United States Department of the Interior
FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Suite W-2605
Sacramento, California 95825-1846
SFWO_mail@fws.gov

In Reply Refer to:
2023-0010007

January 4, 2023

Sarah Firestone
Attn: Elise Piazza
Department of the Army
San Francisco District, U.S. Army Corps of Engineers
450 Golden Gate Avenue
San Francisco, California 94102
Elise.H.Piazza@usace.army.mil

Subject: Reinitiation of Formal Consultation on the Regional General Permit (RGP) for the Los Gatos Creek Watershed Maintenance Program in Santa Clara County, California and Appending to the June 18, 2014, *Programmatic Biological Opinion for Issuance of Permits under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act, including Authorizations Under 22 Nationwide Permits, for Projects that May Affect the Threatened California Red-Legged Frog in Nine San Francisco Bay Area Counties, California* (U.S. Army Corps of Engineers [Corps] file number 2016-00109S)

Dear Sarah Firestone:

This letter is in response to the Corps' October 26, 2022, request for reinitiation of formal consultation with the U.S. Fish and Wildlife Service (Service) on the proposed RGP for the Los Gatos Creek Watershed Maintenance Program (proposed project) in Santa Clara County, California. Your request was received by the Service on October 26, 2022. The Corps is requesting the reinitiation of formal consultation to: (1) reauthorize the five-year RGP; (2) reduce the total acres of habitat disturbance and compensation; and (3) add a new wetland mitigation site (Thompson Box wetland mitigation site). At issue are the proposed project's effects on the federally threatened California red-legged frog (*Rana draytonii*). This response is provided under the authority of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq*.) (Act), and in accordance with the implementing regulations pertaining to interagency cooperation (50 CFR 402). Critical habitat has been designated for the California red-legged frog but does not occur within the action area.

The federal action on which we are consulting is the Corps' issuance of a RGP to the San Jose Water Company (SJWC) pursuant to Section 404 of the Clean Water Act of 1972, as amended (33 U.S.C. § 1344 et seq.) for a long-term and ongoing SJWC program directed to identify and improve facility maintenance and land management within the approximately 6,000-acre upper Los Gatos Creek watershed located south of the Town of Los Gatos in unincorporated Santa Clara County, California. Pursuant to 50 CFR 402.12(j), you submitted a biological assessment

for our review and requested concurrence with the findings presented therein. These findings conclude that the proposed project may affect and is likely to adversely affect the California red-legged frog.

The Corps requested that the proposed project be appended to the June 18, 2014, *Programmatic Biological Opinion for Issuance of Permits under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act, including Authorizations Under 22 Nationwide Permits, for Projects that May Affect the Threatened California Red-Legged Frog in Nine San Francisco Bay Area Counties, California* (Programmatic Biological Opinion) (Service file number 08ESMF00-2014-F-0389, Service 2014). The Service has determined that the proposed project meets the suitability criteria for appending to the Programmatic Biological Opinion.

In considering your request, we based our evaluation on the following: (1) the letter from the Corps requesting formal consultation dated March 30, 2016; (2) your letter requesting the reinitiation of formal consultation dated October 26, 2022; (3) the May 12, 2017 *San Jose Water Company Los Gatos Creek Watershed Maintenance Activities Biological Assessment Covering the California Red-legged Frog* (Biological Assessment) (H.T. Harvey & Associates 2017); (4) the February 2016 *Lake Kittredge Wetland Mitigation Site Providing Compensatory Mitigation for the San Jose Water Company's Los Gatos Creek Watershed Maintenance Project* (Horizon Water and Environment 2016a); (5) the October 25, 2016, memorandum "Proposed Dam Face Rodent Burrow Removal Methodology – San Jose Water Company Los Gatos Creek Watershed Maintenance Program" (G. Bolen, H.T. Harvey & Associates, in litt. 2016a); (6) the October 25, 2016, memorandum "California Red-legged Frog Occurrence Information – San Jose Water Company Los Gatos Creek Watershed Maintenance Program" (G. Bolen, H.T. Harvey & Associates, in litt. 2016b); (7) the June 28, 2017, memorandum "San Jose Water Company Los Gatos Creek Watershed Maintenance Program Section 7 Consultation (08ESMF00-2016-TA-1226) – Additional Information Request" (G. Bolen, H.T. Harvey & Associates, in litt. 2017); (8) electronic mail and conversations among the Corps, SJWC, H.T. Harvey & Associates, Horizon Water and Environment, California Department of Fish and Wildlife (CDFW), San Francisco Bay Regional Water Quality Control Board (SFRWQCB), and the Service; (9) the Service's July 19, 2017, biological opinion for the proposed project (Service file number 08ESMF00-2016-F-1226, Service 2017); and (10) other information available to the Service.

The remainder of this document provides our biological opinion on the effects of the proposed project on the California red-legged frog.

Consultation History

May 7, 2015: The Service received from H.T. Harvey & Associates a technical memorandum (G. Bolen, H.T. Harvey & Associates, *in litt*. 2015) requesting guidance on appending the proposed project to the Programmatic Biological Opinion (Service 2014).

April 4, 2016: The Service received the letter from the Corps requesting the initiation of formal consultation on the proposed project. The Corps requested to append the proposed project to the Programmatic Biological Opinion (Service 2014).

May 10, 2016: The Corps informed the Service that they would not be able to expand the action area to include the proposed road maintenance and vegetation and fuels management activities within the upland areas outside of the Corps' jurisdictional areas.

June 2, 2016: The Service sent a letter to the Corps requesting additional information on the proposed project including estimates of and locations of upland habitat disturbance and methods of fuel and vegetation management (Service file number 08ESMF00-2016-TA-1226). The Service responded at the time that the proposed project could not be appended to the Programmatic Biological Opinion because the amount of habitat disturbance (*e.g.*, 200 acres of vegetation management initially proposed) exceeds the threshold for coverage under the Programmatic Biological Opinion.

July 13, 2016: The Service participated in a conference call with the Corps, SJWC, H.T. Harvey & Associates, and Horizon Water and Environment.

July 28, 2016: The Service participated in a conference call with the Corps, SJWC, H.T. Harvey & Associates, Horizon Water and Environment, CDFW, and SFRWQCB.

September 13, 2016: The Service attended a site visit with the Corps, SJWC, H.T. Harvey & Associates, Horizon Water and Environment, and CDFW.

October 25, 2016: The Service received a memoranda from H.T. Harvey & Associates describing the proposed rodent burrow removal activities along the dam faces (G. Bolen, H.T. Harvey & Associates, *in litt*. 2016a) and information on California red-legged frog sightings within the action area and near the proposed Lake Kittredge wetland mitigation site (G. Bolen, H.T. Harvey & Associates, *in litt*. 2016b).

December 13, 2016: The Service sent via electronic mail to H.T. Harvey & Associates and Horizon Water and Environment a request for the estimates of California red-legged frog habitat disturbance in Corps jurisdictional and non-jurisdictional areas.

January 11, 2017: The Service received via electronic mail from Horizon Water and Environment the revised SJWC Maintenance Manual (Horizon Water and Environment 2016b).

January 17, 2017: The Service received via electronic mail from Horizon Water and Environment the requested information on estimates of California red-legged frog habitat disturbance in Corps jurisdictional and non-jurisdictional areas.

February 24, 2017: The Service received via electronic mail from Horizon Water and Environment the revised Lake Kittredge Wetland Restoration/Mitigation Plan and the Lake Kittredge Bullfrog Management Plan.

March 1, 2017:	The Service attended an interagency meeting with the Corps, SJWC, H.T. Harvey & Associates, Horizon Water and Environment, CDFW, and SFRWQCB.
March 20, 2017:	The Service received from H.T. Harvey & Associates the revised estimates of habitat disturbance.
May 22, 2017:	The Service received from the Corps the revised Biological Assessment (H.T. Harvey & Associates 2017).
June 5, 2017:	The Service spoke with H.T. Harvey & Associates over the telephone and requested additional information on the amount of each habitat type that would be disturbed and created at the Lake Kittredge wetland mitigation site. The Service also asked if SJWC was still seeking California red-legged frog credits for the Lake Kittredge wetland mitigation site.
June 28, 2017:	The Service received from H.T. Harvey & Associates a memorandum summarizing the amount of each habitat type that would be disturbed and created at the Lake Kittredge wetland mitigation site (G. Bolen, H.T. Harvey & Associates, *in litt*. 2017). The memorandum also clarified that SJWC would implement all of the required California red-legged frog habitat compensation offsite by purchasing credits from a Service-approved conservation bank for the California red-legged frog.
July 19, 2017:	The Service issued the biological opinion for the proposed project.
September 17, 2018:	The Service received the bill of sale for the purchase of 2.73 acres of California red-legged frog credits from the Sparling Ranch Conservation Bank.
June 3, 2022:	The Service participated in a joint meeting with the Corps, Horizon Environmental, and SJWC to discuss the forthcoming (2023) renewal of the proposed project RGP and the Corps' consultation, mitigation, and program updates.
October 26, 2022:	The Service received from the Corps the request for reinitiation of formal consultation.
October 31, 2022:	The Service requested clarification of the discrepancies in the estimates of habitat disturbance.
November 29, 2022:	The Service received the revised estimates of habitat disturbance.

BIOLOGICAL OPINION

Description of the Proposed Action

To support its surface supply sources, SJWC operates and maintains several facilities and manages several thousand acres of watershed lands within the Los Gatos Creek watershed. The Maintenance Program is a long-term and ongoing SJWC program developed to identify and improve facility maintenance and land management under SJWC direction. The Maintenance

Program provides guiding principles, specific direction on approach, and regulatory authorization for routine maintenance projects in order to meet the SJWC's water supply objectives in a feasible, cost-effective, and environmentally sensitive manner. The proposed project involves the implementation of the Maintenance Program by the SJWC.

The Maintenance Program area is located in the upper Los Gatos Creek watershed, defined as the watershed upstream of the Trout Creek confluence with Los Gatos Creek. In total, SJWC facilities within the Los Gatos Creek watershed include seven intake structures, five reservoirs (impoundments), a network of distribution pipelines, several access roads, nearly 100 roadside culverts and approximately 6,000 acres of land (Figure 1). Although the Maintenance Program area is large, the Maintenance Program is focused on specific facilities that require more regular and routine maintenance. Key facilities in the Maintenance Program include:

1. Reservoirs/impoundments
    a. Lake Williams
    b. Lake Elsman
    c. Lake Cozzens
    d. Lake Kittredge
    e. Lake Ranch Reservoir
2. Water supply intakes
    a. Ostwald Intake
    b. Hooker Intake
    c. Hendry Intake
    d. Howell Intake
    e. Upper and Lower Cavanee Intake
    f. Beardsley Intake
    g. Trout Creek Intake
    h. Aldercroft Heights County Water District Extraction Well (Aldercroft Intake)
3. Culverts and road crossings
    a. 37 culverts along John Nicholas Trail Road
    b. 30 culverts along Cathermola Road
    c. 33 culverts along Sears Road
    d. 7 culverts along Ellege Road

e. 21 culverts along Hooker Bypass Road

f. 2 culverts along Hooker Intake Road

g. 2 culverts along Ryland Intake Road

h. 1 culvert along Beardsley Intake Road

i. 1 culvert along Trout Intake Road

j. 1 culvert along Vina Drive

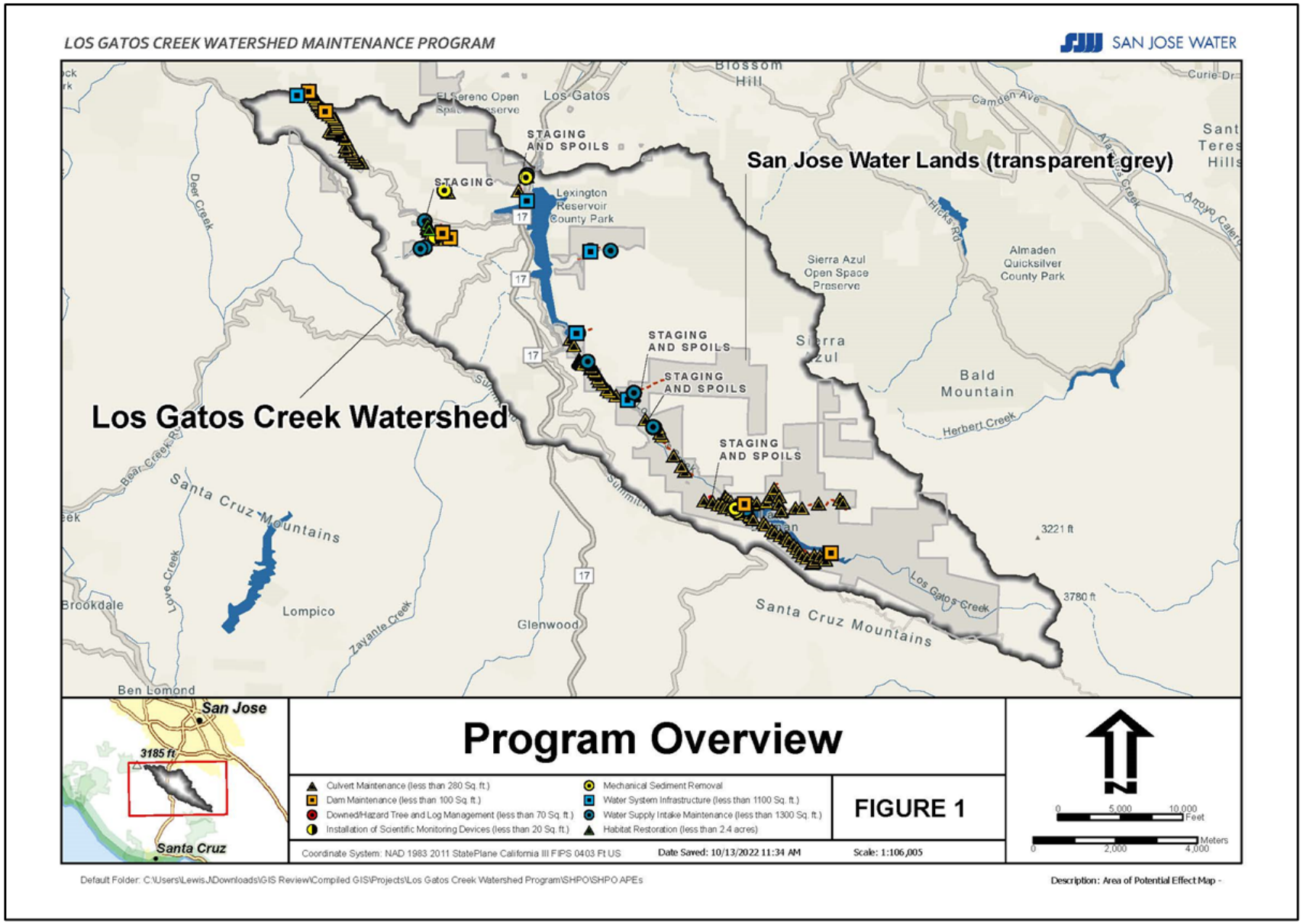

Figure 1. SJWC's Maintenance Program area in the upper Los Gatos Creek watershed.

The Montevina Water Treatment Plant is the SJWC's primary surface water treatment facility for the upper Los Gatos Creek watershed. However, maintenance of the Montevina Water Treatment Plant facility is not included under this Maintenance Program. SJWC also maintains a creek diversion and intake on Saratoga Creek, and the Saratoga Water Treatment Plant, located off Highway 9 in the City of Saratoga. The Saratoga Creek facilities are not included in the Maintenance Program.

The Maintenance Program is designed to meet the SJWC's goals of protecting the quality of its source water supplies, maintaining the structural and functional integrity of SJWC facilities, and reducing reliance on imported water supplies. The SJWC routinely maintains its existing facilities, including conducting periodic repairs or improvements to structures and facilities that are technologically outdated, structurally deficient, threatened, or in need of maintenance to restore their functionality. In addition, SJWC routinely maintains numerous culverts and clears roadside vegetation and debris in order to prevent roadway flooding, reduce safety hazards, and minimize potential threats to the structural integrity of roadways and facilities within their operational range.

The Maintenance Program involves five general categories of work activities: maintenance of reservoirs/impoundments, water intakes, and roads/culverts/crossings; watershed management; and minor maintenance activities:

1. Reservoir/impoundments
    a. Sediment and debris removal at the Lake Elsman spillway, intakes, and culvert outfalls (every other year)
    b. Dam maintenance
        i. Repair damage from burrowing animals (as-needed basis)
2. Water supply intakes
    a. Sediment removal on an annual basis
    b. Debris removal on an annual basis
    c. Flashboard repair (as-needed basis)
    d. Intake gate repair (as-needed basis)
    e. Intake collection pond/weir repair (as-needed basis)
3. Roads, culverts, crossings
    a. Sediment removal (as-needed basis)
    b. Debris removal (as-needed basis)
    c. Culvert repair (as-needed basis)
4. Minor activities

a. Fence repair (as-needed basis)

b. Scientific instrumentation installation and repair (as-needed basis)

The Maintenance Program does not include the following maintenance activities: (1) emergency repair work; (2) maintenance work for large construction projects or Capital Improvement Projects; (3) maintenance work that would increase the water supply capacity of a facility beyond the designed capacity (as-built design); (4) maintenance work conducted on non-SJWC private property by landowners; and (5) maintenance work performed by other agencies. Routine watershed maintenance does not include projects that would alter the designed flood conveyance capacity of a channel. Large construction projects and Capital Improvement Projects are not considered routine maintenance and are not included in this biological opinion.

Lake Kittredge Expansion/Thompson Box Wetland Mitigation

The goals of the mitigation activities at the Lake Kittredge/Thompson Box wetland mitigation sites include enhancement of 0.016 acre of intermittent stream/riparian habitat at the Thompson Box mitigation site, establishment of a minimum of 0.39 acre of seasonal/permanent wetlands, enhancement of 0.30 acre of wetland habitat, and enhancement of 0.21 acre of upland habitat at the Kittredge mitigation site (Figure 2). The Kittredge site will consist of seasonally flooded depressions that will support emergent wetland vegetation with diverse structure (*e.g.*, bulrush and willows). Some large limbs of eucalyptus trees horizontally overhanging the planned wetland will also be removed. The wetlands will be graded to avoid direct contact with the lake to deter dispersal of fish (*e.g.*, large-mouth bass) and American bullfrogs from the lake to the mitigation site. The general approach is to grade the site in such a way that groundwater will support the restored wetlands without a direct connection to Lake Kittredge or existing ephemeral drainages. The mitigation design will expand and enhance existing wetland and riparian habitats found adjacent to the site. A conservation easement will be placed over the Lake Kittredge/Thompson Box wetland mitigation sites (Figure 2).

In addition to removing a non-functional instream diversion structure, the upper portion of the Thompson Box removal area will be regraded to restore natural hydrologic function. Invasive plant removal will be conducted concurrently with grading operations.

At the Kittredge mitigation site, 0.60 acre of ruderal upland/nonnative grassland habitat will be converted to 0.27 acre of freshwater marsh, 0.12 acre of riparian wetlands, and 0.21 acre of mixed shrub ecotone. Also 0.30 acre of existing freshwater wetland/riparian wetlands will be enhanced at the Kittredge mitigation site by additional excavation and replanting.

At the Thompson Box mitigation site, 0.016 acre of a water conveyance structure/intermittent stream will be enhanced by daylighting the stream, and 0.002 acre of bay/oak woodland understory will be enhanced.

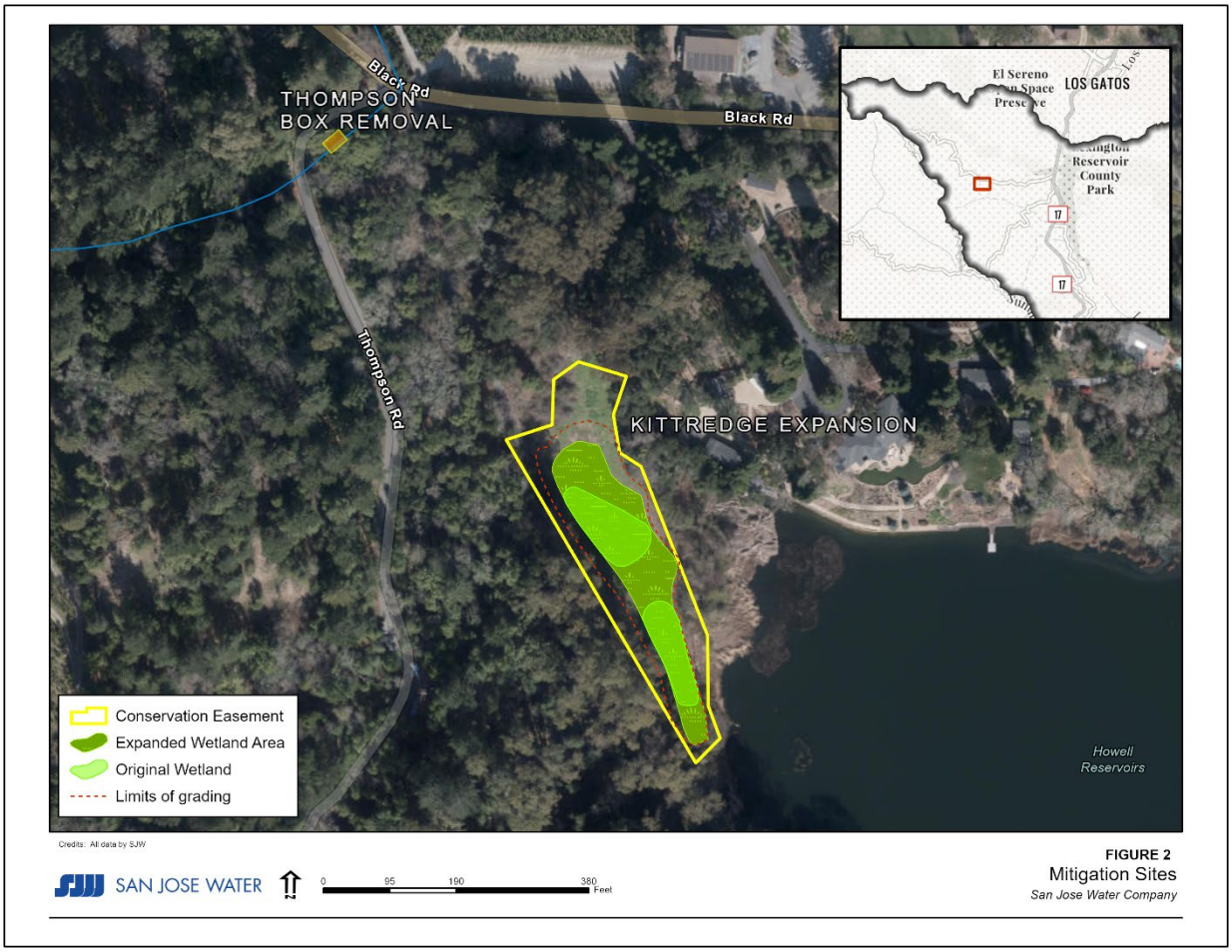

Figure 2. Lake Kittredge and Thomson Box wetland mitigation sites.

Construction Methods

Minor clearing and grubbing will occur for site preparation. The mitigation wetland will be created by excavating soil to lower the ground surface elevation to create conditions for wetland development. One shallow basin will be created with an ecotone graded at approximately 3:1. The majority of the existing north mitigation wetland will be avoided, with some grading on the northern side to create a deeper pool. The upland area will be used as site access. Material excavated from the site will be hauled off-site and disposed of appropriately, or beneficially reused in the watershed. Development of the mitigation wetland is anticipated to require removing approximately 4,460 cubic yards of soil.

Implementation Schedule

Construction activities at the mitigation site will be conducted in the dry season, June 1 to October 15 (or as directed by permit conditions), when streamflow in the unnamed drainage at the Thompson intake is minimal and the Kittredge site conditions are driest. Construction is anticipated to take less than three months. Container plants and willow cuttings will be installed following construction completion, with optimal planting times during the early wet season (November through January).

Vegetation Establishment

The wetland will be planted with a diverse palette of site appropriate native vegetation, including sedges (*Carex* species), rushes (*Juncus* species), bulrushes (*Schoerneplectus* species) and other

wetland graminoids such as creeping wild rye. Common wetlands plants that occur adjacent to the mitigation site, such as tall flatsedge, are anticipated to disperse into the wetland over time. The riparian mixed willow woodland community will be planted with arroyo willow, Pacific willow, and red willow. The transitional ecotone community will be planted with coast live oak, toyon, California blackberry, California rose, and coyote brush. Upland plants will be irrigated for approximately two years to aid in establishment. If within two years vegetation cover in the emergent marsh and riparian mixed willow woodland does not meet performance criteria, adaptive management actions will be implemented (e.g., continuation of irrigation). The Thompson Box mitigation site will be revegetated through natural recruitment. Invasive greater periwinkle will be mechanically removed where it occurs prior to revegetation activities.

Maintenance Plan

Following construction, the mitigation sites will be weeded to control invasive, non-native plant species. For the first two years, invasive species control will take place on a monthly basis at the Kittredge mitigation site during the growing season from May to September. For the third through fifth years, control will be conducted every two months during the growing season. Trees in the upland ecotone will be watered during the dry season to support establishment during the first two to three years.

Conservation Measures

Maintenance Program impacts are addressed following a three-part sequence. First, the Maintenance Program itself has built-in or internal restrictions and protocols that avoid and minimize impacts through limiting how and where maintenance can occur. Second, the operational implementation of maintenance activities must adhere to applicable best management practices (BMPs). Residual impacts remaining after implementation of these two impact avoidance and minimization efforts are addressed through compensatory mitigation. These three approaches to address potential Maintenance Program impacts are further described below.

The Maintenance Program incorporates the following overarching principles to protect natural resources and guide decision-making for maintenance activities. Program BMPs (discussed further below) were developed to be consistent with these principles.

1. **Principle 1:** Avoid and minimize potential impacts on the environment by identifying clearly defined criteria and thresholds to guide when maintenance work is necessary. Decisions regarding the necessity of routine maintenance activities will be made following the thresholds established in the Los Gatos Creek Watershed Maintenance Program Manual (Manual) (SJWC 2016).

2. **Principle 2:** Process all routine maintenance activities in the Maintenance Program area according to the process and protocols established in the Manual.

3. **Principle 3:** SJWC will implement measures to avoid and minimize impacts on native species and habitat.

The Maintenance Program incorporates a range of measures to minimize undesired effects on the environment and to implement the principles described above. BMPs specifically created for the Maintenance Program encompass the SJWC's range of activities and the environmental conditions of the Program area. Types of BMPs include general BMPs that apply to all work, as well as activity specific BMPs designed to address anticipated effects of certain work activities

or particular types of resources. All BMPs for the Maintenance Program are included in Appendix B of the Biological Assessment (Appendix B in H.T. Harvey & Associates 2017) and summarized below:

General Maintenance Practices

1. GEN-1 Work Windows:

    a. Non-ground disturbing maintenance on any facility will generally occur between April 15 and October 1.

    b. Ground-disturbing maintenance activities (i.e., tree removal, mechanized vegetation management, bank stabilization, and sediment removal) occurring in a creek channel will take place between June 15 and October 15.

    c. Hand pruning and hand removal of vegetation will occur year-round, except when wheeled or tracked equipment needs to access the site by crossing a creek, ponded area, or secondary channel.

    d. Removal of standing trees will not occur between February 1 and August 30 to avoid impacts on nesting birds.

    e. Modification and removal of large wood, such as downed trees, is generally conducted during the dry season, but can occur at any time of the year, if imminent danger of a flood threat precludes leaving the wood in place.

    f. Herbicide applications will occur between June 15 and November 15, with an extension through December 31 or until the first occurrence of local rainfall greater than 0.5 inch is forecasted within a 24-hour period from planned application events.

2. GEN-2 Minimize the Area of Disturbance: To minimize impacts to natural resources, the area of ground disturbance will be kept to the minimum footprint necessary to meet the goals and objectives of the maintenance activity.

3. GEN-3 Erosion and Sediment Control Measures:

    a. Upland soils exposed due to maintenance activities will be seeded and stabilized using erosion control fabric or hydroseeding. The channel bed and areas below the Ordinary High Water Mark are exempt from this BMP.

    b. Erosion control fabrics will consist of natural fibers that will biodegrade over time. No plastic or other nonporous material will be used as part of a permanent erosion control approach. Plastic sheeting may be used to temporarily protect a slope from runoff, but only if there are no indications that special-status species would be impacted by the application.

    c. Erosion control measures will be installed according to manufacturer's specifications.

    d. Appropriate measures include, but are not limited to, the following:

1) Silt fences;

2) Straw bale barriers;

3) Brush or rock filters;

4) Storm drain inlet protection;

5) Sediment traps;

6) Sediment basins;

7) Erosion control blankets and mats; and

8) Soil stabilization (i.e., tackified straw with seed, jute or geotextile blankets, broad cast and hydro-seeding, etc.).

e. All temporary construction-related erosion control methods (e.g., silt fences) shall be removed at the completion of the project.

f. The following California Stormwater Quality Association Construction BMPs provide guidance and specifications on implementation of the erosion control measures listed above (see also https://www.casqa.org/resources/bmp-handbooks/construction): SC-3 Sediment Basins; SC-4 Straw or Sand Bag Barriers; SC-5 Sediment Traps; SC-6 Silt Fences; SS-1 Erosion Control Blankets, Mats, and Geotextiles; VR-1 Brush or Rock Filters; VR-4b Temporary Outlet Protection; VR-4b Storm Drain Inlet Protection; WD-1 Earth Dike; WD-1 Slope Drain; and WD-3 Temporary Drains and Swales.

4. GEN-4 Dust Management Controls: SJWC will implement the Bay Area Air Quality Management District's (BAAQMD) Basic Dust Control Measures (www.baaqmd.gov) at maintenance sites less than 4 acres in size. Current measures stipulated by the BAAQMD Guidelines include the following:

a. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.

b. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.

c. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.

d. All vehicle speeds on unpaved roads shall be limited to 15 miles per hour.

e. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.

f. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to five minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.

g. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified visible emissions evaluator.

h. Post a publicly visible sign with the telephone number and person to contact at SJWC regarding dust complaints. Following the review of any dust complaints, SJWC watershed maintenance manager shall respond and take corrective action within 48 hours.

5. GEN-5 Staging and Stockpiling of Materials:

   a. To the extent feasible, staging will occur on access roads, surface streets, or other disturbed areas that are already compacted and only support ruderal vegetation. Similarly, all maintenance equipment and materials (e.g., road rock and project spoil) will be contained within the existing service roads, paved roads, or other pre-determined staging areas. Staging areas for equipment, personnel, vehicle parking, and material storage will be sited as far as possible from major roadways.

   b. To prevent sediment-laden water from being released back into waterways during transport of spoils to disposal locations, truck beds will be lined with an impervious material (e.g., plastic), or the tailgate blocked with wattles, hay bales, or other appropriate filtration material.

   c. Building materials and other maintenance-related materials, including chemicals and sediment, will not be stockpiled or stored where they could spill into water bodies or storm drains.

   d. No runoff from the staging areas may be allowed to enter water ways, including the creek channel or storm drains, without being subjected to adequate filtration (e.g., vegetated buffer, hay wattles or bales, silt screens). The discharge of decant water to water ways from any on-site temporary sediment stockpile or storage areas is prohibited.

   e. During the dry season, no stockpiled soils will remain exposed and unworked for more than seven days. During the wet season, no stockpiled soils will remain exposed, unless surrounded by properly installed and maintained silt fencing or other means of erosion control.

6. GEN-6 Stream Access: SJWC personnel will use existing access ramps and roads to the extent feasible. If necessary to avoid large mature trees, native vegetation, or other significant habitat features, temporary access points will be constructed in a manner that minimizes impacts according to the following guidelines:

   a. Temporary access points will be constructed as close to the work area as possible to minimize equipment transport.

b. In considering channel access routes, slopes of greater than 20 percent will be avoided, if possible.

c. Disturbed areas will be revegetated or filled with compacted soil, seeded, and stabilized with erosion control fabric immediately to prevent future erosion.

d. Personnel will use the appropriate equipment for the job that minimizes impacts. Appropriately tired vehicles, either tracked or wheeled, will be used depending on the site and maintenance activity.

7. GEN- 7 Sediment Removal at Intake Facilities:

a. General BMPs (Mechanical Sediment Removal). If flows are present, and prior to conducting sediment removal work, cofferdams will be installed to isolate the work area and flows will be diverted around the work area in accordance with BMP GEN-14 (Dewatering Measures). An excavator (or other mechanized tools) and loader will be operated in upland areas adjacent to the channel when practicable or in the channel to remove sediment. Material will be off hauled to an upland area and will either be re-used in the watershed or taken to a nearby landfill.

b. Sediment removal work will occur only in late summer and early fall, typically September and October, during the driest period in the creek.

c. Manual Sediment Removal/Relocation. Sediment will be relocated to the channel immediately downstream of weirs/dams and will be conducted using hand tools (shovels) and will only involve moving sediment past the weir/dam structure. Typically, this amounts to less than 2 cubic yards annually, with sediment being moved less than 10 feet downstream past the weir/dam structure. All sediment will be kept in the stream system.

d. No sediment removal/relocation or instream work will be conducted at the Upper Cavanee Intake Facility or the Aldercroft Heights Extraction Well.

8. GEN-8 On-Site Hazardous Materials Management:

a. An inventory of all hazardous materials used (and/or expected to be used) at the worksite and the end products that are produced (and/or expected to be produced) after their use will be maintained by the worksite manager.

b. As appropriate, containers will be properly labeled with a “Hazardous Waste” label, and hazardous waste will be properly recycled or disposed of off-site at an appropriate hazardous waste facility.

c. Contact of chemicals with precipitation will be minimized by storing chemicals in watertight containers or in a storage shed (completely enclosed), with appropriate secondary containment to prevent any spillage or leakage.

d. Petroleum products, chemicals, cement, fuels, lubricants, and non-storm drainage water or water contaminated with the aforementioned materials will not contact soil and not be allowed to enter surface waters or the storm drainage system.

e. All toxic materials, including waste disposal containers, will be covered when they are not in use, and located as far away as possible from a direct connection to the storm drainage system or surface water.

f. All trash that is brought to a project site during maintenance activities (e.g., plastic water bottles, plastic lunch bags, cigarettes) will be removed from the site daily.

9. GEN-9 Existing Hazardous Materials:

   a. If previously unknown hazardous contaminants, including oil, batteries, or paint cans, are encountered during excavation work, SJWC will cease activity and will contact the Santa Clara County Environmental Health Department to determine what measures need to be implemented to address the hazardous materials and ensure that the work site is safe for people and the environment.

   b. As directed by the Santa Clara County Environmental Health Department, SJWC will carefully remove and dispose of the hazardous materials. SJWC staff will wear proper protective gear when handling hazardous materials. All contaminated materials will be stored in appropriate hazardous waste containers for transport and disposal at a permitted hazardous waste facility.

10. GEN-10 Spill Prevention and Response: SJWC will prevent the accidental release of chemicals, fuels, lubricants, and non-storm drainage water into channels following these measures:

    a. New SJWC field personnel will be appropriately trained in spill prevention, hazardous material control, and cleanup of accidental spills.

       1) Equipment and materials for cleanup of spills will be available on site, and spills and leaks will be cleaned up immediately and disposed at a hazardous waste facility.

       2) Field personnel will ensure that hazardous materials are properly handled, and natural resources are protected by all reasonable means.

       3) Spill prevention kits will always be in close proximity when using hazardous materials (e.g., at crew trucks and other logical locations). All field personnel will be advised of these locations.

       4) SJWC staff will routinely inspect the work site, vehicles, and equipment to verify that spill prevention and response measures are properly implemented and maintained. All leaks will be repaired promptly. Drip pans will be used to catch leaks until repairs are made.

    b. For small spills on impervious surfaces, absorbent materials will be used to remove the spill, rather than hosing it down with water. For small spills on pervious surfaces such as soil, the spill area will be excavated and properly disposed rather than burying it. Absorbent materials will be collected and disposed of properly and promptly.

c. All significant spills of hazardous materials, including oil, will be reported immediately. To report a spill: (1) dial 911 or your local emergency response number, (2) call the Governor's Office of Emergency Services Warning Center, (800) 852-7550 (24 hours).

11. GEN-11 Equipment and Fire Prevention:

a. All earthmoving and portable equipment with internal combustion engines will be equipped with spark arrestors.

b. During the high fire danger period (April 1 - December 1), work crews will: have appropriate fire suppression equipment available at the work site; keep flammable materials, including flammable vegetation slash, at least 10 feet away from any equipment that could produce a spark, fire, or flame; and not use portable tools powered by gasoline-fueled internal combustion engines within 25 feet of any flammable materials unless a round-point shovel or fire extinguisher is within immediate reach of the work crew (no more 25 feet away from the work area).

12. GEN-12 Vehicle and Equipment Maintenance:

a. All vehicles and equipment will be kept clean. Excessive build-up of oil and grease will be prevented.

b. All equipment used in the creek channel will be inspected for leaks each day prior to initiation of work.

c. Action will be taken to prevent or repair leaks, prior to use.

d. Incoming vehicles and equipment will be checked for leaking oil and fluids (including delivery trucks, and employee and subcontractor vehicles). Leaking vehicles or equipment will not be allowed onsite.

e. No heavy equipment will operate in a live stream.

f. No equipment servicing will be done in the creek channel or immediate floodplain, unless equipment stationed in these locations cannot be readily relocated (i.e., pumps and generators).

g. If necessary, all servicing of equipment done at the job site will be conducted in a designated, protected area to reduce threats to water quality from vehicle fluid spills. Designated areas will not directly connect to the ground, surface water, or the storm drain system. The service area will be clearly designated with berms, sandbags, or other barriers. Secondary containment, such as a drain pan, to catch spills or leaks will be used when removing or changing fluids. Fluids will be stored in appropriate containers with covers, and properly recycled or disposed of offsite.

h. If emergency repairs are required in the field, only those repairs necessary to move equipment to a more secure location will be conducted in the channel or floodplain.

i. Equipment will be cleaned of any sediment or vegetation before transferring and using in a different watershed to avoid spreading pathogens or exotic/invasive species.

j. Vehicle and equipment washing can occur onsite only as needed to prevent the spread of sediment, pathogens or exotic/invasive species. No runoff from vehicle or equipment washing is allowed to enter water bodies, including creek channels and storm drains, without being subjected to adequate filtration (e.g., vegetated buffers, hay wattles or bales, and silt screens). The discharge of decant water from any onsite wash area to water bodies or to areas outside of the active project site is prohibited. Additional vehicle and equipment washing will occur at the approved wash area in SJWC's corporation yard.

13. GEN-13 Vehicle and Equipment Fueling:

a. No fueling will be done in the channel (top-of-bank to top-of-bank) or immediate floodplain unless equipment stationed in these locations cannot be readily relocated (e.g., pumps and generators).

b. All off-site fueling sites (i.e., on access roads above the top-of-bank) will be equipped with secondary containment and avoid a direct connection to soil, surface water, or the storm drainage system.

c. For stationary equipment that must be fueled on-site, secondary containment, such as a drain pan or drop cloth, will be used to prevent accidental spills of fuels from reaching the soil, surface water, or the storm drain system.

14. GEN-14 Dewatering Measures: When work in flowing streams is unavoidable, streamflow will be diverted around the work area by construction of a temporary dam or bypass.

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

b. The area to be dewatered will encompass the minimum area necessary to perform the maintenance activity.

c. The period of dewatering will extend only for the minimum amount of time needed to perform the maintenance activity.

d. Depending on the channel configurations, sediment removal activities may occur where the flows are not bypassed around the work site as long as a berm is left between the work area and stream flows to minimize water quality impacts during excavation activities.

e. In reaches that contain deep pools, SJWC will maintain these pools, as is practical, by constructing temporary fencing surrounding the pool and avoid pool dewatering. Pools in construction sites may be isolated by upstream or downstream barriers, such as culverts. This approach does not apply to sediment

removal activities that require removal of all sediment to restore the design capacity.

f. Construction

1) Where feasible and appropriate, dewatering will occur via gravity driven systems, and diversion structures shall be installed on concrete sections of the channels, such as concrete box culverts often used at road crossings.

2) Construction of cofferdams will begin in the upstream area and continue in a downstream direction, and the flow will be diverted only when construction of the dams is completed.

3) Cofferdams will be installed both upstream and downstream not more than 100 feet from the extent of the work areas.

4) Instream cofferdams will only be built from materials such as sandbags, clean gravel, or rubber bladders which will cause little or no siltation or turbidity. No earthen fill will be used to construct the cofferdam.

5) Plastic sheeting will be placed over sandbags to minimize water seepage into the maintenance areas. The plastic sheets will be firmly anchored to the streambed to minimize water seepage. If necessary, the footing of the cofferdam will be keyed into the channel bed at an appropriate depth to capture the majority of subsurface flow needed to dewater the streambed.

6) Stream flows will be allowed to gravity flow around or through the work site using temporary bypass pipes or culverts. Bypass pipe diameter will be sized to accommodate, at a minimum, twice the volume of the summer baseflow.

7) When use of gravity-fed dewatering is not feasible and pumping is necessary to dewater a work site, a temporary siltation basin and/or use of silt bags may be required to prevent sediment from re-entering the wetted channel.

g. Implementation

1) A qualified biologist will be present to ensure that fish and other aquatic vertebrates are not stranded during construction and implementation of channel dewatering.

2) If necessary to remove stranded fish or other aquatic vertebrates, electrofishing will be used to collect and relocate fish from the work area. If relocation is necessary, Measure GEN-15 will be implemented.

3) Downstream flows adequate to prevent fish or vertebrate stranding will be maintained at all times during dewatering activities.

4) Diverted and stored water will be protected from maintenance activity-related pollutants, such as soils or equipment lubricants or fuels.

5) If necessary, discharged water will pass over some form of energy dissipater to prevent erosion of the downstream channel. Silt bags will be equipped to the end of discharge hoses and pipes to remove sediment from discharged water.

6) For full channel dewatering, filtration devices or settling basins will be provided as necessary to ensure that the turbidity of discharged water is not visibly more turbid than in the channel upstream of the maintenance site. If increases in turbidity are observed, additional measures will be implemented such as a larger settling basin or additional filtration. If increases in turbidity persist, SJWC's Maintenance Program Manager will be alerted since turbidity measurements may be required.

h. Deconstruction

1) When maintenance is completed, the flow diversion structure will be removed as soon as possible but no more than 48 hours after work is completed. Impounded water will be released at a reduced velocity to minimize erosion, turbidity, or harm to downstream habitat. Cofferdams will be removed such that surface elevations of water impounded above the cofferdam are lowered at a rate not greater than one inch per hour.

2) When diversion structures are removed, to the extent practicable, the ponded flows will be directed into the low-flow channel within the work site to minimize downstream water quality impacts.

3) The area disturbed by flow bypass mechanisms will be restored at the completion of the project. This may include, but is not limited to, recontouring the area and planting of riparian vegetation.

15. GEN-15 Relocation of Aquatic Species for Dewatering: As identified above, before a work area is dewatered, fish and other aquatic vertebrates will be captured and relocated to avoid injury and mortality and minimize disturbance. The following guidelines will apply:

a. Before removal and relocation begins, a qualified fisheries biologist will identify the most appropriate release location(s). Release locations should have water temperatures similar to the capture location and offer ample habitat for released fish and aquatic vertebrates and should be selected to minimize the likelihood of reentering the work area or becoming impinged on the exclusion net or screen.

b. The means of capture will depend on the nature of the work site and will be selected by a qualified fisheries biologist who has a current CDFW scientific collecting permit and is experienced with capture and handling protocols for fish and aquatic vertebrates. Complex stream habitat may require the use of electrofishing equipment, whereas in outlet pools, vertebrates may be captured by pumping down the pool and then seining or dipnetting. Electrofishing will be used only as a last resort; if electrofishing is necessary, it will be conducted only by properly trained personnel following the National Oceanic and Atmospheric

Administration/National Marine Fisheries Service (NMFS) guidelines dated June 2000.

c. To the extent feasible, relocation will be performed during morning periods. Air and water temperatures will be measured periodically, and relocation activities will be suspended if temperatures exceed the limits allowed by NMFS guidelines.

d. To prevent aquatic vertebrates from reentering the work area, the channel will be blocked by placing fine-meshed nets or screens above and below the work area. To minimize entanglement, mesh diameter will not exceed 1/8 inch. The bottom edge of the net or screen will be secured to the channel bed to prevent fish from passing under the screen. Exclusion screening will be placed in low velocity areas to minimize impingement. Screens will be checked periodically and cleaned of debris to permit free flow of water.

e. Handling of aquatic vertebrates will be minimized. When handling is necessary, personnel will wet hands or nets before touching them.

16. GEN-16 Pump/Generator Operations and Maintenance: When needed to assist in channel dewatering, pumps and generators will be maintained and operated in a manner that minimizes impacts to water quality and aquatic species.

    a. Pumps and generators will be maintained according to manufacturers' specifications to regulate flows to prevent dryback or washout conditions.

    b. Pumps will be operated and monitored to prevent low water conditions, which could pump muddy bottom water, or high-water conditions, which creates ponding.

    c. Pump intakes will be screened to prevent entrainment of fish and other vertebrates. If pumping is necessary in streams that support steelhead, a minimum of 2.28-millimeter screens will be installed to prevent entrainment.

Vegetation Management Measures

1. VEG-1 Routine Pruning Measures:

    a. Pruning will be performed according to the most recently published National ANSI A300 Pruning Standards and ISA BMPs for Tree Pruning, which include guidance on pruning practices, pruning objectives, pruning methods (types), palm pruning, and utility pruning.

    b. Pruning activities will follow National ANSI Z133.1-2006 Standards for safe operation of tree care machinery, and safety equipment such as carabiners, helmets, and arborist ropes to ensure the safety of the tree climbers.

2. VEG-2 Minimize Local Erosion Increase from In-channel Vegetation Removal: To minimize the potential effect of localized erosion, the toe of the bank will be protected by leaving vegetation to the maximum extent possible.

3. VEG-3 Standard Herbicide Use Requirements:

a. Hand or mechanical vegetation removal will be used in areas within 0.25 mile of schools. Herbicides will only be applied if hand or mechanical vegetation removal is not feasible.

b. Only herbicides and surfactants that have been approved for aquatic use by the U.S. Environmental Protection Agency (USEPA) and are registered for use by the California Department of Pesticide Regulation (CDPR) will be used for vegetation control activities.

c. Herbicide application will be consistent with Federal Insecticide, Fungicide, and Rodenticide Act label instructions and use conditions issued by the USEPA, CDPR, and the Santa Clara County Agricultural Commissioner.

d. Herbicide application in upland areas will not be made within 48 hours of predicted rainfall.

e. The lowest recommended rate to achieve project objectives of both herbicides and surfactants will be utilized to achieve desired control.

f. An indicator dye may be added to the tank mix to help the applicator identify areas that have been treated and better monitor the overall application.

g. No application in open water; no application to plants whose base is submerged in a stream channel or other water body. Application of herbicides to plants growing directly in water or within a stream channel (top-of-bank to top-of-bank) or its riparian corridor (drip line of trees growing on the top-of-bank) is not covered under this program and requires additional authorizations according to state and local regulations.

4. VEG-4 Downed Tree and Log Management:

a. Logs or downed trees at intake facilities that are less than 10 feet long will be relocated directly downstream of the intake facility and kept in the stream channel.

b. Logs or downed trees that are larger than 10 feet long will be cut into pieces shorter than 10 feet long and then relocated downstream of the intake facility. The intention is to maintain woody debris in the stream channel as much as possible.

c. Prior to any downstream placement of woody debris, SJWC will check to see that downstream facilities if present (such as road crossings or culvert outfalls) would not be impaired by the placement of woody debris in the channel. If downstream facilities exist that could be impacted by the placement of woody debris, then SJWC will seek alternative upland disposal of the woody debris, typically on lands within the riparian corridor near the stream channel.

California Red-legged Frog Measures

In addition, the Maintenance Program will employ the following specific measures for the California red-legged frog from the Programmatic Biological Opinion (Service 2014).

1. For any project with greater than 0.5 acre of permanent impacts to suitable aquatic California red-legged frog habitat, and for any project with greater than 0.5 acre of suitable upland California red-legged frog habitat, the Corps will ensure harm to the California red-legged frog resulting from the Nationwide or other permit action is minimized by the submittal of an appropriate habitat compensation proposal and, if appropriate, a restoration, monitoring, and management plan, at least thirty (30) calendar days prior to the date of initial ground disturbance.

2. When constructing a road improvement, wherever possible, the Corps through the applicant will enhance or construct wildlife passage for the California red-legged frog across roads, highways, or other anthropogenic barriers. This includes upland culverts, tunnels, or overcrossings designed specifically for wildlife movement, as well as making accommodations for terrestrial wildlife movement through culverts that convey hydrology.

3. The Corps will ensure the applicant implements the conservation measures of the Programmatic Biological Opinion, and the appendage. The Corps will ensure the applicant designates a point of contact for the project. The point of contact will maintain a copy of this biological opinion and the appendage onsite for the duration of the construction period. Their name and telephone number will be provided to the Service no more than thirty (30) calendar days prior to the date of initial ground disturbance. At least fourteen (14) calendar days prior to the date of initial ground disturbance, the Corps will ensure the applicant submits a signed letter to the programmatic biological opinion and the appendage and have read and fully understand their responsibilities.

4. If verbally requested before, during, or upon completion of ground disturbance and construction activities, the applicant will ensure the Service, CDFW, and/or their designated agents can immediately and without delay, access and inspect the project site for compliance with the project description, conservation measures, and reasonable and prudent measures of this programmatic biological opinion and appendage, and to evaluate project effects to the California red-legged frog and its habitat.

5. A Service-approved biologist(s) will be onsite during all activities that may result in take of the California red-legged frog. The qualifications of the biologist(s) will be submitted to the Service for review and written approval at least thirty (30) calendar days prior to the date earthmoving is initiated at the project site. The Service-approved biologist(s) will keep a copy of this programmatic biological opinion and the appendage in their possession when onsite.

6. No more than twenty-four (24) hours prior to the date of initial ground disturbance, a preconstruction survey for the California red-legged frog will be conducted by a Service-approved biologist at the project site. The survey will consist of walking the project limits and within the project site to ascertain the possible presence of the species. The Service-approved biologist will investigate all potential areas that could be used by the California red-legged frog for feeding, breeding, sheltering, movement, and other essential behaviors. This includes an adequate examination of mammal burrows, such as California ground squirrels or gophers. If any adults, subadults, juveniles, tadpoles, or eggs are found, the Service-approved biologist will contact the Service to determine if moving any of the individuals is appropriate. In making this determination the Service will consider if an appropriate relocation site exists. If the Service approves moving

animals, the Corps through the applicant will ensure the Service-approved biologist is given time to move the animals from the work site before ground disturbance is initiated. Only Service-approved biologists will capture, handle, and monitor the California red-legged frog.

7. The Service-approved biologist(s) will be given the authority to freely communicate verbally, by telephone, electronic mail, or in writing at any time with construction personnel, any other person(s) at the project site, otherwise associated with the project, the Service, CDFW, or their designated agents. The Service-approved biologist will have oversight over implementation of all the conservation measures in this programmatic biological opinion, and, through the applicant, will have the authority and responsibility to stop project activities if they determine any of the associated requirements are not being fulfilled. If the Service-approved biologist(s) exercises this authority, the Service will be notified by telephone and electronic mail within twenty-four (24) hours. The Service contact is the Coast Bay Division Supervisor of the Endangered Species Program at the Sacramento Fish and Wildlife Office at telephone (916) 414-6623.

8. The Service-approved biologist will conduct employee education training for employees working on earthmoving and/or construction activities. Personnel will be required to attend the presentation, which will describe the California red-legged-frog, avoidance, minimization, and conservation measures, legal protection of the animal, and other related issues. All attendees will sign an attendance sheet along with their printed name, company or agency, email address, and telephone number. The original sign-in sheet will be sent to the Service within seven (7) calendar days of the completion of the training.

9. The Corps through the applicant will minimize adverse effects on the California red-legged frog by limiting, to the maximum extent possible, the number of access routes, construction areas, equipment staging, storage, parking, and stockpile areas. Prior to the date of initial ground disturbance at the project site, equipment staging areas, site access routes, construction equipment and personnel parking areas, debris storage areas, and any other areas that may be disturbed will be identified, surveyed by the Service-approved biologist, and clearly identified with 5-foot-tall bright orange plastic fencing. The fencing will be inspected by the Service-approved biologist and maintained daily by the applicant until the last day that construction equipment are at the project.

10. To the extent practicable, initial ground-disturbing activities will be avoided between November 1 and March 31 because that is the time period when California red-legged frogs are most likely to be moving through upland areas. When ground-disturbing activities must take place between November and March 31, the Corps through the applicant will ensure that daily monitoring by the Service-approved biologist is completed for the California red-legged frog.

11. To minimize harassment, injury, death, and harm in the form of temporary habitat disturbances, all project-related vehicle traffic will be restricted to established roads, construction areas, equipment staging, storage, parking, and stockpile areas. These areas will be included in pre-construction surveys and, to the maximum extent possible, established in locations disturbed by previous activities to prevent further adverse effects.

12. Project-related vehicles will observe a 20 miles per hour speed limit within construction areas, except on County roads, and State and Federal highways. Off-road traffic outside of designated and fenced project work areas will be prohibited.

13. The Corps through the applicant will ensure bio-swales and bio-filtration are installed at the project site adjacent to roadways to avoid and minimize sediment loading and point source pollutants.

14. Stormwater pollution prevention plans (SWPPPs) and erosion control BMPs will be developed and implemented to minimize any wind- or water-related erosion and will be in compliance with the requirements of the Corps. The applicant will include provisions in construction contracts for measures to protect sensitive areas and prevent and minimize stormwater and non-stormwater discharges. Protective measures will include, at a minimum, those listed below.

    a. No discharge of pollutants from vehicle or equipment cleaning will be allowed into any storm drains or water courses.

    b. Vehicle and equipment fueling, and maintenance operations will be at least 50 feet away from water courses, except at established commercial gas stations or established vehicle maintenance facilities.

    c. Concrete waste and water from curing operations will be collected in washouts and will be disposed of and not allowed into water courses.

    d. Spill containment kits will be maintained onsite at all times during construction operations and/or staging or fueling of equipment.

    e. Dust control measures will include use of water trucks and organic tackifiers to control dust in excavation-and-fill areas, covering temporary access road entrances and exits with rock (rocking), and covering of temporary stockpiles when weather conditions require.

15. If a work site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than 5 millimeters to prevent California red-legged frogs 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 to resume with the least disturbance to the substrate.

16. The Corps through the applicant will maintain all construction equipment to prevent leaks of fuels, lubricants, or other fluids.

17. Each encounter with the California red-legged frog will be treated on a case-by-case basis in coordination with the Service, but the general procedure is as follows: (1) the animal will not be disturbed if it is not in danger; or (2) the animal will be moved to a secure location if it is in any danger. These procedures are further described below:

    a. When a California red-legged frog is encountered in the action area, all activities which have the potential to result in the harassment, injury, or death of the individual will be immediately halted. The Service-approved biologist will then

assess the situation in order to select a course of action that will avoid or minimize adverse effects to the animal. To the maximum extent possible, contact with the California red-legged frog will be avoided, and the applicant will allow it to move out of the potentially hazardous situation to a secure location on its own volition. This procedure applies to situations where a California red-legged frog is encountered while it is moving to another location. It does not apply to animals that are uncovered or otherwise exposed or in areas where there is not sufficient adjacent habitat to support the species should the individual move away from the hazardous location. California red-legged frogs that are in danger will be relocated and released by the Service-approved biologist outside the construction area within the same riparian area or watershed. If relocation of the frog outside the fence is not feasible (i.e., there are too many individuals observed per day), the biologist will relocate the animals to a Service pre-approved location. Prior to the initial ground disturbance, the applicant will obtain approval of the relocation protocol from the Service in the event that a California red-legged frog is encountered and needs to be moved away from the project site. Under no circumstances will a California red-legged frog be released on a site unless the written permission of the landowner has been obtained by the applicant.

b. The Service-approved biologist will limit the duration of the handling and captivity of the California red-legged frog to the minimum amount of time necessary to complete the task. If the animal must be held in captivity, it will be kept in a cool, dark, moist, aerated environment, such as a clean and disinfected bucket or plastic container with a damp sponge. The container used for holding or transporting the individual will not contain any standing water.

c. The applicant will immediately notify the Service once the California red-legged frog and the site is secure. The contact for this situation is the Coast Bay Division Supervisor of the Endangered Species Program by electronic mail and at telephone (916) 414-6623.

18. Uneaten human food and trash attracts crows, ravens, coyotes, and other predators of the California red-legged frog. A litter control program will be instituted at each project site. All workers will ensure their food scraps, paper wrappers, food containers, cans, bottles, and other trash are deposited in covered or closed trash containers. The trash containers will be removed from the project site at the end of each working day.

19. All grindings and asphaltic-concrete waste may be temporally stored within previously disturbed areas absent of habitat and at a minimum of 150 feet from any culvert, pond, creek, stream crossing, or other waterbody. On or before the date of project completion, the waste will be transported to an approved disposal site.

20. Restoration and re-vegetation work for temporary effects will be implemented using native California plant species collected on-site or from local sources (i.e., local ecotype). Native or non-native plant species and material from non-local sources will be utilized only with prior written authorization from the Service. All topsoil from natural lands will be removed, cached, and returned to the site according to Service-approved restoration protocols.

21. Restoration and re-vegetation work for temporary effects will be implemented using native California plant species collected on-site or from local sources (i.e., local ecotype). Native or non-native plant species and material from non-local sources will be utilized only with prior written authorization from the Service. All topsoil from natural lands will be removed, cached, and returned to the site according to Service-approved restoration protocols.

22. The Corps through the applicant will not apply insecticides or herbicides at the project site during construction or long-term operational maintenance where there is the potential for these chemical agents to enter creeks, streams, waterbodies, or uplands that contain potential habitat for the California red-legged frog.

23. No pets will be permitted at the project site, to avoid and minimize the potential for harassment, injury and death of the California red-legged frog.

24. No firearms will be allowed at the project site except for those carried by authorized security personnel, or local, State, or Federal law enforcement officials to avoid and minimize the potential for harassment, injury and death of the California red-legged frog.

25. For onsite storage of pipes, conduits and other materials that could provide shelter for California red-legged frogs, an open-top trailer will be used to elevate the materials above ground. This is intended to reduce the potential for animals to climb into the conduits and other materials.

26. To the maximum extent practicable, no construction activities will occur during rain events or within 24 hours following a rain event. Prior to construction activities resuming, a Service-approved biologist will inspect the action area and all equipment/materials for the presence of California red-legged frogs. The animals will be allowed to move away from the project site of their own volition or moved by the Service-approved biologist.

27. To the maximum extent practicable, night-time construction will be minimized or avoided by the applicant. Because dusk and dawn are often the times when the California red-legged frog is most actively moving and foraging, to the maximum extent practicable, earthmoving and construction activities will cease no less than 30 minutes before sunset and will not begin again prior to no less than 30 minutes after sunrise. Except when necessary for driver or pedestrian safety, to the maximum extent practicable, artificial lighting at a project site will be prohibited during the hours of darkness.

28. Plastic monofilament netting (erosion control matting), loosely woven netting, or similar material in any form will not be used at the project site because California red-legged frogs can become entangled and trapped in them. Any such material found on site will be immediately removed by the Service-approved biologist, construction personnel, or the applicant. Materials utilizing fixed weaves (strands cannot move), polypropylene, polymer or other synthetic materials will not be used.

29. Dust control measures will be implemented during construction, or when necessary in the opinion of the Service-approved biologist, Service, CDFW, or their authorized agent. These measures will consist of regular truck watering of construction access areas and disturbed soil areas with water or organic soil stabilizers to minimize airborne dust and

soil particles generated from graded areas. Regular truck watering will be a requirement of the construction contract. Watering guidelines for truck watering will be established to avoid any excessive run-off that may flow into contiguous or adjacent areas containing potential habitat for the California red-legged frog.

30. Trenches or pits one (1) foot or deeper that are going to be left unfilled for more than forty-eight (48) hours will be securely covered with boards or other material to prevent the California red-legged frog from falling into them. If this is not possible, the applicant will ensure wooden ramps or other structures of suitable surface that provide adequate footing for the California red-legged frog are placed in the trench or pit to allow for their unaided escape. Auger holes or fence post holes that are greater than 0.1 inch in diameter will be immediately filled or securely covered so they do not become pitfall traps for the California red-legged frog. The Service-approved biologist will inspect the trenches, pits, or holes prior to their being filled to ensure there are no California red-legged frogs in them. The trench, pit, or hole also will be examined by the Service-approved biologist each workday morning at least one hour prior to initiation of work and in the late afternoon no more than one hour after work has ceased to ascertain whether any individuals have become trapped. If the escape ramps fail to allow the animal to escape, the Service-approved biologist will remove and transport it to a safe location, or contact the Service for guidance.

31. The Service-approved biologist(s) will permanently remove any aquatic exotic wildlife species, such as bullfrogs and crayfish from the project site, to the maximum extent possible.

32. The Corps will ensure the applicant reports any information to the Service about take or suspected take of listed wildlife species not exempted by this programmatic biological opinion. The Service will be notified via electronic mail and telephone within twenty-four (24) hours from the time the information is received by the applicant. Notification will include the species, number of individuals, sex (if known), date, time, location of the incident or of the finding of a dead or injured animal, how the individual was taken, photographs of the specific animal, and names of the persons who observe the take and/or found the animal. The individual animal will be preserved, as appropriate, and held in a secure location until instructions are received from the Service regarding the disposition of the specimen or the Service takes custody of the specimen. The Service contacts are the Division Supervisor of the Coast Bay Division, Endangered Species Program, Sacramento Fish and Wildlife Office at (916) 414-6623.

33. Compensatory Mitigation. Per the Programmatic Biological Opinion, the SJWC will provide compensatory mitigation at a 3:1 ratio for permanent proposed project impacts and a 1:1 ratio for temporary proposed project impacts on habitat for the California red-legged frog, with the exception of those impacts related to habitat enhancement sediment removal activities and mitigation site development activities, which are considered self-mitigating and are discussed in detail in the *Effects of the Action* section below. Therefore, the SJWC will provide 0.075 acre (0.025 acre x 3) of compensation for permanent impacts on habitat for the California red-legged frog and 1.457 acres (1.457 acres x 1) of compensation for temporary impacts, for a total of 1.53 acres of compensation. Compensatory mitigation will be provided by purchasing 1.53 acres of California red-legged frog credits from the Sparling Ranch Conservation Bank in southeastern Santa Clara and northeastern San Benito counties.

Action Area

The action area is defined in 50 CFR § 402.02, as "all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action." For the proposed project, the action area encompasses the approximately 2.382 acres of suitable habitat within the upper Los Gatos Creek watershed that would be disturbed within the SJWC's proposed Maintenance Program area by the proposed project (Figure 1). The action area also includes areas adjacent to or within 500 feet downstream from sites affected, directly or indirectly, by sediment mobilization from Maintenance Program activities. The action area also includes the 0.918 acre of suitable habitat at the Lake Kittredge and Thompson Box wetland mitigation sites that would be disturbed during wetland creation/enhancement (Figure 2). The action area also includes the 1.53 acres of habitat that will be preserved and managed for the benefit of the California red-legged frog at the Sparling Ranch Conservation Bank.

Analytical Framework for the Jeopardy Determination

Section 7(a)(2) of the Act requires that federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. "Jeopardize the continued existence of" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR § 402.02).

The jeopardy analysis in this biological opinion considers the effects of the proposed federal action, and any cumulative effects, on the rangewide survival and recovery of the listed species. It relies on four components: (1) the *Status of the Species*, which describes the current rangewide condition of the species, the factors responsible for that condition, and its survival and recovery needs; (2) the *Environmental Baseline*, which analyzes the current condition of the species in the action area without the consequences to the listed species caused by the proposed action, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the species; (3) the *Effects of the Action*, which determines all consequences to listed species that are caused by the proposed federal action; and (4) the *Cumulative Effects*, which evaluates the effects of future, non-federal activities in the action area on the species. The *Effects of the Action* and *Cumulative Effects* are added to the *Environmental Baseline* and in light of the status of the species, the Service formulates its opinion as to whether the proposed action is likely to jeopardize the continued existence of the listed species.

Status of the Species

California Red-legged Frog

For the most recent comprehensive assessment of the species' rangewide status, please refer to the *California Red-legged Frog (Rana draytonii) 5-Year Review: Summary and Evaluation* (Service 2022, https://ecos.fws.gov/docs/tess/species_nonpublish/4025.pdf). No change in the species' listing status was recommended in this 5-year review. Threats evaluated during that review and discussed in the final document have continued to act on the species since the December 2022 5-year review was finalized, with habitat loss and fragmentation, isolation of populations south of Santa Barbara County and in the Sierra Nevada, invasive predators, and climate change being the most significant effects. While there have been continued losses of California red-legged frog habitat throughout the various recovery units, including the Central

Coast unit and South and East San Francisco Bay unit where the proposed project is located, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

Environmental Baseline

Environmental baseline refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline.

Most of the Los Gatos Creek Watershed is located in the northern portion of the central Santa Cruz Mountains, a rugged and steep range that extends from the northern end of the San Francisco Peninsula south to the Watsonville area. The headwaters of the Los Gatos Creek Watershed are located approximately 11 miles southeast of the Town of Los Gatos. Los Gatos Creek joins the Guadalupe River downstream in the City of San Jose.

The proposed project will occur at discrete locations and SJWC facilities within an approximately 6,000-acre area in the upper Los Gatos Creek Watershed (Figure 1). The primary creeks and channels of the upper watershed join the main stem of Los Gatos Creek (or Lexington Reservoir) at various locations across the watershed. Lexington Reservoir is positioned in the main valley of the watershed, with a north-south orientation. Elevations in the upper Los Gatos Creek Watershed range from 560 feet at the Trout Creek confluence with Los Gatos Creek (downstream of Lexington Reservoir) to 3,791 feet at Loma Prieta Mountain. The upper watershed area is zoned for hillside and open space land use. Hillside land use is defined by the Santa Clara County General Plan (item LU-18) as “mountainous lands unplanned or unsuitable for city development shall be preserved in an open space condition with uses which support and enhance a rural character, which protect and promote wise use of natural resources, and which avoid the risks imposed by natural hazards found in these areas.” A large component of the upper watershed is available for recreational use. Open space and park areas include Lexington Reservoir, which is owned and operated by the Santa Clara Valley Water District; four open space preserves operated by the Midpeninsula Regional Open Space District (i.e., Bear Creek Redwoods Open Space Preserve, Felton Station Open Space Preserve, El Sereno Open Space Preserve, and the Sierra Azul Open Space Preserve); and Sanborn County Park, which is operated by the Santa Clara County Parks Department.

Riparian areas along creeks and stream channels are typically dominated by California bay forest, coast redwood forest, or red alder forest. Mixed evergreen forest extends up the mesic, north facing slopes, while chaparral and northern coastal scrub occurs on the more xeric south and southwest facing slopes. There are also small areas of oak woodland and grassland. Northern coastal scrub and chaparral together cover approximately 38 percent of the watershed, mixed evergreen forest covers approximately 24 percent of the watershed, and redwood forest covers approximately 21 percent of the watershed. The remaining communities each cover approximately 5 percent or less of the watershed. No natural lakes occur within the watershed, but several reservoirs are present. Because the watershed is large and contains some communities

that may not be subject to disturbance by maintenance activities, for the purposes of this biological opinion, only the community types that have the potential of being directly affected by maintenance activities are listed below: aquatic/wetland, forest/woodland, riparian, scrub/shrubland, and grassland.

Aquatic and Wetland Communities

Freshwater Wetlands

Freshwater wetlands generally occur along the margins of creeks and reservoirs in the upper watershed. Species composition varies depending on microhabitat conditions, including frequency of inundation, shading, and substrate. In impounded or slowly moving waterbodies with gently sloping banks and little to no shading (e.g., Lake Ranch Reservoir, Lake Kittredge, and Lake Cozzens), freshwater wetlands are dominated by perennial emergent vegetation including southern cattail, broad-leaved cattail, and hardstemmed tule. Along channels with dense canopy cover and low levels of disturbance (e.g., near Ostwald Intake), freshwater wetlands are dominated by mostly native, shade-tolerant species including western coltsfoot, giant chain fern, common horsetail, American stinging nettle, and elk clover. In disturbed areas with little canopy cover (e.g., Austrian Dam spillway pools), freshwater wetlands are dominated by mostly non-native herbaceous annual and short-lived perennial species including smartweeds, willowherbs, tall flatsedge, annual rabbitsfoot grass, stinging nettle, and cocklebur. These wetlands periodically scour out during storm events but rapidly re-establish once conditions return to normal.

Reservoirs

Several man-made reservoirs are located in the watershed and may be affected by maintenance activities. These reservoirs are Lake Elsman, Williams Reservoir, Lake Kittredge, Lake Cozzens, and Lake Ranch Reservoir. Water quality and biotic conditions within the reservoirs vary depending on site-specific characteristics. Areas with rocky, steeply sloping banks (e.g., Lake Elsman) tend to have clearer water and support little aquatic vegetation. Relatively shallow areas with gently sloping banks (e.g., Lake Ranch Reservoir) tend to support more extensive aquatic vegetation including Pacific mosquito fern, Brazilian waterweed, least duckweed, short-spike watermilfoil, hornwort, and filamentous algae.

Creek Channels

The upper watershed includes Los Gatos Creek and 10 named tributaries, six of which may be affected by maintenance activities (i.e., Los Gatos Creek, Trout Creek, Beardsley Creek, Hooker Gulch, Hendry's Creek, and Cavanee Creek). Hydrology within these creeks is generally perennial; however, flow volumes vary considerably throughout the year, and the geomorphology of the creek channels is largely shaped by storm events. The creek beds are typically dominated by cobbles and pebbles, with coarse sand occupying the pore spaces. These areas are typically sparsely vegetated (<5 percent cover) with western coltsfoot, common horsetail, and other hydrophytic plant species.

Lake Kittredge and Thompson Box Wetland Mitigation Sites

SJWC owns the proposed Kittredge and Thompson Box wetland mitigation sites (Figure 2). The Lake Kittredge wetland mitigation site currently supports two small seasonal depressions built to provide compensatory mitigation for the initial proposed project implementation surrounded by ruderal upland habitat dominated by nonnative, invasive species.

The Thompson Box mitigation site is approximately 750 feet from Lake Kittredge, between Thompson Road and Ellege Road just upstream of where an unnamed creek passes under Black Road (Figure 2). The site is located on an intermittent creek with flashy hydroperiods directly following storm events. The channel's approximate dimensions at the site are 10 feet wide and 2 feet deep. The channel itself is largely unvegetated with mature California bay trees on the top of bank. Understory vegetation is limited to a monoculture of nonnative, invasive greater periwinkle.

California Red-legged Frog

Occurrences within the Action Area

The California Natural Diversity Database (CNDDB) reports the following occurrences of the California red-legged frog within the action area:

1. More than 20 California red-legged frogs heard chorusing at a small pond behind the dam at the Ostwald Intake along upper Los Gatos Creek in 1989 about 1.5 miles upstream of Lexington Reservoir (CNDDB occurrence number 17, CDFW 2022);

2. One dead adult California red-legged frog found on a road about 100 feet from Los Gatos Creek in 1989 about 0.8 mile downstream of the Austrian Dam of Lake Elsman (CNDDB occurrence number 18, CDFW 2022); and

3. One adult California red-legged frog observed below Elsman Dam Spillway in 2020 (CNDDB occurrence number 1734, CDFW 2022).

The California red-legged frog has also been reported at Lake Kittredge and Lake Couzzens (EcoSystems West 2006). However, focused daytime and nighttime surveys for California red-legged frogs conducted at Lake Kittredge and Lake Couzzens in 2010 detected no occurrences of this species but an abundance of aquatic predators, including large-mouth bass, green sunfish, bullfrogs, and Louisiana swamp crayfish in both lakes (EcoSystems West 2010b). The distribution and abundance of California red-legged frogs within stream channels away from these lakes is largely unknown.

Other CNDDB occurrences of the California red-legged frog in other watersheds near the action area include:

1. A California red-legged frog found in Saratoga Creek in 1997 about 2.3 miles north of Lake Ranch Reservoir (CNDDB occurrence number 211, CDFW 2022);

2. Six California red-legged frogs observed in a man-made pond on Skyline Ridge in Santa Cruz County in 2008 about 2.1 miles south of Lake Elsman (CNDDB occurrence number 1038, CDFW 2022);

3. A large adult female California red-legged frog observed in the East Branch of Soquel Creek in Santa Cruz County in 2004 about 2.3 miles south of Williams Reservoir (CNDDB occurrence number 788, CDFW 2022); and

4. One juvenile California red-legged frog observed in upper Bean Creek in Santa Cruz County in 2005 about 2.9 miles south of where Highway 17 crosses the Santa Clara – Santa Cruz county line (CNDDB occurrence number 844, CDFW 2022).

Focused daytime and nighttime surveys for California red-legged frogs conducted during the 2014 breeding season along Los Gatos Creek from the confluence of Hooker Gulch upstream to Austrian Dam detected no California red-legged frogs but an abundance of aquatic predators, including bullfrogs and trout. Thus, the species is not expected to occur regularly or in abundance throughout the action area, except possibly in the few areas where it has been previously recorded. Ongoing focused and protocol-level surveys in the watershed have also resulted in no detections of the California red-legged frog. However, in the absence of much more intensive and widespread surveys, the potential for at least occasional occurrence of the California red-legged frog cannot be dismissed at any of the maintenance sites. If the California red-legged frog does occur at maintenance sites, it is expected to make the greatest use of the aquatic channels/reservoirs and the riparian habitat immediately adjacent to them. The California red-legged frog may forage or take refuge anywhere in the riparian habitats along the channels. California red-legged frogs are expected to use drier, more upland areas within the action area primarily only during dispersal during the wet season. However, some California red-legged frogs may aestivate within small mammal burrows in upland areas during the dry season. Based on the known occurrence of the California red-legged frog within the action area and the availability of suitable habitat throughout the action area, the Service believes the California red-legged frog is likely to occur within all suitable habitat within the action area.

The majority of the action area occurs within the Central Coast recovery unit for the California red-legged frog while the eastern portion of the action area occurs within the South and East San Francisco Bay recovery unit (Service 2002). The recovery status for these units is high, with many existing populations and many areas of high habitat suitability. The action area is located along the northern edge of the Watsonville Slough - Elkhorn Slough core area for the California red-legged frog and about 4.2 miles southeast of the South San Francisco Bay core area (Service 2002). The nearest critical habitat units to the action area are the SCZ-1 unit located about 6.9 miles to the west and the SNM-2 unit located about 7.6 miles to the northwest (Service 2010).

The proposed habitat compensation site at the Sparling Ranch Conservation Bank occurs in the Diablo Range/Salinas Valley recovery unit and the East San Francisco Bay core area for the California red-legged frog (Service 2002).

As of November 30, 2022, the Programmatic Biological Opinion has exempted the incidental take of the California red-legged frog from a total of 34.471 acres of habitat temporarily disturbed and 4.3821 acres of habitat permanently removed.

Effects of the Action

Effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action.

The proposed project (not including the wetland enhancement/creation activities at the Lake Kittredge and Thompson Box wetland mitigation sites) will result in the permanent loss of 0.025 acre of aquatic habitat and the temporary disturbance of 0.653 acre of aquatic habitat and 0.786 acre of upland habitat for the California red-legged frog. The disturbance of suitable habitat for the California red-legged frog will permanently or temporarily remove habitat the California red-legged frog uses for foraging, dispersal, and sheltering.

Habitat restoration at the Lake Kittredge wetland mitigation site will disturb an additional 0.60 acres of ruderal grassland habitat and 0.30 acre of freshwater wetlands/riparian wetlands for the California red-legged frog. Daylighting of the Thompson Box will enhance 0.016 acre of intermittent stream and disturb 0.002 acre of developed/ruderal habitat. However, the wetland created at the Lake Kittredge and Thompson Box wetland mitigation sites will provide higher quality aquatic foraging habitat for the California red-legged frog.

During wet years the created wetland may pond late enough into the summer to provide suitable breeding habitat for the California red-legged frog. However, due to the wetland mitigation site's location adjacent to a large population of bullfrogs at the Lake Kittredge reservoir, the potential for and suitability of the created wetland for California red-legged frog breeding is reduced.

The excavation of accumulated sediment and gravel behind the dams and intakes will benefit California red-legged frogs by enhancing aquatic habitat. Sedimentation at the intake facilities has resulted in channel filling and the absence of any pools immediately upstream of the dams. The proposed project will remove sediment from upstream of the dams to create instream pool areas, which, in combination with the scattered hydrophytic vegetation present, will provide suitable breeding and foraging habitat for California red-legged frogs. It is estimated that 0.1 acre of new California red-legged frog breeding habitat will be created through this enhancement. Sediment removed from intake facilities will be placed in nearby upland grasslands, hauled offsite, or beneficially reused in the watershed. Relocated sediment will be seeded after each maintenance event and will provide habitat suitable for upland dispersal by California red-legged frogs between maintenance events. Thus, the proposed sediment removal project impacts at the intake facilities are considered self-mitigating.

Any California red-legged frogs dispersing, foraging, or sheltering within the action area during construction could be injured or killed. California red-legged frogs could also be injured or killed if they were run over by heavy equipment or construction-related traffic. Dewatering activities could result in injury or mortality of California red-legged frogs if the frogs were entrained or trapped in the pumps. SJWC will minimize the potential for injury and mortality of California red-legged frogs during construction by: having a Service-approved biologist conduct pre-construction surveys of the work site to look for any signs of California red-legged frogs; requiring all construction employees be trained in the identification of the California red-legged frog and its habitats and the implementation of the avoidance and minimization measures; relocation of any California red-legged frogs from the action area by a Service-approved biologist; screening the pumps used for dewatering of the creek; and covering all open trenches or providing escape ramps.

Aquatic habitat for the California red-legged frog could be degraded if the proposed project resulted in a spill of fuel or other hazardous materials or increased sedimentation in Los Gatos Creek and its tributaries. SJWC and its contractors will minimize the potential for the degradation of aquatic habitat from a spill by implementing water quality BMPs, a SWPPP, fueling equipment away from suitable aquatic habitat, implementing a spill prevention plan, and limiting work to the dry season.

As noted previously in the Description of the Action section, the project proponent has also proposed a set of conservation measures, including the commitment to provide compensatory habitat as a condition of the action. This compensatory habitat is intended to minimize the effect on the species of the proposed project's anticipated incidental take, resulting from the permanent loss and temporary disturbance of habitat described above. The compensatory habitat proposed

will be in the form of the preservation and management in perpetuity of 1.53 acres of suitable habitat for the California red-legged frog via the purchase of credits from Sparling Ranch Conservation Bank, a Service-approved conservation bank for the California red-legged frog. This component of the action will have the effect of protecting and managing lands for the species' conservation in perpetuity. The compensatory lands will provide suitable habitat for breeding, feeding, or sheltering commensurate with or better than habitat lost as a result of the proposed project. Providing this compensatory habitat as part of a relatively large, contiguous block of conserved land may contribute to other recovery efforts for the species.

Cumulative Effects

Cumulative effects include the effects of future State, Tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

The SJWC received a grant from the California Board of Forestry and Fire Protection (CalFire) through the California Vegetation Treatment Program for ecological restoration and fuel break treatments to reduce fuel loads on an initial 310.7 acres of SJWC lands in the Los Gatos Creek Watershed including areas in and near the action area (Ascent Environmental 2019; J. Lewis, SJWC, in litt. 2022). The fuels treatment will include manual treatments (e.g., thinning with chainsaws, loppers, or pruners; pulling roots), mechanical treatments (e.g., treatments using tractors/skidders, chippers, masticators), and cut stump application of herbicides. Fuels treatment of the initial 310.7 acres of SJWC lands in the Los Gatos Creek Watershed is expected to begin in the fall 2022. The SJWC proposes to apply for additional funding through CalFire's California Vegetation Treatment Program to conduct fuels treatment on an additional 1,947 acres of their Los Gatos Creek Watershed lands, but the work is not currently funded (J. Lewis, SJWC, in litt. 2022).

In the absence of avoidance and minimization measures (below), California red-legged frogs could be injured or killed during the use of masticators and other heavy equipment in suitable upland habitat for the California red-legged frog. Suitable upland habitat for the California red-legged frog may be degraded in areas where wood chips are spread at a depth of up to 6 inches on the ground resulting in a loss of suitable herbaceous cover. However, opening up the forest canopy and daylighting the forest floor is expected to eventually increase the cover of herbaceous vegetation for the California red-legged frog in the long-term. The creation of fuel breaks will result in the permanent degradation of upland habitat for the California red-legged frog. However, the fuels treatment will also reduce the risk of a catastrophic wildfire that would destroy California red-legged frog habitat throughout the Los Gatos Creek Watershed.

The SJWC has proposed avoidance and minimization measures to reduce the potential for adverse effects to the California red-legged frog and its habitat (T. Thayer, Ascent Environmental, in litt. 2022). These avoidance measures include: (1) no mechanized operations when the chance of rain is greater than 30 percent; (2) shutting down mechanized operations for 24-72 hours following a rain event of greater than 0.2 inch; (3) pre-treatment visual surveys will be performed daily by a qualified biologist or trained worker prior to implementation of any treatment activities (i.e., mechanical, manual, and herbicide) within 300 feet of Class I or Class II streams and within or adjacent to other sensitive habitat areas (e.g., wet intermittent streams, wet seeps); (4) all work will stop within 100 feet of any observed California red-legged frogs; (5) mechanized operations will be prohibited year around (including track chippers unless on an

existing road) and only hand work will be allowed within Watercourse and Lake Protection Zones (i.e., within 75-150 feet of a Class I or Class II watercourse and within 30 feet of a Class III watercourse or adjacent to other potential sensitive habitat areas (e.g., wet seeps)); (6) fuels treatment workers will be trained in the implementation of the avoidance and minimization measures and the identification of the California red-legged frog; (7) any downed woody debris over 12 inches in diameter will be searched for California red-legged frogs before moving it; (8) when treating live understory vegetation, if feasible, masticating heads will be kept out of the duff layer and will conduct treatments approximately 6 inches above the ground; (9) all herbicide use during project implementation will comply with the herbicide use restrictions in the stipulated injunction issued by the Federal District Court for the Northern District of California; (10) only cut stump and basal bark applications of herbicides will be allowed in California red-legged frog habitat; (11) cut stump and basal bark applications of herbicides will not be applied within 60 feet of breeding or non-breeding aquatic habitat for the California red-legged frog; (12) no heavy equipment will be fueled within 65 feet of any watercourse; (13) a mosaic of remaining trees will comprise of approximately 100–200 healthy trees per acre generally, removing dead, dying, and diseased trees first and select live trees less than or equal to 16 inches diameter at breast height; (14) where there are only stands made up of trees less than 16 inches diameter at breast height, these stands of smaller trees will be spaced approximately 10–20 feet apart; (15) 75 percent of the overstory and 50 percent of the understory will be maintained in Watercourse and Lake Protection Zones; (16) snags greater than 12 inches diameter at breast height will be retained that are at least 100 feet from key infrastructure and community assets; (17) woody debris will be retained in strategic locations to maintain forest floor complexity while reducing fuel connectivity; (18) understory will be retained to create a mosaic of vegetation to maintain suitable upland habitat for the California red-legged frog by prioritizing the retention of hydrophytic riparian species and California hazelnut; (19) outside of the drip line of retained trees, shrubs will be retained to achieve a horizontal crown separation of approximately 50–75 feet; (20) at no time will more than 66 precent of any contiguous stand of shrubs be removed unless the treatment activity is a fuel break; (21) a minimum of 5-10 percent of herbaceous vegetation per acre will be retained unless removal is warranted with respect to homes, community protection, or other key infrastructure or assets including roads and staging areas; (22) micro-stands of untreated oak trees with a cluster radius of approximately 25 feet (50-foot diameter) will be periodically maintained throughout the project area where feasible and will be spaced approximately 75–150 feet apart; (23) residual masticated material will remain uniformly spread to the extent feasible within the project area and will not exceed a depth of approximately 6 inches (average depth of 3 inches); and (24) track chippers will be restricted to manual treatment units where slopes do not exceed 35 percent.

Conclusion

After reviewing the current status of the California red-legged frog, the environmental baseline for the action area, the effects of the proposed RGP for the Los Gatos Creek Watershed Maintenance Program, and the cumulative effects, it is the Service's biological opinion that the RGP for the Los Gatos Creek Watershed Maintenance Program, as proposed, fits within the parameters of the level of effects analyzed in the Programmatic Biological Opinion and is therefore not likely to jeopardize the continued existence of the California red-legged frog. We based this determination on the following: (1) successful implementation of the conservation measures described in this biological opinion will minimize the adverse effects on individual California red-legged frogs; (2) suitable breeding and non-breeding aquatic habitat and upland dispersal habitat will remain onsite; (3) the preservation and management in perpetuity of 1.53 acres of suitable habitat for the California red-legged frog at the Sparling Ranch Conservation

Bank; (4) the creation and enhancement of 0.916 acre of suitable wetland habitat for the California red-legged frog at the Lake Kittredge and Thompson Box wetland mitigation sites; and (5) the enhancement of 0.1 acre of breeding habitat for the California red-legged frog by creating instream pools due to sediment removal upstream of dams.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by Service regulations at 50 CFR 17.3 as an intentional or negligent act or omission which creates the likelihood of injury to wildlife 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. Harm is defined by the same regulations as an act which actually kills or injures wildlife. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including 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 section 7(o)(2), 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 and must be undertaken by the Corps so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to assume and implement the terms and conditions or (2) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Corps or SJWC must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

Amount or Extent of Take

California Red-legged Frog

The Service anticipates incidental take of individual California red-legged frogs will be difficult to detect or quantify because of the variable, unknown size of any resident population over time, their elusive and cryptic behavior, and the difficulty of finding killed or injured animals. Due to the difficulty in quantifying the number of California red-legged frogs that will be taken as a result of the proposed project, the Service is quantifying take incidental to the proposed project as the following:

1. The non-lethal harm and capture of all adults, sub-adult, and juvenile California red-legged frogs within the 0.025 acre of suitable aquatic habitat permanently lost and the 1.269 acres of suitable aquatic habitat and 2.006 acres of suitable upland habitat temporarily disturbed during construction of the proposed project.

2. The injury or mortality of one adult, sub-adult, or juvenile California red-legged frog.

Incidental take of the California red-legged frog has been exempted from a total of 34.806 acres of habitat temporarily disturbed and 3.9501 acres of habitat permanently removed in projects appending to the Programmatic Biological Opinion including the proposed project. Upon implementation of the following Reasonable and Prudent Measures, incidental take of California red-legged frog associated with the RGP for the Los Gatos Creek Watershed Maintenance Program will become exempt from the prohibitions described in section 9 of the Act. No other forms of take are exempted under this opinion.

Effect of the Take

The proposed project, as described, fits within the parameters of the level of take analyzed in the Programmatic Biological Opinion, and the Service has determined that this level of take is not likely to result in jeopardy to the California red-legged frog.

Reasonable and Prudent Measures

All necessary and appropriate measures to avoid or minimize effects on the California red-legged frog resulting from implementation of this project have been incorporated into the project's proposed conservation measures. Therefore, the Service believes the following reasonable and prudent measure is necessary and appropriate to minimize incidental take of the California red-legged frog:

1) All conservation measures, as described in the biological assessment and restated here in the Description of the Proposed Action section of this biological opinion, shall be fully implemented and adhered to. Further, this reasonable and prudent measure shall be supplemented by the terms and conditions below.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the Corps must ensure compliance with the following terms and conditions, which implement the reasonable and prudent measure described above. These terms and conditions are nondiscretionary.

1) The Corps shall include full implementation and adherence to the conservation measures as a condition of any permit or contract issued for the proposed project.

Monitoring:

a. For those components of the action that will result in habitat degradation or modification whereby incidental take in the form of harm is anticipated, the Corps of SJWC shall provide a precise accounting of the total acreage of habitat impacted to the Service after completion of construction.

b. The Corps or SJWC shall immediately contact the Service's Sacramento Fish and Wildlife Office (SFWO) at (916) 414-6623 to report direct encounters between listed species and project workers and their equipment whereby incidental take in the form of harm, injury, or death occurs. If the encounter occurs after normal working hours, the Corps or SJWC shall contact the SFWO at the earliest possible opportunity the next working day. When injured or killed individuals of the listed species are found,

the Corps or SJWC shall follow the steps outlined in the Salvage and Disposition of Individuals section below.

c. For those components of the action that will require the capture and relocation of any listed species, the Corps or SJWC shall immediately contact the SFWO at (916) 414-6623 to report the action. If capture and relocation need to occur after normal working hours, the Corps or SJWC shall contact the SFWO at the earliest possible opportunity the next working day.

d. A post-project completion report shall be provided to the Service.

Salvage and Disposition of Individuals:

Injured listed species must be cared for by a licensed veterinarian or other qualified person(s), such as the Service-approved biologist. Dead individuals must be sealed in a resealable plastic bag containing a paper with the date and time when the animal was found, the location where it was found, and the name of the person who found it, and the bag containing the specimen frozen in a freezer located in a secure site, until instructions are received from the Service regarding the disposition of the dead specimen. The Service contact person is the Coast Bay Division Supervisor of the Endangered Species Program at the SFWO at (916) 414-6623.

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 to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service recommends the following actions:

1) The Corps should include in their permits the control of non-native bullfrogs, non-native tiger salamanders, non-native fish, non-native crayfish, and other invasive species and predators within suitable breeding habitat for the California red-legged frog.

2) The Corps should include in their permits the restoration, preservation, and management in perpetuity under a Service-approved long-term management plan suitable aquatic breeding habitat and surrounding upland habitat for the California red-legged frog.

3) The Corps should report sightings of any listed or sensitive animal species to the CNDDB of the CDFW. A copy of the reporting form and a topographic map clearly marked with the location the animals were observed also should be provided to the Service.

4) The Corps should include in their permits the Service's conservation recommendations for the western population of the Federal candidate monarch butterfly (*Danaus plexippus*) available at: https://xerces.org/publications/planning-management/western-monarch-butterfly-conservation-recommendations

    a. Native, insecticide-free milkweed species (*Asclepias* species) (with a focus on early-emerging milkweed species (e.g., *Asclepias vestita*, *A. californica*, *A. eriocarpa*, *A. cordifolia*, *A. erosa*) should be included in the planting palette in restoration plans within suitable breeding habitat in the San Francisco Bay Area

and Central Valley that is more than 5 miles from monarch butterfly overwintering habitat along the coast and San Francisco Bay.

b. Suitable native, insecticide-free nectar plants (with a focus on early-emerging flowering plants that are available to monarchs from January-April) should be included in the planting palette in all restoration plans in suitable habitat in the San Francisco Bay Area and Central Valley.

c. Milkweed larval host plants for the monarch butterfly should be flagged and avoided. If avoidance of milkweed larval host plants is not feasible, then the milkweed plants should be removed between November 1 and March 15 within early breeding habitat in the San Francisco Bay Area and Central Valley when monarchs are less likely to be in the area. Each year and site are different, so when possible, please consider surveying milkweed plants for the early life stages of monarchs prior to removing or disturbing them.

d. Avoid herbicide application on blooming flowers. Apply herbicides during young plant phases, when plants are more responsive to treatment, and when monarch butterflies and other pollinators are less likely to be nectaring on the plants. Whenever possible, use targeted application herbicide methods, avoid large-scale broadcast applications, and take precautions to limit off-site movement of herbicides (e.g., drift from wind and discharge from surface water flows).

e. Report milkweed and monarch observations for all life stages, including breeding butterflies, to the Monarch Milkweed Mapper (https://www.monarchmilkweedmapper.org/) or via the project portal in the iNaturalist smartphone app (https://www.inaturalist.org/projects/western-monarch-milkweed-mapper).

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION—CLOSING STATEMENT

This concludes formal consultation on the RGP for the Los Gatos Creek Watershed Maintenance Program. As provided in 50 CFR §402.16(a), reinitiation of consultation is required and shall be requested by the federal agency or by the Service where discretionary federal involvement or control over the action has been retained or is authorized by law, and:

1) If the amount or extent of taking specified in the incidental take statement is exceeded;

2) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered;

3) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or

4) If a new species is listed or critical habitat designated that may be affected by the identified action.

If you have any questions regarding this biological opinion, please contact Joseph Terry, Senior Biologist (joseph_terry@fws.gov) or at (916) 943-6721 or Ryan Olah, Coast Bay Division Supervisor (ryan_olah@fws.gov), at (916) 414-6623.

Sincerely,

MICHAEL FRIS Digitally signed by MICHAEL FRIS Date: 2023.01.04 14:22:41 -08'00'

Michael Fris
Field Supervisor

Enclosure

ec:
U.S. Army Corps of Engineers, San Francisco, California
Brenda Blinn, California Department of Fish and Wildlife, Fairfield, California
Jared Lewis, San Jose Water Company, San Jose, California

LITERATURE CITED

Ascent Environmental. 2019. California Vegetation Treatment Program Final Environmental Impact Report. November 2019. Prepared for California Board of Forestry and Fire Protection, Sacramento, California. Available at: https://bof.fire.ca.gov/projects-and-programs/calvtp/calvtp-programmatic-eir/.

California Department of Fish and Wildlife (CDFW). 2022. California Natural Diversity Database. RareFind version 5. Natural Heritage Division. Sacramento, California.

EcoSystems West Consulting Group. 2006. California Red-legged frog Habitat Assessment for the San Jose Water Company Lexington Reservoir Raw Water Pipeline Replacement Project Santa Clara County, California. Prepared for Sacramento Fish and Wildlife Service, West Valley Construction Company, and San Jose Water Company. June 2006.

EcoSystems West Consulting Group. 2010. Results of special-status amphibian and aquatic reptile surveys at San Jose Water Company's Lake Kittredge and Lake Couzzens properties, near the community of Lakeside in Santa Clara County California. September 2010.

Horizon Water and Environment. 2016a. Lake Kittredge Wetland Mitigation Site Providing Compensatory Mitigation for the San Jose Water Company's Los Gatos Creek Watershed Maintenance Project. February. Prepared by Horizon Water and Environment, Oakland, California, for the San Jose Water Company, San Jose, California. 20 pp. plus appendices.

Horizon Water and Environment. 2016b. San Jose Water Company Los Gatos Creek Watershed Maintenance Program Manual. December. Prepared by Horizon Water and Environment, Oakland, California, for the San Jose Water Company, San Jose, California. 9-8 pp. plus appendices.

H.T. Harvey & Associates. 2017. San Jose Water Company Los Gatos Creek Watershed Maintenance Activities Biological Assessment Covering the California Red-legged Frog. May 12. Prepared by H.T. Harvey & Associates, Los Gatos, California, for San Jose Water Company, San Jose, California. 37 pp. plus appendices.

ICF International. 2012. Final Santa Clara Valley Habitat Plan. August 2012. San Francisco, California. Available at: https://scv-habitatagency.org/178/Santa-Clara-Valley-Habitat-Plan.

San Jose Water Company (SJWC). 2016. Draft Los Gatos Creek Watershed Maintenance Manual. San Jose, California.

U.S. Fish and Wildlife Service (Service). 1996. Endangered and threatened wildlife and plants; determination of threatened status for the California Red-Legged Frog. Federal Register 61:25813-25833.

U.S. Fish and Wildlife Service (Service). 2002. Recovery Plan for the California Red-legged Frog (*Rana aurora draytonii*). Sacramento, California.

U.S. Fish and Wildlife Service (Service). 2014. Programmatic Biological Opinion for Issuance of

Permits under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act, including Authorizations Under 22 Nationwide Permits, for Project that May Affect the Threatened California Red-Legged Frog in Nine San Francisco Bay Area Counties, California. U.S. Fish and Wildlife Service file number 08ESMF00-2014-F-0389. Sacramento Fish and Wildlife Office, Sacramento, California. 31 pp.

U.S. Fish and Wildlife Service (Service). 2017. Formal Consultation on the Regional General Permit (RGP) for the Los Gatos Creek Watershed Maintenance Program in Santa Clara County, California and appending to the June 18, 2014, *Programmatic Biological Opinion for Issuance of Permits under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act, including Authorizations Under 22 Nationwide Permits, for Projects that May Affect the Threatened California Red-Legged Frog in Nine San Francisco Bay Area Counties, California* (U.S. Army Corps of Engineers [Corps] file number 2016-00109S). July 19, 2017. Service file number 08ESMF00-2016-F-1226. Sacramento Fish and Wildlife Office, Sacramento, California. 38 pp. plus appendix.

U.S. Fish and Wildlife Service (Service). 2022. California Red-legged Frog (*Rana draytonii*) 5-year Review: Summary and Evaluation. December 2022. Sacramento Fish and Wildlife Office, Sacramento, California. Available at https://ecos.fws.gov/docs/tess/species_nonpublish/4025.pdf.

PERSONAL COMMUNICATIONS

Gordon, R. and J. Bennett. Electronic mail communication from Rebecca Gordon and Jesse Bennett, Service, Carlsbad FWO, to Valerie Hentges, Service, Sacramento FWO, dated October 12, 2017.

IN LITT. REFERENCES

Bolen, Ginger. 2015. Letter from Senior Wildlife Ecologist, H.T. Harvey & Associates, Los Gatos, California, to Ryan Olah, U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, Sacramento, California, dated May 7, 2015. Subject: Use of the California Red-legged Frog Programmatic Biological Opinion for the San Jose Water Company Los Gatos Creek Watershed Maintenance Program.

Bolen, Ginger. 2016a. Memorandum from Senior Wildlife Ecologist, H.T. Harvey & Associates, Los Gatos, California, to Joseph Terry, U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, Sacramento, California, dated October 25, 2016. Subject: Proposed Dam Face Rodent Burrow Removal Methodology – San Jose Water Company Los Gatos Creek Watershed Maintenance Program.

Bolen, Ginger. 2016b. Memorandum from Senior Wildlife Ecologist, H.T. Harvey & Associates, Los Gatos, California, to Joseph Terry, U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, Sacramento, California, dated October 25, 2016. Subject: California Red-legged Frog Occurrence Information – San Jose Water Company Los Gatos Creek Watershed Maintenance Program.

Bolen, Ginger. 2017. Memorandum from Senior Wildlife Ecologist, H.T. Harvey & Associates, Los Gatos, California, to Joseph Terry, U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, Sacramento, California, dated June 28, 2017. Subject: San Jose

Water Company Los Gatos Creek Watershed Maintenance Program Section 7 Consultation (08ESMF00-2016-TA-1226) – Additional Information Request.

Lewis, J. 2022. Memorandum from Manager, Environmental Planning and Natural Resources , San Jose Water Company, San Jose, California, to Mike Fris, Field Supervisor, U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, Sacramento, California, dated September 19, 2022. Subject: Consultation regarding Mitigation Measure BIO-2a of the CalVTP Program EIR for the San Jose Water Company Forest Health Program – P1, Approach to Avoid Mortality, Injury, or Disturbance and Maintain Habitat Function for California Red-legged Frog and California tiger salamander. 10 pp.

Thayer, T. 2022. Electronic mail message from Wildlife Biologist, Ascent Environmental, Oakland, California, to Michael Fris, Field Supervisor, U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, Sacramento, California, dated October 28, 2022. Subject: San Jose Water CalVTP PSA Forest Health Fuels Reduction Project - Summary of Measures for California red-legged frog.

United States Department of the Interior
FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

In Reply Refer To:
FF08ESMF00-2014-F-0389

JUN 18 2014

Ms. Jane M. Hicks
Regulatory Division
U.S. Army Corps of Engineers
1455 Market Street 16th Floor
San Francisco, California 94103-1398

Subject: Programmatic Biological Opinion for Issuance of Permits under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act, including Authorizations Under 22 Nationwide Permits, for Projects that May Affect the Threatened California Red-Legged Frog in Nine San Francisco Bay Area Counties, California

Dear Ms. Hicks:

This is the U.S. Fish and Wildlife Service's (Service) programmatic biological opinion for issuance of permits under Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act (RHA), including 22 Nationwide Permits, in Marin, Napa, Solano, Sonoma, Contra Costa, Alameda, San Francisco, San Mateo, and Santa Clara counties, California. Nationwide Permits are authorized by the U.S. Army Corps of Engineers (Corps) under the Clean Water Act (33 U.S.C. 1251 *et seq.*). At issue are the adverse effects on the threatened California red-legged frog (*Rana draytonii*) and its designated critical habitat. This programmatic biological opinion was prepared under the authority of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*)(Act).

The Corps may append activities authorized under CWA and RHA permits in the nine San Francisco Bay Area counties (Bay Area counties) to this programmatic biological opinion with the concurrence of the Service provided the activities meet the suitability criteria for the threatened amphibian and its critical habitat, or the Service determines that implementation of appropriate additional conservation measures sufficiently reduces the effects of the action consistent with the intent of this programmatic biological opinion.

This programmatic biological opinion is based on: (1) recovery plan for the California red-legged frog (Service 2002); (2) designated critical habitat for the California red-legged frog (Service 2010); and (3) other information available to the Service.

ADMINISTRATION OF THE PROGRAMMATIC BIOLOGICAL OPINION

This programmatic consultation will be implemented when the Corps makes a determination that a proposed project that qualifies for authorization under one of the 22 Nationwide Permits described in the Project Description, or otherwise meets the suitability criteria set forth in this document, may affect the California red-legged frog and/or its critical habitat, as required by the implementing

regulations for section 7 of the Act. The Corps will then provide the Service with all of the written documentation utilized to formulate its determination. Upon receipt of the appropriate information, the Service will review the material and append the project to this programmatic biological opinion, or we will issue a letter stating the project is not likely to affect the California red-legged frog. At the Service's discretion, an individual biological opinion will be completed for the Nationwide or other Corps permit action; or if, in addition to the California red-legged frog, other listed species also will be adversely affected, the proposed action will be appended to this programmatic biological opinion and a biological opinion completed for the additional listed species. Both the appendage and the biological opinion will then be combined into a single document by the Service that will be issued to the Corps.

A key element of this programmatic biological opinion is that each separate permit action appended will have minimal effects and low levels of incidental take of the California red-legged frog. Projects not appropriate to be appended to this biological opinion are those that exceed minimal effects to this species, including direct, indirect, and cumulative effects and these would require separate consultation. At the Service's discretion, proposed actions that do not meet the suitability criteria may still be appended, if the complete implementation of appropriate additional conservation measures sufficiently reduces the effects of the action or that the project has minimal effects that are consistent with the intent of this programmatic biological opinion.

This programmatic biological opinion is effective for a period of five (5) calendar years from the date of its issuance and can be extended if deemed appropriate by both agencies The Service will review this programmatic consultation, as appropriate, to ensure that its application is consistent with the intended criteria.

BIOLOGICAL OPINION

Description of the Proposed Action

Project Description

For this programmatic biological opinion, actions authorized by the Corps that may be appended consist of a variety of activities that may result in the incidental take of the California red-legged frog on 1.0 acre or less per project of suitable upland red-legged frog habitat, including areas within 300 feet of the top of bank of a creek, stream, waterbody, or wetland, or up to 1.0 acre of aquatic habitat/waters of the United States, or a combination of uplands and wetlands that is not larger than 1.0 acre in size. The Corps and the Service may determine on a case by case basis that projects larger than one acre can be appended to this programmatic biological opinion. Based on the following criteria: the action has minimal effects to the frog, the action is consistent with the intent of the biological opinion and appropriate conservation measures are included. Each project appended to this programmatic biological opinion may result in temporary effects and/or permanent effects. For the purposes of this biological opinion, temporary effects and permanent effects are defined as:

1. Temporary effects: The effects resulting from a Nationwide or other Corps permit-authorized activity are short term and do not result in effects to California red-legged frog habitat that are longer than one year; all habitats will be restored to better or equal to before the impact within one calendar year following disturbance. Disturbance may include alteration or reduction in vegetative cover or suitable aestivation sites, such as root wads, rodent burrows, or other forms

of cover. An elevation in ambient noise level, for example, also may be considered a disturbance. Temporary effects are those that denude, manipulate, or otherwise modify habitats from their existing, pre-project conditions as a result of project activities that include, but are not limited to, construction, staging, storage, lay down, vehicle access, borrow sites, disposal areas, vehicle parking, dredging, and vegetation removal. In order to be considered a temporary effect, the affected site must be restored to baseline habitat values or higher within one calendar year following the date of initial disturbance.

2. Permanent effects: The effects resulting from project activities which remove existing habitat or essential habitat components that cannot be restored to pre-project conditions of equal or greater value within one calendar year of the date of initial disturbance.

Projects that meet the suitability criteria and may involve some or all of the preceding activities are often authorized under the Corps' Nationwide Permit program. To guide the Corps during project evaluation, the Service has reviewed the Nationwide Permits the Corps has issued under 33 CFR 330.3 and has determined that projects typically authorized under the Nationwide Permits listed below may be appropriate for appendage to this programmatic biological opinion:

(#3) Maintenance.
(#5) Scientific Measuring Devices.
(#6) Survey Activities.
(#7) Outfall Structures.
(#12) Utility Line Discharges.
(#13) Bank Stabilization, provided that activity is less than fifty (50) feet in length.
(#14) Road Crossings.
(#15) U.S. Coast Guard Approved Bridges.
(#17) Hydropower Projects.
(#18) Minor Discharges.
(#19) Minor Dredging.
(#23) Approved Categorical Exclusions.
(#25) Structural Discharges.
(#27) Wetland and Riparian Restoration and Creation Activities.
(#31) Maintenance of Existing Flood Control Facilities.
(#32) Completed Enforcement Actions.
(#33) Temporary Construction, Access and Dewatering.
(#37) Emergency Watershed Protection and Rehabilitation.
(#38) Cleanup of Hazardous and Toxic Waste.
(#44) Mining Activities.
(#45) Repair of Uplands Damaged by Discrete Events.
(#46) Discharges in Ditches.

Suitability Criteria

To make use of this programmatic biological opinion, the Corps will ensure that each Nationwide or other permit activity that is proposed for appendage satisfies the following criteria:

1. The California red-legged frog has been found to inhabit or utilize the action area through the result of a Service-approved protocol survey; or, the action area contains suitable habitat for breeding, foraging, aestivation, movement, or other essential behaviors; or the Corps is assuming

the species will be affected by the proposed action.

2. Each Nationwide or other permit activity appended to this programmatic biological opinion adversely affects no more than 1.0 acre of suitable California red-legged frog upland habitat and no more than 1.0 acre of aquatic habitat. This includes equipment staging areas, site access routes, laydown areas, construction, equipment storage, vehicle parking areas; and stockpile and debris storage areas.

3. Activities authorized under Nationwide and other Corps permits may adversely affect the California red-legged frog through mortality, injury, harassment, capture, trap or harm, or temporary disturbance or permanent loss of the species' aquatic and upland habitats. This includes areas with suitable habitat for California red-legged frog movement. The projects will not occur in locations where the populations are so small and/or isolated that even the minor effects described in the programmatic biological opinion may have substantial adverse effects to the long-term survival and viability of the species within the recovery unit.

4. The measures to reduce and/or avoid adverse effects to the California red-legged frog described in the Conservation Measures of this programmatic biological opinion will be fully implemented by the Corps through the applicant. The measures may be modified on a project-specific basis upon written concurrence by the Service.

5. The Corps through the applicant will include enhancement, creation, or construction of habitat connectivity and safe wildlife passage across roads, whenever possible, as a conservation measure for Nationwide and other permit activities submitted for appendage to this programmatic biological opinion.

6. Nationwide and other permits appended to this programmatic biological opinion are not interdependent or interrelated with other projects being proposed or implemented by the Corps through the applicant, other government agencies, or other parties. This includes actions which have been separated from each other as a result of funding, authorizations, or other constraints.

7. The Corps through the applicant will provide the following information to the Service with their request for appending each Nationwide or other permit action to this programmatic biological opinion:

    a. Corps Permit Application including Assessor's Parcel Number(s), Universal Transverse Mercator (UTM) coordinates, and street address of the project;

    b. Corps-verified jurisdictional determination;

    c. Written description of the project, including but not limited to, construction methods, types and numbers of equipment, specific dates the work will occur, habitat restoration, conservation measures that will be fully implemented, and a monitoring plan for the California red-legged frog. The description will include the location and size of construction areas, borrow sites, laydown areas, parking areas, disposal sites, and other associated activities;

    d. A 7.5 minute U.S. Geological Survey topographic map or similar high-quality color topographic map clearly marked with the precise location of the project, construction areas,

borrow sites, laydown areas, parking areas, disposal sites, restoration sites, California red-legged frog relocation sites, and other associated activities;

e. A map showing known listed plant populations and listed animal sightings, from the California Department of Fish and Wildlife's Natural Diversity Data Base, and other sources, recorded within the action area and within a 10-mile radius of the project site;

f. A map (scale 1" =100') delineating the major vegetation communities present on and adjacent to the project site. Color photographs of the major vegetation communities present on the project site will be included with the document, with the locations of where they were taken indicated on the vegetation map;

g. One plan view and a minimum of one typical cross section indicating water bodies, vegetation types, work areas, roads, restoration sites, refueling, storage, parking, and staging areas;

h. The names and complete curriculum vitae of the biologist(s) who are being proposed to conduct pre-construction surveys, and monitor and handle California red-legged frog;

Conservation Measures

The Project Description includes the Conservation Measures that the Corps through the applicant will fully implement to avoid, minimize, and compensate for the direct effects, indirect effects, both temporary and permanent, and cumulative effects to the California red-legged frog from Nationwide and other Corps permits expected to occur in the nine San Francisco Bay Area counties.

1. For any project with greater than 0.5 acre of permanent impacts to suitable aquatic California red-legged frog habitat, and for any project with greater than 0.5 acre of suitable upland California re-legged frog habitat, the Corps will ensure harm to the California red-legged frog Nationwide or other permit action is minimized by the submittal of an appropriate habitat compensation proposal and, if appropriate, a restoration, monitoring, and management plan, at least thirty (30) calendar days prior to the date of initial ground disturbance (described in Compensation Section below) .

2. When constructing a road improvement, wherever possible, the Corps through the applicant will enhance or construct wildlife passage for the California red-legged frog across roads, highways, or other anthropogenic barriers. This includes upland culverts, tunnels, or overcrossings designed specifically for wildlife movement, as well as making accommodations for terrestrial wildlife movement through culverts that convey hydrology.

3. The Corps will ensure the applicant implements the conservation measures of this programmatic biological opinion, and the appendage. The Corps will ensure the applicant designates a point of contact for the project. The point of contact will maintain a copy of this biological opinion and the appendage onsite for the duration of the construction period. Their name and telephone number will be provided to the Service no more than thirty (30) calendar days prior to the date of initial ground disturbance. At least fourteen (14) calendar days prior to the date of initial ground disturbance, the Corps will ensure the applicant submits a signed letter to the Service verifying that they possess a copy of this programmatic biological opinion and the appendage, and have read and fully understand their responsibilities.

4. If verbally requested before, during, or upon completion of ground disturbance and construction activities, the applicant will ensure the Service, California Department of Fish and Wildlife, and/or their designated agents can immediately and without delay, access and inspect the project site for compliance with the project description, conservation measures, and reasonable and prudent measures of this programmatic biological opinion and appendage, and to evaluate project effects to the California red-legged frog and its habitat.

5. A Service-approved biologist(s) will be onsite during all activities that may result in take of the California red-legged frog. The qualifications of the biologist(s) will be submitted to the Service for review and written approval at least thirty (30) calendar days prior to the date earthmoving is initiated at the project site. The Service-approved biologist(s) will keep a copy of this programmatic biological opinion and the appendage in their possession when onsite.

6. No more than twenty-four (24) hours prior to the date of initial ground disturbance, a pre-construction survey for the California red-legged frog will be conducted by a Service-approved biologist at the project site. The survey will consist of walking the project limits and within the project site to ascertain the possible presence of the species. The Service-approved biologist will investigate all potential areas that could be used by the California red-legged frog for feeding, breeding, sheltering, movement, and other essential behaviors. This includes an adequate examination of mammal burrows, such as California ground squirrels or gophers. If any adults, subadults, juveniles, tadpoles, or eggs are found, the Service-approved biologist will contact the Service to determine if moving any of the individuals is appropriate. In making this determination the Service will consider if an appropriate relocation site exists. If the Service approves moving animals, the Corps through the applicant will ensure the Service-approved biologist is given sufficient time to move the animals from the work site before ground disturbance is initiated. Only Service-approved biologists will capture, handle, and monitor the California red-legged frog.

7. The Service-approved biologist(s) will be given the authority to freely communicate verbally, by telephone, electronic mail, or in writing at any time with construction personnel, any other person(s) at the project site, otherwise associated with the project, the Service, the Department, or their designated agents. The Service-approved biologist will have oversight over implementation of all the conservation measures in this programmatic biological opinion, and, through the applicant, will have the authority and responsibility to stop project activities if they determine any of the associated requirements are not being fulfilled. If the Service-approved biologist(s) exercises this authority, the Service will be notified by telephone and electronic mail within twenty-four (24) hours. The Service contact is the Coast Bay Foothills Division Chief of the Endangered Species Program at the Sacramento Fish and Wildlife Office at telephone (916) 414-6600.

8. The Service-approved biologist will conduct employee education training for employees working on earthmoving and/or construction activities. Personnel will be required to attend the presentation which will describe the California red-legged-frog, avoidance, minimization, and conservation measures, legal protection of the animal, and other related issues. All attendees will sign an attendance sheet along with their printed name, company or agency, email address, and telephone number. The original sign-in sheet will be sent to the Service within seven (7) calendar days of the completion of the training.

9. The Corps through the applicant will minimize adverse effects to the California red-legged frog by limiting, to the maximum extent possible, the number of access routes, construction areas, equipment staging, storage, parking, and stockpile areas. Prior to the date of initial ground disturbance at the project site, equipment staging areas, site access routes, construction equipment and personnel parking areas, debris storage areas, and any other areas that may be disturbed will be identified, surveyed by the Service-approved biologist, and clearly identified with 5-foot tall bright orange plastic fencing. The fencing will be inspected by the Service-approved biologist and maintained daily by the applicant until the last day that construction equipment are at the project.

11. To the extent practicable, initial ground-disturbing activities will be avoided between November 1 and March 31 because that is the time period when California red-legged frogs are most likely to be moving through upland areas. When ground-disturbing activities must take place between November 1 and March 31, the Corps through the applicant will ensure that daily monitoring by the Service-approved biologist is completed for the California red-legged frog.

12. To minimize harassment, injury death, and harm in the form of temporary habitat disturbances, all project-related vehicle traffic will be restricted to established roads, construction areas, equipment staging, storage, parking, and stockpile areas. These areas will be included in pre-construction surveys and, to the maximum extent possible, established in locations disturbed by previous activities to prevent further adverse effects. Project-related vehicles will observe a 20-mile per hour speed limit within construction areas, except on County roads, and State and Federal highways. Off-road traffic outside of designated and fenced project work areas will be prohibited.

13. The Corps through the applicant will ensure bio-swales and bio-filtration are installed at the project site adjacent to roadways to avoid and minimize sediment loading and point source pollutants.

14. Stormwater pollution prevention plans (SWPPPs) and erosion control BMPs will be developed and implemented to minimize any wind- or water-related erosion and will be in compliance with the requirements of the Corps. The applicant will include provisions in construction contracts for measures to protect sensitive areas and prevent and minimize stormwater and non-stormwater discharges. Protective measures will include, at a minimum, those listed below.

    a. No discharge of pollutants from vehicle or equipment cleaning will be allowed into any storm drains or water courses.

    b. Vehicle and equipment fueling and maintenance operations will be at least 50 feet away from water courses, except at established commercial gas stations or established vehicle maintenance facilities.

    c. Concrete waste and water from curing operations will be collected in washouts and will be disposed of and not allowed into water courses.

d. Spill containment kits will be maintained onsite at all times during construction operations and/or staging or fueling of equipment.

e. Dust control measures will include use of water trucks and organic tackifiers to control dust in excavation-and-fill areas, covering temporary access road entrances and exits with rock (rocking), and covering of temporary stockpiles when weather conditions require.

15. 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 prevent California red-legged frogs 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 to resume with the least disturbance to the substrate.

16. The Corps through the applicant will maintain all construction equipment to prevent leaks of fuels, lubricants, or other fluids.

17. Each encounter with the California red-legged frog will be treated on a case-by-case basis in coordination with the Service, but the general procedure is as follows: (1) the animal will not be disturbed if it is not in danger; or (2) the animal will be moved to a secure location if it is in any danger. These procedures are further described below:

a. When a California red-legged frog is encountered in the action area, all activities which have the potential to result in the harassment, injury, or death of the individual will be immediately halted. The Service-approved biologist will then assess the situation in order to select a course of action that will avoid or minimize adverse effects to the animal. To the maximum extent possible, contact with the frog will be avoided and the applicant will allow it to move out of the potentially hazardous situation to a secure location on its own volition. This procedure applies to situations where a California red-legged frog is encountered while it is moving to another location. It does not apply to animals that are uncovered or otherwise exposed or in areas where there is not sufficient adjacent habitat to support the species should the individual move away from the hazardous location.

b. California red-legged frogs that are in danger will be relocated and released by the Service-approved biologist outside the construction area within the same riparian area or watershed. If relocation of the frog outside the fence is not feasible (i.e., there are too many individuals observed per day), the biologist will relocate the animals to a Service pre-approved location. Prior to the initial ground disturbance, the applicant will obtain approval of the relocation protocol from the Service in the event that a California red-legged frog is encountered and needs to be moved away from the project site. Under no circumstances will a California red-legged frog be released on a site unless the written permission of the landowner has been obtained by the applicant.

The Service-approved biologist will limit the duration of the handling and captivity of the California red-legged frog to the minimum amount of time necessary to complete the task. If the animal must be held in captivity, it will be kept in a cool, dark, moist, aerated environment, such as a clean and disinfected bucket or plastic container with a damp sponge. The container used for holding or transporting the individual will not contain any standing water.

c. The applicant will immediately notify the Service once the California red-legged frog and the site is secure. The contact for this situation is the Coast Bay Foothills Division Chief of the Endangered Species Program by email and at telephone (916) 414-6600.

18. Uneaten human food and trash attracts crows, ravens, coyotes, and other predators of the California red-legged frog. A litter control program will be instituted at each project site. All workers will ensure their food scraps, paper wrappers, food containers, cans, bottles, and other trash are deposited in covered or closed trash containers. The trash containers will be removed from the project site at the end of each working day.

19. All grindings and asphaltic-concrete waste may be temporally stored within previously disturbed areas absent of habitat and at a minimum of 150 feet from any culvert, pond, creek, stream crossing, or other waterbody. On or before the date of project completion, the waste will be transported to an approved disposal site.

20. Restoration and re-vegetation work for temporary effects will be implemented using native California plant species collected on-site or from local sources (i.e., local ecotype). Native or non-native plant species and material from non-local sources will be utilized only with prior written authorization from the Service. All topsoil from natural lands will be removed, cached, and returned to the site according to Service-approved restoration protocols.

21. Loss of soil from run-off or erosion will be prevented with straw bales, straw wattles, or similar means provided they do not entangle, block escape or dispersal routes of the California red-legged frog.

22. The Corps through the applicant will not apply insecticides or herbicides at the project site during construction or long-term operational maintenance where there is the potential for these chemical agents to enter creeks, streams, waterbodies, or uplands that contain potential habitat for the California red-legged frog.

23. No pets will be permitted at the project site, to avoid and minimize the potential for harassment, injury and death of the California red-legged frog.

24. No firearms will be allowed at the project site except for those carried by authorized security personnel, or local, State, or Federal law enforcement officials to avoid and minimize the potential for harassment, injury and death of the California red-legged frog.

25. For onsite storage of pipes, conduits and other materials that could provide shelter for California red-legged frogs, an open-top trailer will be used to elevate the materials above ground. This is intended to reduce the potential for animals to climb into the conduits and other materials.

26. To the maximum extent practicable, no construction activities will occur during rain events or within 24-hours following a rain event. Prior to construction activities resuming, a Service-approved biologist will inspect the action area and all equipment/materials for the presence of California red-legged frogs. The animals will be allowed to move away from the project site of their own volition or moved by the Service-approved biologist.

27. To the maximum extent practicable, night-time construction will be minimized or avoided by the applicant. Because dusk and dawn are often the times when the California red-legged frog is most actively moving and foraging, to the maximum extent practicable, earthmoving and construction activities will cease no less than 30 minutes before sunset and will not begin again prior to no less than 30 minutes after sunrise. Except when necessary for driver or pedestrian safety, to the maximum extent practicable, artificial lighting at a project site will be prohibited during the hours of darkness.

28. Plastic monofilament netting (erosion control matting), loosely woven netting, or similar material in any form will not be used at the project site because California red-legged frogs can become entangled and trapped in them. Any such material found on site will be immediately removed by the Service-approved biologist, construction personnel, or the applicant. Materials utilizing fixed weaves (strands cannot move), polypropylene, polymer or other synthetic materials will not be used.

29. Dust control measures will be implemented during construction, or when necessary in the opinion of the Service-approved biologist, Service, California Department of Fish and Wildlife, or their authorized agent. These measures will consist of regular truck watering of construction access areas and disturbed soil areas with water or organic soil stabilizers to minimize airborne dust and soil particles generated from graded areas. Regular truck watering will be a requirement of the construction contract. Watering guidelines for truck watering will be established to avoid any excessive run-off that may flow into contiguous or adjacent areas containing potential habitat for the California red-legged frog.

30. Trenches or pits one (1) foot or deeper that are going to be left unfilled for more than forty-eight (48) hours will be securely covered with boards or other material to prevent the California red-legged frog from falling into them. If this is not possible, the applicant will ensure wooden ramps or other structures of suitable surface that provide adequate footing for the California red-legged frog are placed in the trench or pit to allow for their unaided escape. Auger holes or fence post holes that are greater than 0.10 inch in diameter will be immediately filled or securely covered so they do not become pitfall traps for the California red-legged frog. The Service-approved biologist will inspect the trenches, pits, or holes prior to their being filled to ensure there are no California red-legged frogs in them. The trench, pit, or hole also will be examined by the Service-approved biologist each workday morning at least one hour prior to initiation of work and in the late afternoon no more than one hour after work has ceased to ascertain whether any individuals have become trapped. If the escape ramps fail to allow the animal to escape, the Service-approved biologist will remove and transport it to a safe location, or contact the Service for guidance.

31. The Service-approved biologist(s) will permanently remove any aquatic exotic wildlife species, such as bullfrogs and crayfish from the project site, to the maximum extent possible.

32. The Corps will ensure the applicant reports any information to the Service about take or suspected take of listed wildlife species not exempted by this programmatic biological opinion. The Service will be notified via electronic mail and telephone within twenty-four (24) hours from the time the information is received by the applicant. Notification will include the species, number of individuals, sex (if known), date, time, location of the incident or of the finding of a dead or injured animal, how the individual was taken, photographs of the specific animal, and names of the persons who observe the take and/or found the animal. The

individual animal will be preserved, as appropriate, and held in a secure location until instructions are received from the Service regarding the disposition of the specimen or the Service takes custody of the specimen. The Service contacts are the Chief of the Coast Foothill Division, Endangered Species Program, Sacramento Fish and Wildlife Office at (916) 414-6600, and Resident Agent-in-Charge of the Service's Law Enforcement Division at (916) 569-8444.

Compensation

Compensation measures include protecting and managing habitat at a secure location to minimize the harm of the California red-legged frog caused by alteration, disturbance, or destruction of its habitat. The Corps through the applicant will provide compensation in the form of in-perpetuity habitat protection for any project appended to this BO with greater than 0.5 acre of permanent impacts to suitable California red-legged frog habitat. An area of non-habitat is not necessarily an area absent of vegetation. Shoulder areas or right-of way that lack vegetative cover may function in a landscape highly fragmented by linear structures, such as roads, railways, and canals, as a corridor for dispersal, or potential refugia areas despite the appearance of degradation The compensation ratios for adverse effects are as follows:

California Red-legged Frog Habitat Compensation

Level of Effect	**Compensation Ratio**
Permanent	3:1
Temporary	1:1*

* this often is in the form of on-site restoration in Waters of the United States.

The Corps will ensure the applicant provides in-kind habitat as part of the compensation for projects appended to this programmatic biological opinion. Aquatic habitat will be provided for adverse effects to aquatic habitat, and upland habitat will be protected for damage or loss of upland habitat. The applicant will compensate for adverse effects for temporary or permanent effects to the California red-legged frog by one of the following options: 1) acquire land, by itself, or possibly in conjunction with a conservation organization, State park, State Wildlife Area, National Wildlife Refuge, or local regional park that provides occupied habitat; 2) purchase the appropriate credit units at a Service-approved conservation bank; or 3) by restoration of Waters of the US of an area suitable to support the frog. The Service and the Corps will have to approve the applicability of restoration of a proposed site on a case-by-case basis.

Conservation credits or appropriate habitat obtained by the applicant will consist of the following measures:

1. At least thirty (30) calendar days prior to the date of initial ground disturbance, the applicant will acquire habitat occupied by the California red-legged frog or habitat that is important to this threatened animal, such as movement corridors, that the Service has concurred is appropriate in writing. The property will have a conservation easement or other appropriate entitlement; management plan, and endowment to manage the habitat in perpetuity. All of these documents will be reviewed and approved by the Service. The conservation easement will name the Service

as third-party beneficiaries and it will be held by an entity qualified to hold conservation easements subject to approval by the Service. An in-perpetuity endowment to manage the land and monitor the conservation easement will be secured using an escrow account or other funding assurance acceptable to and approved by the Service. The endowment will be held by a Service-approved entity in an amount agreed to by the Service. A Service-approved management plan will be developed prior to acquisition of land and it will include, but not limited to; a description of existing habitats and planned habitat creation, restoration and/or enhancement; monitoring criteria for the California red-legged frog; an integrated pest management and monitoring plan to control invasive species; habitat creation, restoration and/or enhancement success criteria; and adaptive management strategies if success criteria are not met or to incorporate new scientific data.

OR

2. The applicant will purchase an appropriate number of credits at a Service-approved conservation bank whose service area includes the action area for the proposed appendage to this programmatic biological opinion. Conservation credits will be purchased and documentation provided to the Service comprising the Agreement for Sale of Conservation Credits, Bill of Sale, Payment Receipt and Updated Credit Ledger at least fourteen (14) calendar days prior to the date of initial ground disturbance at the project.

OR

3. The applicant will provide a restoration, monitoring and management plan to the Service and the Corps at least 30 calendar days prior to ground disturbance for review and approval. The plan will include at a minimum success criteria and information regarding site preservation. The plan may also include the removal of invasive species. Because not in all cases will restoration benefit, the species this will be reviewed on a case-by-case basis.

Action Area

The action area is defined in 50 CFR 402.02 as "all areas to be affected directly or indirectly by the Federal action, and not merely the immediate area involved in the action." This programmatic consultation addresses minor projects within the following California counties: Napa, Solano, Contra Costa, Alameda, San Francisco, San Mateo, Santa Clara, Sonoma and Marin. Areas within 1,000 feet of the project footprint, parking, equipment storage, stockpile, access, and borrow site locations for each Nationwide or other permit are included within the action area.

Analytical Framework for the Jeopardy and Adverse Modification Analysis

Jeopardy Determination
The following analysis relies on four components to support the jeopardy determination for the California red-legged frog: (1) the **Status of the Species**, which evaluates the species' range wide condition, the factors responsible for that condition, and its survival and recovery needs; (2) the **Environmental Baseline**, which evaluates the condition of the species in the action area, the factors responsible for that condition, and the role of the action area in the species' survival and recovery; (3) the **Effects of the Action**, which determines the direct and indirect effects of the proposed Federal action and the effects of any interrelated or interdependent activities on the species; and (4) **Cumulative Effects**, which evaluates the effects of future, non-Federal activities in

the action area on the species.
In accordance with the implementing regulations for section 7 and Service policy, the jeopardy determination is made in the following manner: the effects of the proposed Federal action are evaluated in the context of the aggregate effects of all factors that have contributed to the current status of the California red-legged frog and, for non-Federal activities in the action area, those actions likely to affect the species in the future, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of the species in the wild.

The following analysis places an emphasis on using the range-wide survival and recovery needs of the California red-legged frog and the role of the action area in providing for those needs as the context for evaluating the significance of the effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the jeopardy determination.

Adverse Modification Determination
This programmatic biological opinion does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR §402.02. Instead, we have relied upon the statutory provisions of the Act to complete the following analysis with respect to critical habitat.

In accordance with policy and regulation, the adverse modification analysis in this programmatic biological opinion relies on four components: (1) *Status of Critical Habitat*, which evaluates the range wide condition of designated critical habitat for the California red-legged frog in terms of PCEs, the factors responsible for that condition, and the intended recovery function of the critical habitat at the provincial and range-wide scale; (2) *Environmental Baseline*, which evaluates the condition of the critical habitat in the action area, the factors responsible for that condition, and the recovery role of the critical habitat in the action area; (3) *Effects of the Action*, which determines the direct and indirect effects of the proposed Federal action and the effects of any interrelated or interdependent activities on the PCEs and how that will influence the recovery role of affected critical habitat units; and (4) *Cumulative Effects* which evaluates the effects of future, non-Federal activities in the action area on the PCEs and how that will influence the recovery role of affected critical habitat units. For purposes of the adverse modification determination, the effects of the proposed Federal action on the California red-legged frog critical habitats are evaluated in the context of the range-wide condition of the critical habitat at the provincial and range-wide scales, taking into account any cumulative effects, to determine if the critical habitat range-wide would remain functional (or would retain the current ability for the PCEs to be functionally established in areas of currently unsuitable but capable habitat) to serve its intended recovery role for the California red-legged frog.

The analysis in this biological opinion places an emphasis on using the intended range-wide recovery function of the California red-legged frog critical habitat and the role of the action area relative to that intended function as the context for evaluating the significance of the effects of the proposed Federal action, taken together with cumulative effects, for purposes of making the adverse modification determination.

Status and Environmental Baseline of the California Red-Legged Frog

Listing Status: The California red-legged frog was listed as a threatened species on May 23, 1996 (61 FR 25813) (Service 1996). Critical habitat was designated for this species on April 13, 2006 (71 FR 19244) (Service 2006) and revisions to the critical habitat designation were published on March 17, 2010 (75 FR 12816) (Service 2010). At this time, the Service recognized the taxonomic

change from *Rana aurora draytonii* to *Rana draytonii* (Shaffer *et al.* 2010). A Recovery Plan was published for the California red-legged frog on September 12, 2002 (Service 2002).

Description: The California red-legged frog is the largest native frog in the western United States (Wright and Wright 1949), ranging from 1.5 to 5.1 inches in length (Stebbins 2003). The abdomen and hind legs of adults are largely red, while 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 2003), and dorsolateral folds are prominent on the back. Larvae (tadpoles) range from 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).

Distribution: The historic range of the California red-legged frog extended from the vicinity of Elk Creek in Mendocino County, California, along the coast inland to the vicinity of Redding in Shasta County, California, and southward to northwestern Baja California, Mexico (Fellers 2005; Jennings and Hayes 1985; Hayes and Krempels 1986). The species was historically documented in 46 counties but the taxa now remains in 238 streams or drainages within 23 counties, representing a loss of 70 percent of its former range (Service 2002). California red-legged frogs are still locally abundant within portions of the San Francisco Bay Area and the Central California Coast. Isolated populations have been documented in the Sierra Nevada, northern Coast, and northern Transverse Ranges. The species is believed to be extirpated from the southern Transverse and Peninsular ranges, but is still present in Baja California, Mexico (CDFG 2013a).

Status and Natural History: California red-legged frogs predominately inhabit permanent water sources such as streams, lakes, marshes, natural and manmade ponds, and ephemeral drainages in valley bottoms and foothills up to 4,921 feet in elevation (Jennings and Hayes 1994, Bulger *et al.* 2003, Stebbins 2003). However, they also inhabit ephemeral creeks, drainages and ponds with minimal riparian and emergent vegetation. California red-legged frogs breed from November to April, although earlier breeding records have been reported in southern localities. Breeding generally occurs in still or slow-moving water often associated with emergent vegetation, such as cattails, tules or overhanging willows (Storer 1925, Hayes and Jennings 1988). Female frogs deposit egg masses on emergent vegetation so that the egg mass floats on or near the surface of the water (Hayes and Miyamoto 1984).

Habitat includes nearly any area within 1-2 miles of a breeding site that stays moist and cool through the summer including vegetated areas with coyote brush, California blackberry thickets, and root masses associated with willow and California bay trees (Fellers 2005). Sheltering habitat for California red-legged frogs potentially includes all aquatic, riparian, and upland areas within the range of the species and includes any landscape feature that provides cover, such as 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 stacks may also be used. Incised stream channels with portions narrower and depths greater than 18 inches also may provide important summer sheltering habitat. Accessibility to sheltering habitat is essential for the survival of California red-legged frogs within a watershed, and can be a factor limiting frog population numbers and survival.

California red-legged frogs do not have a distinct breeding migration (Fellers 2005). Adults are often associated with permanent bodies of water. Some individuals remain at breeding sites year-round, while others disperse to neighboring water features. Dispersal distances are typically less than 0.5-mile, with a few individuals moving up to 1-2 miles (Fellers 2005). Movements are typically

along riparian corridors, but some individuals, especially on rainy nights, move directly from one site to another through normally inhospitable habitats, such as heavily grazed pastures or oak-grassland savannas (Fellers 2005).

In a study of California red-legged frog terrestrial activity in a mesic area of the Santa Cruz Mountains, Bulger *et al.* (2003) categorized terrestrial use as migratory and non-migratory. The latter occurred from one to several days and was associated with precipitation events. Migratory movements were characterized as the movement between aquatic sites and were most often associated with breeding activities. Bulger *et al.* (2003) reported that non-migrating frogs typically stayed within 200 feet of aquatic habitat 90 percent of the time and were most often associated with dense vegetative cover, i.e., California blackberry, poison oak and coyote brush. Dispersing frogs in northern Santa Cruz County traveled distances from 0.25-mile to more than 2 miles without apparent regard to topography, vegetation type, or riparian corridors (Bulger *et al.* 2003).

In a study of California red-legged frog terrestrial activity in a xeric environment in eastern Contra Costa County, Tatarian (2008) noted that a 57 percent majority of frogs fitted with radio transmitters in the Round Valley study area stayed at their breeding pools, whereas 43 percent moved into adjacent upland habitat or to other aquatic sites. This study reported a peak seasonal terrestrial movement occurring in the fall months associated with the first 0.2-inch of precipitation and tapering off into spring. Upland movement activities ranged from 3 to 233 feet, averaging 80 feet, and were associated with a variety of refugia including grass thatch, crevices, cow hoof prints, ground squirrel burrows at the base of trees or rocks, logs, and under man-made structures; others were associated with upland sites lacking refugia (Tatarian 2008). The majority of terrestrial movements lasted from 1 to 4 days; however, one adult female was reported to remain in upland habitat for 50 days (Tatarian 2008). Upland refugia closer to aquatic sites were used more often and were more commonly associated with areas exhibiting higher object cover, e.g., woody debris, rocks, and vegetative cover. Subterranean cover was not significantly different between occupied upland habitat and non-occupied upland habitat.

California 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). Egg masses containing 2,000 to 5,000 eggs are attached to vegetation below the surface and hatch after 6 to 14 days (Storer 1925, Jennings and Hayes 1994). In coastal lagoons, the most significant mortality factor in the pre-hatching stage is water salinity (Jennings *et al.* 1992). Eggs exposed to salinity levels greater than 4.5 parts per thousand resulted 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 3½ to 7 months following hatching and reach sexual maturity 2 to 3 years of age (Storer 1925; Wright and Wright 1949; Jennings and Hayes 1985, 1990, 1994). 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). California red-legged frogs may live 8 to 10 years (Jennings *et al.* 1992). Populations can fluctuate from year to year; favorable conditions allow the species to have extremely high rates of reproduction and thus produce large numbers of dispersing young and a concomitant increase in the number of occupied sites. In contrast, the animal may temporarily disappear from an area when conditions are stressful (e.g., during periods of drought, disease, etc.).

The diet of California red-legged frogs is highly variable; changing with the life history stage. The diet of the larval stage has been the least studied and is thought to be similar to that of other ranid frogs, which feed on algae, diatoms, and detritus (Fellers 2005; Kupferberg 1996a, 1996b, 1997).

Hayes and Tennant (1985) analyzed the diets of California red-legged frogs from Cañada de la Gaviota in Santa Barbara County during the winter of 1981 and found invertebrates (comprising 42 taxa) to be the most common prey item consumed; however, they speculated that this was opportunistic and varied based on prey availability. They ascertained that larger frogs consumed larger prey and were recorded to have preyed on Pacific chorus frog, three-spined stickleback and, to a limited extent, California mice, which were abundant at the study site (Hayes and Tennant 1985, Fellers 2005). Although larger vertebrate prey was consumed less frequently, it represented over half of the prey mass eaten by larger frogs suggesting that such prey may play an energetically important role in their diets (Hayes and Tennant 1985). Juvenile and subadult/adult frogs varied in their feeding activity periods; juveniles fed for longer periods throughout the day and night, while subadult/adults fed nocturnally (Hayes and Tennant 1985). Juveniles were significantly less successful at capturing prey and all life history stages exhibited poor prey discrimination, feeding on several inanimate objects that moved through their field of view (Hayes and Tennant 1985).

Recovery Plan: The Recovery Plan for the California red-legged frog identifies eight recovery units (Service 2002). The establishment of these recovery units is based on the determination that various regional areas of the species' range are essential to its survival and recovery. These recovery units are delineated by major watershed boundaries as defined by U.S. Geological Survey hydrologic units and the limits of its range. The goal of the recovery plan is to protect the long-term viability of all extant populations within each recovery unit. Within each recovery unit, core areas have been delineated and represent contiguous areas of moderate to high California red-legged frog densities that are relatively free of exotic species such as bullfrogs. The goal of designating core areas is to protect metapopulations. Thus when combined with suitable dispersal habitat, will allow for the long term viability within existing populations. This management strategy identified within the Recovery Plan will allow for the recolonization of habitats within and adjacent to core areas that are naturally subjected to periodic localized extinctions, thus assuring the long-term survival and recovery of California red-legged frogs.

Threats: Habitat loss, non-native species introduction, and urban encroachment are the primary factors that have adversely affected the California red-legged frog throughout its range. 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, signal crayfish, and several species of warm water fish including sunfish, goldfish, common carp, and mosquitofish (Moyle 1976; Barry 1992; Hunt 1993; Fisher and Schaffer 1996). This has been attributed to predation, competition, and reproduction interference. Twedt (1993) documented bullfrog predation of juvenile northern red-legged frogs, and suggested that bullfrogs could prey on subadult California red-legged frogs as well. Bullfrogs may also have a competitive advantage over California red-legged frogs. For instance, bullfrogs are larger and possess more generalized food habits (Bury and Whelan 1984). In addition, bullfrogs have an extended breeding season (Storer 1933) during which an individual female can produce as many as 20,000 eggs (Emlen 1977). Furthermore, bullfrog larvae are unpalatable to predatory fish (Kruse and Francis 1977). Bullfrogs also interfere with California red-legged frog reproduction by eating adult male California red-legged frogs. Both California and northern red-legged frogs have been observed in amplexus (mounted on) with both male and female bullfrogs (Jennings and Hayes 1990; Twedt 1993; Jennings 1993). Thus bullfrogs are able to prey upon and out-compete California red-legged frogs, especially in sub-optimal habitat.

The urbanization of land within and adjacent to California red-legged frog habitat has also affected the threatened amphibian. These declines are attributed to channelization of riparian areas,

enclosure of the channels by urban development that blocks dispersal, and the introduction of predatory fishes and bullfrogs. Diseases may also pose a significant threat, although the specific effects of disease on the California red-legged frog are not known. Pathogens are suspected of causing global amphibian declines (Davidson et al. 2003). Chytridiomycosis and ranaviruses are a potential threat because these diseases have been found to adversely affect other amphibians, including the listed species (Davidson et al. 2003; Lips et al. 2006). Mao *et al.* (1999 cited in Fellers 2005) reported northern red-legged frogs infected with an iridovirus, which was also presented in sympatric threespine sticklebacks in northwestern California. Non-native species, such as bullfrogs and non-native tiger salamanders that live within the range of the California red-legged frog have been identified as potential carriers of these diseases (Garner *et al.* 2006). Humans can facilitate the spread of disease by encouraging the further introduction of non-native carriers and by acting as carriers themselves (i.e., contaminated boots, waders or fishing equipment). Human activities can also introduce stress by other means, such as habitat fragmentation, that results in the listed species being more susceptible to the effects of disease.

The action area for the 22 Nationwide and other Corps permits in the nine Bay Area counties contains three recovery units that were designated in the recovery plan for the California red-legged frog (Service 2002). They are the North Coast and North San Francisco Bay Unit; South and East San Francisco Bay Unit; and the Central Coast Recovery Unit (Service 2002). Recovery Units are based on the identification of various regional areas of the species' range that are essential to its survival and recovery.

The entirety of the proposed project is located within the range and current distribution of the California red-legged frog. Ensure its survival and recovery in the action area is important because most of the known populations of this species are found in the San Francisco Bay region and the central coast range (Service 2002; Fellers 2005). The action area contains a mosaic of industrial, residential, agricultural, fallow, and open space land uses, although the majority of lands do not contain suitable habitat for the animal. The lands containing suitable habitat range from highly modified and degraded to high quality. The Point Reyes peninsula and associated areas in Marin County are known to contain large populations of the California red-legged frog, however, the majority of populations within the action area consist of a small number of individuals.

The California red-legged frog occurs within the action area as demonstrated by: (1) historic and recent observation of the species at numerous locations in all nine San Francisco Bay Area counties (Service 2002; California Department of Fish and Wildlife 2013a, 2013b); (2) the biology and ecology of the animal, especially the ability of individuals to move considerable distances and their ability to spend the dry months of the year in habitats with suitable environmental conditions; (3) the action area contains numerous creeks, streams, constructed drainage features, perennial and seasonal ponds, including stock ponds, and marshes that provide breeding and non-breeding aquatic habitat for the California red-legged frog. Riparian vegetation along creeks and drainages and landscape vegetation in the action area provide valuable refuge, forage, and dispersal habitat for red-legged frogs; (4) the action area contains upland habitat with rodent burrows and other cover sites; (5) the action area contains upland habitat that provides refuge, forage, and dispersal habitat for the species; and (6) the numerous locations and movement corridors where the species can move within the action area and vicinity.

Status and Environmental Baseline of California Red-Legged Frog Critical Habitat

The Service designated critical habitat for the California red-legged frog on April 13, 2006 (71 FR 19244) (Service 2006) and a revised designation to the critical habitat was published on March 17, 2010 (75 FR 12816) (Service 2010). At this time, the Service recognized the taxonomic change from Rana aurora draytonii to Rana draytonii (Shaffer et al. 2010). Critical habitat is defined in Section 3 of the Act as: (1) The specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (a) essential to the conservation of the species and (b) that may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. In determining which areas to designate as critical habitat, the Service considers those physical and biological features that are essential to a species' conservation and that may require special management considerations or protection (50 CFR 424.12(b)). The Service is required to list the known Primary Constituent Elements (PCE's) together with the critical habitat description. Such physical and biological features include, but are not limited to, the following:

1. Space for individual and population growth, and for normal behavior;
2. Food, water, air, light, minerals, or other nutritional or physiological requirements;
3. Cover or shelter;
4. Sites for breeding, reproduction, rearing of offspring, or dispersal; and
5. Generally, habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species.

The PCE's defined for the California red-legged frog was derived from its biological needs. The area designated as revised critical habitat provides aquatic habitat for breeding and non-breeding activities and upland habitat for shelter, foraging, predator avoidance, and dispersal across its range. The PCE's and, therefore, the resulting physical and biological features essential for the conservation of the species were determined from studies of California red-legged frog ecology. Based on the above needs and our current knowledge of the life history, biology, and ecology of the species, and the habitat requirements for sustaining the essential life-history functions of the species, the Service determined that the PCE's essential to the conservation of the California red-legged frog are:

1. Aquatic Breeding Habitat. Standing bodies of fresh water (with salinities less than 7.0 parts per thousand), including: natural and manmade (e.g., stock) ponds, slow-moving streams or pools within streams, and other ephemeral or permanent water bodies that typically become inundated during winter rains and hold water for a minimum of 20 weeks in all but the driest of years.

2. Non-Breeding Aquatic Habitat. Freshwater and wetted riparian habitats, as described above, that may not hold water long enough for the subspecies to hatch and complete its aquatic life cycle but that do provide for shelter, foraging, predator avoidance, and aquatic dispersal for juvenile and adult California red-legged frogs. Other wetland habitats that would be considered to meet these elements include, but are not limited to: plunge pools within intermittent creeks; seeps; quiet water refugia during high water flows; and springs of sufficient flow to withstand the summer dry period.

3. Upland Habitat. Upland areas adjacent to or surrounding breeding and non-breeding aquatic and riparian habitat up to a distance of 1 mile in most cases and comprised of various vegetational series such as grasslands, woodlands, wetland, or riparian plant species that provide the frog shelter, forage, and predator avoidance. Upland features are also essential in that they are needed to maintain the hydrologic, geographic, topographic, ecological, and edaphic features that support and surround the wetland or riparian habitat. These upland features contribute to the filling and drying of the wetland or riparian habitat and are responsible for maintaining suitable periods of pool inundation for larval frogs and their food sources, and provide breeding, non-breeding, feeding, and sheltering habitat for juvenile and adult frogs (e.g., shelter, shade, moisture, cooler temperatures, a prey base, foraging opportunities, and areas for predator avoidance). Upland habitat should include structural features such as boulders, rocks and organic debris (e.g., downed trees, logs), as well as small mammal burrows and moist leaf litter.

4. Dispersal Habitat. Accessible upland or riparian dispersal habitat within designated units and between occupied locations within a minimum of 1 mile of each other that allow for movement between such sites. Dispersal habitat includes various natural habitats and altered habitats such as agricultural fields, which do not contain barriers (e.g., heavily traveled road without bridges or culverts) to dispersal. Dispersal habitat does not include moderate- to high-density urban or industrial developments with large expanses of asphalt or concrete, nor does it include large reservoirs over 50 acres in size, or other areas that do not contain those features identified in PCE's 1, 2, or 3 as essential to the conservation of the subspecies.

With the revised designation of critical habitat, the Service intends to conserve the geographic areas containing the physical and biological features that are essential to the conservation of the species, through the identification of the appropriate quantity and spatial arrangement of the PCE's sufficient to support the life-history functions of the species. Because not all life-history functions require all the PCE's, not all areas designated as critical habitat will contain all the PCE's. Please refer to the final designation of critical habitat for California red-legged frog for additional information (75 FR 12816).

There are 20 critical habitat units of the California red-legged frog located within the action area for the 22 Nationwide and other Corps permits in the nine San Francisco Bay Area counties. The critical habitat units range in size from 1,564 acres to 204,718 acres totaling 692,945 acres in eight counties. There is no designated critical habitat for the California red-legged frog in San Francisco County.

Effects of the Proposed Action

<u>California Red-legged Frog</u>

Projects authorized by the Corps under the 22 Nationwide and other permits in the nine San Francisco Bay Area counties covered by this PBO could have adverse effects on the threatened California red-legged frog through mortality, capture, injury, harassment, and harm of individual subadults and adults.

Ground disturbance and construction activities associated with projects authorized under the Nationwide and other Corps permits may remove vegetation and other materials utilized for cover and aestivation, fill or crush burrows or crevices, and reduce the prey base for the California red-

legged frog. Because this listed amphibian uses small mammal burrows and soil crevices for shelter, individuals may be crushed, buried, or otherwise injured during construction activities. Disturbance caused by construction activities may cause individuals to disperse into areas containing unsuitable habitat, increase the risk of predation or other sources of mortality. Direct injury or mortality to the animal may result from poisoning by pesticides, or harassment from night-lighting, noise, and vibration.

The Corps will ensure the permittees compensate for permanent and, in some cases, temporal habitat loss with in-perpetuity preservation and or restoration of appropriate amounts of California red-legged frog habitat. Preservation of high value habitat at a Conservation Bank will allow for the permanent protection, long-term management, and enhancement of the habitat for the California red-legged frog which will contribute to the recovery of this species. In some cases, the permittee may choose to use a site they acquire which would need to be protected in perpetuity and be managed for the benefit of the frog. In addition, for small in-stream impacts revegetation/restoration of the site may be appropriate and this may benefit the species by improving the functions. This compensation, combined with the implementation of the other conservation measures described above, is anticipated to offset the adverse effects of harm resulting from project-related habitat modification or loss.

Preconstruction surveys and the relocation of the California red-legged frog may reduce injury or mortality. However, death and injury of individual red-legged frogs could occur at the time of relocation or later in time subsequent to their release. Although survivorship for translocated members of this species has not been determined, survivorship of translocated wildlife, in general, is lower because of intraspecific competition, lack of familiarity with the location of potential breeding, feeding, and sheltering habitats, increased risk of contracting disease in a foreign environment, and the risk of predation. Improper handling, containment, or transport of individuals will be reduced or prevented by use of a Service-approved biologist, limiting the duration of handling, limiting the distance of translocation, and requiring the proper transport and release of the animals.

Unless rescued by the Service-approved biologist, individual California red-legged frogs could be harassed, injured, or and killed by ground disturbing and construction-related activities. Even with a Service-approved biologist present at the project site, worker awareness, and escape ramps, animals may fall into the trenches, pits, or other excavations, and then risk being directly injured, killed, or be unable to escape and die as a result of desiccation, entombment, or starvation.

Plastic netting and similar materials that are used for erosion control and other reasons could result in the entanglement and death of California red-legged frogs, as well as birds and wildlife, due to exposure, starvation, strangulation, or predation (Stuart *et al.* 2001). However, the Corps has committed, through implementation of the Conservation Measures, to ensuring the permittees do not utilize these materials which reduces these adverse effects.

Habitat Loss and Fragmentation

The primary factor leading to the listing of this animal is the result of habitat loss and fragmentation in the form of roadway construction, and urban encroachment. Activities associated with urban development, including roadway projects, removal of vegetation and other materials utilized as cover and aestivation, damage or destruction of water bodies utilised by all life history stages, reduction or elimination of movement corridors and upland habitat, filling or collapsing rodent burrows or crevices, and potentially reduce the prey base for the California red-legged frog. Construction activities are likely to result in the direct disturbance, displacement, injury, and/or morality of

California red-legged frogs. Individuals likely are to be killed or injured by construction equipment or other vehicles accessing the construction site. Disturbance from human activities, including roadway activities may also cause individuals to move into or across areas of unsuitable habitat where they may be prone to higher rates of mortality from vehicles and predation.

Summer cover and foraging habitat within the action area may be temporarily and permanently eliminated by the proposed projects. Individual red-legged frogs occupying the affected habitat run the risk of being crushed or buried by earth moving activities. Those that do survive will suffer permanent and temporary loss of habitat and harassment from increased human activity. Loss or reduction of dispersal habitat increases intra-and inter-specific competition for food and living space for the red-legged frog in the action area. Removal of native vegetation, such as willow and coyote brush, may increase exposure of the California red-legged frog to predators due to the permanent loss of cover. Measures to minimize habitat destruction and alteration such as reducing the project footprint, restoration and re-vegetation of disturbed sites with locally collected native plant species can potentially provide refuge, food and shelter for the listed amphibian, while also limiting the establishment of invasive and non-local native plants.

Fragmentation of habitat isolates populations of the California red-legged frog such that breeding between populations becomes impossible or extremely limited. Fragmentation also limits dispersal resulting in a reduced chance of repopulation to locations where it has been extirpated. Isolation due to fragmentation can result in the ultimate decline of populations because of the lack of genetic variability. Van Gelder (1973) and Cooke (1995) have examined the effect of roads on amphibians, such as the California red-legged frog, and found that because of their activity patterns, population structure, and preferred habitats, aquatic breeding amphibians are especially vulnerable to traffic induced mortality.

Road Kills

Roadways, bridges, and other associated structures or facilities may result in adverse effects to the California red-legged frog. Aside from direct construction related-effects, the threats are the result of the slow movements of this animal, inability to notice the approach of cars in time to avoid them, their tendency to become immobilized when in danger which leaves them on roads for longer periods of time, their life cycles that involve periodic long distance dispersal. Traffic volume influences the permeability (e.g., the likelihood of crossings) of roads and the probability for mortality due to vehicle strikes. Factors such as the width of the road, the presence of a median with or without Jersey or "K" rail concrete barriers, the velocity of the traffic, the physical nature of the approach and shoulder of the road, and the behavior of the animals attempting to cross determine probabilities for mortality. Clevenger *et al.* (2003) found that studying roads in Canada found that a low volume road (1,068 to 3,231 vehicles per day) in Canada resulted in higher mortalities of small vertebrate fauna than high volume roads (14,000 to 35,000 vehicles per day).

Contaminants

The presence of roads, ground disturbance and construction or repair of roadways can result in the introduction of chemical contaminants to the site. Contaminants can be introduced in several ways. Substances used in road building materials or to recondition roads can leach out or wash off roads adjacent to habitat. Vehicle exhaust emissions can include hazardous substances which may concentrate in soils along roads. Heavy metals such as lead, aluminum, iron, cadmium, copper, manganese, titanium, nickel, zinc, and boron are all emitted in vehicle exhaust (Trombulak and Frissell 2000). Concentrations of organic pollutants (i.e. dioxins, polychlorinated biphenyls) are higher in soils along roads (Benfenati *et al.* 1992). Ozone levels are higher in the air near roads

(Trombulak and Frissell 2000). Vehicles may leak hazardous substances such as motor oil and antifreeze. A variety of substances could be introduced during accidental spills of materials. Spills can result from leaks in vehicles, small containers falling off vehicles, or from accidents resulting in whole loads being spilled. Large spills may be partially or completely mitigated by clean-up efforts, depending on the substance. Although the quantity leaked by a single vehicle may be small, the substances can accumulate on roads and may be washed into the adjacent environment by runoff during rain storms.

The California red-legged frog could be exposed to contaminants if it inhabits or utilizes areas adjacent to the project site. Exposure pathways could include inhalation, dermal contact and absorption, direct ingestion of contaminated soil or plants, or consumption of contaminated prey. Exposure to contaminants may cause short- or long-term morbidity. Carcinogenic substances could cause genetic damage resulting in sterility, reduced productivity, or reduced fitness among progeny. Contaminants may also have a negative effect on the prey of the California red-legged frog. This could result in reduced prey diversity and abundance, and diminished local carrying capacity for the animal.

Disease
Biologists and construction personnel working in different geographic locations inhabited by different amphibian species may transmit diseases to the California red-legged frog though contaminated equipment and other materials. The chance of a disease, such as chytrid fungus, being introduced into a new area is greater today than in the past due to the increasing occurrences of disease throughout amphibian populations, as well as Global Climate Change in California and the United States. Chytrid fungus may exacerbate the effects of other diseases on amphibians or increase the sensitivity of the amphibian to environmental changes that reduce normal immune response capabilities (Bosch *et al.* 2001).

Invasive Species
Construction of roads can facilitate the invasion and establishment by species not native to the area. Disturbance and alteration of habitat adjacent to roads may create favorable conditions for non-native plants and animals. Non-native plants can spread along roadsides and then into adjacent habitat (Gelbard and Harrison 2003). American bullfrogs and other non-native animals may use modified habitats adjacent to road to disperse into California red-legged frog habitat. These exotic animals could compete for resources such as food or refugia, or directly injure or kill them. Non-native plants and animals may reduce habitat quality for the California red-legged frog or its prey, and reduce the local carrying capacity. Introductions of non-native species could cause them to alter behavioral patterns by avoiding or abandoning areas near roads.

Disturbed areas adjacent to roads provide favorable habitat conditions for a number of non-native plant species. Some of these taxa are aggressively invasive and they can alter natural communities and potentially affect habitat quality. A problematic species within the range of the red-legged frog is yellow star thistle. Dense stands of this plant can form along roadsides and then spread into adjacent habitat. This plant displaces native vegetation and competes with native plants for resources.

Road Effect Zone
In addition to the adverse effects occurring during ground disturbance and construction, roadways are a major source of injury and mortality for amphibians. Ehmann and Cogger (1985) estimated that five million reptiles and frogs are killed annually on Australian roads. Vos and Chardon (1998)

found that road density within 750 feet of a pond was negatively associated with the size of moor frog populations. The density of roads within 2250 feet of a pond was negatively associated with the probability that species would occupy the pond at all. Van Gelder (1973) estimated that 30% of the females from a local breeding population of the common toad succumbed to road kill and reported that an equivalent percentage for males was likely. In a study of frogs and toads, Fahrig *et al.* (1995) found the proportion of dead-to-live animals increased and the total density of animals decreased with increasing traffic intensity.

Roads act as barriers to California red-legged frogs attempting to cross fragmented habitats. As barriers, roads restrict gene flow leading to negative, demographic consequences that can cause extinction (Shepard *et al.* 2008). Roads were found to be significant barriers to gene flow among common frogs in Germany resulting in genetic differentiation among populations separated by roads (Reh and Seitz 1990). Failure to cross roads by the California red-legged frog may disconnect fragmented populations from mating resulting in population declines over time. Isolated populations have a greater chance of extinction when new immigrants are not contributing to the gene pool and are less likely to be re-colonized after extinction. The installation of culverts, tunnels, bridges, and overcrossings, to facilitate safe wildlife passage under or across roads can minimize the reduction of population isolation or loss.

Adverse effects to the California red-legged frog from roads may extend some distance from the actual road. The phenomenon can result from any of the effects already described in this programmatic biological opinion (e.g. vehicle-related mortality, habitat degradation, invasive exotic species, etc.). Forman and Deblinger (2000) and Forman (2000) described the effect as the "road effect" zone. Along a 4-lane road in Massachusetts, they determined that this zone extend for an average of approximately 980 feet to either side of the road for an average total zone width of approximately 1970 feet. However, in places they detected an effect > 0.6 mile from the road. Trombulak and Frissell (2000) described how heavy metal concentrations from vehicle exhaust were greatest within 66 feet of roads, but elevated levels of metals in both soil and plants were detected at 660 feet of roads. The road effect zone apparently varies with habitat type and traffic volume. The road effect zone and the California red-legged frog have not been adequately investigated; however, it is possible it exists given the effects of roads on the animal.

Effects to Critical Habitat

The Service anticipates that the activities associated with the Project could negatively affect some of the PCEs of California red-legged frog critical habitat within the action area. However, these activities will only result in minor effects to habitat and these activities (implemented with the conservation measures) will not prevent critical habitat from providing essential conservation values for the California red-legged frog. While disturbance within critical habitat may prevent some California red-legged frogs from using portions of the critical habitat for essential life functions whether temporarily (e.g., disturbance that can be restored to pre-project conditions within one calendar year from the date of initial ground disturbance) or permanently (e.g., disturbance that cannot be restored to pre-project condition within one calendar year), they will still be able to complete their essential ecological and biological functions in the remaining areas of critical habitat. All critical habitat units will retain their PCEs and the PCEs within each critical habitat unit will still remain functional. Therefore, the designated critical habitat for the California red-legged frog will still be able to perform its intended functions and conservation role.

Cumulative Effects

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

Numerous non-Federal activities continue to adversely affect, primarily through the damage or destruction of habitat, the California red-legged frog in the action area. In addition, the same activities affect this threatened species also affect its critical habitat. Loss and degradation of habitat affecting this listed species with or without Service authorization continues as a result of urbanization; road construction and maintenance, utility right-of-way management; flood control and water banking projects that may not be funded, permitted, or constructed by a Federal agency; inappropriate levels of grazing by livestock; and continuing agricultural expansion. This threatened amphibian also is adversely affected by ground squirrel reduction, mosquito control, including the planting of exotic mosquito fish, and reduction of food sources. Unauthorized take is occurring, and the Service continues to request re-initiation of projects when project descriptions have changed markedly since our biological opinions were issued.

The Association of Bay Area Governments 2007 Projection forecasts the San Francisco Bay Area nine-county population will increase by 2.2 million residents from 2000-2035 (ABAG 2007). The human population is projected to increase by 18 percent for the San Francisco Bay hydrologic region from 1995 to 2020 with agricultural crop land use in the region projected to remain around 65,000 acres (California Department of Water Resources 1998). Development projects that occur during this timeframe due to increases in human population growth will continue to imperil the California red-legged frog.

Conclusion

After reviewing the current status of the California red-legged frog, the environmental baseline for the action area; the effects of projects potentially authorized under the 22 Nationwide and other Corps permits in the nine San Francisco Bay Area counties, and the cumulative effects; it is the Service's biological opinion that the project, as proposed, is not likely to jeopardize the continued existence of this threatened species. We based this determination on the following conservation measures that will be fully implemented by the Corps: (1) habitat loss will be compensated with in-perpetuity preservation of occupied California red-legged frog habitat in the action area; (2) the Corps will incorporate construction or enhancement of culverts or other structures to ensure safe passage of California red-legged frogs across the roadways where appropriate; (3) pre-construction surveys will be conducted for listed species; (4) a Service-approved biologist will monitor all activities for compliance with this programmatic biological opinion; (5) California red-legged frogs found in the project work area will be relocated to nearby suitable habitat; and (6) other conservation measures, as described in the Conservation Measures of this programmatic biological opinion.

After reviewing the current status of the California red-legged frog, the environmental baseline for the action area, the effects of projects potentially authorized under Nationwide or other Corps permits in the nine San Francisco Bay Area counties, and the cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to destroy or adversely modify California red legged frog critical habitat. The proposed action is not likely to result in the destruction or

adverse modification of critical habitat for this threatened species because although the project may adversely affect primary constituent elements within a portion of some of the critical habitat units in the action area, these activities will be limited to a small proportion of the critical habitat and will not affect the ability of the remaining critical habitat to conserve the California red-legged frog.

INCIDENTAL TAKE STATEMENT

Section 9(a)(1) of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened fish and wildlife species without special exemption. Take is defined as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by impairing behavioral patterns including 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 section 7(o)(2), 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 this Incidental Take Statement. The Incidental Take Statement accompanying this biological opinion does not address the restrictions or requirements of other applicable laws.

The measures described below are non-discretionary, and must be implemented by the agency so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

Amount or Extent of Take

The Service anticipates that incidental take of the California red-legged frog will be difficult to detect because when individuals are not in their breeding ponds, they inhabit the burrows of ground squirrels or other rodents, root wads or other objects; they may be difficult to locate due to their cryptic appearance and behavior; subadults and adults may be located a distance from the breeding ponds; their distance movements occur on a limited period during rainy nights in the fall, winter, or spring; and the finding of an injured or dead individual is unlikely because of their relatively small body size. Adverse effects to this animal also may be difficult to quantify due to seasonal fluctuations in their numbers, random environmental events, changes in water regime at their breeding ponds, or additional environmental disturbances. Due to the difficulty in quantifying the number of the California red-legged frog that will be taken as a result of the proposed action, the Service is quantifying take incidental to the project as the harm and harassment, capture, injury and mortality of all eggs, egg masses, tadpoles, subadults, and/or adults inhabiting or utilizing a total of seventy-five (75) acres for the five (5) year duration of this programmatic biological opinion. Reinitiation will be triggered if the amount of incidental take is exceeded by the Corps.

Effect of the Take

The Service has determined that this level of anticipated take for projects potentially authorized under the 22 Nationwide and other Corps permits in the nine San Francisco Bay Area counties, as appended to this biological opinion, is not likely to result in jeopardy to the California red-legged frog, or adverse modification or destruction of its designated critical habitat.

Reasonable and Prudent Measure

1. The Corps shall minimize adverse effects to the California red-legged frog by fully implementing terms and conditions

Terms and Condition

In order to be exempt from the prohibitions of section 9 of the Act, the Corps shall comply with the following Term and Condition that implements the reasonable and prudent measure described above. This Term and Condition is nondiscretionary.

The following Term and Condition implements the Reasonable and Prudent Measure:

1. The Corps shall implement the conservation measure described within the project description of this programmatic biological opinion.

Reporting Requirements

For each Nationwide or other Corps permit appended to this programmatic biological opinion, the Service-approved biologist will maintain a written record that will include, but is not limited to: (1) beginning and ending time of each day's construction activity and monitoring effort; (2) California red-legged frogs, and wildlife species, that were observed, including the specific time and location; and (3) description of any actions taken to protect the California red-legged frog or its habitat. The biological monitor will submit the original written record to the Service within fourteen (14) calendar days of the completion of their monitoring, or immediately upon verbal, email, or written request from the Service, California Department of Fish and Wildlife, or their authorized agent.

Injured California red-legged frogs must be cared for by a licensed veterinarian or other qualified person such as the Service-approved biologist; dead individuals shall be placed in a zip-lock® plastic bag containing a piece of paper with the date, time, and location where the animal was found, and who found it legibly written in permanent ink, and then placed in a freezer located in a secure location. The Service must be notified within twenty-four (24) hours via telephone and electronic mail of the discovery of death or injury to any listed species that occurs or is suspected to have occurred as a result of project related activities, or is observed in or near the action area. Notification must include the date, time, and location of the incident or of the finding of a dead or injured animal clearly indicated on a USGS 7.5 minute quadrangle and other maps at a finer scale, as requested by the Service, and any other pertinent information. The Service contacts are the Coast Bay Foothills Division Chief at telephone (916) 414-6600, and the Resident Agent-in-Charge of the Service's Law Enforcement Division at telephone (916) 569-8444.

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 to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service has developed the following conservation recommendations based, in part, on the Recovery Plan for the California Red-legged Frog (Service 2002).

1. Implement actions within the 2002 Recovery Plan for the California Red-legged Frog.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed and/or proposed species or their habitats, the Service requests notification of the implementation of this recommendation.

REINITIATION NOTICE

This concludes formal consultation on the 22 Nationwide and other Corps permits in the nine San Francisco Bay Area counties. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been 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 agency action that may affect listed species 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 the listed species that was not considered in this opinion; or (4) a new species is listed that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have any questions concerning this biological opinion on projects authorized under the 22 Nationwide and other Corps permits in the nine San Francisco Bay Area counties, please contact Ryan Olah (Ryan_Olah@fws.gov at the Sacramento Fish and Wildlife Office at the letterhead address or at telephone (916)414-6623.

Sincerely,

Jennifer M. Norris
Field Supervisor

cc: Scott Wilson, California Department of Fish and Wildlife, Yountville, California

LITERATURE CITED

Association of Bay Area Governments (ABAG). 2007. ABAG Projections 2007: City, County, and Census Tract forecasts 2000-2035. Accessed March 30, 2009. http://www.abag.ca.gov/planning/currentfcst/regional.html#

Barry, S. 1992. Letter to Marvin L. Plenert, Regional Director, U.S. Fish and Wildlife Service, Portland, Oregon, regarding proposed listing.

Benfenati, E., S. Valzacchi, G. Maniani, L. Airoldi, R. Farnelli. 1992. PCDD, PCDF, PCB, PAH, cadmium and lead in roadside soil: relationship between road distance and concentration.Chemosphere24:1077 1083.

Bosch, J., I. Martinez-Solano, and M. Garciaparis. 2001. Evidence of a chytrid fungus infection involved in the decline of the common midwife toad (*Alytes obstetricans*) in protected areas of central Spain. Biological Conservation 97: 331–337.

Bulger, J. B., N. J. Scott Jr., and R. B. Seymour. 2003. Terrestrial activity and conservation of adult California red-legged frogs *Rana aurora draytonii* in coastal forests and grasslands. Biological Conservation 110:85-95.

Bury, R. B and J. A. Whelan. 1984. Ecology and management of the bullfrog. Fish and Wildlife Service Resource Publication 155.

California Department of Fish and Wildlife. 2013a. California Natural Diversity Data Base (CNDDB) RAREFIND. Natural Heritage Division, Sacramento, California.

_____. 2013b. BIOSIS. Natural Heritage Division, Sacramento, California

California Department of Water Resources. Cal-ifornia Water Plan Update: Bulletin 160-98. Sacramento CA, January 1998.

Clevenger, A.P., B. Chruszcz, and K.E. Gunson. 2003. Spatial patterns and factors influencing small vertebrate fauna road-kill aggregations. Biological Conservation 109: Pages 15-26

Cooke, A. S. 1995. Road mortality of common toads (*Bufo bufo*) near a breeding site, 1974-1994. Amphibia-Reptilia 16: 87-90.

Davidson, E. W., M. Parris, J. Collins, J. Longcore, A. P. Pessier, and J. Brunner. 2003. Pathogenicity and transmission of Chytridiomycosis in tiger salamanders (*Ambystoma tigrinum*). Copeia 2003(3): 601-607.

Emlen, S. T. 1977. "Double clutching" and its possible significance in the bullfrog. Copeia 1977(4):749-751.

Ehmann, H. and H. G. Cogger. 1985. Australia's endangered herpetofauna: a review of criteria and policies. Pages 435-447 *in*: G. Grigg, R. Shine, and H. Ehmann (editors). The biology of Australasian frogs and reptiles. Surrey Beatty and Sons, Sydney, Australia.

Fahrig, L., J. H. Pedlar, S. E. Pope, P. D. Talyor, J. F. Wegner. 1995. Effect of road traffic on amphibian density.Biological Conservation**74**:177–182.

Fellers, G. 2005. *Rana draytonii* Baird and Girard, 1852 California red-legged frog. Pages 552-554 *in* M. Lannoo (editor). Amphibian declines the conservation status of United States species. University of California Press. Berkeley, California.

Fisher, R. N., and H. B. Schaffer. 1996. The decline of amphibians in California's Great Central Valley. Conservation Biology 10(5):1387-1397.

Forman, R. T. 2000. Estimate of the area affected ecologically by the road system in the United States. Conservation Biology 14(1): 31-35.

Forman, R.T.T. and R. D. Deblinger. 2000. The ecological road-effect zone of a Massachusetts (U.S.A.) suburban highway. Conservation Biology 14: 36-46.

Garner, T. W. J., M. W. Perkins, P. Govindarajulu, D. Seglie, S. Walker, A. A. Cunningham, and M. C. Fisher. 2006. The Emerging Amphibian Pathogen *Batrachochytrium dendrobatidis* Globally Infects Introduced Populations of the North American Bullfrog, *Rana catesbeiana*. Biology Letters 2:455-459.

Gelbard, J. L. and S. Harrison 2003. Roadless Habitats as Refuges for Native Grasslands: Interactions with Soil, Aspect, and Grazing. Ecological Applications 13:404–415

Hayes, M. P., and M. R. Jennings. 1988. Habitat correlates of distribution of the California red-legged frog (*Rana aurora draytonii*) and the foothill yellow-legged frog (*Rana boylii*): implications for management. Pages 144-158 *in* R. Sarzo, K. E. Severson, and D. R. Patton (technical coordinators). Proceedings of the symposium on the management of amphibians, reptiles, and small mammals in North America. United States Department of Agriculture, Forest Service, Rocky Mountain Range and Experiment Station, Fort Collins, Colorado. General Technical Report (RM-166): 1-458.

Hayes, M. P. and D. M. Krempels. 1986. Vocal sac variation among frogs of the genus *Rana* from western North America. Copeia 1986(4):927-936.

Hayes, M. P. and M. M. Miyamoto. 1984. Biochemical, behavioral and body size differences between *Rana aurora aurora* and *R. a. draytonii*. Copeia 1984(4):1018-1022.

Hayes, M. P., and M. R. Tennant. 1985. Diet and feeding behavior of the California red-legged frog, *Rana aurora draytonii* (Ranidae). Southwestern Naturalist 30(4): 601-605.

Hunt, L. 1993. Letter to Marvin L. Plenert, Regional Director, U.S. Fish and Wildlife Service, Portland, Oregon, regarding proposed listing.

Jennings, M. R. 1993. Letter to Peter C. Sorensen, U.S. Fish and Wildlife Service, Sacramento, California.

Jennings, M. R., and M. P. Hayes. 1985. Pre-1900 overharvest of California red-legged frogs (*Rana aurora draytonii*): The inducement for bullfrog (*Rana catesbeiana*) introduction. Herpetological

Review 31(1):94-103.

____ 1990. Final report of the status of the California red-legged frog (*Rana aurora draytonii*) in the Pescadero Marsh Natural Preserve. Final report prepared for the California Department of Parks and Recreation, Sacramento, California, through Agreement (4-823-9018). Department of Herpetology, California Academy of Sciences, Golden Gate Park, San Francisco, California.

____ 1994. Amphibian and reptile species of special concern in California. California Department of Fish and Game, Rancho Cordova, California.

Jennings, M. R., M. P. Hayes, and D. C. Holland. 1992. A petition to the U.S. Fish and Wildlife Service to place the California red-legged frog (*Rana aurora draytonii*) and the western pond turtle (*Clemmys marmorata*) on the list of endangered and threatened wildlife and plants.

Kupferberg, S. J. 1996a. Hydrologic and geomorphic factors affecting conservation of a river-breeding frog (*Rana boylii*). Ecological Applications 6:1322-1344.

_____1996b. The Ecology of native tadpoles (*Rana boylii* and *Hyla regilla*) and the impacts of invading bullfrogs (*Rana catesbeiana*) in a northern California river. PhD dissertation. University of California, Berkeley, California.

_____1997. Bullfrog (*Rana catesbeiana*) invasion of a California river: the role of larval competition. Ecology 78(6):1736-1751

Kruse, K. C. and M. G. Francis. 1977. A predation deterrent in larvae of the bullfrog, *Rana catesbeiana*. Transactions of the American Fisheries Society 106(3):248-252.

Lips, K. R., F. Brem, R. Brenes, J. D. Reeve, R. A. Alford, J. Voyles, C. Carey, L. Livo, A. P. Pessier, and J. P. Collins. 2006. Emerging infectious disease and the loss of biodiversity in a neotropical amphibian community. Proceedings of the National Academy of Sciences 103(9):3165-3170.

Mao, J., D. E. Green, G. M. Fellers, and V. G. Chincar. 1999. Molecular characterization of iridoviruses isolated from sympatric amphibians and fish. Virus Research 6: 45-52

Moyle, P. B. 1976. Fish introductions in California: history and impact on native fishes. Biological Conservation 9(1):101-118.

Reh, W., and A. Seitz. 1990. The influences of land use on the genetic structure of populations of the common frog *Rana temporaria*. Biological Conservation 54:239-249.

Shaffer, H. B., G.M. Fellers, S. R. Voss, C. Oliver, and G.B. Pauley. 2010. Species boundaries, phylogeography, and conservation genetics of the red-legged frog (*Rana aurora*/*draytonii*) complex. Molecular ecology 13: 2667-2677.

Shepard, D. B., Kuhns, A. R., Dreslik, M. J., and C. A. Phillips. 2008. Roads as barriers to animal movement in fragmented landscapes. Animal Conservation 11: 288-296.

Stebbins, R. C. 2003. A field guide to western reptiles and amphibians. Houghton Mifflin

Company, Boston, Massachusetts.

Storer, T. I. 1925. A synopsis of the amphibia of California. University of California Publications in Zoology 27:1-1-342.

____ 1933. Frogs and their commercial use. California Department of Fish and Game 19(3)203-213.

Stuart, J. M., M. L. Watson, T. L. Brown, and C. Eustice. 2001. Plastic netting: an entanglement hazard to snakes and other wildlife. Herpetological Review 32(3): 162-164.

Tatarian, P. J. 2008. Movement patterns of California red-legged frogs (*Rana draytonii*) in an inland California environment. Herpetological Conservation and Biology 3(2):155-169.

Trombulak, S. C. and C. A. Frissell. 2000. The ecological effects of roads on terrestrial and aquatic communities: a review. Conservation Biology 14:18-30.

Twedt, B. 1993. A comparative ecology of *Rana aurora* Baird and Girard and *Rana catesbeiana* Shaw at Freshwater Lagoon, Humboldt County, California. Master of Science thesis. Humboldt State University, Arcata, California. 53 pages plus appendix.

U. S. Fish and Wildlife Service (Service). 1996. Endangered and threatened wildlife and plants; determination of threatened status for the California red-legged frog. **Federal Register** 61:25813-25833.

_____ 2002. Recovery plan for the California red-legged frog (*Rana aurora draytonii*). Portland, Oregon. 173 pages.

_____ 2006. Endangered and threatened wildlife and plants; designation of critical habitat for the California red-legged frog (*Rana aurora draytonii*), and special rule exemption associated with final listing for existing routine ranching activities; final rule. **Federal Register** 71(71):19244-19346.

_____ 2010. Endangered and threatened wildlife and plants; revised designation of critical habitat for California red-legged frog; final rule. **Federal Register** 75: 12815-12959.

Van Gelder, J. J. 1973. A quantitative approach to the mortality resulting from traffic in a population of *Bufo bufo* L. Oecologia 13:93-95.

Vos, C. C. and J. P. Chardon. 1998. Effects of habitat fragmentation and road density on the distribution pattern of the moor frog, *Rana arvalis*. Journal of Applied Ecology 35: 44-56.

Wright, A. H. and A. A. Wright. 1949. Handbook of frogs and toads of the United States and Canada. Comstock Publishing Company, Inc., Ithaca, New York.