United States Department of the Interior

FISH AND WILDLIFE SERVICE

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In reply refer to:
1-1-03-F-273

AUG 17 2004

Mr. Calvin C. Fong
Chief, Regulatory Branch
(Attn: Mark D'Avignon)
U.S. Army Corps of Engineers
San Francisco District
333 Market Street
San Francisco, California 94105-2197

Subject: Programmatic Formal Endangered Species Consultation on the Regional General Permit for California Department of Fish and Game Anadromous Fisheries Restoration Grants Program, Corps Permit No. 27922N and 22323N

Dear Mr. Fong:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of the U.S. Army Corps of Engineers' (Corps) proposed issuance of a Regional General Permit, pursuant to section 404 of the Federal Water Pollution Control Act, as amended (Clean Water Act), authorizing projects funded by the California Department of Fish and Game (CDFG) Fisheries Restoration Grant Program (Program) in Alameda, Contra Costa, Lake, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma counties, California. At issue are the effects of the proposed action on the endangered California freshwater shrimp (*Syncaris pacifica*) (shrimp) and threatened California red-legged frog (*Rana aurora draytonii*) red-legged frog. This document does not address project effects on the San Francisco garter snake (*Thamnophis sirtalis tetratenia*). Your July 30, 2003, request to initiate consultation was received in our office August 1, 2003. This document is provided in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act).

In your letter dated July 30, 2003, you requested our concurrence that the proposed authorization is not likely to adversely affect the shrimp, red-legged frog or its proposed critical habitat, threatened marbled murrelet (*Brachyrampus marmoratus*), threatened northern spotted owl (*Strix occidentalis caurina*), endangered Sonoma County Distinct Population Segment (DPS) and proposed threatened Central California DPS of the California tiger salamander (*Ambystoma californiense*), and the endangered least Bell's vireo (*Vireo bellii pusillus*). You reached this conclusion based on the proposed implementation of several measures intended to avoid effects to these species from project activities.

We concur with your determination that the proposed authorization may affect, but is not likely to adversely affect, the marbled murrelet and northern spotted owl. Our concurrence is based on the following factors:

1. Qualified biologists will conduct protocol surveys for spotted owls and marbled murrelets at proposed project sites which contain potential habitat;

2. Work will not be conducted within 0.25 mile of any site with known or potential marbled murrelet habitat between November 1 and September 15, or known or potential spotted owl habitat between November 1 and July 31. If protocol surveys determine that nesting spotted owls or marbled murrelets do not occur within 0.25 mile of a specific project site, project activities at that site may commence prior to September 15; and

3. Project activities will not remove or degrade suitable spotted owl or marbled murrelet habitat.

We concur with your determination that the proposed authorization may affect, but is not likely to adversely affect, the least Bell's vireo. Our concurrence is based on the following factors:

1. Protocol surveys for least Bell's vireo will be conducted at proposed project sites by a qualified biologist knowledgeable in least Bell's vireo identification and biology;

2. Work will not begin within 0.25 mile of any site with known or potential least Bell's vireo habitat until after September 15; and

3. Willow branches will not be harvested at any site with potential least Bell's vireo habitat between March 1 and September 15.

We concur with your determination that the proposed authorization may affect, but is not likely to adversely affect, the California tiger salamander. Our concurrence is based on the following factors:

1. Most of the proposed projects will occur in or near streams and riparian corridors;

2. Upslope projects will be limited to road upgrading and decommissioning in areas that are steep, eroding, and often vegetated with trees and shrubs; and

3. California tiger salamanders use ponds and vernal pools for breeding, and existing burrows in grassland habitat for estivation. Neither of these habitat types is usually located in proximity to anadromous fish-bearing streams.

We concur with your determination that the proposed authorization may affect, but is not likely to adversely affect, proposed critical habitat for the red-legged frog. Our concurrence is based on the following factors:

1. Projects implemented under the proposed authorization will not damage or deteriorate any of the primary constituent elements (essential aquatic habitat, associated upland habitat, and dispersal habitat) of the proposed critical habitat as defined in the proposed designation (69 **FR** 19620);

2. Restoration projects implemented under the proposed authorization within proposed critical habitat units will likely improve the quality of red-legged frog habitat in these areas. This will improve the function and productivity of the proposed critical habitat units for red-legged frogs; and

3. Restoration projects implemented under the proposed authorization will revitalize degraded or impaired aquatic and riparian habitats. This will provide a long-term benefit to the shrimp and red-legged frog, and result in higher quality habitat in dispersal corridors and core areas.

We do not concur with your determination that the proposed authorization may affect, but is not likely to adversely affect, the shrimp and the red-legged frog. We believe that the proposed authorization may adversely affect these species. Factors contributing to this determination are the proposed relocation of shrimp and red-legged frogs project areas and use of heavy equipment in or near shrimp or red-legged frog habitat. The Service believes that these activities may adversely affect them and thereby warrant formal consultation. No critical habitat has been designated for the shrimp.

This biological opinion is based on information provided in (1) The June 25, 2003, Corps Pubic Notice; (2) the 2003 Mitigated Negative Declaration for the Fisheries Restoration Grant Program; (3) numerous emails from Fish and Game to Cecilia Brown of the Service; and (4) information in Service files. A complete administrative record of this consultation is on file in this office.

Consultation History

In your letter requesting our concurrence, you requested initiation of formal consultation if the Service did not concur with your determination. Therefore, we considered your July 30, 2003, letter to be a request for initiation of formal consultation on the potential effects of the proposed authorization on the shrimp and the red-legged frog. During this process, several conference calls were held between staff members of the Corps, CDFG, National Marine Fisheries Service, and the Service to clarify the Corps' effects determinations, project description, and proposed protective measures. On May 8, 2004, the Corps and the CDFG provided us with the final information necessary to proceed with this consultation (CDFG 2004).

BIOLOGICAL OPINION

Description of the Proposed Action

The Corps proposes to issue a Regional General Permit authorizing the CDFG to fund and carry out various salmonid habitat enhancement and restoration projects through implementation of the Program. The Regional General Permit would have a term of 5 years from the date of authorization. Program activities are proposed annually for various watersheds throughout Alameda, Contra Costa, Del Norte, Glenn, Humboldt, Lake, Marin, Mendocino, Monterey, Napa, San Benito, San Francisco, San Luis Obispo, San Mateo, Santa Clara, Santa Cruz, Siskiyou, Solano, Sonoma, Trinity, and Ventura counties. The Corps' proposed authorization addressed by this consultation would apply only to Program projects in counties within the regulatory jurisdictional boundaries of the Corps' San Francisco District. Of the resulting geographic area, the Sacramento Fish and Wildlife Office has regulatory purview only over Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma Counties. Therefore, this consultation pertains only to Program projects utilizing the proposed authorization that are executed in Alameda, Contra Costa, Lake, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma counties, with the exception of streams, ponds, wetlands, and uplands in San Mateo County which are within the range of the San Francisco garter snake. Projects conducted under this permit within the range of the San Francisco garter snake are not analyzed in this opinion and require separate consultation.

Individual restoration projects would involve the application of one or more of the restoration treatments described in Parts VII, IX, X and XI of the California Salmonid Stream Habitat Restoration Manual (Restoration Manual) (CDFG 2002) with the exception of dam removal. Dam removal activities are not addressed in this consultation due to the varying potential effects of sediment mobilization and require separate consultation.

All projects would be restricted to, and carried out in accordance with, techniques identified in the Restoration Manual. The following descriptions of restoration treatments are summarized from the Restoration Manual; these descriptions are not intended to be exhaustive. For more detailed information on specific project methods, Parts VII, IX, X and XI of the Restoration Manual is hereby incorporated by reference. In the following discussion, use of heavy equipment refers to one or more of the following types: hydraulic excavator, front-end loader, self-propelled logging yarder, or backhoe. The following projects and treatments are among those proposed:

1. Instream Habitat Improvements

    a. Installation of cover structures such as logs, root wads, tree bundles, and boulders using heavy equipment. Cover structures are used to increase the quality of pool habitat in a stream.

b. Installation of boulder structures such as boulder weirs, boulder clusters, and boulder wing-deflectors using heavy equipment. Boulder structures are used to break up or diversify stream flow in a particular stream reach, to provide instream cover for juvenile salmonids and spawning adults, or to recruit spawning gravel.

c. Installation of log structures such as log weirs, log wing-deflectors, divide logs, digger logs, and Hewitt ramps using heavy equipment and manual labor. Log structures are used to provide instream cover for juvenile salmonids and spawning adults, to scour pools for rearing habitat, to recruit spawning gravel, and to stabilize eroding stream banks.

d. Placement of spawning gravel using heavy equipment. Gravel would be clean, creek-run ranging from 0.5 inch to 4 inches in diameter.

e. Installation of fish screens at water diversion intake sites. Fish screens are used to prevent entrainment of juvenile salmonids and other wildlife in water diverted for agriculture, power generations, or domestic use on both gravity flow and pump diversion systems. Fish screens typically consist of perforated metal plate or mesh material with openings sized to prevent entrainment of aquatic wildlife.

2. Fish Passage

a. Modification of obstructions such as log jams or beaver dams would be conducted to facilitate fish passage. Log barriers would be modified using either manual labor or heavy equipment.

b. Modification of waterfalls and chutes would be conducted by blasting resting pools into bedrock, forming a step-and-pool passage for fish.

c. Modification of landslides would be conducted using either manual labor or heavy equipment such as a hydraulic excavator.

d. Man-made obstructions such as dams, sills, and culverts would be addressed through construction of fishways such as step-and-pool, Denil ladders, and Alaskan steep-pass fishways.

e. Culvert modification would involve either construction of back-flooding weirs downstream of the culvert outflow, or installation of baffles within the culvert.

3. Watershed and Stream Bank Stabilization

a. Boulder riprap to armor stream banks would be installed using heavy equipment such as a hydraulic excavator or backhoe. A gravel blanket or geotextile fabric would be placed on the soil in the area to be covered by riprap. Riprap would be

installed beginning in a trench dug at the toe of the bank, and extending up the stream bank to the bankfull discharge level.

b. Log stream bank stabilization structures such as cribbing or bank armoring would be installed using heavy equipment. Log structures may also be installed using manual labor in areas without access for heavy equipment. These structures would be installed by stacking logs against the stream bank and securing them using threaded rebar and/or steel cable. Base logs are placed in a toe trench below stream grade. When installing log cribbing, tieback logs are imbedded 4-6 feet into the slope perpendicular to the direction of stream flow. When installing log bank armoring, metal fence posts, culvert stakes, or 'deadman' structures would be substituted for tieback logs.

c. Tree revetments would be used to stabilize vertical, eroding stream banks in low gradient meadow streams. Trees would be cut and laid against the vertical bank, using either heavy equipment or manual labor, with the tree tops angling downstream. Tree bases would be tied off to the upper stream bank. Branches slow the water velocity and cause suspended sediment to settle, allowing banks to rebuild and vegetation to re-establish.

d. Mulching for erosion control would be conducted by applying weed-free straw or forest leaf litter to bare soil.

e. Revegetation would be accomplished by transplanting, planting container-grown or bare root stock, or sprigging (inserting cut stakes of willow or cottonwood). Transplanting would typically be done using hand excavation. In hard soils an iron bar or power auger would be used to bore planting holes for cut stakes; otherwise, cut stakes would be driven into the soil by hand.

f. Willow wall revetments, brush mattresses, and willow siltation baffles would also be used to stabilize and revegetate degraded stream banks. These treatments would involve combinations of the following: excavation of a trench at the toe of the stream bank, installation of willow poles perpendicular to the stream bank, weaving willow branches throughout the standing willow poles, or placing and compressing willow branches on the stream bank's soil surface parallel to the stream channel.

g. Check dams are small dams (less than 10 feet in height) that would be installed across small drainages to reduce water velocity and trap sediment. Check dams would be constructed using straw bales, rock, brush, small trees, redwood boards, or compacted earth.

h. Water bars would be installed as a temporary means of breaking surface flow over sloped sections of road using hand tools or heavy equipment. Water bars consist

of a shallow ditch and rounded berm, less than 2 feet in height, placed diagonally across a road surface.

i. Exclusionary fencing would be installed to prevent livestock from overgrazing riparian vegetation, reducing water quality, and compromising stream bank integrity. Fencing would be constructed approximately parallel to the stream channel, with a setback of at least 25 feet from the top of the stream bank.

Minimization Measures

The CDFG proposes to implement the following measures to minimize adverse effects to the red-legged frog and its habitat (CDFG 2004):

1. At least 15 days prior to the onset of activities, the CDFG will submit the name(s) and credentials of biologists who would conduct activities specified in the following measures. No project activities will begin until the CDFG has received written approval from the Service that the biologist(s) is qualified to conduct the work.

2. A Service-approved biologist will survey the work site at least two weeks before the onset of activities. If red-legged frogs are found in the project area and these individuals are likely to be killed or injured by work activities, the Service-approved biologist will be allowed sufficient time to move them from the site before work activities resume. Only Service-approved biologists will participate in activities associated with the capture, handling, and monitoring of red-legged frogs.

3. Before any construction activities begin on a project, a Service-approved biologist will conduct a training session for all construction personnel. At a minimum, the training shall include a description of the red-legged frog and its habitat, the importance of the red-legged frog and its habitat, the general measures that are being implemented to conserve the 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.

4. A Service-approved biologist shall be present at the work site until such time as all removal of red-legged frogs, instruction of workers, and habitat disturbance has been completed. 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.

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

6. All fueling and maintenance of vehicles and other equipment and staging areas will occur at least 65 feet from any riparian habitat or water body. The Corps and the CDFG will ensure contamination of habitat does not occur during such operations. Prior to the onset of work, the CDFG will ensure that the contractor has prepared a plan to allow a prompt and effective response to any accidental spills. All workers will be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur.

7. A Service-approved biologist will ensure that the spread or introduction of invasive exotic plant species is avoided to the maximum extent possible. Areas disturbed by project activities will be restored and planted with native plants.

8. The number of access routes, number and size of staging areas, and the total area of the activity will be limited to the minimum necessary to achieve the project goal. Routes and boundaries will be clearly demarcated.

9. Ground-disturbing activities in potential red-legged frog habitat will be restricted to the period between July 1 and October 15.

10. To control erosion during and after project implementation, the CDFG will implement best management practices, as identified by the appropriate Regional Water Quality Control Board.

11. If a work site is to be temporarily dewatered by pumping, intakes will be completely screened with wire mesh not larger than 0.2 inch to prevent red-legged frogs from entering the pump system. Water will be released or pumped downstream at an appropriate rate to maintain downstream flows during construction and reduce the creation of ponded water. Upon completion of construction activities, any barriers to flow will be removed in a manner that would allow flow to resume with the least disturbance to the substrate.

12. A Service-approved biologist will permanently remove, from within the project area, any individuals of exotic species, such as bullfrogs (*Rana catesbiana*), centrarchid fishes, and non-native crayfish to the maximum extent possible. The biologist will have the responsibility to ensure that their activities are in compliance with the Fish and Game Code.

Table 1 shows the maximum number of red-legged frog adults, juveniles, tadpoles, and eggs that the Corps and the CDFG anticipate may be injured or killed as a result of project activities conducted under the proposed authorization. Because ground-disturbing project activities in potential red-legged frog habitat will be restricted to the period between July 1 and October 15, red-legged frog egg masses should not be encountered. If any of the projected injury or mortality limits are reached, project activities will cease and the Corps will reinitiate formal consultation with the Service.

Table 1. Maximum number of red-legged frogs that may be injured or killed during Program activities, as proposed by the Corps and the CDFG.

Unit of Measure	*Adults or Juveniles*	*Tadpoles*	*Egg Masses*
Per Project Site	1	10% of those encountered	0
Per Dewatered Area per Project Site	N/A	10% of those encountered	0
Per Watershed	5	10% of those encountered	0
Per Year	25	10% of those encountered	0

The Corps and the CDFG propose to implement the following additional measures to minimize adverse effects to the freshwater shrimp and its habitat:

1. Where appropriate, a Service-approved CDFG biologist will survey each site for shrimp before allowing work to proceed and prior to issuance of a Streambed Alteration Agreement. All overhanging vegetation, undercut banks, and tree roots will be surveyed with a butterfly net or fish net. In site locations where shrimp are present, CDFG will require the contractor to implement the mitigation measures listed below:

    a. Equipment work will be performed only in riffle, shallow run, or dry habitats, avoiding low velocity pool and run habitats occupied by shrimp, unless shrimp are relocated according to the protocol described below. "Shallow" run habitat is defined as a run with a maximum water depth, at any point, less than 12 inches, and without undercut banks or vegetation overhanging into the water.

    b. Hand placement of logs or rocks will be permitted in pool or run habitat in stream reaches where shrimp are known to be present only if the placement will not adversely affect shrimp and their habitat.

    c. Care shall be taken during placement or movement of materials in the stream to prevent any damage to undercut stream banks and to minimize damage to any streamside vegetation. Streamside vegetation overhanging into pools or runs shall not be modified.

    d. No log or rock weirs (including vortex rock weirs) shall be constructed that would span the full width of the low flow stream channel. Vegetation shall be incorporated with any structures involving rocks or logs to enhance migration potential for shrimp.

    e. CDFG must be notified at least one week in advance of the date on which work will start in the stream, so that a qualified CDFG biologist can monitor activities

at the work site. All work in the stream shall be stopped immediately if it is determined by CDFG that the work has the potential to adversely impact on the shrimp or its habitat. Work shall not recommence until CDFG is satisfied that there will be no impact on the shrimp.

f. At least 15 days prior to the onset of activities, the CDFG will submit the name(s) and credentials of biologists who will conduct activities specified in the following measures. The contractor will implement any additional conservation requested by DFG and/or the Service.

2. If, in the opinion of the Service-approved biologist, adverse affects to shrimp would be further minimized by moving shrimp away from the project site, the following procedure shall be used:

a. A second survey will be conducted within 24 hours of any construction activity and relocated. Shrimp will be moved while in the net, or placed in buckets containing stream water and then moved directly to the nearest suitable habitat. Stress and temperature monitoring of shrimp shall be performed by the Service-approved biologist. Numbers of shrimp and any mortalities or injuries must be identified and recorded. Shrimp habitat is defined as reaches in low elevation (less than 116 m) and low gradient (less than 1 percent) streams where banks are structurally diverse with undercut banks, exposed fine root systems, overhanging woody debris or overhanging vegetation.

b. When no other habitat exists on a landowner's property, the shrimp shall be held in suitable containers with site water and released at the end of the day. Containers shall be placed in the shade.

c. Only Service-approved biologists shall participate in the capture, handling, and monitoring of shrimp. CDFG will report annually on the number of capture, release and injuries/mortality and agrees to modify capture/release strategy with Service staff as needed to prevent adverse effects.

d. If moving the shrimp out of the work area cannot be accomplished, and other avoidance measures have been deemed inappropriate, the CDFG will drop activities at the work site from the project.

3. Before any construction activities begin at a work site that may contain shrimp, the Service-approved CDFG biologist shall conduct a training session for all construction personnel. At a minimum the training shall include a description of the shrimp and its habitat, the importance of the shrimp and its habitat, the general measures that are being implemented to conserve the shrimp as they relate to the work site, and the work site boundaries where construction may occur.

4. At any work site that may contain shrimp, all fueling and maintenance of vehicles, other equipment, and staging areas shall occur at least 65 feet from any riparian habitat or water body. The contractor shall ensure contamination of habitat does not occur during such operations. Prior to the onset of work, CDFG shall ensure that the contractor has prepared 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.

5. A Service-approved CDFG biologist shall be present at the work site until such time as all removal of shrimp, instruction of workers, and habitat disturbance associated with the restoration project have been completed. The Service-approved biologist shall have the authority to halt any action that might result in the loss of any shrimp or its habitat. If work is stopped, the Service-approved biologist shall immediately notify CDFG and the Service.

6. Ground disturbing activities in potential shrimp habitat shall be restricted to the period between July 1 and November 1.

7. If a work site is temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than 0.2 inch to prevent shrimp from 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 with the least disturbance to the substrate.

8. A Service-approved biologist shall permanently remove from within the project work site, any individuals of exotic species, such as bullfrogs, centrarchid fishes, and non-native crayfish, to the maximum extent possible. The contractor shall have the responsibility that such removals are done in compliance with the California Department of Fish and Game Code.

The DFG Watershed Program's shrimp and salmonid surveys conducted in the Russian River basin did not incur or document injury or mortality to shrimp. Shrimp were successfully captured, rescued, and relocated incidental to coho rescue operations in 2001, which constitutes take in the form of harassment. While the identification of habitat, net capture and release that will be conducted under this Program will result in the low likelihood of injury or mortality to shrimp, it is unreasonable to assume that injury or mortality will never occur.

Table 2 shows the maximum number of shrimp that the Corps and the CDFG anticipate may be injured or killed as a result of project activities conducted under the proposed authorization.

Table 2. Maximum number of shrimp that may be injured or killed during Program activities, as proposed by the Corps and the CDFG.

Unit of Measure	*Adults or Juveniles*
Per Project Site	2% of those encountered
Per Dewatered Area per Project Site	2% of those encountered
Per Watershed	2% of those encountered
Per Year	2% of those encountered

If any of the projected injury or mortality limits are reached, project activities will cease and the Corps will reinitiate formal consultation with the Service. If projects that qualify for authorization under the proposed Regional General Permit have already undergone individual consultation pursuant to section 7(a)(2) of the Act, the requirements of individual project consultation documents will supersede those outlined in this biological opinion. If a proposed project involves additional species or effects not considered in this consultation, the Corps will reinitiate this consultation or consult on the project individually.

Action Area

The action area for this project consists of all anadromous fish-bearing streams in Alameda, Contra Costa, Lake, Marin, Lake, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma counties.

Status of the Species and Environmental Baseline

California freshwater shrimp

The California freshwater shrimp was listed as endangered on October 31, 1988 (53 **FR** 43884). A detailed account of the shrimp's taxonomy, biology, and ecology is presented in the *Recovery Plan for the California Freshwater Shrimp* and is on file with the Service (Service 1998).

The shrimp is a decapod crustacean of the family Atyidae. According to Eng (1981), adults are generally less than 50 millimeters (mm) (2 inches [in.]) in postorbital length (from eye orbit to tip of tail). Based on shrimp collected in October, Eng (1981) described females ranging between 32-45 mm (1.26-1.77 in.) in length and males from 29-39 mm (1.14-1.52 in.) in length. Shrimp coloration varies extensively. Undisturbed shrimp are virtually invisible and move slowly on submerged leaf and twig substrates and among fine, exposed, live tree roots along undercut stream banks.

Shrimp are generally found in stream reaches where banks are structurally diverse with undercut banks, exposed fine root systems, overhanging woody debris, or overhanging vegetation (Eng 1981, Serpa 1986 and 1991). Excellent habitat conditions for shrimp involve streams 30 to 90 cm (14 to 41 in.) in depth with live roots along undercut banks (greater than 15 cm/6.8 in.) with

overhanging stream vegetation and vines (Serpa 1991). Such microhabitats may provide protection from high velocities and sediment loads associated with high stream flows.

Reproductive ecology of the shrimp has not been described formally. Shrimp reach sexual maturity at the end of the second summer, and reproduction appears to occur once a year. Based upon the reproductive physiology and behavior of other marine and freshwater shrimp, the male probably transfers and fixes a sperm sac to the female shrimp after her last molt, before autumn. The shrimp does not have life history characteristics that favor quick recovery following disturbances, having low fecundity and a long maturation period.

Following a feeding group classification system by Merritt and Cummins (1978), atyid shrimp can be described as collectors feeding upon fine particulate organic matter (Anderson and Cummins 1979, Goldman and Horne 1983). Shrimp observed on pool bottoms, submerged twigs and vegetation appeared to feed on fine particulate matter (Eng 1981).

The shrimp has evolved to survive a range of stream and water temperature conditions characteristic of small, perennial coastal streams. However, no data are available for defining the optimum temperature and stream flow regime for the shrimp or the limits it can tolerate. The shrimp appears to be able to tolerate warm water temperatures (greater than 23° Celsius, 73° Fahrenheit) and low flow conditions that are detrimental or fatal to native salmonids.

Habitat preferences apparently change during late spring and summer months. Eng (1981) rarely found shrimp beneath undercut banks in summer; submerged leafy branches were the preferred summer habitat. The highest concentrations of shrimp were in reaches with adjacent vegetation comprised of stinging nettles (*Urtica* sp.), blackberry (*Rubus* sp.) grasses, and mint (*Mentha* sp.). None were caught from cattails (*Typha* sp.), cottonwood (*Populus fremontii*), or California laurel (*Umbellularia californica*). Serpa (pers. comm. 1994 cited in Service 1998) noted that populations of shrimp were proportionally correlated with the quality of summer habitat provided by trailing terrestrial vegetation. However, during summer low flows, shrimp have been found in apparently poor habitat such as isolated pools with minimal cover. In such streams, opaque waters may allow shrimp to escape predation and persist in open pools (Serpa 1991).

Shrimp has relatively low fecundity, is believed to reproduce only once a year, and requires over one year to reach sexual maturity. Wallace (1990) summarized studies that have shown mollusks to be one of the last taxa to recolonized disturbed stream reaches, whereas insect colonization occurs faster. Shrimp may be even less adapted to disturbances than mollusks. The shrimp has no known resistant or dormant life stage that would allow it to survive a toxic event such as a chemical spill.

Shrimp are assumed to have been common historically in perennial freshwater streams within Marin, Sonoma, and Napa counties. Today, the shrimp is found in 19 streams within these counties. Shrimp distribution can be separated into four general geographic regions:
(1) tributaries to the lower Russian River, (2) coastal streams flowing to the Pacific Ocean,

(3) streams draining to Tomales Bay, and (4) streams flowing southward to San Pablo Bay. Many of these shrimp populations are isolated from each other. Where shrimp are present in two connecting watercourses, smaller tributaries generally support greater numbers of shrimp than their larger receiving streams. Shrimp have been found only in low elevation (less than 116 m, 380 ft.) and low gradient (generally less than 1 percent) streams. With the exception of Yulupa Creek, shrimp have not been found in stream reaches with boulder and bedrock bottoms. High velocities and turbulent flows in such reaches may hinder upstream movement of shrimp.

Distribution of shrimp populations within streams is not expected to be static, because of habitat changes from natural or manmade forces. Distribution may expand or contract depending upon conditions within streams. A recovery objective for the shrimp is the gradual removal of unnatural barriers to shrimp dispersal and restoration of natural habitat conditions (Service 1998). These measures are expected to expand shrimp distribution beyond its existing range. Existing shrimp distribution in streams is not continuous, and the species often occupies only short reaches of the stream (Service 1998). However, entire streams are considered shrimp habitat, because the shrimp disperses between areas of good habitat. Shrimp have been found only in low elevation (less than 116 m, 380 ft.) and low gradient (generally less than 1 percent) streams. With the exception of Yulupa Creek, shrimp have not been found in stream reaches with boulder and bedrock bottoms. High velocities and turbulent flows in such reaches may hinder upstream movement of shrimp.

Introduced fish may affect shrimp distribution significantly through predation. Carp (*Cyprinus carpio*) occur in Stemple Creek (Serpa 1986), which dislodge and consume invertebrates from plants and silty bottoms through their rooting activities (Moyle 1976). Introduced sunfish (*Lepomis cyanellus*) and mosquitofish (*Gambusia affinis*) are likely shrimp predators (Service 1998). Williams (1977) found no coexistence between mosquitofish and atyids in Hawaiian streams. Because of the relatively recent introduction of these fish, the shrimp probably has not developed defense mechanisms to reduce their risk of predation. Like the shrimp, many introduced fish can persist under relatively poor water quality conditions in the absence of natural predators such as juvenile steelhead (*Oncorhynchus mykiss*).

Although largely absent from coastal streams today, large, complex organic debris dams may have been historically prevalent in streams supporting shrimp populations. These structures may have been important feeding and refugial sites for the shrimp. Such structures are known to collect detrital material and leaf litter (Triska *et al.* 1982). Debris dams may offer refugia during high flow events and reduce displacement of invertebrates (Covich *et al.* 1991). These dams are transitory in nature and break apart during high flow events, allowing shrimp to disperse periodically and maintain genetic connections among populations. In 529 surveys between 1994 and 2003, CDFG encountered shrimp in 42 separate surveys (CDFG Hopland Office files). The majority of shrimp were encountered on Green Valley Creek (130, 457 and 330) and Franz Creek (approximately 100) in the Russian River basin during a few surveys. The majority of shrimp were encountered during electro-fishing surveys for salmonids and were incidental to capture. Fewer individuals were encountered during preconstruction survey for shrimp at Restoration Program sites (CDFG *in litt.* 2004). In total CDFG has observed or captured 1,423

shrimp over the period of record in the Russian River basin. Similar numbers are not available for shrimp in coastal streams or tributaries to San Pablo Bay.

Objectives in the shrimp's recovery plan includes protection of existing populations, removal of threats to these populations, and enhancement of habitat for native aquatic species within the shrimp's historic range. Projects performed under the Restoration Program will aid in the implementation of these recovery objectives.

California red-legged frog

The California red-legged frog was federally listed as threatened on May 23, 1996 (61 **FR** 25813). A recovery plan has been published (Service 2002). Critical habitat for the California red-legged frog was designated on March 13, 2001 (66 *Federal Register* 14625). On November 6, 2002, the United States District Court for the District of Columbia set aside the designation and ordered the Service to publish a new final rule with respect to the designation of critical habitat for the California red-legged frog (*Home Builders Association of Northern California et al. versus Gale A Norton, Secretary of the Department of Interior et al.* Civil Action No. 01-1291 (RJL) U.S. District Court, District of Columbia). The Service published a new proposed rule to designate critical habitat for the California red-legged frog on April 13, 2004 (69 **FR** 19620).

This species is the largest native frog in the western United States (Wright and Wright 1949), ranging from 4 to 13 centimeters (1.5 to 5.1 inches) in length (Stebbins 1985). The abdomen and hind legs of adults are largely red; the back is characterized by small black flecks and larger irregular dark blotches with indistinct outlines on a brown, gray, olive, or reddish background color. Dorsal spots usually have light centers (Stebbins 1985), and dorsolateral folds are prominent on the back. Larvae (tadpoles) range from 14 to 80 millimeters (0.6 to 3.1 inches) in length, and the background color of the body is dark brown and yellow with darker spots (Storer 1925).

Red-legged frogs have paired vocal sacs and vocalize in air (Hayes and Krempels 1986). Female frogs deposit egg masses on emergent vegetation so that the egg mass floats on the surface of the water (Hayes and Miyamoto 1984). Red-legged frogs breed from November through March with earlier breeding records occurring in southern localities (Storer 1925). Individuals occurring in coastal drainages are active year-round (Jennings *et al.* 1992), whereas those found in interior sites are normally less active during the cold season.

Adult red-legged frogs prefer dense, shrubby or emergent riparian vegetation closely associated with deep (>0.7 meters [2.3 feet]), still, or slow-moving water (Hayes and Jennings 1988). However, frogs also have been found in ephemeral creeks and drainages and in ponds that may or may not have riparian vegetation. The largest densities of red-legged frogs currently are associated with deep pools with dense stands of overhanging willows (*Salix* spp.) and an intermixed fringe of cattails (*Typha latifolia*) (Jennings 1988). Red-legged frogs disperse upstream and downstream of their breeding habitat to forage and seek sheltering habitat. Sheltering habitat for red-legged frogs is potentially all aquatic, riparian, and upland areas within

the range of the species and includes any landscape features that provide cover, such as existing animal burrows, boulders or rocks, organic debris such as downed trees or logs, and industrial debris. Agricultural features such as drains, watering troughs, spring boxes, abandoned sheds, or hay ricks may also be used. Incised stream channels with portions narrower than 46 centimeters (18 inches) and depths greater than 46 centimeters (18 inches) may also provide important summer sheltering habitat. Accessibility to sheltering habitat is essential for the survival of red-legged frogs within a watershed, and can be a factor limiting frog population numbers and survival.

During winter rain events, juvenile and adult red-legged frogs are known to disperse up to 1-2 kilometers (0.54-1.08 miles) (Rathbun and Holland, unpublished data, cited in Rathbun *et al.* 1991). Semlitsch and Bodie (2003) using tracking data for a diverse array of adult frogs and toads found that protection of 205 - 368 meter wide upland buffers around aquatic breeding habitats will encompass the core upland habitat used by adult anuran amphibians. In northern Santa Cruz County red-legged frogs migrating between breeding ponds and moist summer habitats traveled distances from 0.4 kilometer (0.25 mile) to more than 3 kilometers (2 miles) without apparent regard to topography, vegetation type, or riparian corridors (Bulger *et al.* 2003).

Egg masses contain about 2,000 to 5,000 moderate sized (2.0 to 2.8 millimeters [0.08 to 0.11 inches] in diameter), dark reddish brown eggs and are typically attached to vertical emergent vegetation, such as bulrushes (*Scirpus* spp.) or cattails (Jennings *et al.* 1992). Red-legged frogs are often prolific breeders, laying their eggs during or shortly after large rainfall events in late winter and early spring (Hayes and Miyamoto 1984). Eggs hatch in 6 to 14 days (Jennings 1988). In coastal lagoons, the most significant mortality factor in the pre-hatching stage is water salinity (Jennings *et al.* 1992); exposure to salinity levels greater than 4.5 parts per thousand results in 100 percent mortality (Jennings and Hayes 1990). Increased siltation during the breeding season can cause asphyxiation of eggs and small larvae. Larvae undergo metamorphosis 3.5 to 7 months after hatching (Storer 1925, Wright and Wright 1949, Jennings and Hayes 1990). Of the various life stages, larvae probably experience the highest mortality rates, with less than 1 percent of eggs laid reaching metamorphosis (Jennings *et al.* 1992). Sexual maturity normally is reached at 3 to 4 years of age (Storer 1925, Jennings and Hayes 1985). Red-legged frogs may live 8 to 10 years (Jennings *et al.* 1992). Populations of red-legged frogs fluctuate from year to year. When conditions are favorable, red-legged frogs can produce large numbers of dispersing young and a concomitant increase in densities and the number of occupied sites. In contrast, red-legged frogs may temporarily disappear from an area when conditions are stressful (*e.g.*, drought).

The diet of red-legged frogs is highly variable. Hayes and Tennant (1985) found invertebrates to be the most common food items. Vertebrates, such as Pacific tree frogs (*Hyla regilla*) and California mice (*Peromyscus californicus*), represented over half the prey mass eaten by larger frogs (Hayes and Tennant 1985). Hayes and Tennant (1985) found juvenile frogs to be active diurnally and nocturnally, whereas adult frogs were largely nocturnal. Feeding activity probably occurs along the shoreline and on the surface of the water (Hayes and Tennant 1985). Larvae likely eat algae (Jennings *et al.* 1992).

Several researchers in central California have noted the decline and eventual disappearance of red-legged frog populations following the establishment of bullfrogs (*R. catesbeiana*) at a site (L. Hunt, in litt. 1993, S. Barry, in litt. 1992, S. Sweet, in litt. 1993). This has been attributed to both predation and competition. Twedt (1993) documented bullfrog predation of juvenile northern red-legged frogs, and suggested that bullfrogs could prey on subadult northern red-legged frogs as well. In addition to predation, bullfrogs may have a competitive advantage over red-legged frogs; bullfrogs are larger, possess more generalized food habits (Bury and Whelan 1984), have an extended breeding season (Storer 1933) during which an individual female can produce as many as 20,000 eggs (Emlen 1977), and larvae are unpalatable to predatory fish (Kruse and Francis 1977). In addition to competition, bullfrogs also interfere with Red-legged frog reproduction. Both California and northern red-legged frogs have been observed in amplexus with (mounted on) both male and female bullfrogs (Jennings and Hayes 1990, Twedt 1993, M. Jennings, in litt.1993, R. Stebbins in litt. 1993). Thus bullfrogs are able to prey upon and out-compete red-legged frogs, especially in sub-optimal habitat.

The urbanization of land within and adjacent to red-legged frog habitat has also impacted Red-legged frogs. In a survey by H.T. Harvey and Associates (1997), it was determined that red-legged frogs were historically found throughout Santa Clara County, however they have been essentially extirpated from the urbanized lowland areas of the county. These declines are attributed to channelization of riparian areas, enclosure of the channels by urban development that blocks red-legged frog dispersal, and the introduction of predatory fishes and bullfrogs. This report further identifies the conversion and isolation of perennial pool habitats resulting from urbanization as an ongoing impact to red-legged frogs.

Juvenile and adult frogs, including red-legged frogs, have been found in human-created habitats such as golf course ponds, but these habitats may not be suitable for the long-term survival or successful reproduction of local frog populations, especially near urban areas where predators such as bullfrogs and raccoons are able to build up large populations (H.T. Harvey and Associates 1997). In the Central Coast area of California, which contains the largest known red-legged frog populations, red-legged frogs are known from three golf courses. Two of these golf courses are also inhabited by bullfrogs, and the two species are found in separate ponds. Within Alameda and Contra Costa counties we are not aware of red-legged frogs inhabiting ponds within golf courses. In Solano County, red-legged frogs were found in large numbers immediately after the construction of water features within one golf course, however, this population has been nearly eliminated by a substantial bullfrog population, and perhaps by water chemistry manipulation by the golf course (Service files).

California red-legged frogs have been extirpated or nearly extirpated from over 70 percent of their former range. Historically, this species was found throughout the Central Valley and Sierra Nevada foothills. As of 1996, California red-legged frogs have been documented in approximately 240 streams or drainages from 23 counties, primarily in central coastal California. Monterey, San Luis Obispo, and Santa Barbara counties support the largest extent of currently occupied habitat. The most secure aggregations of red-legged frogs are found in aquatic sites that support substantial riparian and aquatic vegetation and lack non-native predators. Several

researchers in central California have noted the decline and eventual local disappearance of California and northern red-legged frogs in systems supporting bullfrogs (Jennings and Hayes 1990, Twedt 1993), red swamp crayfish (*Procambarus clarkii*), signal crayfish (*Pacifastacus leniusculu*), and several species of warm water fish including sunfish (*Lepomis* spp.), goldfish (*Carassius auratus*), common carp (*Cyprinus carpio*), and mosquitofish (*Gambusia* sp.) (L. Hunt, in litt. 1993, S. Barry, in litt. 1992, S. Sweet, in litt. 1993). Habitat loss, non-native species introduction, and urban encroachment are the primary factors that have adversely affected the red-legged frog throughout its range.

Effects of the Proposed Action

General Effects

Direct effects to adult and juvenile shrimp and to red-legged frog adults, sub-adults, tadpoles, and eggs in the footprint of projects utilizing the proposed authorization would include injury or mortality from being crushed by earth-moving equipment, construction debris, and worker foot traffic. These effects would be reduced by minimizing and clearly demarcating the boundaries of the project areas.

Shrimp and red-legged frog tadpoles may be entrained by pump or water diversion intakes. Screening pump intakes with wire with not greater than 0.2-inch diameter mesh may reduce the potential that shrimp and tadpoles would be caught in the inflow.

Shrimp and red-legged frogs may be killed by predators. If water that is impounded during or after work activities creates favorable habitat for non-native predators, such as bullfrogs, crayfish, and centrarchid fishes, shrimp and red-legged frogs may incur abnormally high rates of predation. Additionally, any time red-legged frogs are concentrated in a small area at unusually high densities, native predators such as great blue herons (*Ardea herodias*), great egrets (*A. alba*), opossums (*Didelphis virginiana*), and raccoons may feed on them opportunistically. This impact can be minimized by avoiding creation of ponded water as a result of project actions such as dewatering the work area.

Trash left during or after project activities could attract predators to work sites, which could, in turn, prey on shrimp and red-legged frogs. For example, raccoons are attracted to trash and also prey opportunistically on both species. This potential impact can be reduced or avoided by careful control of waste products at all work sites.

Accidental spills of hazardous materials or careless fueling or oiling of vehicles or equipment could degrade water quality to a degree where shrimp or red-legged frogs are injured or killed. The potential for this effect to occur can be reduced by thoroughly informing workers of the importance of preventing hazardous materials from entering the environment, locating staging and fueling areas a minimum of 65 feet from riparian areas or other water bodies, and by having an effective spill response plan in place.

Uninformed workers could disturb, injure, or kill shrimp or red-legged frogs. The potential for this effect to occur may be greatly reduced by informing workers of the presence and protected status of this species and the measures that are being implemented to protect it during project activities.

The restoration projects that would utilize the proposed authorization are intended to provide additional habitat for, and increased populations of, steelhead and salmon in the respective project areas. These fish prey on the shrimp and the red-legged frog. The effects of potentially increasing predator populations on the shrimp and red-legged frog cannot be accurately predicted at this time. Shrimp, salmon and steelhead presumably occurred sympatrically in coastal watersheds prior to the onset of human disturbance. Although we anticipate some predation of shrimp and red-legged frogs by salmonid fishes, this level of predation is not expected to appreciably alter the population structure within the project areas.

The Corps' proposed authorization would affect a small number of shrimp and red-legged frogs, if any occur in the areas that would be temporarily disturbed by project activities. Because of the small size of the work areas, the temporal nature of the projects, the implementation of the projects in the dry season, and the proposed protective measures, we anticipate that few, if any, shrimp and red-legged frogs are likely to be killed or injured during project activities. The areas disturbed by Program projects constitute a small portion of the available shrimp and red-legged frog habitat throughout the Corps' San Francisco District's jurisdiction; additionally, disturbed areas will be restored and planted with native plants. Restoration and enhancement of riparian vegetation in project sites is likely to increase the number and quality of cover sites and the diversity and abundance of prey species for red-legged frogs. The proposed authorization is generally likely to improve the quality of habitat for the red-legged frog in areas affected by projects implemented under the Program.

Effects to California freshwater shrimp

The shrimp adjacent to project sites may be incidentally taken in the form of harm, harassment injury, or mortality as a result of temporary disturbances from project activities. With implementation of the conservation measures, only low levels of injury or mortality of shrimp are anticipated. Injury or mortality to shrimp was not incurred or documented and any of the salmonid or shrimp surveys conducted in the Russian River basin. Shrimp were successfully captured, rescued, and relocated incidental to coho rescue operations in 2001, which constitutes take in the form of harassment. While the identification of habitat, net capture and release that will be conducted under this Program will result in the low likelihood of injury or mortality to shrimp, it is unreasonable to assume that injury or mortality will never occur. The potential for take in the form of harassment of individuals depending upon restoration technique in a project area is higher. In addition, injury to or mortality of shrimp during a dewatering rescue and relocation is more likely due to their fragile size and requirement for an aquatic environment.

For Program projects, maximum projected take in the form of harassment includes all individuals in the project area. Maximum projected take in the form of direct mortality or injury should not

exceed 2% of all individuals encountered (while no shrimp mortalities or injuries have been observed so far in existing surveys, CDFG has experienced and documented a 1% mortality with salmonids – NOAA allows 2%). Based on CDFG's estimation of the shrimp present in past surveys, for each dewatered area we expect; 2 % of individuals in a dewatered area. The 2% figure is estimated based on the scientific literature and CDFG data for other aquatic species; while numbers of shrimp encountered are based on CDFG data.

Work in live streams or in floodplains could cause unusually high levels of siltation downstream. Although shrimp are usually able to survive in poor water quality conditions, this siltation could alter the quality of the habitat to the extent that use by individuals of the species is precluded. Siltation also could fill slow-moving pools, reducing the extent or quality of shrimp habitat near the project area. Implementing best management practices for erosion control and reducing the area to be disturbed to the minimum necessary should decrease the amount of sediment that is washed downstream as a result of project activities.

The Corps' proposed authorization of the Program may result in the loss of shrimp habitat. Installation of check dams, rock weirs, log weirs and wing deflectors may prevent shrimp from dispersing along streambanks. The potential for this effect may be reduced by ensuring that project proponents are thoroughly briefed by CDFG on the locations of shrimp streams, by designing projects to match the historical stream ecosystem as closely as possible, and by ensuring that check dams and weirs do not span any creek known to support shrimp.

Removal of nonnative invasive vegetation such as Himalayan blackberry (*Rubus discolor*) may reduce the extent and quality of shrimp habitat. The restoration projects will provide more stable stream banks, better water quality through decreased erosion and sediment loading, and shelter along stream banks for red-legged frogs. Additionally, many of the projects will improve red-legged frog habitat by creating additional pools and providing a more natural water flow regime by eliminating or altering fish passage barriers. The restoration projects will contribute to the local recovery of the red-legged frog by removing non-native predators such as bullfrogs, which out-compete and ultimately displace red-legged frogs from suitable habitat, and by improving the riparian buffer which will reduce the movement of pesticides into the aquatic environment.

Many activities in this Program will benefit the shrimp. Riparian plantings and cattle exclusion fences will improve habitat quality in shrimp streams and their tributaries. Increased riparian cover will increase habitat complexity and root density on streambanks. Riparian vegetation will allow shrimp to disperse more easily and will stabilize water temperatures in the creeks. Exclusionary fencing will reduce cattle impacts to the creek such as overgrazing, streambank trampling, and soil compaction. Objectives in the shrimp's recovery plan includes protection of existing populations, removal of threats to these populations, and enhancement of habitat for native aquatic species within the shrimp's historic range. Projects performed under the Restoration Program will aid in the implementation of these recovery objectives.

Effects to California red-legged frog

Work activities, including noise and vibration, may cause red-legged frogs to leave the work area. This disturbance may increase the potential for predation and desiccation. Minimizing the area disturbed by project activities may reduce the potential for dispersal resulting from the action. Red-legged frogs are more likely to disperse overland in mesic conditions. Because the CDFG would primarily be executing the proposed projects during the dry season, these impacts are less likely. As long as no substantial rainfall (substantial rainfall = greater than 0.5 inch of rain in a 24-hour period) occurs, red-legged frogs are unlikely to be at risk.

Work in live streams or in floodplains could cause unusually high levels of siltation downstream. This siltation could smother eggs of the red-legged frog and alter the quality of the habitat to the extent that use by individuals of the species is precluded. Implementing best management practices for erosion control and reducing the area to be disturbed to the minimum necessary should decrease the amount of sediment that is washed downstream as a result of project activities.

The Corps' proposed authorization of the Program is not expected to result in the temporary loss of red-legged frog habitat. The restoration projects will provide more stable stream banks, better water quality through decreased erosion and sediment loading, and shelter along stream banks for red-legged frogs. Additionally, many of the projects will improve red-legged frog habitat by creating additional pools and providing a more natural water flow regime by eliminating or altering fish passage barriers. The restoration projects will contribute to the local recovery of the red-legged frog by removing non-native predators such as bullfrogs, which out-compete and ultimately displace red-legged frogs from suitable habitat, and by improving the riparian buffer which will reduce the movement of pesticides into the aquatic environment. These actions will help to implement watershed protection and restoration actions outlined in the red-legged frog's recovery plan (Service 2002)

Cumulative Effects

Cumulative effects are those impacts of future State, Tribal, local, or private actions affecting listed species that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section, because they require separate consideration pursuant to section 7 of the Act.

California freshwater shrimp

Cumulative effects include several human activities which pollute and degrade shrimp habitat. Many factors operate synergistically with one another and with natural disturbances such as floods and droughts. Pollution from point and non-point discharges can degrade water quality to the extent that shrimp cannot survive. Increased urbanization results in greater levels of stormwater runoff to streams, treated sewage effluent, and contaminated road runoff. Flood control activities such as channelization, sediment removal, levee maintenance, and vegetation

removal eliminate shrimp habitat and preclude recolonization of historic habitat areas. Instream gravel mining causes direct loss of shrimp habitat through vegetation removal, stream substrate removal, and water quality degradation through increased siltation.

Overgrazing results in trampled riparian vegetation, increased water temperatures, and streambank and upland erosion, and shrimp habitat. Livestock operations also degrade water quality with nutrients and pesticides. Agricultural development, impoundments, and irrigation can reduce stream flows, causing streams to dry up during the summer and fall so shrimp cannot survive. Row crop cultivation often results in more severe adverse effects. Napa and Sonoma counties have allowed the conversion of thousands of acres of land from grazing to grape production. Vineyard owners often raze the riparian corridors on their property in an attempt to prevent the spread of Pierce's disease, a bacterial infection that attacks grapes and other plants. Many of the plants considered undesirable to vineyard owners (wild grapes, blackberry) provide habitat for freshwater shrimp, and the elimination of these plants can be highly detrimental to the shrimp. Introduced predators can eliminate shrimp populations or preclude colonization. More than one factor threatens shrimp populations in most streams. Many threats identified prior to the shrimp's listing have intensified. A species closely related to the freshwater shrimp, *Syncaris pasadenae*, became extinct in the 1930s, in large part due to construction and stabilization projects which disrupted their environment (Hedgpeth 1975).

Properly constructed stream restoration projects may benefit shrimp and other native species in the long term by increasing habitat complexity, stabilizing channels and streambanks, increasing spawning gravels, decreasing sedimentation, and increasing shade and cover. However, restoration activities may cause temporary increases in turbidity, alter channel dynamics and stability, and harass and kill shrimp.

California red-legged frog

Non-Federal activities expected to occur within the project area considered under this biological opinion include water treatment, potential release of toxic substances, water diversions, residential and commercial development activity, agricultural practices, intentional or unintentional release of native and non-native predators into water bodies, and grazing on private and municipal lands. The Service anticipates that the effects of these non-Federal activities would be addressed through section 10(a)(1)(B) permits. Habitat conservation plans that are required to obtain such permits would include measures that would minimize and mitigate the effects to the red-legged frog resulting from the non-Federal activities.

Conclusion

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the Corps' issuance of the CDFG Fisheries Restoration Grant Program Regional General Permit, as proposed, is not likely to jeopardize the continued existence of the shrimp or

the red-legged frog. Critical habitat has not been designated for the shrimp; therefore, none will be adversely modified or destroyed.

We have reached this conclusion based on the following reasons:

1. The Corps and the CDFG have proposed measures to minimize the potential adverse effects of project activities on the shrimp and red-legged frog;

2. The persistence of the shrimp and red-legged frog in the affected area would not be diminished by the activities covered under this programmatic consultation;

3. Few, if any, shrimp or red-legged frogs are likely to be killed or injured during project activities; and

4. The overall quality of shrimp and red-legged frog breeding, foraging, and dispersal habitat would be improved as a result of improved water quality, reduced sedimentation, and habitat enhancement associated with Program projects. This improvement would offset any injury or mortality that might result from implementation of Program activities.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibits 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 the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, 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 7(o)(2) of the Act, taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary. The Corps must make them binding conditions of its authorization issued to the 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 fails to require the CDFG to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the authorization, the protective coverage of section 7(o)(2) may lapse.

Amount or Extent of Take

Incidental take of shrimp and red-legged frogs will be difficult to detect, because their small body size and cryptic coloration make the finding of a dead or injured specimen unlikely. For actions covered by this consultation, some harassment and mortality could be directly observed from red-legged frogs captured during translocation efforts. However, mortality from other sources would be difficult to observe. The observed take for both species may be lower than the actual take. However, with the implementation of the reasonable and prudent measures, the effects of the unobserved take would not change our analysis of effects of the actions covered by this biological opinion.

If any shrimp or red-legged frogs are found dead or injured, the Corps or the CDFG must contact our office immediately so we can review the project activities to determine if additional protective measures are needed. Project activities may continue during this review period, provided that all protective measures proposed by the Corps and the CDFG and the terms and conditions of this biological opinion have been and continue to be implemented. Shrimp and red-legged frogs may be taken only within the boundaries of individual project sites. This biological opinion does not authorize any form of take that is not incidental to implementation of the Program projects within the boundaries covered under the Corps' jurisdiction.

We anticipate that few shrimp or red-legged frogs will be killed or injured during projects conducted under the proposed authorization. All shrimp and red-legged frog adults, juveniles, and tadpoles that are at risk of injury or death from project activities within the boundaries of work areas may be taken through harassment during translocation activities.

Based on the take limits proposed by Corps and the CDFG in Table 1 of the Description of the Proposed Action portion of this biological opinion, the maximum amount of incidental take in the form of injury or mortality that may occur as a result of Program project activities is as follows:

Unit of Measure	Adults or Juveniles	Tadpoles	Egg Masses
Per Project Site	1	10% of those encountered	0
Per Dewatered Area per Project Site	N/A	10% of those encountered	0
Per Watershed	5	10% of those encountered	0
Per Year	25	10% of those encountered	0

Projected take in the form of harassment includes all individuals in the project area. The Service does not expect take in the form of direct mortality or injury to exceed 2% of all individuals encountered. The 2% figure is estimated based on the scientific literature and CDFG data for

other aquatic species (CDFG 2004a). The maximum amount of incidental take in the form of injury or mortality that may occur as a result of Program project activities is as follows:

Unit of Measure	*Adults or Juveniles*
Per Project Site	2% of those encountered
Per Dewatered Area per Project Site	2% of those encountered
Per Watershed	2% of those encountered
Per Year	2% of those encountered

This biological opinion does not exempt any form of take that is not incidental to the execution of Program project activities that are analyzed by this biological opinion. If the amount of anticipated incidental take is exceeded, the exemption from the prohibition against take provided by this biological opinion may lapse. If the amount of incidental take by any geographic or temporal unit of measure described above (*i.e.*, per project site, per dewatered area, per watershed, per year) is reached, project activities will cease and the Corps will reinitiate formal consultation with the Service.

Effect of the Take

The Service has determined that this level of anticipated take is not likely to jeopardize the continued existence of the shrimp or the red-legged frog. Critical habitat has not been designated for the shrimp; therefore, none will be adversely modified or destroyed. We have reached this conclusion based on the following reasons:

1. The Corps and the CDFG have proposed measures to minimize the potential adverse effects of project activities on the shrimp and red-legged frog;

2. Few, if any, shrimp or red-legged frogs are likely to be killed or injured during project activities; and

3. The overall quality of shrimp and red-legged frog breeding, foraging, and dispersal habitat would be improved as a result of improved water quality, reduced sedimentation, and habitat enhancement associated with Program projects.

Reasonable and Prudent Measures

The Service believes that the following reasonable and prudent measures are necessary and appropriate to minimize take of red-legged frogs:

1. The CDFG must implement well-defined measures to ensure shrimp are not harmed, killed or injured directly or indirectly by project activities.

2. The CDFG must implement well-defined measures to ensure red-legged frogs are not killed or injured directly or indirectly by project activities.

The Service's evaluation of the effects of the proposed action includes consideration of the measures to minimize the adverse effects of the proposed action on the red-legged frog that were developed by the CDFG and stated in the Description of the Proposed Action portion of this biological opinion. Any subsequent changes in these measures proposed by the Corps or the CDFG may constitute a modification of the proposed action and may warrant reinitiation of formal consultation, as specified at 50 CFR 402.16. These reasonable and prudent measures is intended to supplement the protective measures that were proposed by the Corps and the CDFG as part of the proposed action.

Terms and Conditions

To be exempt from the prohibitions of section 9 of the Act, the Corps must ensure that the CDFG complies with the following terms and conditions, which implement the reasonable and prudent measures. These terms and conditions are non-discretionary.

1. The following terms and conditions implement reasonable and prudent measure 1:

    a. CDFG shall implement the Program as proposed, including all minimization measures outlined to protect the shrimp.

    b. No check dams shall be constructed in creeks known to support the shrimp.

    c. Shrimp conservation measures in the 2004 Negative Declaration (DFG 2004) shall be incorporated into updated versions of the Restoration Manual.

    d. A map showing the range of the shrimp shall be incorporated into updated versions of Appendix F of the Restoration Manual. The map shall be of similar scale to the map found in the shrimp's recovery plan and show all current known occurrences of the shrimp.

    e. Invasive nonnative vegetation that provides shrimp habitat and is removed as a result of Program activities shall be replaced with native vegetation that provides comparable habitat for the shrimp. Revegetated sites shall be irrigated as necessary until vegetation is established. Revegetated sites shall be monitored until shading and cover achieves 80% of pre-project shading and cover and for a minimum of 5 years.

    f. No dumping of dead trees, yard waste or brush shall occur in shrimp streams, which may result in oxygen depletion of aquatic systems.

2. The following terms and conditions implement reasonable and prudent measure 2:

    a. The project will be implemented as described, including all minimization measures outlined to protect the red-legged frog.

b. Prior to the onset of any project-related activities, the approved biologists must identify appropriate areas to receive translocated red-legged frog adults and tadpoles from the project areas. These areas must be in proximity to the capture site, contain suitable habitat, not be affected by project activities, and be free of exotic predatory species (*i.e.*, bullfrogs, crayfish) to the best of the approved biologists' knowledge.

c. In a project involving installation of a fish screen on a water diversion intake, the screen mesh must not be larger than 0.2 inch to prevent red-legged frogs from being entrained in the diversion system.

d. Biologists who handle red-legged frogs must ensure that their activities do not transmit diseases. To ensure that diseases are not conveyed between work sites by the Service-approved biologist, the fieldwork code of practice developed by the Declining Amphibian Populations Task Force must be followed at all times.

e. Red-legged frog conservation measures in the Negative Declaration (CDFG 2004) shall be incorporated into updated versions of the Restoration Manual.

Reporting Requirements

The Corps or the CDFG must submit an annual report of implemented projects to the Service's Sacramento Fish and Wildlife Office, 2800 Cottage Way, Sacramento, California 95825). The report must include (1) a table documenting the number of shrimp or red-legged frogs killed, injured, and handled during each Program project that utilizes the Corps' proposed authorization; (2) a summary of how the terms and conditions of this biological opinion and the protective measures proposed by the Corps and the CDFG worked; and (3) any suggestions of how these measures could be revised to improve conservation of this species while facilitating compliance with the Act. This information will assist the Service in evaluating future actions for the conservation of the California red-legged frog. Reports must be submitted to the Service's Sacramento Fish and Wildlife Office by January 31 of each year the Corps' proposed authorization is valid.

Disposition of Dead or Injured Specimens

The Service shall be notified within twenty-four (24) hours of the finding of any injured or dead shrimp or any unanticipated harm to their habitat addressed in this biological opinion. Notification shall include the date, time, and precise location of the specimen/incident, and any other pertinent information. The Service contact person is Catrina Martin, Deputy Assistant Field Supervisor, Endangered Species Division in the Sacramento Fish and Wildlife Office at (916) 414-6600. Any dead or injured specimen shall be deposited with the Service's Division of Law Enforcement, 2800 Cottage Way, Sacramento, California 95825, telephone (916) 414-6660. If any of the projected injury or mortality limits are reached, project activities will cease and the Corps will reinitiate formal consultation with the Service.

Care must be taken in handling dead specimens to preserve biological material in the best possible state for later analysis. Should any injured California red-legged frogs survive, either the Corps or the CDFG must contact the Service regarding their final disposition. The remains of California red-legged frogs must be placed with the California Academy of Sciences Herpetology Department (Contact: Jens Vindum, Collections Manager, California Academy of Sciences Herpetology Department, Golden Gate Park, San Francisco, California, 94118, (415) 750-7037). The Corps or the CDFG should make arrangements with the California Academy of Sciences regarding proper disposition of potential museum specimens prior to the commencement of project activities.

In the case of take or suspected take of listed species not exempted in this biological opinion, the Sacramento Fish and Wildlife Office must be notified within 24 hours.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities that can be implemented to further the purposes of the Act, such as preservation of endangered species habitat, implementation of recovery actions, or development of information or data bases. The Service recommends the following actions:

1. We recommend that the Service-approved biologists relocate any southwestern pond turtles (*Clemmys marmorata pallida*), California legless lizards (*Anniella pulchra*), western spadefoot toads (*Scaphiopus hammondii*), and any other native reptiles or amphibians found within work areas to suitable habitat outside of the project area, if such actions are in compliance with State laws.

2. We recommend that areas that are revegetated be monitored for a minimum of five years to ensure that revegetation is successful.

3. The Corps and CDFG should implement the recovery actions for shrimp and frog in their programs.

REINITIATION - CLOSING STATEMENT

This concludes formal consultation on the proposed CDFG Anadromous Fisheries Restoration Grants Program. As provided in 50 CFR 402.16, re-initiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the proposed action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently

modified in a manner that causes an effect to listed species or critical habitat that was not considered in this opinion; or (4) a new species or critical habitat is designated that may be affected by the proposed action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take shall cease pending re-initiation.

If you have any questions regarding this consultation on the Regional General Permit for California Department of Fish and Game Anadromous Fisheries Restoration Grants Program, please contact Cecilia Brown or Dan Buford at (916) 414-6625.

Sincerely,

for Cay C. Goude
Acting Field Supervisor

cc:
ARD (ES), Portland, OR
Arcata Fish and Wildlife Office, Arcata, CA (Attn David Solis)
Ventura Fish and Wildlife Office, Ventura, CA (Attn Roger Root)
CDFG, Anadromous Fisheries Restoration Program, Sacramento, CA (Attn Helen Birss)
National Marine Fisheries Service, Santa Rosa, CA (Attn Jeffrey Jahn)
CDFG, Anadromous Fisheries Restoration Program, Napa, CA (Attn Bob Coey)

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