat for captured fish
    c. Low likelihood of fish re-entering work site or becoming impinged on exclusion net or screen.

- Determine the most efficient means for capturing fish. Complex stream habitat generally requires the use of electrofishing equipment, whereas in outlet pools, fish may be concentrated by pumping-down the pool and then seining or dipnetting fish.

- Electrofishing should only be conducted by properly trained CDFG personnel following CDFG and NMFS guidelines. Electrofishing in the endangered Southern California DPS will only be allowed with written approval by NMFS.

- Minimize handling of salmonids. However, when handling is necessary, always wet hands or nets prior to touching fish.

- Temporarily hold fish in cool, shaded, aerated water in a container with a lid. Provide aeration with a battery-powered external bubbler. Protect fish from jostling and noise and do not remove fish from this container until time of release.

- Place a thermometer in holding containers and, if necessary, periodically conduct partial water changes to maintain a stable water temperature. If water temperature reaches or exceeds those allowed by CDFG and NMFS, fish should be released and rescue operations ceased.

- Avoid overcrowding in containers. Have at least two containers and segregate young-of-year (YOY) fish from larger age-classes to avoid predation. Place larger amphibians, such as Pacific giant salamanders, in container with larger fish.

- If fish are abundant, periodically cease capture, and release fish at predetermined locations.

- Visually identify species and estimate year-classes of fish at time of release. Count and record the number of fish captured. Avoid anesthetizing or measuring fish.

- Submit reports of fish relocation activities to CDFG and NMFS in a timely fashion.

- If feasible, plan on performing initial fish relocation efforts several days prior to the start of construction. This provides the fisheries biologist an opportunity to return to the work area and perform additional fish surveys and relocation immediately prior to construction. In many instances, additional fish will be captured that eluded the previous days efforts.

- If mortality during relocation exceeds 5 percent, stop efforts and immediately contact the appropriate agencies.

C. Measures to Minimize Disturbance from Instream Construction

Measures to minimize disturbance associated with instream habitat restoration construction activities are presented below. Measures are excerpted from *Measures to Minimize Disturbance From Construction,* on page IX-50 of the CDFG Manual:

- Construction should generally occur during the lowest flow period of the year, normally between June 1 and November 30.

- Construction should occur during the dry period if the channel is seasonally dry.

- Prevent any construction debris from falling into the stream channel. Any material that does fall into a stream during construction should be immediately removed in a manner that has minimal impact to the streambed and water quality.

- Where feasible, the construction should occur from the bank, or on a temporary pad underlain with filter fabric.

- Temporary fill must be removed in its entirety prior to close of work-window.

- Areas for fuel storage, refueling, and servicing of construction equipment must be located in an upland location.

- Prior to use, clean all equipment to remove external oil, grease, dirt, or mud. Wash sites must be located in upland locations so that dirty wash water does not flow into the stream channel or adjacent wetlands.

- All construction equipment must be in good working condition, showing no signs of fuel or oil leaks.

- Petroleum products, fresh cement, and other deleterious materials must not enter the stream channel.

- Operators must have spill clean-up supplies on site and be knowledgeable in their proper use and deployment.

- In the event of a spill, operators must immediately cease work, start clean-up, and notify the appropriate authorities.

D. Measures to Minimize Degradation of Water Quality

Measures to minimize the degradation of water quality associated with habitat restoration construction activities are presented below which are excerpted from *Measures to Minimize Degradation of Water Quality,* on pages IX-50 and IX-51 of the CDFG Manual:

- Isolate the construction area from flowing water until project materials are installed and erosion protection is in place.

- Erosion control measures shall be in place at all times during construction. Do not start construction until all temporary control devices (straw bales, silt fences, *etc.*) are in place downslope or downstream of project site.

- Maintain a supply of erosion control materials onsite, to facilitate a quick response to unanticipated storm events or emergencies.

- Use erosion controls to protect and stabilize stockpiles and exposed soils to prevent movement of materials. Use devices such as plastic sheeting held down with rocks or sandbags over stockpiles, silt fences, or berms of hay bales, to minimize movement of exposed or stockpiled soils.

- Stockpile excavated material in areas where it cannot enter the stream channel. Prior to start of construction, determine if such sites are available at or near the project location. If unavailable, determine location where material will be deposited. If feasible, conserve topsoil for reuse at project location or use in other areas.

- Minimize temporary stockpiling of excavated material.

- When needed, utilize instream grade control structures to control channel scour, sediment routing, and headwall cutting.

- Immediately after project completion and before close of seasonal work window, stabilize all exposed soil with mulch, seeding, and/or placement of erosion control blankets.

E. Measures to Minimize Loss or Disturbance of Riparian Vegetation

Measures to minimize the loss or disturbance of riparian vegetation associated with habitat restoration construction activities are presented below which are excerpted from *Measures to Minimize Loss or Disturbance of Riparian Vegetation,* on page IX-50 of the CDFG Manual:

- Prior to construction, determine locations and equipment access points that minimize riparian disturbance. Avoid affecting unstable areas.

- Retain as much understory brush and as many trees as feasible, emphasizing shade producing and bank stabilizing vegetation.

- Minimize soil compaction by using equipment with a greater reach or that exerts less pressure per square inch on the ground, resulting in less overall area disturbed or less compaction of disturbed areas.

- If riparian vegetation is to be removed with chainsaws, consider using saws currently available that operate with vegetable-based bar oil.

- Decompact disturbed soils at project completion as the heavy equipment exits the construction area.

- Revegetate disturbed and decompacted areas, with native species specific to the project location that comprise a diverse community of woody and herbaceous species.

F. Action Area

This opinion applies to restoration activities that take place within coastal streams and rivers inhabited by the San Luis Obispo County portion of the threatened South-Central California Steelhead DPS, the entire endangered Southern California Steelhead DPS, and designated critical habitat for steelhead within these regions. Restoration projects will occur within the following counties that encompass the regulatory jurisdictional boundaries of the Corp's Los Angeles District: coastal San Luis Obispo County, Santa Barbara County, Ventura County, Los Angeles County, Orange County, and San Diego County (Figure 1). Restoration projects will occur within stream channels, riparian areas and hydrologically-linked upslope areas within these counties.

The action area is defined as all areas affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR §402.02). Because restoration projects could potentially occur within any stream within these DPS boundaries, the action area includes all coastal anadromous streams from the Monterey-San Luis Obispo County border to the U.S.-Mexican border (inclusive), (Figure 1). The action area for this RGP encompasses a broad range of environmental conditions within the San Luis Obispo County portion of the South-Central Steelhead DPS to the southern end of the Southern California Steelhead DPS and the U.S.-Mexican border. NMFS anticipates the effects resulting from most restoration activities will be restricted to the immediate restoration project site. However, minor sediment releases from some restoration projects such as culvert replacements or road decommissioning, may increase turbidity for a short distance downstream. The action area includes these downstream or downslope areas.

G. Number and Location of Future Projects

The number of projects that occur on a yearly basis will be influenced by the amount of funding available, the merit of the projects, and on competition with projects from other regions outside of the action area. Based on the data from the past 4 years, it is expected that there will be an average of 8 to 10 projects within the action area per year. Past project data shows no clear trend in terms of where most future projects are expected to occur; locations of past projects have ranged throughout the action area. Counties containing more occupied steelhead streams and greater stream miles of designated steelhead critical habitat have the potential to incur more restoration projects over the long term.

III. STATUS OF THE SPECIES AND CRITICAL HABITAT AND THE ENVIRONMENTAL BASELINE

This Biological Opinion considers the potential effects of the proposed action on the threatened South-Central California DPS of steelhead and the endangered Southern California DPS of steelhead, and designated critical habitat for these species. The status of South-Central and Southern California steelhead, their life history and habitat requirements, the status of their critical habitat, and recent factors affecting steelhead populations and their critical habitat are described below. Because the action area covers most of the area covered by both the South-Central and Southern California Steelhead DPSs, the Environmental Baseline is also described in this section.

A. Status of South-Central and Southern California Steelhead

1. Listing Status

Steelhead, an ocean-going form of rainbow trout (*Oncorhynchus mykiss*), are native to Pacific Coast streams from Alaska south to northwestern Mexico (Moyle 2002; August 18, 1997, 62 FR 43937). Wild steelhead populations in California have decreased considerably from their historic levels (Swift *et al.* 1993; August 18, 1997, 62 FR 43937). This decline prompted listing of the South-Central California DPS of steelhead as "threatened" and the Southern California DPS of steelhead as "endangered" on August 18, 1997 (62 FR 43937). These population segments include all naturally spawned populations of steelhead and their progeny residing below long-term impassible barriers. The status of these DPSs was reaffirmed on January 5, 2006 (71 FR 834). Critical habitat for South-Central California and Southern California steelhead was recently designated on September 2, 2005 (70 FR 52488).

South-Central California Steelhead DPS: The South-Central California steelhead DPS extends from the Pajaro River in Monterey County down to, but not including, the Santa Maria River, at the San Luis Obispo/Santa Barbara County border. NMFS characterized the abundance of steelhead in the South-Central California DPS when the species was originally listed (August 18, 1997, 62 FR 43937) and cited this information as the basis for the recent relisting of this South-Central California steelhead (71 FR 834). In the mid-1960s, the California Department of Fish and Game estimated a total of 27,750 spawning steelhead in this coastal DPS. Recent estimates for those rivers where comparative abundance data are available show a substantial decline. McEwan and Jackson (1996, as cited in August 18, 1997, 62 FR 43937) reported adult numbers ranging from 1,000 to 2,000 in the Pajaro River in the early 1960s, and Snider (1983, as cited in August 18, 1997, 62 FR 43937) estimated escapement of about 3,200 steelhead for the Carmel River for the 1964 to 1975 period. No recent estimate for total run size exists for this DPS, but estimates of abundance from five rivers (Pajaro River, Salinas River, Carmel River, Little Sur River, and Big Sur River) suggest that there has been a substantial decline in the overall population abundance for this DPS (Good *et al.*2005). Recent (1988 to 2002) counts of adult steelhead migrating upstream in the Carmel River suggest an increase in localized abundance, with a single adult reported in 1991 and 881 adults being reported in 2002 (NMFS 2007a). Additionally, surveys of the South-Central DPS in 2002 indicated that a majority of watersheds that historically supported steelhead in the South-Central DPS were still occupied, with three additional basins that had no historical record of steelhead presence being occupied (Boughton *et al.* 2006).

Major inland watersheds occupied by steelhead in the action area portion of this DPS begin along the Big Sur Coast and include San Carpoforo and Arroyo de la Cruz Creeks. South of the

Big Sur coast, other steelhead watersheds include San Simeon, Santa Rosa, San Luis Obispo, Pismo, and Arroyo Grande Creeks (Busby *et al.* 1996, 1997, Titus *et al.* 2002, Good *et al.* 2005). While the creeks in the northern part of San Luis Obispo County occur in relatively undisturbed areas, development within the watersheds increases in a southerly direction, especially near the cities of San Luis Obispo, Pismo Beach, and Arroyo Grande. A list of watersheds within the South-Central California Steelhead DPS region which have had recent observations or historical presence of steelhead is shown in Table 1. Due to current or historical presence of steelhead, FRGP activities could potentially occur within any of the watersheds listed in Table 2.

Even with recent positive findings and the documentation of watersheds still occupied in the South-Central DPS, the Biological Review Team (BRT) in its evaluation of the viability and extinction risk of naturally spawning populations within each steelhead DPS found high risks to steelhead abundance, productivity, and diversity in the South-Central California steelhead DPS, and expressed particular concern for the DPS's connectivity and spatial structure. Additionally, climate change is expected to result in somewhat less rainfall over the next 100 years for this portion of California (Hayhoe et al. 2004), and could lead to more severe weather patterns and changes in oceanic conditions, all of which are expected to influence steelhead survival, viability and spatial structure (Boughton et al. 2007). The consensus of the BRT was that the South-Central California Steelhead DPS was currently not endangered but was likely to become endangered in the foreseeable future (Good et al. 2005).

Table 1. South-Central California (San Luis Obispo County) and Southern California coastal streams and rivers historically and currently occupied by steelhead (N to S) based on historical data and recent surveys (adapted from Boughton et al. 2006).

	Presence		Presence
South-Central Cal. DPS			
San Carpoforo Creek	Y	Cañada del Corral	Y
Arroyo de la Cruz	Not determined	Cañada del Capitan	Historical Presence
Little Pico Creek	Not determined	Gato Canyon	Not determined
Pico Creek	Y	Dos Pueblos Canyon	Y
San Simeon Creek	Not determined	Eagle Canyon	Not determined
Santa Rosa Creek	Y	Tecolote Creek	Y
Villa Creek	Y	Bell Canyon	Barrier
Cayucos Creek	Y	Goleta Slough Complex	Y
Old Creek	Negative obs.	Arroyo Burro	Y
Toro Creek	Dry	Mission Creek	Y
Morro Creek	Y	Montecito Creek	Y
Chorro Creek	Y	Oak Creek	Barrier
Los Osos Creek	Y	San Ysidro Creek	Y
Islay Creek	Y	Romero Creek	Y
Coon Creek	Y	Arroyo Paredon	Y
Diablo Canyon	Y	Carpinteria Creek	Y
San Luis Obispo Creek	Y	Rincon Creek	Y
Pismo Creek	Y	Ventura River	Y
Arroyo Grande Creek	Y	Santa Clara River	Y
Southern Cal. DPS		Big Sycamore Canyon	Negative obs.
Santa Maria River	Y	Arroyo Sequit	Y
Santa Ynez River	Y	Malibu Creek	Y
Jalama Creek	Historical Presence	Topanga Canyon	Y
Cañada de Santa Anita	Y	San Juan Creek	Y
Cañada de la Gaviota	Y	San Mateo Creek	Y
Arroyo Hondo	Y	San Onofre Creek	Dry
Arroyo Quemado	Barrier	Santa Margarita River	Historical Presence
Tajiguas Creek	Barrier	San Luis Rey River	Y
Cañada del Refugio	Y	San Dieguito River	Y
Cañada del Venadito	Barrier	Sweetwater River	Y

Southern California Steelhead DPS: The Southern California steelhead DPS extends from the Santa Maria River in Santa Barbara County to the Mexican border (inclusive). NMFS characterized the abundance of steelhead in the Southern California DPS when the species was originally listed (August 18, 1997, 62 FR 43937) and cited this information as the basis for the recent relisting of this Southern California steelhead (71 FR 834). Estimates of historical (pre-1960s) and recent (1990s) abundance show a considerable drop in numbers of spawning adults for major rivers in the Southern California steelhead DPS. A recent updated status report states that the chief causes for the decline of steelhead populations in the Southern California DPS are urbanization, de-watering, channelization of creeks, human-made barriers to migration, and the introduction of exotic fishes and riparian plants (Good *et al.* 2005). Historical data on steelhead numbers for this region are sparse. The historic and recent steelhead abundance estimates, and percent decline are summarized in Table 2 below. The run size estimates illustrate the severity of the decline for the major rivers in the Southern California steelhead DPS (Busby et al. 1996).

Table 2. Historical and current estimates of adult steelhead in the Southern California DPS. Data from Busby *et al.* 1996.

	Pre-1950	**1990s**	**% Decline**
Santa Ynez River	20,000-30,000 Adults	< 100	99.6
	Pre-1960	**1990s**	**% Decline**
Ventura River	4,000-5,000 adults	< 100	96
Santa Clara River	7,000-9,000 adults	< 100	99
Malibu Creek	1,000 adults	< 100	90

Efforts to document the species' current pattern of occurrence indicate that steelhead are still wide spread across the northern portions of the DPS, although the steelhead components (i.e., anadromy) of *O. mykiss* populations appear to have been lost in about one third of the basins, mostly in the southern portion of the DPS (Boughton et al. 2006). Recent surveys have concluded that of the 46 basins in which steelhead were known to have occupied historically, *O. mykiss* (either resident or anadromous) only occupied about 40 to 50% of these basins currently (NMFS 2007a). Even though population estimates of steelhead have decreased substantially from historic estimates, fish surveys by NOAA Southwest Fisheries Science Center (SWFSC), direct observations by NMFS biologists, and anecdotal information from major rivers and creeks throughout the DPS suggest that steelhead populations, although small, continue to persist in many coastal watersheds (see Table 1, Titus *et al.* 2002, Good *et al.* 2005). On a positive note, there have been recent observations of steelhead recolonizing vacant watersheds during years with abundant rainfall, notably San Mateo Creek and Topanga Creek (Good *et al.* 2005). During the 2005 updated status review, NMFS' BRT assessed the viability of the Southern California DPS. The viability analyses suggest that many populations in large watersheds should continue to survive in the near future (Boughton et al. 2006). However, climate change is expected to result in a decrease in rainfall in the Southern California region of between 5% and 15% over the next 100 years (Hayhoe et al. 2004), and other factors of climate change could lead to more severe weather patterns and changes in oceanic conditions, all of which are expected to influence Southern California steelhead survival, viability and spatial structure (Boughton et al. 2007). Consequently, the 2005 updated status review completed by the BRT concluded that the

Southern California steelhead DPS was in danger of extinction (Good *et al.* 2005). The biggest threat to the viability of the southern populations of steelhead in coastal basins appears to be climate related, as the BRT found a high degree of correlation between the risk of extinction and environmental stochasticity for the coastal basins (Boughton et al. 2006).

2. Life History and Habitat Requirements

The major freshwater life history stages of steelhead involve freshwater rearing and emigration of juveniles, upstream migration of adults, spawning, and incubation of embryos (Shapovalov and Taft 1954, Moyle 2002, Cederholm and Martin 1983, Barnhart 1991, Meehan and Bjornn 1991, Busby *et al.* 1996). Steelhead juveniles rear in freshwater for 1-3 years before migrating to the ocean, usually in the spring, where they may remain for up to 4 years. Steelhead grow and reach maturity at age 2 to 4 while in the ocean. In Southern California, adults immigrate to natal streams for spawning during December to March, but some adults may not enter coastal streams until spring, depending on flow conditions. Adults may migrate several miles to hundreds of miles in some watersheds to reach their spawning grounds. Although spawning may occur during December to June, the specific timing of spawning may vary a month or more among streams within a region. Steelhead do not necessarily die after spawning and may return to the ocean, sometimes repeating their spawning migration two or more years. Female steelhead dig a nest in the streambed and then deposit their eggs. After fertilization by the male, the female covers the nest with a layer of gravel; the embryos incubate within the gravel pocket. Hatching time varies from about 3 weeks to 2 months depending on water temperature. The young fish emerge from the nest about 2 to 6 weeks after hatching.

Habitat requirements of steelhead in streams generally depend on the life history stage (Cederholm and Martin 1983, Bjornn and Reiser 1991). Habitat for southern California steelhead consists of water, substrate, and adjacent riparian zone of estuarine and riverine reaches of coastal river basins, and major rivers. Generally, streamflow volume, water temperature, and water chemistry must be appropriate for adult immigration and juvenile emigration (specific habitat requirement data can be found in Bjornn and Reiser 1991). Low streamflow, high water temperature, physical barriers, low dissolved oxygen, and high turbidity can delay or halt upstream migration of adults and timing of spawning, and downstream migration of juveniles and subsequent entry into estuary, lagoon, or ocean. Suitable water depth and velocity, and substrate composition are the primary requirements for spawning, but water temperature and turbidity are also important. Dissolved oxygen concentration, pH, and water temperature are factors affecting survival of incubating embryos. Fine sediment, sand, and smaller particles can fill interstitial spaces between substrate particles, thereby reducing water-flow through and dissolved oxygen levels within a nest. Juvenile steelhead require living space (different combinations of water depth and velocity), shelter from predators and harsh environmental conditions, adequate food resources, and suitable water quality and quantity, for ontogeny and survival during summer and winter. Young-of-the-year and yearling steelhead generally use riffles and runs during much of a given year where these habitats exist (Roper *et al.* 1994). However, young-of-the-year and older juveniles may seek cover and cool water in pools during periods of elevated water temperature (Matthews and Berg 1997) or low flows (Kraft 1972, cf. Spina 2006)

B. Status of Critical Habitat

Critical habitat for the South-Central California steelhead DPS and the Southern California steelhead DPS was designated on September 2, 2005, and consists of the stream channels listed in 70 FR 52488. Critical habitat has a lateral extent defined as the width of the channel delineated by the ordinary high-water line as defined by the Corps in 33 CFR 329.11, or by its bankfull elevation, which is the discharge level on the streambank that has a recurrence interval of approximately 2 years (September 2, 2005, 70 FR 52522). NMFS' Critical Habitat Analytical Review Teams (CHARTs) developed a list of Primary Constituent Elements (PCEs) specific to steelhead and their habitat, and relevant to determining whether occupied stream reaches within a HSA fit the definition of critical habitat. Primary constituent elements (PCE) within these streams essential for the conservation of the Southern California Steelhead DPS are those sites and habitat components that support one or more steelhead life stages and in turn contain physical or biological features essential to steelhead survival, growth, and reproduction, and the conservation of the DPS. These include:

1. **Freshwater spawning sites** with sufficient water quantity and quality and adequate substrate (i.e., spawning gravels of appropriate sizes) to support spawning, incubation and larval development.

2. **Freshwater rearing sites** with sufficient water quantity and floodplain connectivity to form and maintain physical habitat conditions and allow salmonid development and mobility; sufficient water quality to support growth and development; food and nutrient resources such as terrestrial and aquatic invertebrates and forage fish; and natural cover such as shade, submerged and overhanging large wood, log jams, beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.

3. **Freshwater migration corridors** free of obstruction and excessive predation with adequate water quantity to allow for juvenile and adult mobility; cover, shelter, and holding areas for juveniles and adults; and adequate water quality to allow for survival.

4. **Estuarine areas** that provide uncontaminated water and substrates; food and nutrient sources to support steelhead growth and development; and connected shallow water areas and wetlands to cover and shelter juveniles.

5. **Marine areas** with sufficient water quality to support salmonid growth, development, and mobility; food and nutrient resources such as marine invertebrates and forage fish; and nearshore marine habitats with adequate depth, cover, and marine vegetation to provide cover and shelter.

Streams designated as critical habitat in the South-Central and Southern California DPS contain the above PCE attributes in differing amounts and to varying degrees, depending on the particular stream and the characteristics of the watershed. Streams in the South-Central DPS and the northern end of the Southern California DPS critical habitat area (*i.e.*, Santa Barbara and Ventura Counties) make up the greater portion of the overall critical habitat for steelhead within the action area (Figures 2 and 3). Perennial streams with conditions suitable for steelhead are less abundant in the Southern Steelhead DPS critical habitat area compared to South-Central steelhead DPS. Some of this is due to the amount of coastal development in the southern region. During the summer many creeks at the southern edge of the range become intermittent in sections or dry up completely, and stream temperatures become a factor in terms of suitability for rearing steelhead (Boughton *et al.* 2006, Spina 2006). For these reasons steelhead oversummering habitat is thought to have a restricted distribution more so than winter spawning and rearing habitat in the Southern California DPS range (Boughton *et al.* 2006).

As part of the process to gather and analyze information to finalize this most recent designation of critical habitat several CHARTs compiled all available information regarding the distribution and habitat use of steelhead within the South-Central and Southern California DPSs, as well as habitat condition. The CHARTs also performed conservation assessments for all occupied watersheds, including riverine reaches and estuarine areas within each DPS. To assess the conservation value of the hydrologic sub-areas (HSA) in the DPS, the CHART used their best professional judgment, considered a variety of data sources and employed a generally uniform scoring system based on the quality, quantity, and distribution of physical or biological features associated with spawning, rearing, and migration in each HSA. From this analysis each occupied HSA was given a value of "high," "medium," or "low." Within the freshwater and estuarine range of the South-Central California Steelhead DPS, the CHART identified 30 HSAs that were occupied by steelhead (NMFS 2005). Of the 30 occupied HSAs that were evaluated, 13 were rated as having high conservation value, 11 were rated as having medium conservation value, and 6 were rated as having low conservation value. Essential features of critical habitat for steelhead spawning, rearing, and migration were found to be contained in 1,251 miles (2,002 km) of occupied stream habitat within the 30 HSAs. Within the freshwater and estuarine range of the Southern California Steelhead DPS, the CHART identified 32 HSAs that were occupied by steelhead (NMFS 2005). Of the 32 occupied HSAs that were evaluated, 21 were rated as having high conservation value, 6 were rated as having medium conservation value, and 5 were rated as having low conservation value. Essential features of critical habitat for steelhead spawning, rearing, and migration were found to be contained in 741 miles (1,186 km) of occupied stream habitat within the 32 HSAs. The tables of the results of the habitat conservation assessments for action area streams are shown in tables 3 and 4 below.

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.

Table 3. Scores and overall ratings of conservation values for critical habitat within HSA watersheds within the action area occupied by the South-Central California Steelhead DPS.

BASIN	WATERSHED	CALWATER UNIT	TOTAL SCORE	CONSERVATION VALUE
Estero Bay	San Carpoforo	331011	8	MEDIUM
Estero Bay	Arroyo de la Cruz	331012	10	MEDIUM
Estero Bay	San Simeon	331013	11	HIGH
Estero Bay	Santa Rosa	331014	12	HIGH
Estero Bay	Villa Creek	331015	7	LOW
Estero Bay	Cayucos Creek	331016	7	LOW
Estero Bay	Old Creek	331017	10	MEDIUM
Estero Bay	Toro Creek	331018	10	HIGH
Estero Bay	Morro Ceek	331021	11	HIGH
Estero Bay	Chorro Creek	331022	12	HIGH
Estero Bay	Los Osos Creek	331023	9	MEDIUM
Estero Bay	San Luis Obispo Creek	331024	11	HIGH
Estero Bay	Point San Luis Creek	331025	9	MEDIUM
Estero Bay	Pismo Creek	331026	9	MEDIUM
Estero Bay	Morro Bay	331027		NA
Estero Bay	Oceano Creek	331031	8	MEDIUM
Estero Bay	Nipomo Mesa	331032		NA
Santa Maria River	Guadalupe	331210		NA
Estrella	Estrella River	331700		NA

Table 4. Scores and overall ratings of conservation values for critical habitat within HSA watersheds occupied by the Southern California Steelhead DPS.

BASIN	WATERSHED	CALWATER UNIT	TOTAL SCORE	CONSERVATION VALUE
Santa Maria	Santa Maria	331210	6	LOW
Santa Maria	Sisquoc	331220	11	HIGH
Santa Maria	Cuyama	331230	7	LOW
Santa Ynez	Mouth of Santa Ynez	331410	11	HIGH
Santa Ynez	Santa Ynez, Salsipuedes	331420	11	HIGH
Santa Ynez	Santa Ynez, Zaca	331430	7	LOW
Santa Ynez	Santa Ynez to Bradbury	331440	10	MEDIUM
Santa Ynez	Hilton Creek	331451	8	MEDIUM
South Coast	Arroyo Hondo	331510	11	HIGH
South Coast	UCSB Slough	331531	11	HIGH
South Coast	Mission Creek	331532	12	HIGH
South Coast	San Ysidro Creek	331533	11	HIGH
South Coast	Carpinteria Creek	331534	11	HIGH
Ventura River	Ventura River	440210	12	HIGH
Ventura River	Ventura River	440220	12	HIGH
Ventura River	Lion Creek	440231	9	MEDIUM
Ventura River	Thatcher Creek	440232	9	MEDIUM
Santa Clara	Mouth of Santa Clara	440310	10	MEDIUM
Santa Clara	Santa Clara, Santa Paula	440321	11	HIGH
Santa Clara	Sisar Creek	440322	12	HIGH
Santa Clara	Sespe, Santa Clara	440331	12	HIGH
Santa Clara	Sespe Creek	440332	13	HIGH
Santa Clara	Hopper Creek, Piru Creek	440341	11	HIGH
Santa Monica Bay	Topanga Creek	440411	11	HIGH
Santa Monica Bay	Malibu Creek	440421	13	HIGH
Santa Monica Bay	Arroyo Sequit	440444	12	HIGH
Calleguas	Calleguas Creek	440811	3	LOW
Calleguas	Calleguas Estuary	440813	4	LOW
San Juan	Middle Trabuco Creek	490123	11	HIGH
San Juan	Lower San Juan Creek	490127	11	HIGH
San Juan	San Mateo Creek	490140	12	HIGH

C. Environmental Baseline

South-Central California Steelhead DPS and Recovery Planning Areas: The South-Central California Coast Steelhead DPS extends from the Pajaro River south to but not including the Santa Maria River and includes naturally spawned anadromous populations of *O. mykiss* that inhabit those portions of coastal watersheds which are at least seasonally accessible to steelhead entering from the ocean (Figure 4). The topography of the area is dominated in the north by the southern end of the Santa Cruz Mountains, along the coast by the Santa Lucia Mountains, and in the inland areas by the Diablo, Gabilan, and Cholame/Temblor Mountains. Major inland watersheds occupied by steelhead in the action area portion of this DPS begin along the Big Sur Coast and include San Carpoforo and Arroyo de la Cruz Creeks. South of the Big Sur coast, other steelhead watersheds include San Simeon, Santa Rosa, San Luis Obispo, Pismo, and Arroyo Grande Creeks (Busby *et al.* 1996, 1997, Titus *et al.* 2002, Good *et al.* 2005). While the creeks in the northern part of San Luis Obispo County occur in relatively undisturbed areas, development within the watersheds increases in a southerly direction, especially near the cities of San Luis Obispo, Pismo Beach, and Arroyo Grande. Due to current or historical presence of steelhead, FRGP activities could potentially occur within any of the watersheds listed in Table 2.

The climate within the South-Central California Steelhead DPS is Mediterranean, with long dry periods from about May through November and wet periods from about December through April with short, sometimes intense cyclonic winter storms. Rainfall is restricted almost exclusively to the winter months (December through March), although significant rainfall can occur in April and May. The Southern California Steelhead DPS is subject to an El Niño/La Niña weather cycle which can significantly affect winter precipitation, causing highly variable rainfall between years. Additionally, there is a wide disparity between winter rainfall from north to south, as well as between coastal plains and inland mountainous areas. Annual precipitation ranges along the coast (north to south) from 32 to 24 centimeters (cm), with larger variations (24 to 90 cm) due to the orographic effects of the various mountain ranges. Fog along the coastal areas is typical in late spring and summer, extending inland along coastal reaches with valleys extending into the interior, and moderating conditions for rearing steelhead in the lower reaches near the coast (Felton 1965, Bailey 1966, Karl 1979, Hornbeck 1983, Barbour *et al.* 2007).

Within the South-Central California Steelhead DPS river flows vary greatly between seasons, and can be highly flashy during the winter season, changing by several orders of magnitude over a few hours. Snow accumulation is generally small and of short duration, and does not contribute significantly to peak run-off. Base flows in some river reaches can be influenced significantly by groundwater stored and transported through faults and fractured rock formations. Many rivers and streams naturally exhibit interrupted base flow patterns (alternating channel reaches with surface and no surface flow) controlled by geologic formations, and the strongly seasonal precipitation pattern characteristic of a Mediterranean climate. Water temperatures are generally highest during summer months (Boughton *et al.* 2006), but can be locally controlled by springs, seeps, and rising groundwater, creating micro-aquatic conditions suitable for salmonids (Reid and Wood 1976, Faber *et al.* 1989, Jacobs 1993, Mount 1995, Harrison *et al.* 2005).

Southern California Steelhead DPS and Recovery Planning Areas: The Southern California Steelhead DPS extends from the Santa Maria River south to the Tijuana River at the U.S.-Mexican border and includes naturally spawned anadromous populations of *O. mykiss* that inhabit those portions of coastal watersheds which are at least seasonally accessible to steelhead entering from the ocean (Figure 5). The topography of the area is dominated by the San Rafael, Santa Ynez, Topatopa, and Santa Monica Mountains in the north, and the Santa Susana, San Gabriel, San Bernardino, San Jacinto, and Santa Ana Mountains in the south. Major inland watersheds occupied by steelhead in this DPS include the Santa Maria, Santa Ynez, Ventura, and Santa Clara River systems (Good *et al.* 2005, Boughton *et al.* 2006) (Table 1). Many small coastal streams in Santa Barbara County (*e.g.*, Arroyo Hondo Creek, Mission Creek, Montecito Creek) Ventura County (*e.g.*, San Antonio Creek) and northern Los Angeles County (*e.g.*, Malibu Creek, Topanga Creek) also currently support naturally spawning steelhead. Three watersheds in southern Orange County and northern San Diego County (*e.g.*, San Juan Creek, San Luis Rey, and San Mateo Creek) have also had recent observations of steelhead. These southernmost populations are disjunct in distribution and are separated from the northernmost populations by approximately 80 miles (128 km). (NMFS 2007b). A list of watersheds within the Southern California Steelhead DPS region which have had recent observations or historical presence of steelhead is shown in Table 1. Due to current or historical presence of steelhead, FRGP activities could potentially occur within any of the watersheds listed in Table 2.

The climate within the Southern California Steelhead DPS and corresponding Steelhead Recovery Planning Areas is Mediterranean, with long dry periods from about May through November and wet periods from about December through April with short, sometimes intense cyclonic winter storms. Rainfall is restricted almost exclusively to the winter months (December through March), although significant rainfall can occur in April and May. The Southern California Steelhead DPS is subject to an El Niño/La Niña weather cycle which can significantly affect winter precipitation, causing highly variable rainfall between years. Additionally, there is a wide disparity between winter rainfall from north to south, as well as between coastal plains and inland mountainous areas. Annual precipitation ranges along the coast (north to south) from 32 to 24 centimeters (cm), with larger variations (24 to 90 cm) due to the orographic effects of the various mountain ranges. Fog along the coastal areas is typical in late spring and summer, extending inland along coastal reaches with valleys extending into the interior, and moderating conditions for rearing steelhead in the lower reaches near the coast (Felton 1965, Bailey 1966, Karl 1979, Hornbeck 1983, Barbour *et al.* 2007).

Within the Southern California Steelhead DPS river flows vary greatly between seasons, and can be highly flashy during the winter season, changing by several orders of magnitude over a few hours. Snow accumulation is generally small and of short duration, and does not contribute significantly to peak run-off. Base flows in some river reaches can be influenced significantly by groundwater stored and transported through faults and fractured rock formations. Many rivers and streams naturally exhibit interrupted base flow patterns (alternating channel reaches with surface and no surface flow) controlled by geologic formations, and the strongly seasonal precipitation pattern characteristic of a Mediterranean climate. Water temperatures are generally highest during summer months (Boughton *et al.* 2006), but can be locally controlled by springs, seeps, and rising groundwater, creating micro-aquatic conditions suitable for salmonids (Reid and Wood 1964, Faber *et al.* 1989, Jacobs 1993, Mount 1995 Harrison *et al.* 2005).

D. Factors Affecting Steelhead and Critical Habitat within the Action Area

The best scientific information presently available demonstrates that a multitude of factors, past and present, have contributed to the decline of west coast salmonids. NMFS cites many reasons (primarily anthropogenic) for the decline of the South-Central and Southern California DPSs of steelhead (Busby *et al.* 1996). The foremost reason for the decline in steelhead populations is the degradation and/or destruction of freshwater-habitat (Good et al. 2005). Additional factors contributing to the decline of these populations include: migration barriers, commercial and recreational harvest, ocean conditions, predation, natural stochastic events, and water quality.

The following section details the general factors affecting the South-Central and Southern California Steelhead DPSs. The extent to which each of the following factors affects each steelhead bearing stream is not clear; but these factors likely affect all watersheds to some degree.

1. Habitat Degradation and Destruction

A major cause of the decline of salmon and steelhead is the loss or severe decrease in quality and function of essential freshwater habitat (Good *et al.* 2005). Most of this habitat loss and degradation have resulted from anthropogenic watershed disturbances caused by agriculture, urban development, water diversion, road construction, erosion and flood control, dam building, and grazing (Good *et al.* 2005). Most of this habitat degradation is associated with the loss of essential habitat components necessary for salmon and steelhead survival. For example, the loss of deep pool habitat as a result of sedimentation and stream flow reductions has reduced rearing and holding habitat for juvenile and adult salmonids. Additionally, low flow crossings, undersized culverts, and concrete channels have impeded migration of adult and juvenile steelhead.

a. Urban Development

Urbanization has degraded anadromous salmonid habitat through stream channelization, flood plain drainage, and riparian damage (reviewed in 61 FR 56138). When watersheds are urbanized, problems may result simply because structures are placed in the path of natural runoff processes, or because the urbanization itself has induced changes in the hydrologic regime. In almost every point that urbanization activity touches the watershed, point source and nonpoint pollution occur. Sources of nonpoint pollution, such as sediments washed from the urban areas, contain trace metals such as copper, cadmium, zinc, and lead (California State Lands Commission 1993). These, together with pesticides, herbicides, fertilizers, gasoline, and other petroleum products, contaminate drainage waters and harm aquatic life necessary for anadromous salmonid survival. Water infiltration is reduced due to extensive ground covering. As a result, runoff from the watershed is flashier, with increased flood hazard (Leopold 1968).

Flood control and land drainage schemes may concentrate runoff, resulting in increased bank erosion, loss of riparian vegetation and undercut banks and eventually causes widening and down-cutting of the stream channel (Florsheim and Goodwin 1993, Spence *et al.* 1996).

b. Water Quality

Many waterways fail to meet the Federal Clean Water Act and Federal Safe Drinking Water Act water quality standards due to the presence of pesticides, heavy metals, silts and fine sediments, and other pollutants. These pollutants originate from both point- (industrial and municipal waste) and nonpoint (agriculture, urban activities, *etc.*) sources. In South-Central and Southern California, the types and amounts of compounds found in runoff are often correlated with land use patterns; fertilizers and pesticides are found frequently in agricultural and urban settings, and nutrients are found in areas with human septic systems and animal waste. People contribute to chemical pollution in the area, but natural and seasonal factors also influence pollution levels. Nutrient and pesticide concentrations vary considerably from season to season, as well as among regions with different geographic and hydrological conditions. Excess nutrients, low levels of dissolved oxygen, heavy metals, and changes in pH also decrease the water quality for Southern California steelhead. Natural features (such as geology and soils) and land-management practices (such as agriculture, logging, and irrigation) can influence the movement of chemicals over both land and water (Norris et al. 1991).

In the South-Central and Southern California region, another component of water quality is water temperature. High summer water temperatures are a factor for steelhead in South-Central and Southern California streams, and may restrict steelhead distribution in streams within the Southern California DPS (Boughton et al. 2007). Loss of riparian vegetation along streams can elevate water temperatures which, in turn, affect steelhead behavior and survival in South-Central and Southern California streams (Matthews and Berg 1997). Steelhead also require clean, cool, water and clean gravels for successful spawning, egg incubation, and fry emergence. Fine sediments resulting from urban runoff can clog the spaces between gravel and restrict the flow of oxygen-rich water to the incubating eggs (Cordone and Kelley 1961). Additionally, turbidity in streams during emergence and rearing of steelhead negatively affects the number and quality of fish produced. Suspended sediments can cause physiological damage to steelhead at concentrations of 3,000 parts per million or greater, including adhesion of silt particles to the chorion of salmonid ova (Cordone and Kelley 1961), and abrasion, thickening, and fusion of gill filaments (Herbert and Merkens 1961). Erosion and increased sedimentation are harmful to salmonids because they can reduce the forage base, as fine sediments transferred to the creek can bury less mobile organisms that serve as food to juvenile steelhead (Cordone and Kelley 1961).

c. Water Development

In many streams within the South-Central and Southern California DPS, water is diverted for urban, commercial, agricultural, and residential use. In addition to a number of large reservoirs, there are an unknown number of permanent and temporary water withdrawal facilities that divert water for similar purposes. Impacts from water withdrawals include localized dewatering of stream reaches, entrapment of younger salmonids, and depletion of flows necessary for migration, spawning, rearing, flushing of sediment from spawning gravels, gravel recruitment, and transport of large woody debris (LWD). Unprotected or poorly screened water diversions can also impact juvenile steelhead as young fry are easily drawn into water pumps or become stuck against the pump's screened intakes.

Water withdrawals (primarily for irrigation) have reduced summer flows in many streams and thereby profoundly decreased the quantity and quality of steelhead rearing habitat. Decreased surface flows caused by water withdrawals are a significant cause of habitat degradation and reduced fish production. Although some of the water withdrawn from streams eventually returns as agricultural runoff or groundwater recharge, crops consume a large proportion of it. Water withdrawals have a significant affect on summer rearing habitat and seasonal flow patterns by removing water from streams in the summer (mostly May through September). Summer rearing habitat has been found to be the most restricted habitat type in the South-Central and Southern California DPS (Boughton and Goslin 2006).

d. Dams

Dams have eliminated spawning and rearing habitat and altered the natural hydrograph of most of the major river systems, decreasing spring and summer flows and increasing fall and winter flows. Depletion and storage of natural flows have drastically altered natural hydrological cycles in many Southern California rivers and streams. Alteration of streamflows has increased juvenile steelhead mortality for a variety of reasons: migration delay resulting from insufficient flows or habitat blockages; loss of usable habitat due to dewatering and blockage; stranding of fish resulting from rapid flow fluctuations; entrainment of juveniles into unscreened or poorly screened diversions; and increased juvenile mortality resulting from increased water temperatures (Chapman and Bjornn 1969, Berggren and Filardo 1993, 61 FR 56138). Many streams which had historic steelhead runs in the South-Central Steelhead DPS (*i.e.*, Salinas River, Carmel River, Pajaro River, Old Creek, Chorro Creek, Arroyo Grande Creek), and all of the streams which historically had the largest numbers of steelhead in the Southern California Steelhead DPS (*i.e.*, Santa Ynez River, Santa Clara River, Ventura River at Matilija, Malibu Creek) are dammed. Notably, the dams on Matilija Creek and Malibu Creek are defunct and do not provide for water storage or flood control. Plans are under way to remove these 2 defunct dams and restore access to historic steelhead spawning and rearing habitat.

e. Agriculture and Livestock

Agricultural practices have contributed to the degradation of salmonid habitat on the West Coast through irrigation withdrawals and diversions, overgrazing in riparian areas, and compaction of soils in upland areas from livestock (reviewed in 61 FR 56138). These practices have also altered the natural flow patterns of streams and rivers. Agricultural practices and urbanization have resulted in filled sloughs and side channels and removed riparian vegetation, as well as the loss of estuaries. River valleys have been leveled and water courses channelized, altering drainage and runoff patterns. Agricultural operations removed riparian vegetation, small in-channel islands, and gravel bars to increase arable acreage and achieve flood control. Riparian vegetation removal and the resulting channel destabilization have accelerated erosion. In response to increased erosion, bank stabilization measures have been employed as cultivated acreage has increased. Stabilization measures have resulted in channel constriction and downcutting. In addition to changing river morphology, agricultural practices have decreased water quality by releasing fertilizers and pesticides into streams and rivers (Florsheim and Goodwin 1993). Enrichment from manures is also a problem where barns and livestock are adjacent to watercourses. Maahs *et al.* (1984) reported that the largest diffuse source of water quality degradation comes from agriculture-derived contaminants such as sediment, nutrients, and pesticides (reported in Osborne and Kovacic (1993)).

Livestock grazing activities have resulted in loss of native perennial grasses and riparian vegetation; soil loss; hillside trailing and gullying; and the incision of swales and meadows (Platts 1991). Soils compaction by overgrazing on land with minimal vegetative cover have significantly reduced infiltration rates. Instead of the water moving into the soil, it moves rapidly over it, delivering heavy runoff to streams, which in turn can result in flashy watersheds (Kohler and Hubert 1993). This altered cycle is characterized by reduced groundwater storage capacity, and a greater propensity for intermittent stream flow during low-flow periods. The response within the stream corridor is one of bank erosion, channel scour, and loss of riparian and fish habitat (Platts 1991). The vigor, composition, and diversity of natural vegetation can be altered by livestock grazing in and around riparian areas. This, in turn, can affect the riparian zone's ability to control erosion, provide stability to stream banks, and provide shade, cover, and nutrients to the stream. Compaction can reduce the productivity of the soils appreciably and cause bank slough and erosion, and bank damage often leads to channel widening, lateral stream migration, and excess sedimentation (Platts 1991).

2. <u>Natural Stochastic Events</u>

Natural events such as droughts, landslides, floods, and other catastrophes have adversely affected salmon and steelhead populations throughout their evolutionary history and yet they have survived. The effects of these events are often times exacerbated by anthropogenic changes to watersheds caused by activities such as logging, road building, and water diversion. Additionally, the ability of species to rebound from natural stochastic events may be limited as a result of other existing anthropogenic factors or depressed populations.

Variability in ocean productivity has been shown to affect salmon production both positively and negatively. Beamish and Bouillion (1993) showed a strong correlation between North Pacific salmon production from 1925 to 1989 and their marine environment. Beamish *et al.* (1997) noted decadal-scale changes in the production of Fraser River sockeye salmon that they attributed to changes in the productivity of the marine environment. They (along with many others) also reported the dramatic change in marine conditions occurring in 1976-77, whereby an oceanic warming trend began. El Niño conditions, which occur every three to five years, can negatively affect ocean productivity. Johnson (1988) noted increased adult mortality and decreased average size for Oregon's chinook and coho salmon during the strong 1982-83 El

Niño. It is unclear to what extent ocean conditions have played a role in the decline of Southern California steelhead; however, ocean conditions have likely affected steelhead populations throughout their evolutionary history. The effects of poor ocean conditions and lack of ocean forage have been implicated in the recent collapse of Chinook salmon numbers in the Sacramento River.

3. Artificial Propagation

Releasing large numbers of hatchery fish can pose a threat to wild salmon and steelhead stocks through genetic impacts, competition for food and other resources, predation of hatchery fish on wild fish, and increased fishing pressure on wild stocks as a result of hatchery production (Waples 1991). The genetic impacts of artificial propagation programs are primarily caused by the straying of hatchery fish and the subsequent hybridization of hatchery and wild fish. Artificial propagation threatens the genetic integrity, and diversity that protects overall productivity against changes in environment (61 FR 56138). The potential adverse impacts of artificial propagation programs are well documented (reviewed in Waples 1991, National Research Council 1995, National Research Council 1996, Waples 1999). Although there has been a great deal of stocking in some streams within the South-Central and Southern California DPS streams historically, recent research has shown that the genetic effects on the South-Central and Southern California Steelhead DPS has been minimal, and the genetic integrity of the South-Central and Southern California Steelhead DPS is still intact (Girman and Garza 2006).

V. EFFECTS OF THE PROPOSED ACTION

The purpose of this section is to identify the direct and indirect effects of the proposed action on the South-Central and Southern California Steelhead DPS and designated critical habitat for these species. NMFS is unaware of any specific interrelated or interdependent actions associated with the proposed RGP and restoration activities. Because projects will occur in the future and exact project descriptions needed to determine the precise effects of the proposed action on South-Central and Southern California steelhead and their habitats are limited or unavailable, this assessment of effects focuses mostly on qualitative assessment, except where data are available. This approach was based on a review of ecological literature concerning the effects of loss and alteration of habitat elements important to salmonids, including water, substrate, food, and adjacent riparian areas, which are the primary constituent elements of critical habitat that will be affected. This information was then compared to the likely effects associated with the proposed restoration project types, including: diversion of stream flow, changes to habitat, loss of water quality (sediment and turbidity), loss of fish passage, and harm during capture, transport, and release.

Individual FRGP projects authorized through the RGP that require instream activities will be annually implemented at some point during the summer low-flow period, typically between June 1 and November 30. Since low flows in streams within the action area typically occur beginning in late spring, NMFS analyzed an annual instream construction season beginning on June 1 and ending on November 30, however, the specific timing and duration of each individual restoration project will vary depending on the project type, specific project methods, and site conditions. The duration and magnitude of direct effects to steelhead and steelhead critical habitat associated with restoration projects is expected to be minimized due to the multiple best management practices (BMPs) and impact minimization measures that will be utilized during project implementation.

Implementing individual restoration projects during the summer low-flow period will avoid emigrating steelhead smolts and immigrating steelhead adults at all habitat restoration project sites. However, rearing juvenile steelhead may be present during the implementation of some projects. NMFS anticipates that only a small proportion of the total number of rearing juvenile steelhead within a stream will be within the action area of the restoration project work sites. This is based on data from restoration projects within the action area since 2003, and recent observations of NMFS biologists and surveys of Southern California steelhead bearing watersheds. The total number of projects and the location of individual projects authorized through the RGP annually will vary from year to year depending on various factors including funding and scheduling. Based on the yearly coordination and reviews of past restoration projects by NMFS staff biologists and M. Larson of CDFG, restoration projects authorized through the previous RGP are widely dispersed throughout the action area. Data on the number of FRGP projects, their location, the type of project, and the size of project is shown in Appendix A.

A. Fish Relocation Activities

Instream restoration projects occurring in perennial stream channels will require steelhead surveys by qualified biologists and possible fish relocation activities prior to dewatering of the project work site. The following project activities authorized through the proposed RGP may require fish relocation activities: Instream Habitat Improvements (Part VII, CDFG Manual), Instream Barrier Modification for Fish Passage Improvement (Part VII, CDFG Manual), Stream Bank Stabilization (Part VII, CDFG Manual), Fish Passage Improvements at Stream Crossings (Part IX, CDFG Manual), and fish screen projects (Appendix S, CDFG Manual).

If biologists find steelhead within a project area and within areas subject to dewatering, CDFG personnel or designated biological monitors will capture and/or relocate steelhead to avoid direct mortality and to minimize take of steelhead. Steelhead found during surveys of the immediate project area will be encouraged to leave the action area of their own accord by seining the longitudinal profile of the stream. Steelhead which do not leave the action area and have to be physically relocated may be captured by seine, dip net, fish trap, by hand, and in rare cases, by electrofishing. Electrofishing is not prohibited in the San Luis Obispo County projects because they are located in the South-Central Steelhead DPS which is listed as threatened, however, electrofishing is severely restricted in the endangered Southern California Steelhead DPS. Block nets will be set upstream and downstream of the project site after juvenile steelhead have left or been removed from the project area to prevent steelhead from re-entering the construction area. After steelhead are captured they will be placed in buckets or tubs and relocated to the nearest suitable habitat within the same watershed, and immediately adjacent to the action area if possible. Not all FRGP projects will require fish relocation; out of 25 projects completed since 2004, only 4 required fish relocation. The actual number of juvenile steelhead captured and relocated on a project-by-project basis cannot be predicted, but based on past FRGP projects the numbers will likely differ between county because of greater numbers of steelhead being present further north. The numbers of relocated juvenile steelhead in San Luis Obispo County streams are expected to range from 0 to several hundred per project; in Santa Barbara County the numbers of relocated juvenile steelhead are expected to range 0 to around 40 per project. Steelhead juveniles have never been relocated from project sites in Ventura, Los Angeles, Orange, or San Diego counties, thus, the number of relocated juvenile steelhead per project is expected to be lower than 10 per project. There is a chance that steelhead may be missed by the biological monitors during capture and relocation efforts if steelhead hide under rocks and large woody debris. Electrofishing may be employed for some project areas if there is likelihood that steelhead will be inaccessible and will die from desiccation after stranding. Overall, the number of steelhead killed from stranding is expected to be range from 0 to less than 5% of fish actually present in the action area since water diversion and fish relocation is rarely employed for FRGP projects in Southern California (i.e., only 4 out of 25 projects had steelhead relocated from the project area since 2003).

NMFS anticipates that fish relocation activities associated with implementation of individual restoration projects will not adversely affect or reduce the number of migrating steelhead smolts or steelhead adults. This is because fish relocation activities will occur during the summer low-flow period after migrating adults and smolts have left freshwater stream sites. It is expected that the majority of steelhead captured and relocated during project activities will be rearing juveniles. Juvenile steelhead may be harassed or harmed during capture and relocation, but few are expected to be killed because mortality of steelhead from capture, handling and relocation under these conditions is typically less than 5%, based on capture and relocation efforts during other projects in Southern California streams. The mortality of fish missed during the dewatering process is also expected to be very low to none since fish surveys will occur continually during the dewatering process. Additionally, effects associated with fish relocation activities will be significantly minimized due to the required multiple minimization measures that will be utilized as described in the section entitled, *Measures to Minimize Injury and Mortality of Fish and Amphibian Species During Dewatering* within Part IX of the CDFG Manual. Past capture and relocation efforts have only resulted in 2% mortality since 2003 (7 out of 399 juvenile steelhead relocated). As previously mentioned, only a small fraction of juvenile steelhead within any stream are expected to be relocated as a result of a few FRGP projects per year, and only a very low percentage (< 5%) of those relocated fish are expected to be harmed during relocation because of required handling protocols. In the end, the overall result of relocating rearing juvenile steelhead is expected to be negligible for individual stream populations and the South-Central and Southern California DPSs.

Fish relocation activities do pose risk of injury or mortality to rearing juvenile steelhead. Any fish collecting gear or methods, whether passive or active has some associated risk to fish, including stress, disease transmission, injury, or death (Hayes et al. 1996). The amount of unintentional injury and mortality attributable to fish capture varies widely depending on the method used, the ambient conditions, and the expertise and experience of the field crew. The effects of capture by seining or dipnetting on juvenile salmonids include stress, scale loss, physical damage, suffocation, and dessication. Electrofishing can kill juvenile salmonids, and researchers have found serious sublethal effects including spinal injuries (Reynolds 1983, Habera *et al.* 1996, Habera *et al.* 1999, Nielsen 1998, Nordwall 1999). The long-term effects of electrofishing on salmonids are not well understood. Although chronic effects may occur, NMFS believes that most impacts from electrofishing occur at the time of sampling. To minimize adverse effects to the endangered Southern California Steelhead DPS the use of electrofishing will only be performed by trained CDFG personnel. Additionally, since fish relocation activities will be conducted by CDFG personnel and/or designated qualified fisheries biologists following both CDFG and NMFS electrofishing guidelines, direct effects to and mortality of juvenile steelhead during capture are expected to be minimized.

B. Dewatering

NMFS anticipates that the following project activities authorized through the proposed RGP may require dewatering: Instream Habitat Improvements (Part VII, CDFG Manual), Instream Barrier Modification for Fish Passage Improvement (Part VII, CDFG Manual), Stream Bank Stabilization (Part VII, CDFG Manual), Fish Passage Improvements at Stream Crossings (Part IX, CDFG Manual), and fish screen projects (Appendix S, CDFG Manual).

Stream flow diversion and construction area dewatering are expected to cause temporary reduction, loss of service, and alteration of aquatic habitat. NMFS anticipates that only a fraction of projects will require stream dewatering (11 of 25 project required dewatering since 2003), and only a small portion of the stream at each project site will be dewatered for in-channel construction activities. Based on a review of similar projects, NMFS expects that the length of contiguous stream reach that will be dewatered for most projects will be less than 500 feet for any one project site

In terms of the possible effects of stream dewatering to steelhead, stream flow diversions could harm individual rearing juvenile steelhead by concentrating or stranding them in residual wetted areas before they are relocated (Cushman 1985), or causing them to move to adjacent areas of poor habitat (Clothier 1953, Clothier 1954, Kraft 1972, Campbell and Scott 1984). Rearing juvenile steelhead could be killed or injured if stranded or crushed during diversion construction and implementation, though direct mortality is expected to be minimal due to relocation efforts prior to installation of the diversion. While some changes in flow are anticipated to occur within the dewatered area, flows upstream and downstream of project sites during and after dewatering activities will be unaffected because all streamflow coming from upstream will be transferred around the project site to downstream areas. Thus, the dewatering will not affect juvenile steelhead residing upstream or downstream of the dewatered area. Stream flow in the vicinity of each project site is expected to be the similar upstream and downstream of the dewatering site and the loss of aquatic habitat associated with dewatering of project sites will be temporary. Additionally, effects associated with dewatering activities will be minimized due to the multiple minimization measures that will be utilized as described in the section entitled, *Measures to Minimize Impacts to Aquatic Habitat and Species During Dewatering of Projects* within Part IX of the CDFG Manual.

Benthic aquatic macroinvertebrates may be temporarily lost or their abundance reduced when creek habitat is dewatered (Cushman 1985). Effects to aquatic 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 is expected following rewatering (Cushman 1985, Thomas 1985, Harvey 1986). 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 are required to be maintained around the project work site. Based on the foregoing, the loss of aquatic macroinvertebrates as a result of dewatering activities is not expected to adversely affect steelhead or critical habitat.

C. Increased Mobilization of Sediment within the Stream Channel

NMFS anticipates that the following restoration project activities authorized through the proposed RGP will increase turbidity and suspended sediment levels within the project work site and downstream areas: Instream Habitat Improvements (Part VII, CDFG Manual), Instream Barrier Modification for Fish Passage Improvement (Part VII, CDFG Manual), Stream Bank Stabilization (Part VII, CDFG Manual), Fish Passage Improvements at Stream Crossings (Part IX, CDFG Manual), Upslope Watershed Restoration (Part X, CDFG Manual), and dewatering the project work area. Other restoration project activities, such as riparian restoration (Part XI, CDFG Manual) and fish screen projects (Appendix S, CDFG Manual), are not expected to release appreciable sediment into the aquatic environment.

Depending on the type of project, restoration activities could cause temporary increases in sedimentation and turbidity within and downstream of the project area, and may alter channel dynamics and stability (Habersack and Nachtnebel 1995, Hilderbrand *et al.* 1997, Powell 1997, Hilderbrand *et al.* 1998). Short-term increases in turbidity are anticipated to occur during dewatering activities, during construction of coffer dams for the purpose of dewatering, during the first flush of stream channels that are re-watered after water diversion removal, and during the first rainstorms which may mobilize disturbed sediments within restoration project sites. Generally, increases in sedimentation and turbidity levels resulting from FRGP restoration activities are expected to be temporary and discountable due to the small work footprint of most projects and because only small releases of sediment are expected due to the nature of the projects (*i.e.*, habitat restoration, riparian restoration, fish passage remediation). In addition, sedimentation and turbidity increases during the first wet-season rains are not expected to be significantly higher than background levels for similar reasons, and because the effects from sedimentation and turbidity will be further minimized due to sediment control devices and multiple impact avoidance and minimization measures required for FGRP restoration projects. These measures are described in the section entitled, *Measures to Minimize Degradation of Water Quality* within Part IX of the CDFG Manual.

While FRGP projects will be implemented in conjunction with the sedimentation and turbidity impact minimization measures identified above, some short-term increases in sedimentation and turbidity, with their associated impacts on steelhead, are expected to occur during certain FRGP projects. In general, sediment related impacts are expected mostly during the summer construction season (June 1-November 30), as well as during first rainstorms and peak-flow storm events when any remaining project-related sediment may be mobilized. Sediment may affect stream fish by a variety of mechanisms. High concentrations of suspended sediment can disrupt normal feeding behavior, reduce feeding efficiency, and decrease food availability (Cordone and Kelly 1961, Bjornn *et al.* 1977, Berg and Northcote 1985). Chronic elevated sedimentation and turbidity can also reduce salmonid growth rates (Crouse *et al.* 1981), increase salmonid plasma cortisol levels (Servizi and Martens 1992), cause salmonid mortality (Cordone and Kelly 1961, Sigler *et al.* 1984), and reduce the survival and emergence of salmonid eggs and fry (Chapman 1988). Even small pulses of turbid water will cause salmonids to disperse from established territories (Waters 1995) which can displace salmonids into less suitable habitat and/or increase competition and predation, decreasing chances of survival. However, it should be noted that much of the research mentioned above artificially created turbidity levels significantly higher than those which are expected to result during and after restoration activities since sediment control devices and turbidity minimization measures are required and will be employed during and after restoration projects. Additionally, streams in the South-Central and Southern California Steelhead DPS naturally have very high sediment concentrations during storm events (Corps 2004), such that additional sediment inputs from FRGP project sites are not expected to measurably increase sediment and turbidity levels in Central and South Coast Streams within the action area. NMFS anticipates that steelhead and steelhead habitat downstream of restoration project sites will be temporarily affected by short-term increases in suspended sediment during coffer dam construction, dewatering, rewatering, and first rains of the wet season. But NMFS expects that these pulses of sediment from these occurrences will be minimized by best management practices, sediment control devices, and turbidity minimization measures required for these projects such that they will not result in harm to steelhead and the effects on steelhead will be discountable.

In summary, restoration practices outlined within the CDFG Manual are, for the most part, intended to fix chronic watershed problems that are presently (and will likely continue) degrading valuable aquatic habitat for steelhead. Inherent within these practices is the potential for certain activities (*e.g.*, culvert replacement, road decommissioning, and bank stabilization) to minimally increase background suspended sediment loads for a short period during project implementation and following project completion. However, NMFS anticipates the potential increase in background sediment levels resulting from restoration activities will be much lower than levels common to research outlined above, and is therefore unlikely to have a measurable effect on the health and survival of steelhead adults or juveniles. Additionally, few restoration projects are expected to occur in close proximity to other projects during a given restoration season, which is expected to diminish the likelihood of cumulative effects of multiple restoration projects in a watershed or hydrologic sub-area. Additionally, sediment effects to instream habitat and steelhead are only expected to be short-term, since most project-related sediment will likely mobilize during the initial high flow event the following winter season.

D. Toxic Chemicals

Equipment refueling, fluid leakage, and maintenance activities within and near the stream channel pose some risk of contamination of aquatic habitat and potential take of steelhead. In addition to toxic chemicals associated with construction equipment, water that comes into contact with wet cement during construction of a restoration project can also adversely affect water quality and cause harm and potential take of steelhead. However, the implementation of multiple measures in the sections entitled, *Measures to Minimize Disturbance From Instream Construction* and *Measures to Minimize Degradation of Water Quality* within Part IX of the CDFG Manual which will be required for FRGP projects is expected to address and avoid this risk. For example, no fueling or maintenance of vehicles is allowed in or near streams, Heavy equipment will be checked for leaks daily and will be fitted with drip catchments, and water is not allowed to come in contact with cement until it has cured for one week and essentially non-toxic. Therefore, NMFS does not anticipate localized or appreciable water quality degradation from toxic chemicals associated with the habitat restoration projects.

E. Additional Effects and Benefits of Each Project Type

Misguided restoration efforts often fail to produce the intended benefits and can even result in further habitat degradation, and improperly constructed projects typically can cause greater adverse effects than the pre-existing condition (Reeves et al. 1991). The most common reason for this is improper identification of the design flow for the existing channel conditions as related to salmonid habitat restoration projects (Reeves et al. 1991, CDFG Manual). To avoid these mistakes the CDFG Manual provides design guidance and construction techniques that facilitate proper design and construction for a wide variety of salmonid stream restoration projects. Additionally, all project designs need to be reviewed and approved by CDFG and NMFS hydraulic engineers before the projects are funded to ensure their success. Properly constructed stream restoration projects are expected to increase available habitat, habitat complexity, stabilize channels and streambanks, increase spawning gravels, decrease sedimentation, and increase shade and cover for salmonids.

Habitat restoration projects that are authorized through the RGP will be designed and implemented consistent with the techniques and minimization measures presented in the CDFG Manual to maximize the benefits of each project while minimizing effects to salmonids. All of the restoration projects are for the purpose of restoring degraded salmonid habitat and are intended to improve instream cover, pool habitat, and spawning gravels; screen diversions; remove barriers to fish passage; and reduce or eliminate erosion and sedimentation impacts. Although some habitat restoration projects may cause mild short-term effects to listed salmonids, all of these projects are anticipated to improve salmonid habitat and salmonid survival over the long-term.

1. <u>Instream Habitat Improvements</u>

Instream habitat structures and improvement projects are designed to provide predator escape and resting cover, increase spawning habitat, improve upstream and downstream migration corridors, improve pool to riffle ratios, and add habitat complexity and diversity. Some structures will be designed to reduce sedimentation, protect unstable banks, stabilize existing slides, provide shade, and create scour pools. A very high rate of success has been recorded in Northern and Central California (NMFS 2004), and similar results are expected in the South-Central and Southern California Steelhead DPS regions based on recent completed projects within this region.

2. Instream Barrier Modification for Fish Passage Improvement

Instream barrier modification for fish passage improvement projects are designed to improve salmonid fish passage and increase access to suitable salmonid habitat. Long-term beneficial effects are expected to result from these projects by improving passage at sites that are partial barriers, or by providing passage at sites that are total barriers. Both instances will provide better fish passage and will increase access to available habitat. In the most recent annual evaluation (2002/2003) of fish passage improvement projects for Northern and Central California, all projects were rated as either good or excellent for their function and integrity (Collins 2004). Because all projects are reviewed by NMFS and/or CDFG hydraulic engineers for site adequacy and effectiveness, similar success rates are expected in the South-Central California and Southern California regions.

3. Stream Bank Stabilization

Stream bank stabilization projects are expected to reduce sedimentation from watershed and bank erosion, decreasing turbidity levels, and improving water quality for salmonids over the long-term. In a recent annual evaluation (2002/2003) of watershed and streambank stabilization projects, the majority (82 percent) were rated as either good or excellent for their function and their integrity (Collins 2004). High success rates are expected in the South-Central California and Southern California regions because similar design criteria and a similar review process are required for the projects to be funded.

4. Fish Passage Improvement at Stream Crossings

Thousands of stream crossings exist on roadways throughout the coastal drainages of South-Central and Southern California. Many of the crossings prevent steelhead from accessing vast expanses of historic spawning and rearing habitat located upstream of the crossings. In recent years, much attention has been focused on identifying, analyzing, and ranking fish passage barriers at stream crossings in the action area with the goal of improving steelhead passage and migratory habitat (Stoecker 2002). Reestablishing the linkages between mainstem migratory habitat and headwater spawning/rearing habitat is expected to facilitate the recovery of steelhead throughout the action area, and the reintroduction of steelhead into previously unavailable upstream habitat will also likely increase reproductive success and ultimately fish population size in watersheds where the amount of quality freshwater habitat is a limiting factor. Fish Passage projects have already been successfully implemented with FRGP funds (*i.e.*, Robles Fish Pasage Facility, Arroyo Hondo Culvert, El Capitan Creek Culvert) and this is expected to continue as a result of the FRGP.

5. Riparian Habitat Restoration

Riparian zones help provide hydraulic diversity to the stream channel, add structural complexity, buffer runoff energy from storm events, moderate water temperatures through shading, protect water quality, and provide a source of food and nutrients (Reeves *et al.* 1991). Riparian zones can also be important as a LWD source for streams. LWD creates stream habitat complexity critical to steelhead juveniles survival by forming and maintaining pool structures in streams, and providing refuge from predators and high-flow events for steelhead that rear for extended periods in freshwater.

Riparian restoration projects are expected to improve shade and cover, protect rearing juveniles, reduce stream temperatures, and improve water quality through pollutant filtering. Additionally, the beneficial effects of constructing livestock exclusionary fencing in or near streams as outlined in the riparian restoration portion of the CDFG Manual include the rapid regrowth of grasses, shrubs, and other vegetation released from overgrazing and the reduction of excessive nitrogen, phosphorous, and sediment loads in the streams (Line *et al.* 2000, Brenner and Brenner 1998).

F. Interdependent and Interrelated Actions

NMFS is not currently aware of, and 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 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 Act. Other than the impacts of on-going activities described above in the Environmental Baseline section, NMFS is unaware of specific future State, tribal, local, or private actions reasonably certain to occur that will affect the action area. However, because of the large size of the action area, non-federal actions are expected to occur which may increase the potential for adverse effects to steelhead. These include urban development, agricultural development, and construction and maintenance of roads and highways. Urban development will likely increase the amount of impervious surfaces within some watersheds, which is expected to increase the potential for dry and wet-season runoff and input of potentially toxic elements into streams where steelhead are present. Ongoing urbanization is expected to cause elevated rates of treated-wastewater releases to streams, possibly increasing nitrogen loads and the likelihood of adverse effects on aquatic organisms.

Housing developments constructed in or near historical floodplains of rivers streams, or tributaries are expected to cause, or perpetuate, the loss of aquatic habitat and riparian vegetation. Agricultural development and land use is expected to increase agricultural water uses and agricultural runoff which could increase the potential for the input of fertilizers, pesticides and herbicides into streams inhabited by steelhead. In contrast, NMFS believes actions likely to occur through non-federal entities implementing restoration projects and NMFS steelhead recovery plan actions will benefit listed steelhead by improving habitat conditions and access to habitat in the South-Central and Southern California DPS.

VII. INTEGRATION AND SYNTHESIS OF EFFECTS

Steelhead populations throughout South-Central and Southern California have shown a substantial decrease in abundance over the past several decades, but are still present in many coastal streams within the South-Central and Southern Californa Steelhead DPSs (Good et al. 2005). In addition, recent surveys have observed steelhead in watersheds with no historical record of steelhead presence, and recolonization of streams that were historically occupied by steelhead has also been observed (Boughton et al. 2006, 2007). This suggests that, while there are significant threats to steelhead populations, they possess a resilience that likely buffers their extinction risk. However, the poor condition of their habitat in many areas and the extremely low numbers of some stocks poses a risk to the survival and recovery South-Central and Southern California steelhead (Good *et al.* 2005, Boughton *et al.* 2006, 2007). Recent status reviews, TRT assessments and other information indicate that steelhead of the South-Central steelhead DPS, are "likely to become endangered in the foreseeable future," and steelhead in the Southern California DPS are "likely to become extinct in the foreseeable future."

Currently, accessible steelhead habitat throughout South-Central California DPS and Southern California DPS has been severely degraded, and the condition of designated critical habitat, specifically its ability to provide for their long-term conservation, has also been degraded from conditions known to support viable salmonid populations. Logging, agricultural and mining activities, urbanization, stream channelization, dams, wetland loss, and water withdrawals and unscreened diversions for irrigation have been identified as causes contributing to the modification and curtailment of steelhead habitat in central and southern California. Other 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 sedimentation and turbidity from upland areas, loss of shade (higher water temperatures), and loss of nutrient inputs (61 FR 56138).

Although projects authorized through the FRGP are for the purpose of restoring anadromous salmonid habitat, small amounts of take of listed salmonids will likely result from fish relocation activities and the temporary effects of sediment mobilization, temporary decreased habitat values, and temporarily modified hydrology. NMFS anticipates that only a very small proportion of the steelhead population within a project stream may be affected at each individual restoration project work site. Effects to steelhead at these sites are primarily expected to be in the form of short-term behavioral effects with minimal or no mortality (*i.e.*, less than 5% of individuals relocated). Steelhead present in project areas during project construction may be subject to capture, relocation, and related stresses, but very few steelhead are expected to be killed during project activities, including dewatering and fish relocation. Unintentional mortalities of steelhead during fish relocation activities will occur almost exclusively at juvenile stage. Short-term impacts to steelhead habitat from restoration activities are expected to be minimal and localized at each project site.

The duration and magnitude of direct effects to steelhead and to designated critical habitat associated with implementation of individual restoration projects will be significantly minimized due to the multiple minimization measures that will be utilized during implementation. NMFS anticipates that the effects of individual restoration projects will not reduce the number of returning steelhead adults and will not appreciably reduce the number of rearing juveniles in any particular watershed. Additionally, the temporal and spatial scale at which individual restoration project activities are expected to occur in the next five years of the RGP will likely preclude significant additive effects. NMFS has observed that past individual restoration projects tend to occur over a broad spatial scale during each year analyzed, and few restoration projects occurred in close proximity to other projects during a given restoration season, thus diminishing the likelihood any of the limited adverse effects from projects would combine.

NMFS believe that the effects of restoration projects, individually or collectively, are not likely to appreciably reduce the numbers, distribution, or reproduction of steelhead within the streams and watersheds where restoration projects occur. This is based on the spatial distribution of all restoration projects implemented annually, the low percentage of projects that result in direct adverse effects to steelhead, the low mortality rates associated with fish relocation activities, and the minor short-term negative habitat effects (*i.e.*, increased turbidity levels) resulting from the implementation of the FRGP projects. As a result, NMFS concludes that the 5-year RGP program will not impact the viability of steelhead populations within the South-Central or the Southern California DPS, and therefore, not affect the likelihood of survival and recovery of the DPSs.

Habitat restoration projects that are authorized through the RGP will be designed and implemented consistent with techniques and minimization measures presented in the CDFG Manual in order to maximize the benefits of each project while minimizing affects to steelhead. All of the restoration projects are intended to restore degraded salmonid habitat and improve instream cover, pool habitat, and spawning gravel; screen diversions; remove barriers to fish passage; and reduce or eliminate erosion and sedimentation impacts. Although there will be short-term impacts to salmonid habitat associated with some percentage of projects implemented annually, NMFS expects that most FRGP projects implemented annually will provide long-term improvements to salmonid habitat. NMFS also anticipates that the additive beneficial effects to steelhead habitat and steelhead populations in south-central and southern California over the five-year period of the RGP should outweigh any of the adverse effects that the FRGP may cause for steelhead and steelhead habitat, because these projects will improve local instream habitat conditions for multiple life stages of steelhead, and should improve survival of local populations of steelhead into the future. As a result, the effects of individual restoration projects and their combined effects are not likely to appreciably reduce the likelihood of survival and recovery of the South-Central Steelhead DPS or the Southern California Steelhead DPS, and are not likely to diminish the value of designated critical habitat.

VIII. CONCLUSION

After reviewing the best available scientific and commercial information, the current status of South-Central Coast steelhead and Southern California Coast steelhead, the environmental baseline for the action area, the effects of the proposed projects, and the cumulative effects, it is NMFS' opinion that the proposed projects are not likely to jeopardize the continued existence of the South-Central California Steelhead DPS or the Southern California Steelhead DPS, and are not likely to destroy or adversely modify designated critical habitat for these species.

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 so that they become binding conditions of any grant or permit issued to CDFG for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to assume and implement the terms and conditions or (2) fails to require CDFG to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Corps or CDFG 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

The amount or extent of take resulting from specific actions proposed under the RGP cannot be quantified for each individual project due to uncertainty in the scope and location of these actions. Due to this uncertainty and variability in steelhead presence and abundance between areas and years, NMFS cannot specify a number of individuals anticipated to be taken. Instead, spatial limitation specified in the project description and location and extent of actions completed by CDFG in the past allow us to identify the maximum area of aquatic habitat likely to be disturbed at each individual project site that could result in take of listed salmonids. That area is a maximum of 500 feet of contiguous stream reach. In general, incidental take is expected to be in the form of capture of any and all steelhead within the 500 feet of stream, and injury or mortality due to handling during capture and relocation, or injury or mortality during dewatering, and temporary displacement. Injury and/or mortality from relocation activities is anticipated to be no more than 5 percent of juvenile steelhead inhabiting each individual project action area.

Dam removal projects, fish ladder projects, fish hatchery/fish stocking projects, watershed stewardship training, salmon in the classroom, obstruction blasting (with explosives) projects, and projects that would dewater or disturb more than 500 feet of contiguous stream reach were not analyzed in this opinion. These projects will require separate section 7 consultations to determine impacts to listed steelhead.

B. Effect of the Take

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

C. Reasonable and Prudent Measures

NMFS believes the following reasonable and prudent measures are necessary and appropriate to minimize take of South-Central and Southern California steelhead:

1. Measures shall be taken to minimize harm and mortality to steelhead resulting from fish relocation and dewatering activities.

2. Measures shall be taken to minimize harm to steelhead resulting from culvert replacement activities and other instream construction work.

3. Measures shall be taken to minimize harm to steelhead resulting from construction within the riparian corridor.

4. Measures shall be taken to minimize harm to steelhead resulting from road decommissioning activities.

5. Measures shall be taken to ensure that individual restoration projects authorized annually

through the RGP will minimize take of steelhead, monitor and report take of steelhead, and to obtain specific project information to better account for the effects and benefits of salmonid restoration projects authorized through the RGP.

D. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the Corps and the permittee (CDFG) must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are nondiscretionary.

1. The following terms and conditions implement Reasonable and Prudent Measure 1, which states that measures shall be taken to minimize harm and mortality to steelhead resulting from fish relocation and dewatering activities:

    a. Fish relocation and dewatering activities shall only occur between June 15 and November 30 of each year.

    b. The Corps and/or CDFG shall minimize the amount of wetted stream channel that is dewatered at each individual project site to the fullest extent possible.

    c. Electrofishing shall only be implemented when the other methods of fish capture are infeasible and more steelhead are expected to die from being missed than from the effects of the electrofishing itself. NMFS believes this is likely when projects occur in or near complex stream habitat with boulders and woody debris. In this type of habitat steelhead are likely to become trapped or hide unnoticed under rocks and boulders and will later die of desiccation if the habitat is dewatered. All electrofishing shall be performed by CDFG biologists trained in the electrofishing of listed salmonids, and conducted according to the NMFS' *Guidelines for Electrofishing Waters Containing Salmonids Listed Under the Endangered Species Act*, June 2000. Electrofishing in the endangered Southern California DPS will only be allowed with written approval by NMFS.

    d. Fish relocation data must be provided annually as described in Term and Condition 5c below.

2. The following terms and conditions implement Reasonable and Prudent Measure 2, which states that measures shall be taken to minimize harm to steelhead resulting from culvert replacement activities and other instream construction work.

    a. All culvert replacement or modification designs must be visually reviewed and authorized by NMFS and/or CDFG engineers prior to commencement of work.

b. If the stream in the project location was **not** passable to or was not utilized by all life stages of steelhead prior to the existence of the road crossing, the project shall pass the life stages of steelhead that historically did pass there. Retrofitted culverts shall meet the NMFS fish passage guidelines for steelhead passage (NMFS 2001) and steelhead life stages historically passing through the site prior to the existence of the road crossing.

c. Effective erosion control measures shall be in place at all times during construction. Construction within the 5-year flood plain will not begin until all temporary erosion controls (*i.e.*, straw bales, silt fences that are effectively keyed in) are in place downslope of project activities within the riparian area. Erosion control structures shall be maintained throughout the construction period. If continued erosion is likely to occur after construction is completed, then appropriate erosion prevention measures (*i.e.*, hydroseeding, jute netting) shall be implemented and maintained until erosion has subsided.

d. Sediment shall be removed from sediment controls once it has reached one-third of the exposed height of the control. Whenever straw bales are used, they shall be staked and dug into the ground 12 cm. Catch basins shall be maintained so that no more than 15 cm of sediment depth accumulates within traps or sumps.

e. Sediment-laden water created by construction activity shall be filtered before it leaves the right-of-way or enters the stream network or an aquatic resource area. Silt fences or other detention methods shall be installed as close as possible to culvert outlets to reduce the amount of sediment entering aquatic systems.

f. Upon project completion, all exposed soil present in and around the project site shall be stabilized within 7 days.

3. The following terms and conditions implement Reasonable and Prudent Measure 3, which states that measures shall be taken to minimize harm to steelhead resulting from construction within the riparian corridor.

a. Retain as many native riparian trees and shrubs as feasible, emphasizing shade producing and bank stabilizing trees and shrubs.

b. Use project designs and access points that minimize riparian disturbance without affecting less stable areas, which may increase the risk of channel instability.

c. Minimize compaction by using equipment that either has (relative to other equipment available) less pressure per square inch on the ground or a greater reach, thus resulting in less compaction or less area overall compacted or disturbed.

d. At the completion of the project, compacted soil that is not an integral element of the design of a crossing should be decompacted.

e. Disturbed and compacted areas shall be revegetated with native plant species. The species used should be specific to the project vicinity or the region of the state where the project is located, and comprise a diverse community structure (plantings should include both woody and herbaceous species). Plant at a ratio of at least 2 plantings to 1 removed plant.

f. Unless otherwise specified, the standard for success is 80 percent survival of plantings or 80 percent ground cover for broadcast planting of seed after a period of 3 years.

g. Riparian restoration sites will be monitored yearly in spring or fall months for three years following completion of the project. All plants that have died will be replaced during the next planting cycle (generally the fall or early spring) and monitored for a period of three years after planting.

4. The following terms and conditions implement Reasonable and Prudent Measure 4, which states that measures shall be taken to minimize harm to steelhead resulting from road decommissioning activities.

a. Woody debris will be concentrated on finished slopes adjacent to stream crossings to reduce surface erosion, contribute to amounts of organic debris in the soil, encourage fungi, provide immediate cover for small terrestrial species, and to speed recovery of native forest vegetation.

b. Work sites will be winterized at the end of each day when significant rains are forecast that may cause unfinished excavations to erode. Winterization procedures shall be supervised by a qualified geologist and involve taking measures necessary to minimize erosion on unfinished work surfaces. Winterization includes the following: smoothing unfinished surfaces to allow water to freely drain across them without concentrating or ponding; compacting unfinished surfaces where concentrated runoff may flow with an excavator bucket or similar to minimize surface erosion and the formation of rills; and installation of culverts, silt fences and other erosion control devices where necessary to convey concentrated water across unfinished surfaces, and trap eroded sediment before it leaves the work site.

c. Adequate erosion control supplies (gravel, straw bales, shovels, *etc.*) shall be kept at all restoration sites to ensure materials are kept out of water bodies.

5. The following terms and conditions implement Reasonable and Prudent Measure 5, which states that measures shall be taken to ensure that individual restoration projects authorized annually through the RGP will minimize take of steelhead, monitor and report take of steelhead, and to obtain specific project information to better account for the effects and benefits of steelhead restoration projects authorized through the RGP.

a. If the 5% steelhead injury/mortality take limit is exceeded, or if it is evident that the 500 foot stream disturbance threshold is or will be surpassed, during the implementation of any restoration project permitted through the RGP, then the project proponent shall immediately stop all work, immediately contact CDFG (Mary Larson: 562-342-7186) and NMFS (Stan Glowacki: 562-980-4061) and the Corps (Bruce Henderson: 805-585-2145) , and Section 7 consultation shall be reinitiated immediately.

b. The Corps and/or CDFG shall provide NMFS with a notification list of projects that are authorized through the RGP. The notification shall be submitted by May 15 of each year, or at least 14 days prior to project implementation and must contain specific project information (name of project, type of project, location of project including: HUC, creek, or watershed, city or town, and county). This shall be submitted annually to the following NMFS offices:

National Marine Fisheries Service
Long Beach Offices
Protected Resources Division
Steelhead Team
501 West Ocean Blvd. Suite 4200
Long Beach, California 90802

c. Restoration, construction, fish relocation, and dewatering activities within any wetted and/or flowing creek channel shall only occur between June 1 and November 30 of each year unless written permission from NMFS is obtained which would authorize such activities.

d. In order to monitor the impact to, and to track incidental take of listed salmonids, the Corps and/or CDFG must annually submit to NMFS a report of the previous years restoration activities. The annual report shall include a summary of the specific type and location of each project, stratified by individual project, 4th field HUC and DPS. The report shall include the following project-specific summaries, stratified at the individual project, 4th field HUC and DPS level:

- A summary detailing fish relocation activities, including the number and species of fish relocated and the number and species injured or killed.

- The number and type of instream structures implemented within the stream channel.
- The length of streambank (feet) stabilized or planted with riparian species.
- The number of culverts replaced or repaired, including the number of miles of restored access to unoccupied salmonid habitat.
- The distance (miles) of road decommissioned.
- The distance (feet) of aquatic habitat disturbed at each project site.

This report shall be submitted annually by March 1 to the following NMFS offices:

National Marine Fisheries Service
Long Beach Offices
Protected Resources Division
Steelhead Team
501 West Ocean Blvd. Suite 4200
Long Beach, California 90802

e. The Corps and/or CDFG shall perform implementation monitoring on all completed restoration activities annually, as outlined in *California Coastal Salmonid Restoration Monitoring and Evaluation Program, Interim Restoration Effectiveness and Validation Monitoring Protocols* (CDFG 2003b). A copy of the final report shall be submitted no later than March 1 annually to NMFS at the addresses provided above.

f. The Corps and/or CDFG shall perform validation monitoring on at least 10 percent of completed restoration projects annually, following guidelines in *California Coastal Salmonid Restoration Monitoring and Evaluation Program, Interim Restoration Effectiveness and Validation Monitoring Protocols* (CDFG 2003b). A copy of the final report shall be submitted no later than March 1 annually to NMFS at the address provided above.

g. The Corps and/ or CDFG shall incorporate project data into a format compatible with the CDFG/NMFS/Pacific Fisheries Management Council Geographic Information System (GIS) database, ultimately allowing scanned project-specific reports and documents to be linked graphically within the GIS database.

X. REINITIATION NOTICE

This concludes formal consultation on the actions outlined in the proposed CDFG salmonid habitat restoration RGP. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal 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 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 is not considered in this opinion, or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, formal consultation shall be reinitiated immediately.

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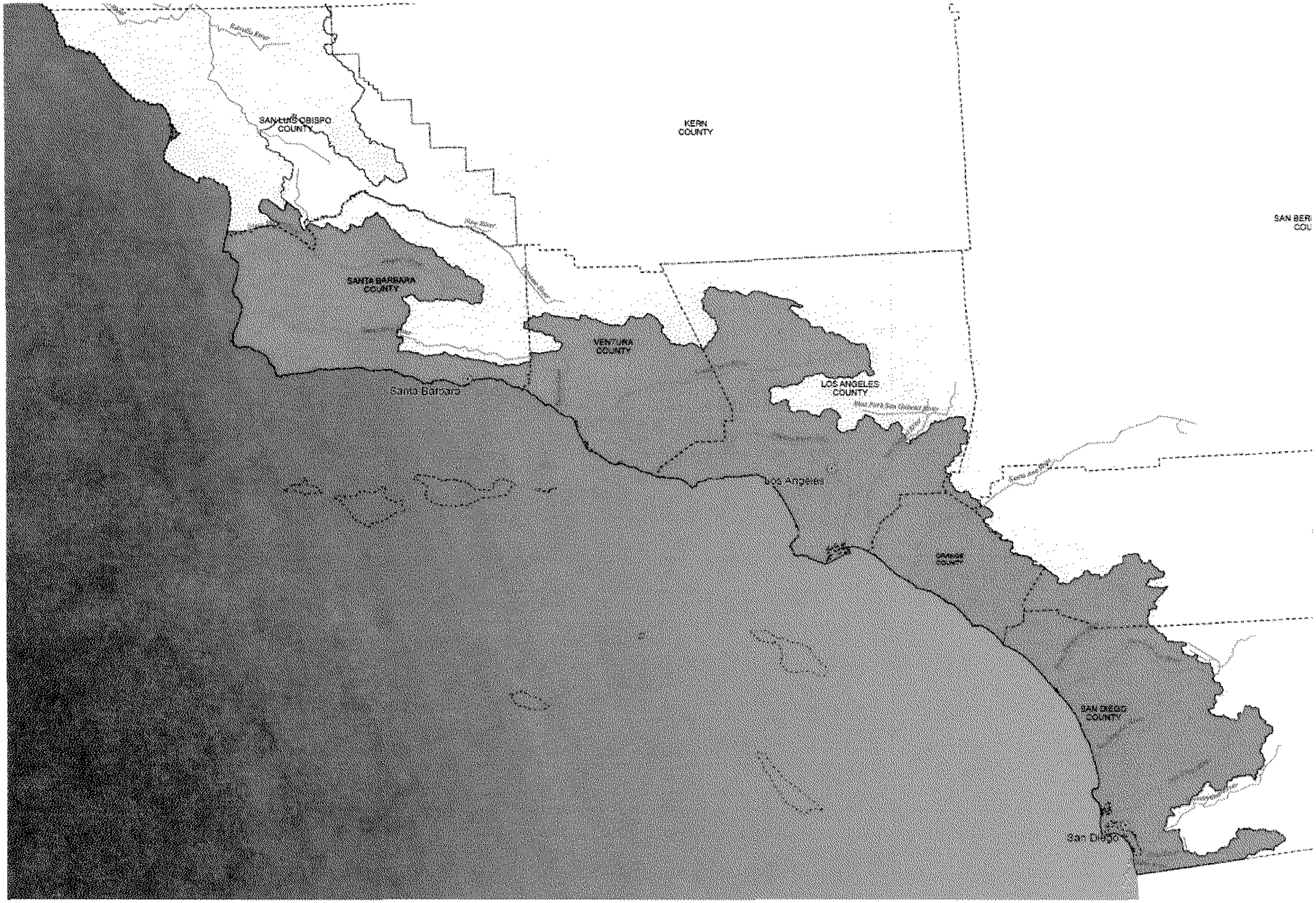

Figure 1: Map showing the general areas of the San Luis Obispo County portion of the Threatened South-Central California Steelhead DPS (in yellow) and the Endangered Southern California Steelhead DPS (in red).

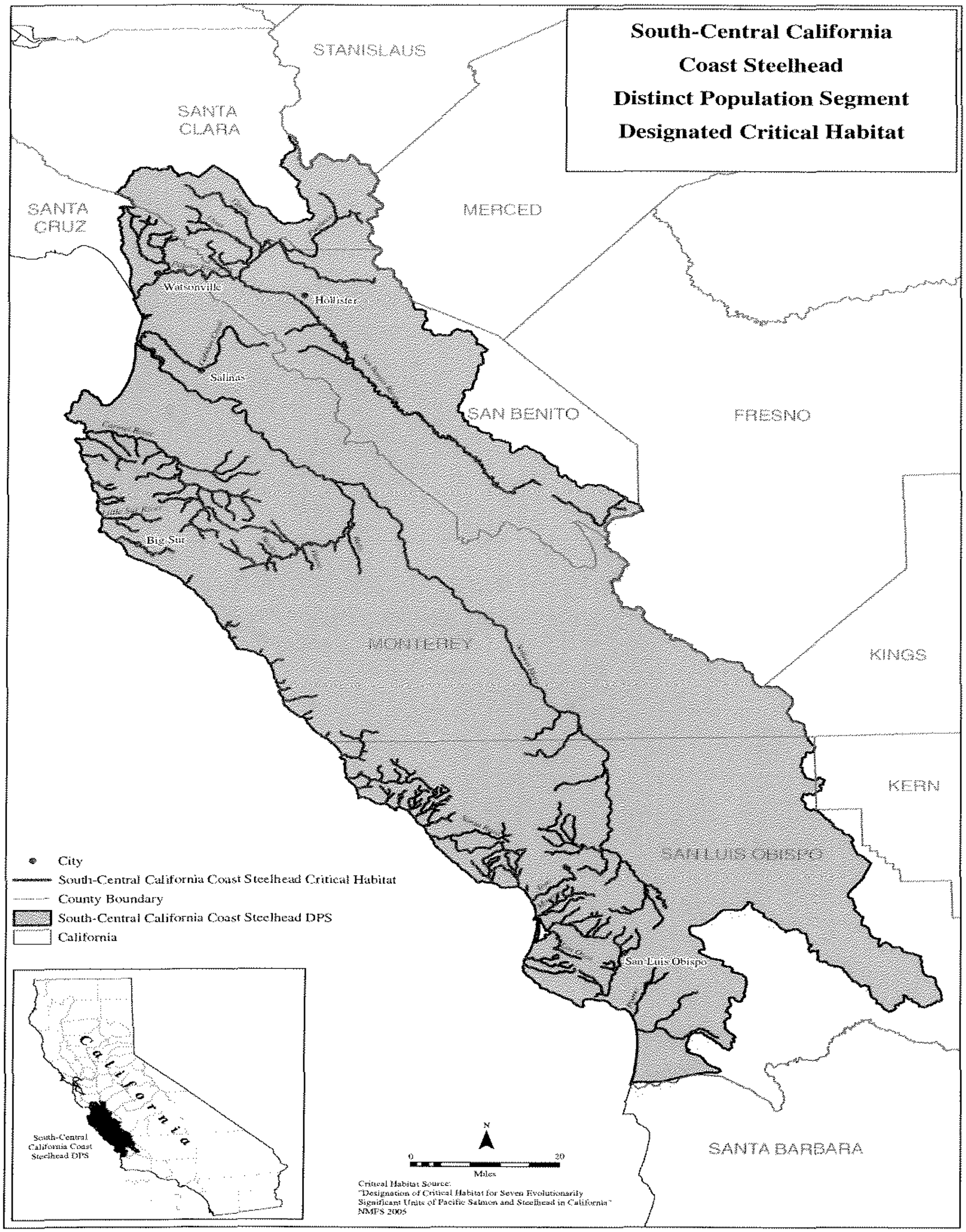

Figure 2. Map of the South-Central California Steelhead DPS and designated critical habitat areas for the South-Central California Steelhead DPS.

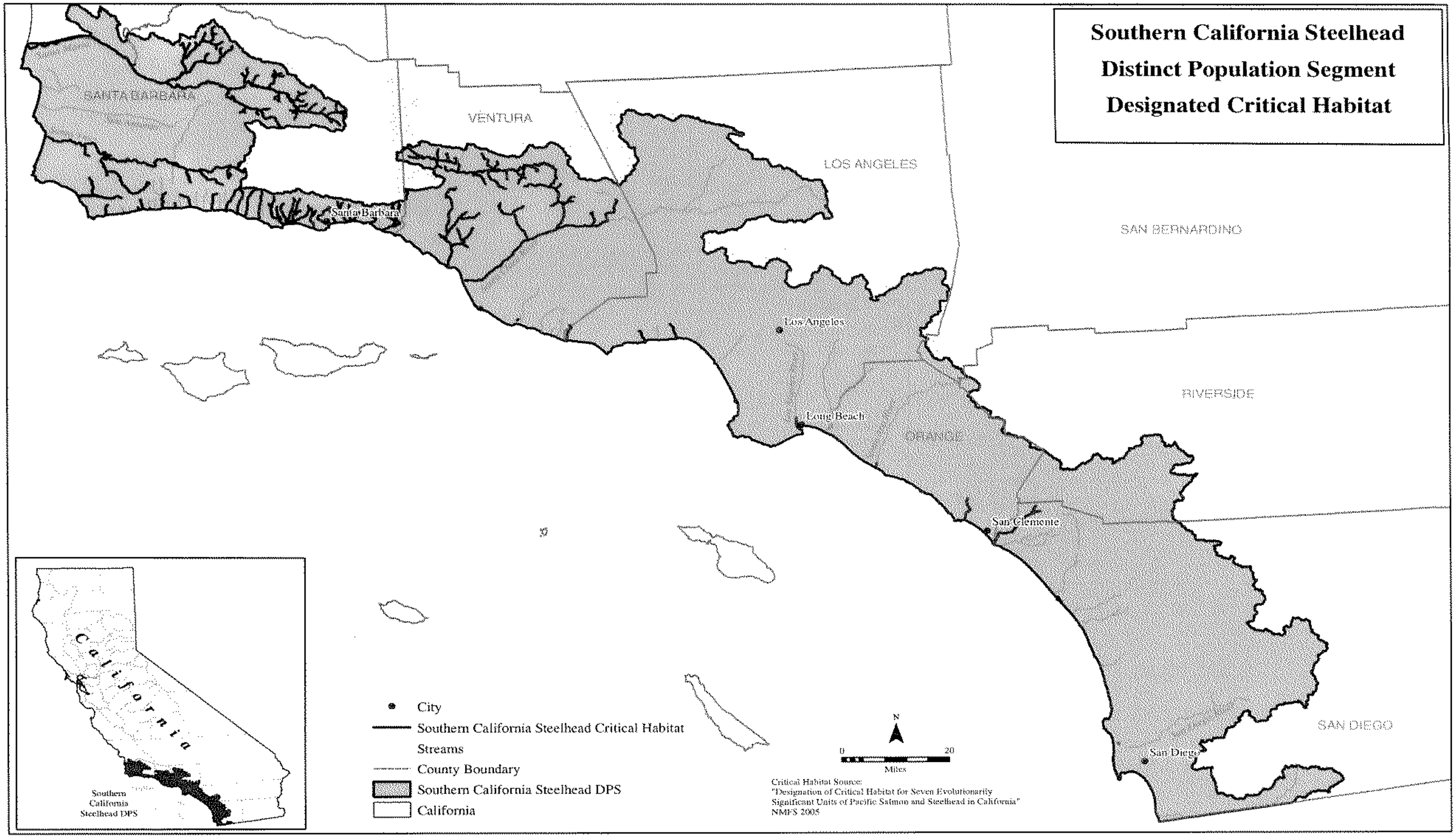

Figure 3. Southern California Steelhead DPS and designated critical habitat areas for the Southern California DPS.

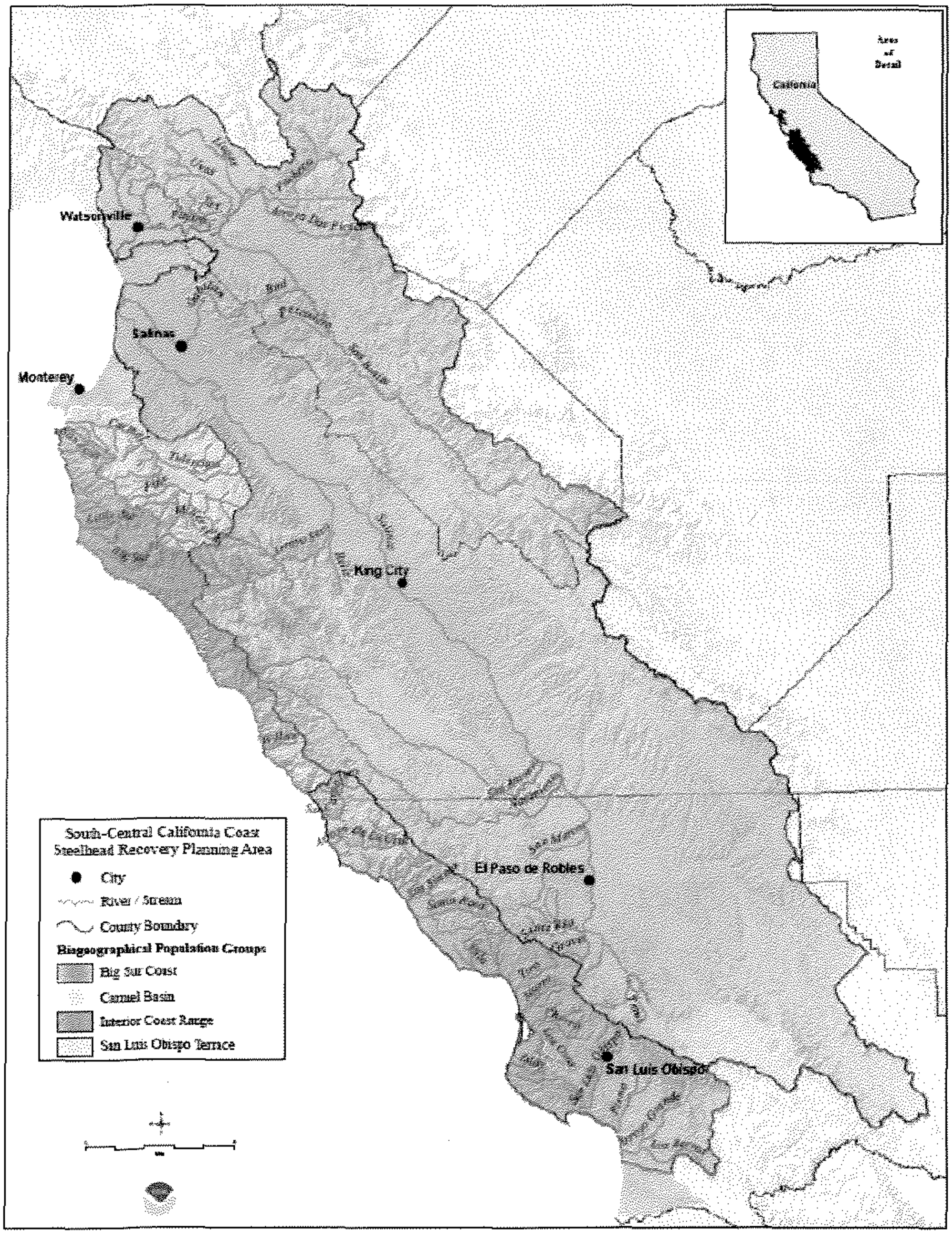

Figure 4: South-Central California Steelhead DPS Recovery Planning Area

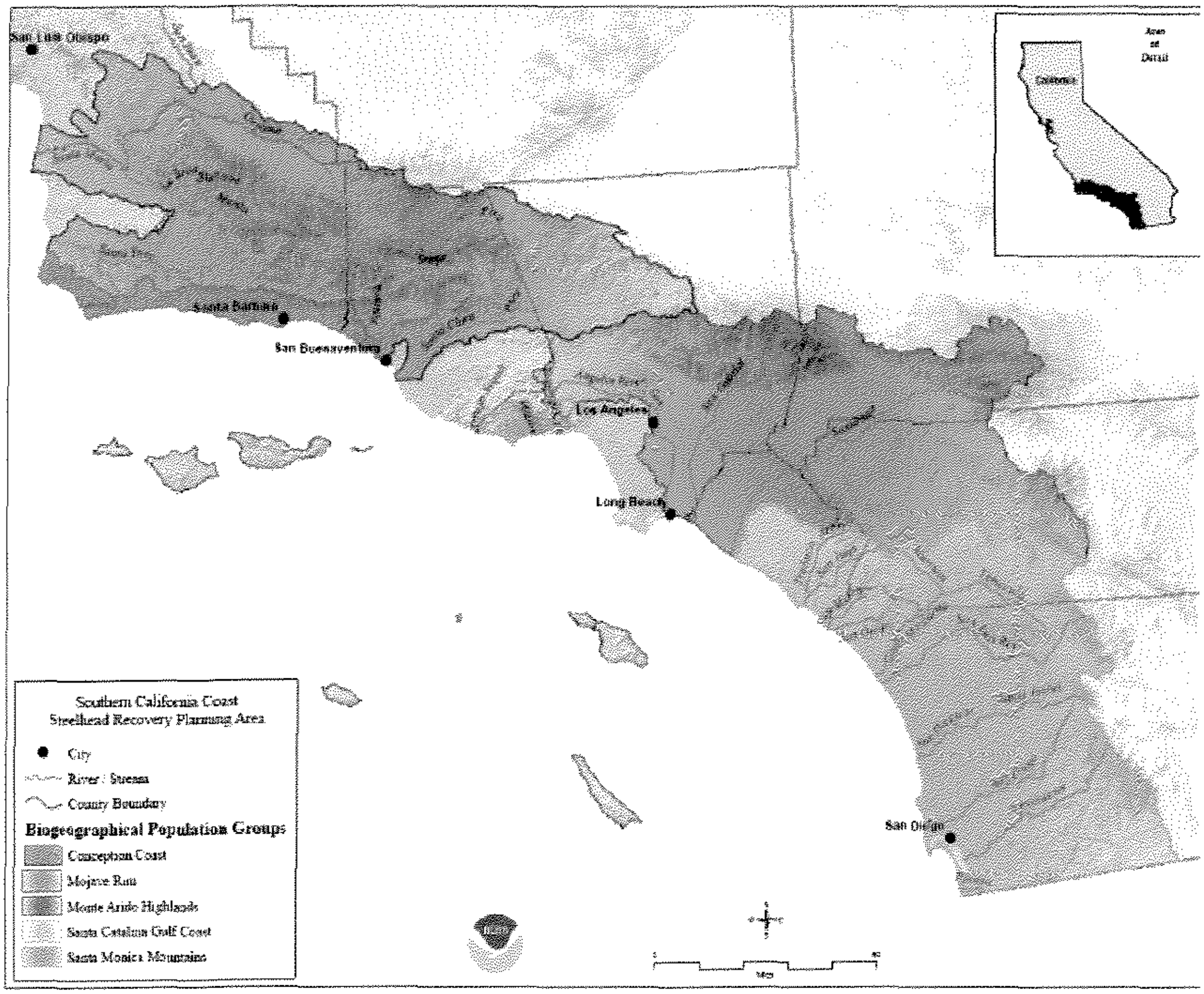

Figure 5: Southern California Steelhead DPS Recovery Planning Area.

Appendix A: Funded FRGP Projects from 2003 through 2007 showing County location, type of project, and size of project.

Fiscal Year	County	Type of Project	Code	Size of Project
04/05	Los Angeles	Fish Passage at Stream Crossings	FP	0.13 stream miles
05/06	Los Angeles	Instream Bank Stabilization	HS	appx 0.28 stream miles
06/07	Los Angeles	Instream Habitat Restoration	HI	0.189 stream miles
04/05	Orange	Instream Barrier Modification for Fish Passage	HB	appx .13 stream miles
03/04	San Luis Obispo	Watershed Restoration (Upslope)	HU	10 acres
03/04	San Luis Obispo	Instream Bank Stabilization	HS	0.0663 stream miles
03/04	San Luis Obispo	Instream Bank Stabilization	HS	15 acres
04/05	San Luis Obispo	Riparian Restoration	HR	apprx. 1 stream miles
04/05	San Luis Obispo	Instream Barrier Modification for Fish Passage	HB	0.01 stream miles
04/05	San Luis Obispo	Instream Bank Stabilization	HS	0.0457 stream miles
04/05	San Luis Obispo	Instream Bank Stabilization	HS	.2 stream miles
05/06	San Luis Obispo	Instream Bank Stabilization	HS	apprx. 0.3 stream miles
05/06	San Luis Obispo	Project Maintenance	PM	0.6628 stream miles
05/06	San Luis Obispo	Riparian Restoration	HR	0.06 stream miles
05/06	San Luis Obispo	Riparian Restoration	HR	0.5 road miles
06/07	San Luis Obispo	Riparian Restoration	HR	apprx. 15 acres
06/07	San Luis Obispo	Fish Passage at Stream Crossings	FP	0.1 stream miles

03/04	Santa Barbara	Fish Passage at Stream Crossings	FP	0.02 stream miles
03/04	Santa Barbara	Fish Passage at Stream Crossings	FP	0.0189 stream miles
03/04	Santa Barbara	Riparian Restoration	HR	1.2 stream miles
03/04	Santa Barbara	Instream Barrier Modification for Fish Passage	HB	.0075 stream miles
04/05	Santa Barbara	Fish Passage at Stream Crossings	FP	0.076 stream miles
04/05	Santa Barbara	Instream Bank Stabilization	HS	0.1 stream miles
04/05	Santa Barbara	Fish Passage at Stream Crossings	FP	0.02 stream miles
05/06	Santa Barbara	Fish Passage at Stream Crossings	FP	appx 0.019 stream miles
05/06	Santa Barbara	Instream Bank Stabilization	HS	0.38 stream miles
05/06	Santa Barbara	Instream Barrier Modification for Fish Passage	HB	0.004 stream miles
06/07	Santa Barbara	Instream Barrier Modification for Fish Passage	HB	.04 miles
06/07	Santa Barbara	Instream Habitat Restoration	HI	apprx. 0.076 stream miles
03/04	Ventura	Fish Passage at Stream Crossings	FP	0.13 stream miles
03/04	Ventura	Fish Passage at Stream Crossings	FP	0.1136 stream miles
03/04	Ventura	Instream Barrier Modification for Fish Passage	HB	0.25 stream miles
03/04	Ventura	Instream Bank Stabilization	HS	0.0284 stream miles
03/04	Ventura	Instream Barrier Modification for Fish Passage	HB	0.01 stream miles
05/06	Ventura	Instream Bank Stabilization	HS	0.075 stream miles