REVISED PROJECT DESCRIPTION

DEPARTMENT OF THE ARMY

REGIONAL GENERAL PERMIT APPLICATION NO. 24460S

CARMEL RIVER MAINTENANCE AND RESTORATION PROJECTS

MONTEREY COUNTY, CALIFORNIA

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U.S. Army Corps of Engineers Regional General Permit No. 24460S

Attachments

1.2 Project Description

1.2.1 Overview

The Monterey Peninsula Water Management District (MPWMD) is requesting authorization from the Corps to act on behalf of the Corps as the local agency with authority to accept, review, authorize, and conduct maintenance and restoration projects along approximately 16.3-miles of the Carmel River. Work limits are from the upstream boundary of the Coastal Zone at about River Mile (RM) 1.3 to the vicinity of Sleepy Hollow near RM 17.6, which is approximately one mile downstream of San Clemente Dam (see attached Figure 1). MPWMD is requesting authorization under proposed Regional General Permit (RGP) 24460S for a 10-year period.

The objectives of this work are to restore and maintain bank stability and channel meanders in unstable areas, prevent resource degradation, and to reestablish or enhance riparian resources. Activities authorized under the RGP are designed to work together in a comprehensive approach to channel maintenance and restoration. The proposed RGP will simplify the permit process and provide a framework for project development for those agencies and landowners who are interested in the following types of projects:

- installing limited erosion protection in unstable, degraded areas;
- channel restoration in unstable areas;
- reestablishing riparian vegetation along stream banks and adjacent areas;
- fisheries enhancement projects;
- limited removal of vegetation and debris from the active channel;
- maintenance or repairs of existing restoration projects and projects completed under RGP 24460S;.

Erosion protection and channel restoration activities would likely occur in heavily degraded areas, which in many cases exhibit three characteristics: 1.) little or no vegetation; 2.) steep or unstable streambanks; and 3.) large mid-stream gravel bars. Maintenance, enhancement, and vegetation modification activities may occur in channel areas with relative higher quality habitat. Proposed activities may require the use of heavy construction equipment in the channel and on the banks of the river. Construction techniques will be used that are compatible with weather and channel conditions and reduce or minimize impacts to sensitive species. Construction activities in the channel bottom and in sensitive streamside areas would be implemented primarily during low-flow periods (i.e., July 1 to October 31). Some activities (such as planting and irrigation in the floodplain) may be conducted during spring and fall. Annually, the maximum length of stream affected by restoration projects could be approximately 0.7 miles. Selective removal or modification of vegetation and debris would not exceed three miles in any single year.

Certain activities could affect Federally threatened California red-legged frogs (CRLF) (*Rana aurora draytonii*) and steelhead (*Oncorhynchus mykiss*). Written biological opinions concerning possible effects of proposed activities on threatened species will be necessary before the Corps can issue an RGP. MPWMD has formally consulted with the U.S. Fish and Wildlife Service (FWS or Service) concerning potential impacts to CRLF and with the National Oceanic and Atmospheric Administration Fisheries Service (NOAA Fisheries) concerning potential impacts

to steelhead. This project description includes a set of avoidance and minimization measures developed during formal consultation to reduce potential impacts to Federally threatened species.

Prior to MPWMD or an authorized agent carrying out any channel activity, NOAA Fisheries will review each individual project for consistency with the Federal Endangered Species Act (ESA) and will issue project-specific conditions and incidental take statements, if necessary. FWS will review an annual list of projects and may provide direction regarding protection of CRLF.

Over the next several years, significant changes in the river environment may occur as a result of the proposed retrofit of the San Clemente Dam and from proposed water supply alternatives that, when achieved, would drastically reduce water extraction from the Carmel Valley. Activities proposed for this RGP address a certain range of the dynamic behavior of the river; however, analysis of the effects of these activities on threatened species is based primarily on past experience and present river conditions. Reinitiation of formal consultation may be required if changes to the river and threatened species occur that are not considered for this RGP.

For MPWMD sponsored projects, MPWMD will be responsible for planning, design, environmental review, securing permits, construction management, restoration planting, irrigation system installation, monitoring, and project maintenance. For non-MPWMD sponsored projects, MPWMD will act as an agent on behalf of the Corps.

MPWMD will be responsible for the preparation of annual notification/compliance reports. These reports will contain information on all projects constructed under the RGP. Prior to carrying out activities in the channel, MPWMD will prepare project descriptions, schedules, maps, pre-construction photos, and habitat evaluations. During project work, MPWMD will inspect for compliance with RGP conditions. After completion of work, MPWMD will provide post construction photographs, estimates of quantities of fill placed and/or acreage of Federal jurisdictional areas affected, and evaluation for compliance with the RGP.

General information on the Carmel River and additional descriptions of proposed activities are included in the permit application package submitted to the Corps by MPWMD for Carmel River maintenance and restoration projects, dated May 20, 1999, and in additional information provided by MPWMD to the Corps and other regulatory agencies. In addition, guidelines for vegetation management and the removal of deleterious materials from the Carmel River riparian corridor were developed by the MPWMD (see Final Guidelines for Vegetation Management and Removal of Deleterious Materials for the Carmel River Riparian Corridor, MPWMD, March 2003).

1.2.2 Federally Threatened Species

The Carmel River is host to several sensitive species, including the Federally threatened California red-legged frog (CRLF) (*Rana aurora draytonii*) and steelhead (*Oncorhynchus mykiss*). CRLF were listed by the U.S. Fish and Wildlife Service (FWS or Service) as threatened under the Federal Endangered Species Act (ESA) in 1996 (61 *Federal Register* 25813, http://endangered.fws.gov/r/fr96583.html) and much of the Carmel River watershed was designated as critical habitat for the frogs in 2001 (66 *Federal Register* 14625 to 14758, which are found on the web at: http://policy.fws.gov/library/66fr14625.html and http://endangered.fws.gov/r/fr96583.html). However, the USFWS has recently withdrawn its critical habitat designation for CRLF throughout most of California and will be conducting further review. The National Oceanic and Atmospheric Administration Fisheries Service (NOAA Fisheries) listed Carmel River steelhead as threatened in 1997 (62 Federal Register 43937 to 43954 or on the web at http://www.nwr.noaa.gov/reference/frn/1997/62FR43937.pdf). Similar to the CRLF critical habitat designation, NOAA Fisheries is reviewing the status of steelhead critical habitat designation along much of the West Coast.

1.2.3 Annual Scope of Activities

Three basic types of activities are proposed: 1.) restoration projects requiring heavy construction equipment (e.g., bulldozer, loader, backhoe, excavator) to restore channel geometry and repair streambanks; and 2.) vegetation management and project maintenance carried out primarily with hand tools (e.g., chainsaw, loppers); and 3.) enhancement projects requiring some heavy equipment (e.g. a backhoe), such as for vegetation planting or spawning gravel injection.

Based on the current MPWMD staff level and other constraints to work in the river (e.g., high flows, steelhead spawning, smolt and adult migration, California red-legged frog development), the anticipated number and size of restoration projects will be limited. The annual maximum scope of work proposed under this RGP would limit MPWMD-sponsored restoration projects to a total of ½-mile of stream length, and private-property sponsored projects would be limited to a total of 1,000 lineal feet of stream channel for the year for a maximum of 3,500 lineal feet of stream affected annually.

Vegetation management and project maintenance would be limited to a maximum of three miles of stream in any single year. Vegetation management occurs in selected areas of the channel bottom within an identified reach and removal is often carried out in a discontinuous pattern that alternates between streambanks. Project maintenance in this case refers to vegetation planting. Other types of project maintenance, such as bank repairs, would be considered a separate restoration project.

No specific additional limit for enhancement projects sponsored by MPWMD is proposed. This type of activity would fall under the previously discussed limitations.

1.2.4 Non-MPWMD Sponsored Projects

For projects sponsored by other parties, MPWMD will act both as an agent for the Corps and

local regulator. As a local regulator, MPWMD requires that activities within the riparian corridor comply with MPWMD ordinances for the Carmel River. MPWMD will assume the responsibility for screening applicants, conducting pre-project evaluations, and inspecting project sites during and after construction to ensure compliance with criteria outlined in the RGP. To facilitate non-MPWMD sponsored projects, MPWMD desires a permit that is severable, which will allow MPWMD to assign portions of the permit to individual property owners. MPWMD will enter into an agreement with each party proposing to do work in order to ensure compliance with Corps 404 permit conditions and MPWMD standards. MPWMD will also issue a MPWMD River Work Permit to conduct activities. If time and staff resources permit, MPWMD will provide assistance with carrying out projects.

1.2.5 Activities Not Covered by the RGP

Please note that RGP 24460S is not intended to cover channel activities such as:

- channelization for flood control;
- installation or maintenance of levees;
- lining of the main stem with rock rip-rap, concrete rubble, or other permanent erosion protection, except as noted in section 1.2.8 "Proposed Activities;"
- grade control installation.

It is assumed that project types not covered in this application would require review and permitting as individual projects.

1.2.6 Coordination with the U.S. Fish and Wildlife Service

For projects to be authorized under RGP 24460S, the MPWMD proposes to continue with the methods developed by the District for selection and prioritization of projects. MPWMD has consulted extensively with the Service to develop appropriate avoidance and minimization measures (see Section 1.2.10 "Avoidance and Minimization Measures for Adverse Impacts to California red-legged frogs"). The Service has stated that a biological opinion for this project will include an incidental take based on the estimated potential annual mortality from activities undertaken in the river (see next section). After issuance of the biological opinion for this RGP, no additional formal consultation will be required for projects within the scope of the RGP, unless the anticipated mortality of CRLF is exceeded (see next section). However, MPWMD will provide annual project descriptions to several regulatory agencies, including the Service (see section 1.2.7 for details on information to be provided). The Service will have an opportunity to review an annual list of projects and may provide direction regarding protection of CRLF.

1.2.6a Estimated Annual Mortality of California red-legged frogs

There are two subsets of activities proposed for the RGP that have substantially different environments. One set includes activities focused on restoration and repair of portions of the

river damaged by drought, flood, and water extraction practices. At such locations, habitat for CRLF is likely to be poor to fair and so the CRLF population is likely to be low or non-existent. These areas are characterized by lack of cover, lack of emergent vegetation, and may be subject to annual dewatering. Another set of activities is broadly termed "maintenance", such as vegetation management, revegetation, and irrigation. Areas where these activities are carried out are likely to have higher quality habitat that would attract CRLF. Data gathered on frog sightings between 1990 and 2002 appear to confirm that frog populations differ substantially between degraded areas and more stable portions of the river.

Between 1996, when CRLF were listed as a threatened species, and 2002, more than 20 repair and restoration projects were completed in the Carmel River, totaling about three miles of stream directly affected by activities in the channel bottom. Only two adult CRLF were recorded at these sites and no frog mortalities were recorded as a result of these permitted projects[1]. These data indicate that CRLF appear to be relatively rare in degraded areas.

Based on these data and the proposed use of appropriate avoidance and minimization measures, **MPWMD estimates that the annual mortality rate for repair and restoration activities may be up to two CRLF per year.**

MPWMD records for the period between 1990 and 2002 show a total of 71 adult sightings and five tadpole sightings between the lagoon and San Clemente Dam (about 18 miles). With few exceptions, these were daytime sightings. In June 1997, MPWMD staff assisted the Service with relocation of 56 tadpoles using an electrofisher in the main stem as the river was drying up. No mortalities were recorded. In 2002, during intense night time surveys associated with a project to install large wood in the stream, surveyors found and relocated 10 adults and two juveniles in a 2,000-foot reach near Rivermile 13 at the deDampierre ballfields. No mortalities were recorded. Based on the data at deDampierre, there could be as many as 32 frogs in a one-mile reach of the river that has appropriate habitat. Maintenance and enhancement activities, including vegetation and woody debris management and fisheries enhancement, are more likely to be carried out in the areas where frogs have been sighted in the past.

Based on these data and the proposed use of appropriate avoidance and minimization measures, **MPWMD estimates that the annual mortality rate for maintenance and enhancement activities may be up to three frogs per year.**

[1] However, at one project (the 1997 Red Rock Project at Rivermile 8), MPWMD biologists found numerous tadpoles within the project area one week before the scheduled start of construction (the day after Labor Day). Subsequently, over the September Labor Day weekend, which attracted a large influx of visitors to the Monterey Peninsula on a hot weekend, the river dried up through the project reach. When municipal demand on the Monterey Peninsula dropped after the weekend, river flow increased and the wetted front of the stream advanced through the project area. Another survey after flow returned did not turn up any live frogs or tadpoles and the project proceeded as planned.

If the annual threshold level of CRLF killed or injured is exceeded, then MPWMD would halt activities under the RGP and contact the Service regarding the need for additional protective measures or reinitiation of formal consultation.

1.2.7 Coordination with the National Oceanic and Atmospheric Administration Fisheries Service (NOAA Fisheries)

The RGP will be implemented in a manner consistent with the process described below:

A notification package shall be prepared containing all the following information:

- maps and plans, including but not limited to: a project description including date and duration of construction;
- an erosion control plan;
- a temporary streamflow diversion plan;
- description of impact minimization practices used during construction activities;
- a mitigation and monitoring plan; and,
- identification of listed species and life stages that may use the project area at any time.

MPWMD shall review the notification package for completeness and determine if the RGP is applicable to the proposed project and send the notification package to the Corps and NOAA Fisheries Service. MPWMD shall forward the notification package to the Corps and to NOAA Fisheries with a cover letter asking for the proposed project to be covered under the Biological Opinion (Opinion) issued by NOAA Fisheries for RGP 24460S.

The Corps shall notify NOAA Fisheries prior to authorization.

NOAA Fisheries shall have up to 60 days to review and send comments to the Corps and MPWMD.

NOAA Fisheries shall respond within the 60 day comment period. If NOAA Fisheries does not respond within 60 days, it shall be understood that NOAA Fisheries approves the proposed package and it will be included under the Opinion.

MPWMD will be responsible for the preparation of annual post-notification/compliance reports.

These reports will contain:

- Information on all projects constructed under the RGP for a given year;
- MPWMD evaluation forms prepared for each project; and
- Project specific information such as: a) project descriptions, b) project impacts, c) maps, d) pre- and post construction photographs, e) quantities and types of fill material placed and/or acreage of Federal jurisdictional areas affected, f) salmonid life stages that may use the project area at any time, and g) compliance with all permit conditions.

In summary, MPWMD will send complete notification packages to the Corps and NOAA Fisheries for projects that fall under the Opinion. MPWMD, in cooperation with the Corps, will request concurrence from NOAA Fisheries that the actions are covered by the Opinion and NOAA Fisheries shall respond within 60days. If NOAA Fisheries concurs, the action will be appended or tiered to the consultation and an Incidental Take Statement (ITS) will be prepared, if necessary. In addition to following the above procedures, only actions consistent with the minimization measures analyzed in the effects section of the Opinion shall be covered under this programmatic Biological Opinion.

1.2.8 Proposed Activities

1.2.8.a Installing Erosion Protectionl

1.Excavation and Backfill

Grading of the river banks may be required to recontour or reduce the slope of the existing bank to 1.5:1 or flatter. In cases where the river bank is being severely undercut or eroded, the toe of the bank may be stabilized by excavation of a toe trench, up to several feet deep, below the adjacent channel bottom and backfilling the trench with rip-rap and/or incorporating a biotechnical method to prevent scour. Material excavated from such trenches would normally be placed on the streambanks.

Temporary fill for access may be required to allow equipment into the work area. Excavation and fill may be necessary for a temporary flow diversion structure, if necessary. Excavation activities could include the use of a backhoe to dig planting holes for trees and to trench irrigation lines. Prior to the start of channel grading work, salvageable vegetation along the project reach may be removed with mechanized equipment and relocated within the project. In areas where the banks have been severely eroded, excess channel or gravel bar material may be excavated, stockpiled and used as backfill material. Only material above the level of frequent flows (i.e., the 1.5- to 3.0-year return flow) will be excavated. Fill material required for bank stabilization projects may include rock slope protection, vegetative material and other material such as boulders and logs. Fill material could also include topsoil that would be placed over rip-rap and along graded banks.

2. Importation of Fill Material

Areas with property loss could be backfilled to a pre-loss configuration. Imported soil shall be free of deleterious material and be coarse grained (i.e., have some gravel in it), sandy loam, loamy sand, or sand. Fill material should match, as nearly as possible, the grain size distribution found within the project area. As with excavation and backfill activities, streambank areas could be stabilized with structural and/or biotechnical erosion protection in key areas.

3. Slope Protection

Slope protection may be installed along unstable, degraded areas of banks which have eroded and are causing sediment input into the river or are threatening structures along the riverbank. It

should be noted that all bank stabilization projects conducted under this permit would incorporate bioengineering techniques as the first choice of construction methods.

Where bank erosion occurs within 25 feet of public or private infrastructure (including, but not limited to roads, buildings, bridges, and utilities), the use of rip-rap, gabion baskets or other traditional slope protection may be used. Gabion baskets will be restricted to slope areas higher than eight feet above the channel bottom. Where structures are not within 25 feet of an erosion site, no more than eight vertical feet of rip-rap will be used above the channel bottom.

Note: The active channel refers to the lowest portion of the main stem channel that is occupied by flows of between the 1.5-year and 3.0-year return frequency. Generally, for the Carmel River, this is the area within the bottom of the channel that is inundated by four to eight feet (vertically) of flow. This corresponds roughly with the Corps of Engineers wetlands jurisdictional limit.

The majority of these sites are located on the outside of meander bends, or in areas where bank vegetation has eroded away. Slopes protected by structural erosion protection will be built at a 1.5:1 (horizontal to vertical) grade or flatter.

Other slope areas will be constructed at a 2:1 (horizontal to vertical) grade or flatter. Erosion protection installed on these slopes could be geotextiles, live plant material, logs, rootwads, or other flexible types of erosion protection. At the outside of bends and in critical erosion areas, a combination of erosion resistant materials, log deflectors, rip-rap and vegetation will be installed to provide bank protection in case of high flows. Erosion protection installed along the outside of meander bends may consist of granite rip-rap in the 1/4-to 3-ton class, if it is infeasible to install bioengineered structures. This structural protection will eventually blend into vegetation planted on the bank and along the toe of the riverbank.

Filter fabrics that act as a barrier to root development would not be allowed; other filtering materials such as biodegradable filters, gravel filters or “backing rock” would be used. One exception would be for slope protection of public or private infrastructure that is within 25 feet of the active channel.

4. Temporary Diversion Channel

Where necessary, in order to divert flow around a work site in areas of perennial flow, a trench will be excavated, usually in a dry portion of the channel bottom, to pass flow around the site. Material excavated from the trench (primarily sand, gravel, and cobble) will be used to temporarily block the bottom of the channel and divert flow into the excavated trench for the duration of the project. After construction is completed, the diversion berm is removed and the excavated trench area filled in to pre-existing contours.

Prior to diverting flow around a work site, steelhead would be rescued and removed from the site. Porous fish fences and/or rock barriers would be set up to prevent migration into a repair site. Fish fences (plastic mesh) are less desirable than rock barriers, as they require daily cleaning due to algae and other organic build-up and are subject to failure if flow fluctuates.

Fish are electro-shocked, placed in an insulated, oxygenated tank filled with Carmel River water, and transported to areas of perennial flow or to the MPWMD Sleepy Hollow fish rearing facility. Water temperature in the tank is controlled by using ice if necessary. Generally, fish are not placed downstream of a repair site, as habitat conditions usually decrease in the downstream direction due to reduced flow and increased water temperature. However, if conditions allow, fish could be placed downstream of a repair site.

If flow in the river is perennial or nearly so throughout the river, fish located in repair sites can be captured with a variety of techniques, designed to minimize capture stress, direct mortality from acute physical injury, and delayed mortality from mild injuries. Once the porous rock barriers are set up at the head and tail of the repair site, flow should be gradually reduced through the site to maintain viable habitat conditions and improve efficiency of capture gear, which can include 1/4" stretch mesh beach seines and electrofishing gear. Electrofishing techniques will follow guidelines as established by the NOAA Fisheries. The minimum amount of current and voltage will be used to ensure capture of 95% of the fish during three repetitive passes through the repair site over a one-day period, and in no case should output voltage exceed 300 volts. The data on cumulative catch and catch per unit will be used to estimate total population size in the repair site. Additional passes may be needed to ensure that 95% of the fish are captured before the repair site is dewatered and all surface flow is shifted to the diversion.

1.2.8.b Channel Restoration

1. Excavation and Backfill

Excavation and fill activities will be required to implement channel restoration projects. Excavation of sand and gravel bars may be carried out to realign the active channel into a more stable configuration. This is a key component of reestablishing meander geometry and recreating low-lying floodplain areas. A “low-flow” channel, capable of carrying dominant or frequent flows (1.5- to 3.0-year events) is excavated within the channel bottom. This low-flow channel meanders back and forth within the main stem and generally has a wavelength of between 1,000 and 2,000 lineal feet. The amplitude of meanders is frequently dictated by existing constraints; however, where possible, an increase in amplitude would be desirable. For large restoration projects, this activity is frequently combined with installation of erosion protection at critical areas, such as at the outside of meander bends.

In most cases, large equipment such as a front end loader, dump truck, backhoe, bulldozer or excavator will be used to restore channel geometry to a more stable alignment. Temporary fill for access may be required to allow equipment into the work area. Excavation and fill may be necessary for a temporary flow diversion structure. Prior to the start of channel grading work, salvageable vegetation within the project reach may be removed with mechanized equipment and relocated to bank stabilization project areas.

Projects normally include excavation of a narrow stable channel, excavation of a pool and riffle sequence after reestablishment of a stream channel, excavation of gravel bar material, and replacement of cobble and gravel material along the channel bottom. During excavation, substrate material is stockpiled at the beginning of grading and replaced during final grading

operations.

1.2.8.c Channel Realignment

Project work starts by surveying and staking out project boundaries to prevent heavy equipment operation outside the work area. The contractor begins grading by scraping off the "upper" layer of the riverbed, which contains the largest proportion of cobbles and gravel. This material is stockpiled for later use as a finishing layer to promote steelhead spawning and to form a restraint to bed mobilization. Deleterious material, such as auto parts, various metal objects, and refuse will be hauled away to an appropriate dump site outside Corps jurisdiction. A channel of appropriate dimensions will be graded in the stream bottom. The finished channel will be designed to carry excess sediment stored in point bars located within and upstream of the project.

Material excavated from the channel can be used to buttress eroded slopes and to build an active floodplain for vegetation plantings. After completion of this work, a smaller pilot channel is excavated within the main channel. This pilot channel provides fish passage for migrating steelhead during periods of low flow. Pools are excavated at appropriate intervals (usually five to seven channel widths) to provide areas for migrating steelhead to rest and feed and to provide habitat for California red-legged frogs. In most areas the finished stream bottom will be at or near the elevation of the existing channel bottom.

If existing streamside ponds or pools are filled in during channel and floodplain construction, this action would be offset by the creation of new pools and/or low-lying floodplain areas adjacent to the low flow channel.

1.2.8.d Reestablishing Riparian Vegetation

Banks and low floodplain terraces will be revegetated with willow, cottonwood, sycamore, box elder, elderberry, and other native riparian species. Special emphasis will be placed on revegetation with plant species which are appropriate for the restored bank or terrace elevation and moisture condition. The integration of top soil into the slope assists in the retention of moisture, and provides a more nutrient-rich medium for root development. In several of MPWMD's restoration areas the willows are sufficiently large that cuttings for other projects can be taken.

All graded slopes, including rip-rapped areas, will be revegetated with cuttings or seedlings on a four- to seven-foot grid. As a component of reestablishing native riparian cover, an irrigation system will be installed (if needed), operated, and maintained for a minimum of three years. If feasible, appropriate low-lying areas may be irrigated to provide refugia for wildlife. Weed removal would continue for a minimum of three years. MPWMD standards for the Carmel River include replanting of native riparian vegetation in areas that do not achieve a 70% success rate by year three after initial planting.

1.2.8.e Fisheries Habitat Enhancement

Improvement of degraded anadromous fisheries resources in the lower Carmel River watershed

has long been considered a primary goal of MPWMD's river restoration program. Several activities are proposed by MPWMD to enhance or restore steelhead habitat. Fish habitat enhancement projects include excavation of a pool and riffle sequence after reestablishment of a stream channel, placement of log and boulder groups at erosion protection locations to provide additional habitat, replacement of gravel material along the channel bottom, flood plain restoration, and revegetation of riparian habitat along the banks of the river. These actions will reduce the potential for bank erosion that degrades aquatic habitat and will increase the availability and quantity of rearing and spawning habitat.

The live plant material, logs, and rootwads incorporated with slope protection, including boulders, will enhance steelhead habitat. This material will provide shelter and cover for juveniles as well as substrate for macroinvertebrates.

Spawning gravels may be injected at various locations between Carmel Valley Village and the upstream limit of the RGP. These gravels will be delivered to the channel by dump trucks unloading gravel along the streambank and allowing high flows to distribute the gravels downstream. At restoration sites, contractors will be required to skim the top four- to twelve-inch layer of gravel and stockpile it, replacing it back onto the channel bed once the restoration work is completed. This results in the reestablishment of substrate suitable for spawning and macroinvertebrates.

Revegetation and irrigation will occur at streambank restoration sites as well as in areas impacted by water extraction. These efforts will occur throughout the riparian corridor along streambanks, in floodplain areas and occasionally in terrace areas. Plantings will include many of the woody riparian species found in the Carmel River drainage and several understory species.

1.2.8.f Vegetation and Woody Debris Management

Since Fall 1990, MPWMD has carried out annual channel maintenance projects along portions of the Carmel River to reduce the potential for bank erosion and to maintain channel capacity. Vegetation growth and sediment deposits trapped by vegetation can decrease hydraulic capacity of the river channel and increase the potential for bank erosion and damage to public infrastructure. MPWMD targets only woody plant material representing an erosion threat to streambanks and public infrastructure. In addition to erosion hazard reduction for property, channel maintenance objectives include removing trash and inorganic debris from the river channel, and maintaining aquatic habitat.

Under RGP 24460S, MPWMD proposes to modify or remove vegetation and wood from the channel bottom under a limited set of circumstances and with full recognition of and mitigation for impacts associated with such activity. These activities would follow MPWMD's Final Guidelines for Vegetation Management and Removal of Deleterious Materials for the Carmel River Riparian Corridor, March 2003. Streamside plants growing on adjacent riverbanks would not be affected. Vegetation cutting normally will be done by hand crews using hand tools and hand-held power tools. Some cut vegetation will be chipped on the terraces above the riverbank or utilized in MPWMD bank stabilization projects elsewhere along the river. Large

wood (defined here as four inches or greater in diameter or three feet or longer in length) may be modified under certain circumstances, but would be left in the channel.

1.2.8.g Maintenance of Previously Authorized Restoration Sites

One of the goals of MPWMD's river projects is to carry out works that will eventually need no maintenance or irrigation; however, floodplain development, two existing main stem dams, and water extraction practices disrupt restorative processes that would normally occur in the riparian zone after episodes of erosion. Restoration projects may require maintenance work either to repair flood damage or to stabilize a project after initial construction.

Maintenance work normally includes irrigation operation and repair, weed removal, and installation of supplemental plantings. For MPWMD-sponsored projects, MPWMD normally enters into a 10-year agreement with landowners to perform this type of activity. For privately sponsored projects, MPWMD requires maintenance for a three-year period, which is a generally accepted period for plant establishment.

Restoration projects using techniques that rely on streamside vegetation for erosion protection are vulnerable to damage from high flows in the first few years after plant installation. For this reason, repairs may be required to stabilize damaged areas. A combination of methods and techniques previously discussed would normally be used in repair work.

1.2.9 Avoidance and Minimization Measures for Adverse Impacts to Steelhead

The following descriptions of minimizing typical impacts from construction activities are presented to provide assistance to MPWMD and the applicants. The level of potential impacts and the correlated level of impact minimization measures needed for all projects are difficult to determine at this time. The descriptions of impact minimization measures are general guidelines with which proposed projects will be consistent as a requirement for being appended to a Biological Opinion. Nevertheless, site specific characteristics should dictate impact minimization practices deployed as the impact minimization practices described below are generalized and may not prevent adverse effects at specific projects.

Projects will be evaluated by NOAA Fisheries to determine if the impact minimization measures are sufficient to avoid or minimize adverse effects.

1.2.9.a Harassment from In-Water Construction or Activities

Generally, impacts from construction activities may be sufficiently minimized if they are conducted in the following manner:

1. The work window for construction projects shall be between June 15 and October 31 of each year.
2. Construction is in the dry stream channel by being separated from flowing water, or if the channel is dry seasonally by being conducted during the dry period.

3. Listed steelhead in the project area during construction activities are removed prior to the onset of activities.

1.2.9.b Dewatering or Water Diversions

Dewatering will result in an incremental temporary loss of steelhead habitat during the construction period. The following descriptions of typical impact minimization measures for dewatering are presented to provide assistance to the MPWMD and applicants. Generally, if project activities are conducted according to the principles below, impacts may be sufficiently minimized.

4. No redds are dewatered when eggs or alevins are present.
5. The stream channel is returned to its original state at the completion of dewatering and construction.
6. The duration of dewatering is minimal.
7. The dewatering method minimizes harassment, risk of mortality, risk of entrapment, and risk of stranding of steelhead.
8. Projects that require dewatering of the stream channel shall first avoid dewatering the entire channel in order to maintain passage for steelhead by methods such as the following examples: use of a washed, clean gravel berm slowly placed to displace steelhead without crushing any; inflatable bladders from behind which fish are chased away.
9. Projects requiring entire stream dewatering shall incorporate the installation of a coffer dam and temporary bypass channel, or other methods which minimize impacts to steelhead.
10. Channel and bank disturbances are first avoided, then minimized, during placement of the dewatering "structure".
11. Any wastewater from project activities and de-watering is disposed of off-site or in a location that will not drain directly into a stream channel or carry sediment-laden water into a stream channel.
12. The following measures will be taken to monitor and report the incidental take of listed steelhead:
    a. For projects involving dewatering, project proponents will use fisheries biologists familiar with identification and handling of all life stages of listed steelhead to monitor the specific project area.
    b. Prior to and during stream flow diversion and dewatering the biologist shall capture any steelhead that may become stranded in the residual wetted areas as a result of project activities, and relocate the individuals to the nearest suitable instream location immediately up- or downstream of the work area. All fish shall be moved promptly and transported in insulated containers filled with cool, well-oxygenated water. Fish will be captured, held and transported according to MPWMD's guidelines entitled Recommended Number of Juvenile Steelhead in 5-, 125-, and 400-Gallon Containers, at Loading Densities Ranging from 0.01 to 0.1 Kg/Kg (see **Attachment 1**).
    c. The fishery biologist shall note the number of individuals observed in the affected area, the number of individuals relocated, and the date and time of the collection and relocation. All efforts shall be taken to neither exhaust nor kill listed steelhead during

collection and relocation.

d. The fishery biologist shall be empowered to halt work activity during steelhead collection.
e. After construction, when water is returned to the construction area, the habitat will be accessible to steelhead.

1.2.9.c Construction Access and Temporary Stream Crossings

Potential impacts from construction activities can be avoided or minimized by following all appropriate minimization measures described in the Biological Opinion. Additionally, the following practices are necessary to minimize impacts:

13. The work window for construction projects is between June 15 and October 31 of each year.
14. Construction impacts are confined to the absolute minimum area necessary to complete the project, and the site rehabilitated prior to October 31 each year.
15. Damaged areas are restored to pre-work conditions. Where the site shall be revegetated or restored, top soil is stockpiled for re-distribution on the project area.
16. Temporary crossings shall pass all listed steelhead in the stream concurrent with the crossing.
17. Temporary crossings are removed prior to October 31 each year.
18. Flatcar bridges with preconstructed footings are used if they create less impacts than temporary culverts.

1.2.9.d Impediment to Upstream or Downstream Migration by Listed Steelhead During Water Diversion/Bypass Construction Activities

Generally, impacts from construction activities may be sufficiently minimized if they are conducted in the following manner:

19. Temporary migration impediments occur only during non-migratory periods.
20. The amount of time a temporary migration impediment is in place shall be restricted to the minimum necessary to complete the project.
21. If a bypass pipe is installed, depending on the site and potential impacts to listed steelhead from being in the bypass pipe, either screen the pipe, adhering to NOAA Fisheries screening criteria (NOAA Fisheries 1996; NMFS 1997), to prevent fish from entering, or use pipe that facilitates migration, for example, a pipe containing baffles and that is kept out of direct sunlight to prevent warming.

1.2.9.e Degradation of Water Quality and Channel Structure from Turbidity or Sediment Plumes, Petroleum Products from Machinery, Leachate from Material Used in the Water, and Fertilizers and/or Herbicides Used During Revegetation

Construction can produce significant sedimentation. The following descriptions are measures to minimize sediment delivery to streams from construction activities. The objective of effective sediment minimization practices is to reduce amounts of fine sediments delivered from a project to a stream to a level that is immeasurable and discountable in effects. If construction activities were conducted consistent with the following measures, sediment delivery may be minimized:

22. Construction occurs between June 15 and October 31.
23. Construction is avoided when eggs or alevin are in the gravels downstream.
24. Excavation in streambanks is isolated so that water is prevented from entering the excavated area until the project materials are installed and erosion protection is in place.
25. Effective erosion control measures are in-place at all times during construction. Construction within the 5-year floodplain begins with placement of all temporary erosion controls (e.g., straw bales, silt fences that are effectively keyed in) downslope of project activities within the riparian area. Erosion control structures are maintained throughout and possibly after construction activities.
26. Sediment is 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 are maintained so that no more than 15 cm of sediment depth accumulates within traps or sumps.
27. Sediment-laden water created by construction activity is filtered before it enters the stream network or an aquatic resource area.
28. A supply of erosion control materials (e.g., straw bales and clean straw mulch) is kept on hand to respond to unanticipated storm events or emergencies.
29. The use of end hauling is maximized to reduce the temporary stockpiling of earth to be removed from the project site.
30. Temporary stockpiling of earth during wet weather is avoided.
31. Concurrent with projects occurring during wet weather, erosion control (protection or stabilization) is used on stockpiles (all of which shall be temporary and unavoidable) and exposed soils. Soils will not be left exposed overnight; exposed soils will receive final erosion protection as soon as that area will not receive further disturbance, and all areas will be stabilized within 7 days of project completion or prior to forecasted rain, whichever is sooner. Movement of soil off of stock piles will be prevented by, for example, covering any temporary stockpiles with plastic sheeting or tarps; and/or installing a berm around the stockpile; and/or preventing the overland flow of water from upslope road or hillside from contacting stockpile; and by preventing any water-carrying material from a stockpile from entering the aquatic ecosystem.
32. Material removed during excavation is placed only in locations where it cannot enter stream networks. Conservation of topsoil (removal, storage and reuse) is employed.
33. Sediment wedges that may be released by a proposed project are removed to an upland location, placed in a location where they cannot enter stream networks or road drainages that are hydrologically connected to a stream and stabilized.
34. After project completion and prior to October 31, all exposed soil is stabilized, e.g. erosion control seeding and mulching. Placement of erosion control blankets and mats (if applicable) will occur within 7 days.
35. Efforts are made to cover exposed areas as soon as possible after exposure.
36. Temporary fill is removed in its entirety prior to October 31 of the year of activities.
37. Areas for fuel storage, and refueling and servicing of construction equipment and

vehicles, are located in an upland location.

38. All equipment that is used for in-water work is cleaned to remove external oil, grease, dirt and mud prior to placing the equipment in the water; wash sites are placed so that wash water does not flow into flowing waters or wetlands; equipment is in good condition showing no signs of leaking fuels or fluids.
39. Petroleum products, chemicals, fresh cement, or deleterious materials are not allowed to enter flowing waters.
40. Water contaminated by petroleum products, chemicals, fresh cement, or deleterious materials is not allowed to enter flowing waters.
41. In the event of a spill, the permittee stops work immediately, begins clean up and notifies the appropriate authorities.
42. Spill clean-up supplies, for example, absorbent booms (when working in live streams), are on site and operators know how to employ them.

1.2.9.f Loss of LWD and In-Channel Vegetation from Vegetation Management Activities

The following are descriptions of typical impact minimization measures and mitigation for in-channel vegetation and LWD removal. Generally, if project activities are conducted in the manner below, impacts may be sufficiently minimized.

43. The amount of in-channel vegetation removal is minimized to only what is necessary to reduce erosion and potential bank failure.
44. Only in-channel vegetation larger than 3" in diameter is removed.
45. Vegetation clearing is done with the use of hand tools and hand-held power tools.
46. Only LWD that poses a hazard to public facilities (i.e., bridges) is notched and left in the channel to break apart if mobilized; otherwise, all LWD is left undisturbed in the channel.
47. Heavy equipment, used to remove saplings and rootwads for salvage and replanting, operates only in the dry channel bed.
48. Compaction is minimized 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.

1.2.9.g Loss of Riparian Vegetation

The following descriptions are typical impact minimization measures and mitigation for riparian vegetation loss. Generally, if project activities are conducted in the manner below, impacts may be sufficiently minimized.

49. All native trees and brush are retained as feasible, emphasizing the shade-producing and bank-stabilizing trees and brush.
50. Project designs and access points are used that minimize riparian disturbance without affecting less stable areas which may increase the risk of channel instability.
51. Compaction is minimized 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.

52. At the completion of the project, soil compacted areas are decompacted.
53. Disturbed and decompacted areas are revegetated with native plant species. The species used shall be specific to the project vicinity, and comprise a diverse community structure (plantings should include both woody and herbaceous species).
54. A ratio of 3 plantings to 1 removed plant (3:1 ratio) is used.
55. Unless otherwise specified, the standard for success is 70% survival of plantings after a period of three years.
56. Broadcast planting of seed results in 70% ground cover after a period of three years.
57. Mitigation and restoration sites are monitored yearly in spring or fall months for three years. If there is not 70% survival after three years, all plants that have died are replaced during the next planting cycle (generally the fall or early spring) and monitored for a period of three years after planting.
58. If chemical fertilizers are applied, fertilizer does not enter the hydrologic network or is carried by runoff into the hydrologic network.
59. Herbicides are not applied in the project area, except at MPWMD irrigation sites only to control poison oak and non-native invasive species. Only the use of Rodeo or a technical grade of glyphosphate (without surfactant) will be allowed.

1.2.9.h Bank Hardening and Associated Habitat Loss and Long Term Channel Changes (Bank Stabilization, Rock Slope Protection, Gabion Baskets)

The following descriptions are typical impact minimization measures and mitigation for habitat loss associated with bank hardening practices. Generally, if project activities are conducted in the manner below, impacts may be sufficiently minimized.

60. The first choice of bank stabilization techniques shall be “soft” bioengineering methods. Rock slope protection (RSP) is used only as a last choice when bioengineering methods cannot provide adequate protection to infrastructures.
61. Very large angular rock is used to reduce chance of movement.
62. LWD is incorporated into the RSP.
63. Willow cuttings are staked through the RSP into the bank beneath.
64. RSP is terraced and trees are planted on the terraces.
65. Soil is imbedded into the interstitial spaces above ordinary high water (OHW) and planted with riparian vegetation.
66. RSP is designed with “hard points”. Instead of a solid linear wall of RSP along a length of streambank, rock groins are placed strategically in noncontiguous sections.
67. An underlay of gravel, biodegradable filter fabric or matting is sometimes appropriate for RSP.
68. Gabion baskets are used only on slopes eight feet above the toe of the channel in limited, steep areas (<1.5:1 slope) where alternative bank stabilization techniques would fail.

1.2.10 Avoidance and Minimization Measures for Adverse Impacts to California red-legged frogs

MPWMD recommends adopting the following minimization and mitigation measures, which are based primarily on modified terms and conditions provided by biological opinions previously issued to the Corps for projects along the Carmel River (1-8-96-F-42; 1-8-F-98-65) and subsequently revised by the MPWMD through coordination with the U.S. Fish and Wildlife Service (Service). Projects must be substantially in conformance with the goals, descriptions, and standards as described in the application to the Corps dated May 1999 and the Public Notice dated July 14, 2000.

69. Prior to or during submission of projects proposed to be implemented within the following year, the MPWMD would submit to the Service the qualifications of the biologist(s) who will conduct the activities as identified in the minimization and mitigation measures below. The Service shall approve the biologist(s), and shall approve any personnel who may be hired in the future to conduct activities associated with California red-legged frog mitigation. Only approved biologists shall be authorized to handle California red-legged frogs. Prior to handling any California red-legged frogs, these individuals shall be trained to handle the species by a qualified herpetologist familiar with ranids, if necessary.

70. For each proposed project, the MPWMD would conduct an assessment of California red-legged frog habitat within the proposed work area according to habitat assessment forms developed by the MPWMD. This assessment includes documentation of incidental observations of California red-legged frogs. The results of the habitat assessment would be submitted to the Service along with other project-related information. For activities within a designated critical habitat reach, the MPWMD shall include a review of the primary constituent elements of critical habitat for the California red-legged frog. The habitat assessment shall extend a minimum of one pool and riffle sequence up and downstream of the work area (i.e., through the end of the closest pools up and downstream of the project site). The MPWMD would also provide an assessment of potential impacts to habitat from proposed activities. The MPWMD or Service-approved biologists would conduct habitat assessments. The proposed field habitat assessment forms are included as **Attachment 2.**

71. For all project-related construction activities that occur within the channel and the floodplain, a Service-approved biologist shall survey the work area twice at night and twice in daylight hours using the Service's protocol for field surveys of California red-legged frogs dated February 18, 1997, within one week before the onset of activities. Should the survey protocol be revised by the Service, the MPWMD shall use the updated protocol, as recommended by the Service. The survey shall extend a minimum of one pool-riffle sequence up and downstream of the work area. If California red-legged frogs are found, the approved biologist shall contact the Service to determine if moving of adults is appropriate. In making this determination the Service shall consider if an appropriate relocation site exists. If the Service approves moving animals, the approved biologist shall be allowed sufficient time to move California red-legged frogs from the work site before work activities begin. Only Service-approved biologists shall participate in activities associated with the capture, handling, and monitoring of California red-legged frogs. If feasible, MPWMD shall tag relocated animals. Tagging

methods shall not include permanent removal of any parts or disfigurement of any parts of the body.

72. Project activities shall be completed primarily between July 1 and October 31, with exceptions noted in measure 73 below, which begins with "Activities that may be completed outside of the proposed July 1 and October 31 work period…". For activities proposed to be conducted between July 1 and October 31, the following measures will be taken.

    a. If any California red-frogs are observed during pre-construction surveys within a particular work site, relocation is determined to be inappropriate and/or if tadpoles are observed, the area shall be inspected by a Service-approved biologist for California red-legged frogs daily prior to the onset of activities. If any California red-legged frogs are detected during daily inspections, the approved biologist shall delay work activities until they move or are removed from the immediate work site.
    b. If relocation of California red-legged frogs is determined to be appropriate prior to the onset of construction, a Service-approved biologist shall be present at the work site until such time as all removal of California red-legged frogs, instruction of workers, and habitat disturbance have been completed. After this time, the contractor or permittee shall designate a person to monitor on-site compliance with all minimization measures. The Service-approved biologist shall ensure that this individual receives training in carrying out monitoring and identification of California red-legged frogs as described in measure 72.a. The monitor and the Service-approved biologist shall have the authority to halt any action that might result in impacts that exceed the levels anticipated by the Corps and Service during review of the proposed action. If work is stopped, the Corps and Service shall be notified immediately by the Service-approved biologist or on-site biological monitor.

73. Activities that may be completed outside of the proposed July 1 and October 31 work period consist of those described below.
    a. Revegetation of graded areas with construction equipment shall be completed within a year following project implementation, provided the following measures are taken: work shall not occur within or adjacent to the flowing stream or in standing water; no existing native vegetation will be removed or disturbed; a Service-approved biologist shall inspect the restoration site for the presence of California red-legged frogs prior to the onset of revegetation activities, and; if any California red-legged frogs are detected, the approved biologist shall stop work activities until they move out of the work site or are relocated.
    b. During revegetation activities with construction equipment, additional inspections of a work site for the presence of California red-legged frogs by a Service-approved biologist may be required if weather conditions change in a manner that may cause individuals to move into or through the site (i.e., during rainy conditions). The Service shall be contacted prior to the onset of such activities to determine whether additional inspections (e.g., on a daily basis) by a Service-approved biologist should be required.
    c. No work will occur within 25 feet of any area known to be occupied by California

red-legged frogs or known to provide breeding habitat, unless otherwise approved by the Service.

d. Revegetation by hand methods may be conducted at any time by MPWMD biologists and/or restoration maintenance staff.
e. Monitoring, including such activities as surveys for topography, water and sediment movement, wildlife, and vegetation may be conducted at any time. Such surveys shall use passive methods.

74. Should the proponent or applicant demonstrate a need to conduct activities beyond the July 1 to October 31 work period, in addition to those specified in the previous measure, such activities may be authorized after obtaining the Service's approval.

75. Prior to implementation of any construction activities, a MPWMD or Service-approved biologist shall conduct a training session for all construction personnel. At a minimum, the training shall include a description of the California red-legged frog and its habitat, the importance of the California red-legged frog and its habitat, the general measures that are being implemented to conserve the California red-legged frog as they relate to the project, and the boundaries within which the project may be accomplished. Brochures, books and briefings may be used in the training session, provided that a qualified person is on hand to answer any questions.

76. During project activities, all trash that may attract predators shall be properly contained, removed from the work site and disposed of regularly. Following construction, all trash and construction debris shall be removed from work areas.

77. All fueling and maintenance of vehicles and other equipment and staging areas shall occur at least 20 meters from any riparian habitat or water body. The permittee shall ensure contamination of habitat does not occur during such operations. Prior to the onset of work, the permittee must prepare a plan to allow a prompt and effective response to any accidental spills. All workers shall be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur.

78. Prior to beginning construction activities, final design plans shall be reviewed by the MPWMD. Final design plans shall incorporate restoration of natural channel morphologic features including, but not limited to shallow floodplains, backwater areas, off-channel ponds, pool-riffle sequences, and meanders, to the extent possible. Structural protection, such as rip-rap or similar hard streambank lining, shall be minimized and shall include features to enhance aquatic habitat, such as rootwads and live vegetation.

79. To the maximum extent possible, existing vegetation shall be preserved during construction activities. Existing vegetation in areas that receive fill material for stream bank repair or stabilization shall not be removed except for trimming to provide equipment access to place fill material. No trees shall be removed from these areas for access or during grading or placement of rip-rap. Vegetation trimmings shall either be stockpiled for use in revegetation or shall be disposed of off-site. In areas where soil is removed, vegetation shall be salvaged and shall be placed in areas that receive fill

material as near to the surface of the fill as possible.

80. A planting and monitoring plan shall be included with the final project design for review and approval by the MPWMD. Such a plan would include the location of the proposed restoration, species to be used, restoration techniques, time of year the work would be done, identifiable success criteria for completion, and remedial actions if the success criteria are not achieved. Project sites shall be revegetated with an appropriate assemblage of native riparian and upland vegetation suitable for the area. Plants shall be selected from a species list maintained by the MPWMD. The details of a monitoring program will depend on the nature and extent of habitat disturbance.

81. A MPWMD or Service-approved biologist shall ensure that the spread or introduction of invasive exotic plant species shall be avoided to the maximum extent possible. When practicable, invasive exotic plants in the work areas shall be removed.

82. The number of access routes, number and size of staging areas, and the total area of the activity shall be limited to the minimum necessary to achieve the project goal. Routes and boundaries shall be clearly demarcated, and these areas shall be outside of riparian and wetland areas. Where impacts occur in these staging areas and access routes, restoration shall occur as identified in measures 79, which begins "Prior to beginning construction...," and 80, which begins "To the maximum extent possible..." above.

83. To control erosion during and after project implementation, the applicant shall implement best management practices, as identified by the appropriate Regional Water Quality Control Board or the Monterey County Planning and Building Inspection Department.

84. If a work site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than five millimeters to minimize the risk of California red-legged frogs entering the pump system. Water shall be released or pumped downstream at an appropriate rate to maintain downstream flows during construction. Upon completion of construction activities, any barriers to flow shall be removed in a manner that would allow flow to resume with the least disturbance to the substrate.

85. A MPWMD or Service-approved biologist shall permanently remove, from within the project area, any individuals of exotic species, such as bullfrogs, crayfish, and centrarchid fishes, to the maximum extent possible. The permittee shall have the responsibility to ensure that their activities are in compliance with all local, State, and Federal laws, ordinances, and statutes.

1.2.11 Reinitiation of Formal Consultation

Activities proposed for this RGP address a certain range of the dynamic behavior of the river; however, analysis of the effects of these activities on threatened species is based primarily on past experience and present river conditions. Reinitiation of formal consultation may be required

if changes to the river and threatened species occur that are not considered for this RGP.

Rivers are the most actively changing of all geomorphic forms and the Carmel River is no exception. Rather, the Carmel River may be one of the more dynamic rivers for its size, as the Mediterranean climate has a wide range of extremes. Adding to this basic dynamic is the near-term potential for two significant environmental changes due to structural changes in the water supply system for the Monterey Peninsula, which are discussed below. Either change could result in both positive and negative changes to habitat and Federally threatened species and may lead to a reinitiation of formal consultation.

San Clemente Dam Retrofit Project

The San Clemente Dam and Reservoir, built in 1921, does not meet current earthquake safety standards and is near the end of its useful life as a water supply, due to sedimentation in the reservoir. Several alternatives to retrofit this main stem dam are under discussion. These range from buttressing the existing dam and leaving it in place to complete removal of the existing dam. All alternatives currently under discussion will result in an increased supply of sediment downstream of the dam, as the reservoir will no longer act as sediment sink. The effect of this supply increase on habitat and sensitive species will depend on the quality, quantity, and travel time of the sediment passed downstream of the dam. It is beyond the scope of this project description to give a detailed analysis of the potential effects from a retrofit project. However, effects of past episodes of erosion and sedimentation give a starting point in describing potential effects.

Under what might be described as the "best" of circumstances, impacts could be short-term (a few years) and result in a slug of fine material quickly passing through the riverbottom before gravel and cobble is passed downstream. Past episodes of erosion indicate that such a condition temporarily reduces steelhead spawning areas and probably reduces food production in the river bottom substrate while fine material passes over the river bottom. However, once the supply of fine material is exhausted, normal riverflows can reestablish habitat suitable for steelhead, often within one or two winter seasons. Moreover, fine material deposited at stream margins encourages rapid development of emergent wetland species and woody riparian vegetation.

At the other end of the range of effects, an increased supply of sediment could overwhelm the transport capacity of the river for an extended period and result in extensive braiding, increased bank erosion, loss of riparian vegetation, decrease in spawning and rearing habitat, decrease in conveyance, and damage to public and private infrastructure. Episodic erosion in the 1978-83 period translated downstream for nearly 25 years and resulted in significant long term impacts to habitat and flood conveyance.

This RGP has an annual limit that is focused on addressing problems on a reach-oriented scale, but not over the entire river. Changes to the river that occur in short stretches or over a relatively long period (five to ten years) can be addressed under this RGP. However, rapid change over a large portion of the river would need a different management strategy that may require reinitiation of formal consultation with Federal agencies.

Water Supply Alternatives

The Monterey Peninsula is under an order (95-10) from the California State Water Resources Control Board to substantially reduce water extraction from the Carmel Valley. When this order is complied with it will result in more streamflow, especially in the critical summer and fall months when typically little or no rain falls. A reduction in water extraction is not likely to have an immediate effect on the scope of activities in this RGP. Changes to the river environment from an increase in streamflow are likely occur over several years.

Increased streamflow, especially in lower portions of the river, is likely to encourage encroachment of vegetation into the channel bottom. This may require additional or different types of vegetation management. Should this occur, reinitiation of formal consultation with Federal agencies may be required.

With an increase in streamflow, the need for restoration and repair activities may slowly decrease. However, stream instability is influenced by many factors, including floodplain encroachment and the retention of sediment at Los Padres Dam and Reservoir. These two influences, in particular, are not likely to change in the foreseeable future and represent significant barriers to restoring a natural stream regime.

Recommended Number of Juvenile Steelhead in 5-, 125-, and 400-gallon Containers, at Loading Densities Ranging from 0.01 to 0.1 Kg/Kg.

Forklength (mm)	Forklength (in)	Weight (gm)	NUMBER OF FISH PER CONTAINER								
			5-Gallon Bucket			125-Gallon Tank			400-Gallon Tank		
			Loading Density 0.01	Loading Density 0.05	Loading Density 0.1	Loading Density 0.01	Loading Density 0.05	Loading Density 0.1	Loading Density 0.01	Loading Density 0.05	Loading Density 0.1
50	2.0	1.4	99	493	987	3,084	15,418	30,838	9,869	49,337	98,675
55	2.2	1.8	74	369	737	2,304	11,517	23,037	7,372	36,856	73,713
60	2.4	2.4	56	282	565	1,765	8,825	17,652	5,649	28,241	56,482
65	2.6	3.1	44	221	442	1,382	6,908	13,817	4,422	22,106	44,212
70	2.8	3.9	35	176	352	1,101	5,506	11,014	3,525	17,621	35,242
75	3.0	4.8	28	143	285	892	4,458	8,918	2,854	14,267	28,534
80	3.1	5.8	23	117	234	732	3,659	7,320	2,342	11,710	23,421
85	3.3	7.0	19	97	195	608	3,040	6,080	1,946	9,727	19,455
90	3.5	8.3	16	82	163	510	2,552	5,105	1,634	8,167	16,333
95	3.7	9.8	14	69	138	433	2,163	4,326	1,384	6,921	13,843
100	3.9	11.5	12	59	118	370	1,849	3,698	1,183	5,916	11,832
105	4.1	13.4	10	51	102	318	1,592	3,185	1,019	5,095	10,191
110	4.3	15.4	9	44	88	276	1,381	2,762	884	4,419	8,839
115	4.5	17.7	8	39	77	241	1,205	2,411	772	3,857	7,715
120	4.7	20.1	7	34	68	212	1,058	2,117	677	3,386	6,773
125	4.9	22.8	6	30	60	187	934	1,868	598	2,989	5,977
130	5.1	25.7	5	27	53	166	828	1,657	530	2,651	5,301
135	5.3	28.8	5	24	47	148	738	1,476	472	2,362	4,723
140	5.5	32.2	4	21	42	132	660	1,321	423	2,113	4,226
145	5.7	35.9	4	19	38	119	593	1,186	380	1,898	3,796
150	5.9	39.8	3	17	34	107	535	1,069	342	1,711	3,421
155	6.1	44.0	3	15	31	97	484	967	310	1,547	3,095
160	6.3	48.5	3	14	28	88	439	878	281	1,404	2,808
165	6.5	53.3	3	13	26	80	399	799	256	1,278	2,556
170	6.7	58.4	2	12	23	73	364	729	233	1,166	2,333
175	6.9	63.8	2	11	21	67	334	667	214	1,067	2,135
180	7.1	69.5	2	10	20	61	306	612	196	979	1,958
185	7.3	75.6	2	9	18	56	281	563	180	900	1,801
190	7.5	82.0	2	8	17	52	259	519	166	830	1,660
195	7.7	88.8	2	8	15	48	240	479	153	767	1,533
200	7.9	96.0	1	7	14	44	222	443	142	709	1,419
205	8.1	103.5	1	7	13	41	206	411	132	658	1,315
210	8.3	111.4	1	6	12	38	191	382	122	611	1,222
215	8.5	119.8	1	6	11	36	178	355	114	569	1,137
220	8.7	128.5	1	5	11	33	166	331	106	530	1,060
225	8.9	137.6	1	5	10	31	155	309	99	495	989
230	9.1	147.2	1	5	9	29	145	289	93	463	925
235	9.3	157.2	1	4	9	27	135	271	87	433	866
240	9.4	167.7	1	4	8	25	127	254	81	406	812
245	9.6	178.6	1	4	8	24	119	238	76	381	762
250	9.8	190.0	1	4	7	22	112	224	72	358	717
255	10.0	201.9	1	3	7	21	105	211	67	337	675
260	10.2	214.2	1	3	6	20	99	199	64	318	636
265	10.4	227.1	1	3	6	19	94	187	60	300	600
270	10.6	240.5	1	3	6	18	88	177	57	283	566
275	10.8	254.3	1	3	5	17	84	167	54	268	535
280	11.0	268.8	1	3	5	16	79	158	51	253	507
285	11.2	283.7	0	2	5	15	75	150	48	240	480
290	11.4	299.2	0	2	5	14	71	142	46	228	455
295	11.6	315.3	0	2	4	13	67	135	43	216	432
300	11.8	331.9	0	2	4	13	64	128	41	205	410

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MPWMD California Red-legged Frog Habitat Assessment/Carmel River

SITE/RIVER MILE: GPS WAYPOINT:

DATA COLLECTOR:

DATE: Time and Weather:

LIMITING FACTORS FOR CALIFORNIA RED-LEGGED FROGS AT DIFFERENT LIFE HISTORY STAGES												
Habitat Characteristics	**Egg and Tadpole**			**Young-of-Year or Juvenile** (Tail-stub or SNVL 4 cm)			**Adult (Resident)**			**Adult (Temporary Hydration)**		
Seasonality of water (in a normal rainfall year)	Water depth less than 20 cm (8 in) and dry before July 1	**Y**	**N**	Water dry before July 1	**Y**	**N**	Water dry before July	**Y**	**N**		**Y**	**N**
Flushing Flows (moving water strong enough to scour eggs or tadpoles)	Flushing flows during or after the month of March	**Y**	**N**	Flushing flows or areas without slow moving water after the month of June	**Y**	**N**		**Y**	**N**		**Y**	**N**
Water Salinity (coastal lagoon environments)	Greater (>) 4.0 ppt by April, > 6.5 ppt by the end of June. (>7.5 ppt by August only if tadpoles still present)	**Y**	**N**	>7.5 ppt year round or between March and September	**Y**	**N**	>9.0 ppt year round or between March and September	**Y**	**N**	Temporary water sources with surface salinity >9.0 ppt	**Y**	**N**
Water Temperature	Above 25 C	**Y**	**N**	Above 29 C	**Y**	**N**	Above 29 C	**Y**	**N**	Above 29 C	**Y**	**N**
Other (**Explain)**	_____	**Y**	**N**	_____	**Y**	**N**	_____	**Y**	**N**		**Y**	**N**
LIMITING FACTOR	**Egg and Tadpoles**	**Y**	**N**	**Young-of-Year/Juv**	**Y**	**N**	**Resident Adult**	**Y**	**N**	**Temporary Adult**	**Y**	**N**

NOTES:

REFERENCES:

Reis, Dawn, K. 1999. Habitat characteristics of California red-legged frog (*Rana aurora draytonii*): Ecological Differences between eggs, tadpoles and adults in a coastal brackish and freshwater system. Masters Thesis. San Jose State University, San Jose, CA.

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SITE/RIVER MILE: **Page 2 of 3**

DATE:

HABITAT QUALITY FOR CALIFORNIA RED-LEGGED FROGS AT DIFFERENT LIFE HISTORY STAGES CIRCLE IF PRESENT and TALLY COLUMNS				
Habitat Characteristic	**Egg and Tadpole** Circle items in column if present between Jan-Jul	**Young-of-Year or Juvenile** (Tail-stub or SNVL 4 cm) Circle items in column if present between Jul-Sept	**Adult (Resident)** Circle items in column if present between all year	**Adult (Temporary Hydration)** Circle items in column if present seasonally
Water depth	Shallow water depth (0.2m to 0.5m)	Both shallow and moderate depth (0.2 m to 1 m)	Deep water (> 1m) perennially	Deep water (> 1m) Seasonally
Predators (1)	No adult bullfrogs	No adult bullfrogs	No adult bullfrogs	No or few adult bullfrogs
Predators (2)	No bullfrog reproduction	No bullfrog reproduction	No bullfrog reproduction	No bullfrog reproduction
Predators (3)	No fish or crayfish	No fish or crayfish	No fish or crayfish	No or few or crayfish
Cover (1) Aquatic vegetation	Presence of **sub**mergent (rooted aquatic plants) especially high oxygenating plants (e.g. *Potamogeton*. sp.)	**Low** to **moderate** cover of **e**mergent vegetation and/or **moderate** to **high sub**mergent vegetation.	**Moderate** cover of **e**mergent vegetation and/or **moderate** to **high sub**mergent vegetation.	**Moderate** cover of **e**mergent vegetation and/or **moderate** to **high sub**mergent vegetation.
Cover (2)	Deep mud substrate or benthic algae for cover	Deep mud substrate or algae mats for cover	Deep mud substrate or algae mats for cover	Deep mud substrate or algae mats for cover
Cover (4) Upland cover near water's edge	N/A	Under-cut bank, dense veg., or wood (logs, tree roots with craw space for frogs)	Under-cut bank, dense veg., or wood (logs, tree roots with craw space for frogs)	Under-cut bank, dense veg., or wood (logs, tree roots with craw space for frogs)
Other (Explain)				
Ranking: 1 to 2 = low 3 to 4 = moderate over 5 = excellent	Numbered Circled_____ 1 to 2 = low 3 to 4 = moderate over 5 = excellent	Numbered Circled_____ 1 to 2 = low 3 to 4 = moderate over 5 = excellent	Number Circled _____ 1 to 2 = low 3 to 4 = moderate over 5 = excellent	Number Circled_____ 1 to 2 = low 3 to 4 = moderate over 5 = excellent

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SITE/RIVER MILE: **Page 3 of 3**

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DESCRIPTIVE INFORMATION

# CRLF Observed focused surveys conducted? **Y N**	Eggmass:_____ Tadpoles: _____ Young-of Year: _____ Juvenile: _____ Adult _____
Other Amphibians	**Circle if present** Bullfrog adult juvenile tadpole eggs Tree frog adult juvenile tadpole eggs Western toad adult juvenile tadpole eggs Other _____adult juvenile tadpole eggs
Aquatic Habitat Type	**Circle**: Pond Year-round Seasonal Size_____ River-main stem Year-round Seasonal Size_____ Tributary/Creek Year-round Seasonal Size_____ Off channel pocket pool Year-round Seasonal Size_____ Other _____ Year-round Seasonal Size_____
Aquatic Habitat Features	Aquatic Substrate_____ Submergent species and % cover _____ Emergent species and % cover _____
Upland Habitat	Habitat type/species from water's edged to 500 ft._____ Circle if present: leaf litter mammal burrow woody debris
Water Quality Velocity/Temp	Time Depth (m) Temp (c) Gage (if present) (surface)0.0m _____ Flow 0.25m _____Bottom Depth (m) _____ _____

PHOTOS:

OTHER NOTES: