United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

IN REPLY REFER TO:
81440-2010-F-0204

May 25, 2010

Craig Cooper, Project Manager
Region 9 Infrastructure Office
U.S. Environmental Protection Agency
75 Hawthorne Street
San Francisco, California 94105-3901

Subject: Biological Opinion for the Santa Susana Field Laboratory Area IV Radiological Study Project, Ventura County, California [EPA Contract # EP-S7-05-05] (8-8-10-F-12)

Dear Mr. Cooper:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of the U.S. Environmental Protection Agency's (EPA) Santa Susana Field Laboratory (SSFL) Area IV Radiological Study Project, Ventura County, California, and its effects on the federally endangered Riverside fairy shrimp (*Streptocephalus woottoni*), Braunton's milkvetch (*Astragalus brauntonii*) and its designated critical habitat, and Lyon's pentachaeta (*Pentachaeta lyonii*); and the federally threatened coastal California gnatcatcher (*Polioptila californica californica*), California red-legged frog (*Rana draytonii*) and its designated critical habitat, vernal pool fairy shrimp (*Branchinecta lynchi*), spreading navarretia (*Navarretia fossalis*), and California Orcutt grass (*Orcuttia californica*), in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 et seq.). Your request for formal consultation, dated February 12, 2010, was received in our office on February 12, 2010.

The Service has designated critical habitat for the endangered Riverside fairy shrimp and Lyon's pentachaeta and the threatened coastal California gnatcatcher and vernal pool fairy shrimp; however, designated critical habitat for these species does not occur within the boundaries of the proposed project area in Ventura County and therefore neither will be affected by the actions of this project nor discussed further in this biological opinion. Revised critical habitat is currently proposed for the threatened spreading navarretia; however, proposed critical habitat for this species does not occur within the boundaries of the proposed project area in Ventura County and therefore will not be affected by the actions of this project nor discussed further in this biological opinion.

You also determined the proposed action may affect, but is not likely to adversely affect, the federally endangered least Bell's vireo (*Vireo bellii pusillus*) and Quino checkerspot butterfly

(*Euphydryas editha quino*), and the federally threatened Conejo dudleya (*Dudleya abramsii* subsp. *parva* [=*D. parva*]), Santa Monica Mountains live-forever (*D. cymosa* subsp. *ovatifolia* [inclusive of *D. cymosa* subsp. *agourensis*]), and marcescent dudleya (*D. cymosa* subsp. *marcescens*). You also determined that the proposed action will have no effect on the federally endangered California condor (*Gymnogyps californianus*). We concur with your determinations regarding these species.

This biological opinion is based on information that accompanied your request for consultation, including the biological assessment (HydroGeoLogic and Envicom 2010), telephone and electronic mail communications between our staffs, and our files. A complete administrative record for this consultation is on file at the Ventura Fish and Wildlife Office.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The proposed project site consists of a radiological characterization (and associated activities) of a portion of the SSFL in an unincorporated area of the Simi Hills in southeastern Ventura County, California. The proposed project is designed to determine the presence of potential radioactive contamination in surface soils and subsurface soils, groundwater, surface water, and sediment. The proposed project would occur within and adjacent to Area IV of the SSFL (Area IV), and an adjacent undeveloped area to the north referred to as the Northern Buffer Zone (NBZ). Area IV consists of 290 acres (ac) (117 hectares (ha)) owned by The Boeing Company (Boeing), upon which U.S. Department of Energy (USDOE) and its contractors once operated several nuclear reactors and associated research fuel facilities and laboratories. The NBZ consists of 182 ac (74 ha). The proposed project will be administered by EPA pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and is proposed to commence in May 2010 and be completed by September 2011.

The separate components of the proposed project include vegetation cutting, gamma scanning, geophysical survey, surface and subsurface soil sampling, groundwater monitoring well sampling, surface water and sediment sampling, and support activities. A discussion of each of these components, along with corresponding avoidance and minimization measures, is provided below.

Vegetation Cutting

To provide access for project-related vehicles/equipment and allow operation of gamma scanning equipment at optimum levels of sensitivity, vegetation within the project action area would be cut or trimmed to a height of approximately 6 to 18 inches (152 to 457 millimeters (mm)). Limited pruning of mature trees may occur to allow access under the canopy; mature trees will not be felled. Vegetation cutting will be conducted using a combination of mechanical equipment and hand tools. Cutting within designated critical habitat or areas occupied by listed species willbe limited to hand tools unless areas free of sensitive biological resources can be delineated by a Service-approved biologist (see avoidance and minimization measures below).

The vegetation cutting will be conducted in a manner that does not cause irreparable damage to the vegetation and candidate species of plants and animals. Likewise, cutting activities will be performed such that designated critical habitat areas are not likely to be adversely affected. Unless otherwise specified within the vegetation cutting avoidance and minimization measures, cut materials will be collected into localized micro-piles for light spreading of mulch within areas deemed appropriate by a Service-approved biologist. Cuttings of poison oak (*Toxicodendron diversilobum*) will be separated from other cuttings for off-site disposal.

Gamma Scanning

The EPA will characterize surface soil for gamma activity over all of the accessible areas of Area IV and the NBZ to identify and characterize elevated areas of gamma radiation. Scanning will be conducted at a rate of 1 to 3 feet (ft) per second (0.3 to 0.9 meter (m) per second) and will normally require only one pass over each area being scanned. Gamma scanning will be completed using a combination of hand-held, stroller-mounted, mule-mounted, and off-road, fork-lift mounted systems. The potential impact that may result from the use of each scanning system is provided below:

- Hand-held: foot traffic and vegetation alteration.
- Wheel mounted: foot traffic, light vehicle traffic, and vegetation alteration.
- Mule mounted: foot traffic, mule traffic, grazing, and vegetation alteration. The mule may be fitted with a restraining muzzle if it is observed eating protected species.
- Fork-lift mounted: foot traffic, vehicle traffic and vegetation alteration.
- The presence of personnel and equipment during gamma scanning efforts (regardless of the type of equipment used) may impact nesting birds.

Geophysical Survey

The EPA will conduct a geophysical survey to determine areas of potential subsurface disturbance that may be indicative of waste burial areas. The sub-surface geophysical survey will be conducted using ground-penetrating radar (GPR) (or other appropriate technology) and either electromagnetometer (EM) or magnetometer in locations suggested by the EPA's Historical Site Assessment report. It is assumed that the EM and magnetometer survey will be completed at target locations in search of potential buried materials covering as much as approximately 10 ac (4 ha). The GPR survey will be conducted over approximately 2 ac (0.8 ha), based on the results of the EM and magnetometer surveys. Impacts associated with each type of geophysical survey are foot traffic and light vehicle traffic. The presence of personnel and equipment during the geophysical surveys (regardless of the type of equipment used) may also impact nesting birds.

Surface and Subsurface Soil Sampling

The EPA will collect surface and subsurface soil samples to characterize the representative concentration of each radionuclide of concern in surface and subsurface soil within Area IV. Biased and random sampling techniques will be used to identify surface and subsurface soil sampling locations. Should a sample location be identified within an area known to contain a threatened, endangered, or sensitive species and/or their habitat then that sample location will be

relocated to minimize or avoid impacts to them. The EPA anticipates that up to approximately 3,500 surface and 3,500 subsurface soil samples will be initially collected. The surface and subsurface samples will be co-located; thus minimizing the surface disturbance during drilling. As explained below, from two to four closely spaced boreholes will be needed at each sample location to conduct the gamma logging, define the subsurface sample interval and collect the requisite soil volume for sample analysis.

Borehole gamma logging will be performed to identify depth intervals for subsurface soil samples. Boreholes will be made using a mechanized direct push technology (DPT) rig and 3.25-inch (83-mm) tooling. Each borehole will be advanced to a depth of approximately 10 ft (3 m) deep below ground surface or until refusal is reached if less than 10 ft (3 m).

A 2-inch (51-mm) inner diameter polyvinyl chloride (PVC) pipe will be inserted into the open borehole. A probe will be lowered down the PVC piping to document total gamma radiation counts at 6-inch (153-mm) intervals. After the lithologic and gamma logging efforts have been completed at the borehole, the sample interval will be selected based on the previously described parameters.

Soil sample collection will then begin at a location offset by approximately 6 to 12 inches (153 to 305 mm) from the initial borehole. Surface soil samples will be collected from 0 to 6 inches (0 to 153 mm) below the ground surface using trowels, shovels, and/or spoons to collect enough soil to fill the sampling container (approximately 1 gallon (gal) (3.8 liters (l))). Subsurface soil sample intervals will be selected based on subsurface gamma scanning results and material noted during the lithologic logging effort. The DPT rig will then off-set to the surface sample location and advance the desired depth to collect the subsurface soil sample. Additional off-set boreholes may be necessary to meet sample volume requirements. Additional off-set boreholes, if needed, will also be 6 to 12 inches (153 to 305 mm) from the previous borehole. The EPA does not anticipate more than four boreholes per location: one for lithologic and gamma logging, and one to three for soil sample collection. After the logging and sampling efforts are completed, each borehole will be backfilled with high solids bentonite.

Groundwater Monitoring Well Sampling

The EPA will evaluate existing groundwater conditions at on- and off-site locations. Groundwater sampling will be conducted at existing on-site and off-site wells. Approximately 10 existing on-site and 9 existing off-site monitoring wells will be sampled on a quarterly basis. All of the off-site wells are within 1,500 ft (457 m) of Area IV or NBZ and are within the action area. Low-flow purging and sampling methods will be implemented. Low-flow purging and sampling methods will use a bladder pump set in the monitoring well screen to purge the well at a rate of 0.026 to 0.26 gal (100 to 1,000 milliliters (ml)) per minute until water quality parameters are within established guidelines. Once the established purging criteria are met sample collection will proceed at a rate of 0.026 to 0.13 gal (100 to 500 ml) per minute. Typical low-flow monitoring well sampling efforts generate between 0.5 to 1.3 gal (2 to 5 l) of purge water waste per monitoring well. The impacts resulting from this sampling activity are expected to be trampling/disturbance from foot traffic and light vehicle traffic.

Surface Water and Sediment Sampling
The EPA will collect surface water and sediment samples to determine radionuclide concentrations in on-site and off-site surface water and seeps. Sediment samples will be co-located with the surface water/seep sampling locations. The surface water sampling will be conducted in two phases. Phase 1 will focus on identifying the general extent of contamination and identification of key radionuclides. Phase 2 will involve conducting a detailed evaluation of the radionuclides that were detected during Phase 1. Phase 2 may include a more extensive sediment sampling effort in areas of sediment contamination identified during Phase 1, and a targeted radionuclide suite. The collection of surface water samples will be focused on drainage pathways with specific sample locations being determined during the site reconnaissance. Approximately 50 sample locations will be sampled with a surface water and sediment sample collected at each location. Surface water sampling will target major drainages downstream of potential source areas. Sediment sampling will target fine-grained sediment located within the stream and associated stream bank. Approximately 40 of the sample locations are onsite within Area IV and NBZ, and approximately 10 are located offsite, but within 1,400 ft (427 m) of the Area IV and NBZ. The EPA does not intend to install any new ground water wells or mobilize any equipment for this sediment sampling that would cause ground disturbance (Cooper 2010a). If the EPA determines it is necessary to install new wells, such revisions to the project description may warrant reinitiation of consultation with the Service if the revisions may affect listed species or critical habitat. Environmental impacts for this element of the proposed project are expected to consist of trampling/disturbance from foot traffic and light vehicle traffic.

Support Activities
The support activities may consist of a variety of actions including mobilization/staging, equipment/Investigation Derived Waste (IDW) stock piling, IDW management, access/on-site travel, access improvement, vegetation alteration, and vegetation/soil removal. The impacts of each of the aforementioned actions vary greatly and are summarized in Table 1.

IDW associated with the proposed site activities would consist of purge water, decontamination water, and soil cuttings.

- Purge water would be generated during monitoring well sampling activities.
- Decontamination water would be associated with every sampling activity.
- Soil cuttings would be collected during soil logging activities.

The IDW generated during field activities will be placed in leak-tight vessels (55-gallon drums or similar containers) and transported to a temporary staging area near the on-site office for subsequent removal by a disposal contractor.

Table 1
Field Action Potential Impact Summary
Santa Susana Field Laboratory

Action	Ground Storage of Materials, Equipment, or Soils	Surface Soil Disturbance / Mechanical Scarification				Grazing/ Browsing	Manual Vegetation Alteration	Produces Loud Noise	Produces Heat
		Foot Traffic	Mule Traffic	Light Vehicle Traffic	Heavy Vehicle Traffic				
Vegetation Cutting									
Hand cutting	-	X	-	-	-	-	X	-	-
Mechanical cutting		X	-	X	X	-	X	X	X
Gamma Scanning									
Hand-held	-	X	-	-	-	-	X	-	-
Wheel-mounted	-	X	-	X	-	-	X	-	-
Mule-mounted	-	X	X	-	-	X	X	-	-
Fork-lift mounted	-	X			X	-	X	-	X
Geophysical Survey									
GPR	-	X	-	X	-	-	-	-	-
EM Conductivity	-	X	-	X	-	-	-	-	-
Magnetometer	-	X	-	X	-	-	-	-	-
Soil Sampling									
Surface	-	X	-	X	-	-	X	-	-
Subsurface (DPT Rig)	-	X	-	X	X	-	X	X	X
Subsurface gamma logging	-	X	-	X	X	-	X	-	-
Monitoring Well Sampling									
Dedicated pump/PDB	-	X	-	X	-	-	-	-	-
Mobile pump	-	X	-	X	-	-	-	-	-
Surface Water & Sediment Sampling									
Sample collection	-	X	-	X	-	-	-	-	-
Support Activities									
Mobilization /staging	X	X	-	X	X	-	X	-	-
Equipment/IDW stockpile	X	X	-	X	-	-	X	-	-
IDW Management	X	X	-	X	-	-	X	-	-
Access / On-site Travel	-	X	-	X	X	-	-	-	-
Access Improvement	-	X	-	X	X	-	X	X	X
Vegetation Cutting (to <12" high)	X	X	-	X	X	-	X	X	X
Soil Excavation	X	X	-	X	X	-	X	X	X

The EPA proposes the following conservation, avoidance, and minimization measures to avoid and minimize adverse effects to coastal California gnatcatchers, California red-legged frogs, vernal pool fairy shrimp, Riverside fairy shrimp, Braunton's milkvetch, spreading navarretia, California Orcutt grass, and Lyon's pentachaeta and critical habitat for California red-legged frogs and Braunton's milkvetch (HydroGeoLogic and Envicom 2010):

General Avoidance and Minimization Measures

The EPA proposes the following measures to avoid and minimize the adverse effects of the project.

GEN-1 Prior to conducting biological surveys or monitoring related to the project and/or avoidance and minimization measures identified herein, each biologist will submit their qualifications to the Service to be considered a Service-approved biologist.

GEN-2 All members of project-related crews will participate in an environmental education program to be administered by the project biologist. The environmental education program will inform the participants as to the sensitive biological resources within the project area and avoidance and minimization measures to be employed. Species-specific training will be administered to crews who will be performing activities within areas occupied, or presumed to be occupied, by listed species.

GEN-3 Before entering natural habitat areas, project-related vehicles and equipment brought to the project area from off-site locations will be cleaned to prevent the transport and introduction of invasive plant species to site. Additionally, project-related vehicles and/or equipment that have been operated in areas of invasive weed infestations, especially that of yellow star-thistle (*Centaurea melitensis*), will be cleaned before entering other natural habitat areas, and especially areas occupied by listed species, in order to prevent the transport and introduction of invasive plant species.

<u>Braunton's Milkvetch</u>

GEN-4 Before initiating the proposed project, a Service-approved biologist will conduct a survey to appropriately demarcate with flagging and/or fencing the limits of areas occupied by Braunton's milkvetch. Any project related activities to be undertaken within said areas will adhere to the avoidance and minimization measures identified for each component of the project as discussed below.

<u>Lyon's Pentachaeta, Spreading Navarretia, and San Fernando Valley Spineflower</u>

GEN-5 Before initiating the proposed project, a Service-approved biologist will conduct surveys to identify areas exhibiting the PCEs or suitable habitat for Lyon's pentachaeta, spreading navarretia, or San Fernando Valley spineflower. Potential suitable habitat areas will be appropriately demarcated with flagging and/or fencing, and no activities will be undertaken in those areas until it has been determined whether they support the listed or candidate plant species. In areas

identified as potentially suitable habitat for Lyon's pentachaeta, spreading navarretia, or San Fernando Valley spineflower, a Service-approved biologist will conduct presence/absence surveys at the appropriate time of the year, March to June, to determine whether these species are present. Activities undertaken within areas occupied by Lyon's pentachaeta, spreading navarretia or San Fernando Valley spineflower will be delayed until the dry phase, after plants therein have become senescent, typically by late August (Lyon's pentachaeta), late June (spreading navarretia) or late July (San Fernando Valley spineflower).

Quino Checkerspot Butterfly

GEN-6 Before initiating the proposed project, a Service-approved biologist will survey the project area to identify and flag primary host plants for Quino checkerspot butterfly, or demarcate groups of primary host plants using flagging. Project-related activities to be undertaken within said areas will adhere to the avoidance and minimization measures identified for each component of the project as discussed below. Primary larval host plants include: dwarf plantain (*Plantago erecta*), white snapdragon (*Antirrhinum coulterianum*), woolly plantain (*P. patagonica*), thread-leaved bird's beak (*Cordylanthus rigidus*), owl's clover (*Castilleja exserta*), and Chinese houses (*Collinsia concolor*) (74 FR 28775, Service 2003).

Dudleya species

GEN-7 Prior to initiating the proposed project upon or immediately adjacent to rock outcrops, a Service-approved biologist will conduct surveys to identify any *Dudleya* species possibly attributable to the listed taxa. Such occurrences will be appropriately flagged and/or fenced to alert field personnel to their presence and need for protection. *Dudleya* species encountered will be treated as if they are a listed taxon, unless they are determined otherwise by a Service-approved biologist.

Coastal California Gnatcatcher

GEN-8 Before project-related activities commence within areas identified as potential habitat for the coastal California gnatcatcher (as shown on Figure 1[1]), a Section 10(a)(1)(A) permitted biologist will conduct a survey of the potential habitat to determine the extent of suitable habitat present. For areas identified as suitable habitat, protocol surveys will be conducted between February 15 and August 30, according to Service presence/absence survey guidelines (Service 1997). If active nests are found, activities will be postponed or halted in the area until an appropriate setback (i.e., buffer zone) can be established, based on the judgment of the Section 10(a)(1)(A) permitted biologist, and in consultation with the Service. No project activities will occur within the setback area, until the nest is vacated and juveniles have fledged, as determined by the Section 10(a)(1)(A) permitted biologist, and there is no evidence of a second attempt at nesting.

[1] Figure 1 – after HydroGeoLogic and Envicom 2010 Figure 4; identified in consultation with Service staff.

Least Bell's Vireo

GEN-9 To the extent feasible, project-related activities within areas identified as potential habitat for least Bell's vireo (as shown on Figure 1), will be conducted between October 1 and March 14. Before commencing work within potential habitat during this timeframe, preconstruction surveys will be conducted by a Service-approved biologist.

Before initiating project-related activities between March 15 and September 30 within areas identified as potential habitat for least Bell's vireo, protocol surveys will be conducted by a Section 10(a)(1)(A) permitted biologist to determine presence/absence of the species. If individuals are present, the nature of their activities will be determined, and consultation with the Service will be conducted to identify activities and/or avoidance and minimization measures that will not adversely affect the species.

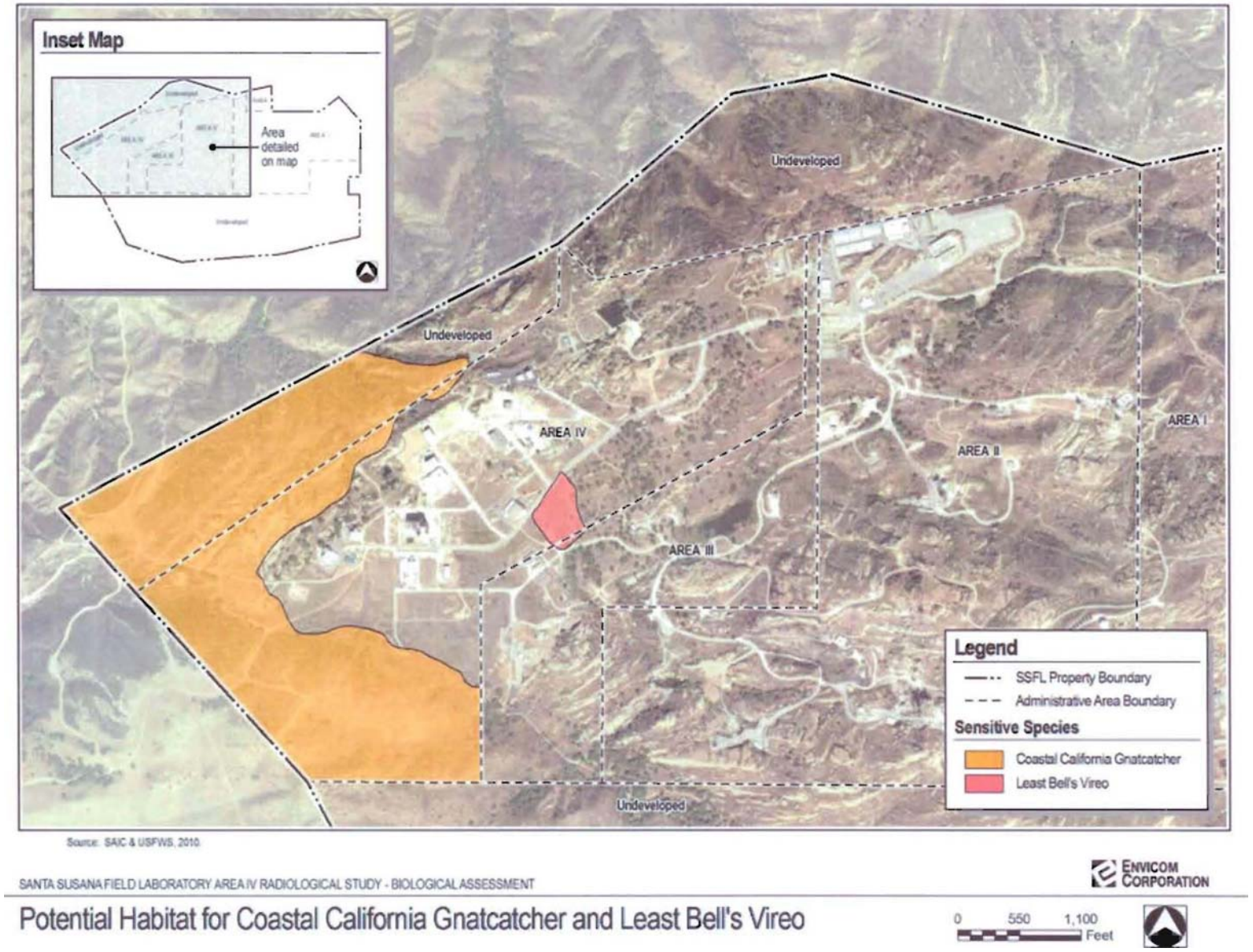
Vernal Pool Branchiopods

GEN-10 Before initiating the proposed project within areas identified as potentially suitable habitat for Riverside fairy shrimp or vernal pool fairy shrimp, a Service-approved biologist will conduct habitat suitability surveys to determine whether suitable habitat is present. Activities undertaken within suitable habitat or areas occupied by Riverside fairy shrimp or vernal pool fairy shrimp will be delayed until the vernal pools have entered their dry phase. Activities within areas of suitable habitat during the dry phase will be conducted on foot, and to the extent feasible activities will be limited to those that do not disturb biota or soil structure. In the event that a biota or soil disturbing activity is required within vernal pool branchiopod habitat in order to meet the objectives of the project, the Applicant will consult with Service regarding additional avoidance and minimization measures based upon the conditions at that time.

California Red-legged Frog

GEN-11 Activities conducted within aquatic or riparian habitats, and upland habitats within 300 ft (91 m) thereof, will be supervised by a Service-approved biologist. Activities other than water sampling activities within intermittent aquatic habitats will be conducted when the intermittent water body is dry.

Figure 1 – Potential Habitat for California Coastal Gnatcatcher and Least Bell's Vireo



Activity and Species Specific Avoidance and Minimization Measures

The EPA proposes the following measures to avoid and minimize the adverse effects of the project specifically for each given species.

Vegetation Cutting Avoidance and Minimization Measures
The EPA proposes the following measures to avoid and minimize the adverse effects of vegetation cutting activities:

VC-1 Within 2 weeks before initiation of vegetation cutting activities, a Service-approved biologist will survey the project area to delineate and flag the locations of individuals and/or habitat occupied by listed species or nesting migratory birds that will be avoided or protected from mechanical cutting and specific activities associated with the project (i.e., the ERGS or subsurface soil sampling). Cutting within these areas will be performed under the supervision of a Service-approved biologist pursuant to specific measures identified for each listed species below.

VC-2 During brush cutting, the root systems of perennial and woody plant species will not be disturbed (i.e., cutting will not involve grubbing).

Braunton's Milkvetch

VC-3 Before brush removal in areas occupied by Braunton's milkvetch, Service-approved biologists and field-trained technicians will flag standing individuals or groups of individuals for avoidance. A limited number of live outlier individuals may be cut where their removal would facilitate access for scanning equipment into otherwise unoccupied habitat. Standing dead individuals will be allowed to be cut; however, the cut plants including any senescent inflorescences that may contain seeds will remain on site at their original location, or relocated to other suitable habitat for the species, as determined by a Service-approved biologist.

Brush cutting in occupied areas will be done manually, using hand-saws, pruners, chain saws, bow saws, etc., by personnel specifically field-trained to carry out these avoidance and minimization measures. Reasonable care will be undertaken not to damage or cause further mortality of standing live individuals during the brush cutting or when moving cut brush to temporary stockpiles.

Spreading Navarretia and Vernal Pool Branchiopods

VC-4 Vernal pools, or other spreading navarretia that provides suitable vernal pool branchiopod habitat, will be qualitatively monitored to determine whether cutting or mowing of vegetation results in substantial changes in the pattern of runoff flows that contribute to seasonal inundation of the habitat. If significant negative effects result from the proposed changes, measures will be taken to divert flow to provide the necessary quantity of surface water to the habitat.

California Red-legged Frog

VC-5 Vegetation cutting activities within aquatic or riparian habitats, and upland habitats within 300 ft (91 m) thereof, will be monitored by a Service-approved biologist. Within these areas, only hand tools will be used for cutting vegetation.

VC-6 Aquatic habitats will be qualitatively monitored to determine whether cutting or mowing of vegetation results in substantial changes in the pattern of runoff flows, or the amount of sediment discharged to aquatic habitats. If significant negative effects result from the proposed changes, measures will be taken to divert flows to redirect the necessary quantity of surface water to the habitat.

Quino Checkerspot Butterfly

VC-7 Before brush cutting and mowing, a Service-approved biologist will survey the project area to identify and flag primary host plants, or demarcate groups of primary host plants. If host plants are present, prior to cutting within areas occupied by host plants, a habitat suitability survey will be conducted. If the habitat suitability survey concludes that the host plants within the project area represent suitable habitat, the host plants will be preserved in their existing condition until a protocol survey can be conducted to determine whether Quino checkerspot butterflies are present. If Quino checkerspot butterflies are found to be present, the host plants will not be cut and the Service will be consulted regarding the preservation of adult nectar sources in the proximity of primary host plants prior to vegetation cutting. Hand tools will be used with extreme care to cut vegetation in the vicinity of primary host plants or plants containing Quino checkerspot butterfly larvae.

Lyon's Pentachaeta, Spreading Navarretia, and San Fernando Valley Spineflower

VC-8 Mowing and/or brush cutting in areas determined to support Lyon's pentachaeta, spreading navarretia, or San Fernando Valley spineflower will be done manually, using hand-saws, pruners, chain saws, bow saws, etc., by personnel specifically field-trained to carry out these avoidance and minimization measures. Reasonable care will be taken not to damage soil structure during the brush cutting, or when moving cut brush to temporary stockpiles.

Dudleya species

VC-9 Vegetation cutting activities undertaken within or adjacent to areas occupied by known or suspected listed *Dudleya* species will be performed with care by field-trained personnel, so as not to damage or dislodge any of these plants.

Santa Susana Tarplant (*Deinandra minthornii*)

VC-10 Vegetation cutting activities undertaken within or adjacent to areas occupied by Santa Susana tarplant will be performed with care by field-trained personnel under the supervision of a Service-approved biologist, so as not to damage or dislodge any of these plants. To further prevent impacts to individual plants, the

Service-approved biologist will flag Santa Susana tarplants in advance of vegetation cutting activities.

Gamma Scanning Avoidance and Minimization Measures

The EPA proposes the following measures to avoid and minimize the potential adverse effects associated with gamma scanning activities:

GS-1 When conducting gamma scanning surveys within areas occupied by listed species, appropriate scanning equipment will be selected that maximizes the sensitivity of the scanner and minimizes physical damage to species or their habitat, including the primary constituent elements (PCEs) of designated critical habitat. Scanning undertaken within or adjacent to areas occupied or presumed to be occupied by listed species will be performed with care by field-trained personnel and under the supervision of a Service-approved biologist.

GS-2 When conducting mule-mounted gamma scanning within areas occupied by listed species, the mule "handler" will prevent (with hand controls or by using a muzzle or similar device) the mule from grazing on listed plant species or vegetation that is suitable habitat for listed species. A Service-approved biologist will work with the handler to identify such vegetation.

Vernal Pool Branchiopods

GS-3 Gamma scanning surveys undertaken within areas occupied by Riverside fairy shrimp or vernal pool fairy shrimp will be delayed until the dry phase as determined by a Service-approved biologist. Gamma scanning surveys within areas of suitable habitat during the dry phase will be conducted on foot, and only activities that do not disturb biota or soil structure will be permitted.

California Red-legged Frog

GS-4 Gamma scanning surveys conducted within aquatic or riparian habitats, and upland habitats within 300 ft (91 m) thereof, will be supervised by a Service-approved biologist. Gamma scanning surveys of intermittent aquatic habitats will only be conducted when the intermittent water body is dry.

Santa Susana Tarplant

GS-5 Gamma scanning surveys conducted within areas occupied by Santa Susana tarplant will be supervised by a Service-approved biologist. When scanning over or adjacent to individuals, the Service-approved biologist will carefully hold the branches down or out of the way to allow the scanning equipment to access the area. When using the hand scanner in rocky areas, if scanning down to 6 inches would result in breaking of Santa Susana tarplant branches, the height of the scanner will be raised to 12 to 18 inches (305 to 457 mm) above the ground.

Geophysical Survey Avoidance and Minimization Measures

The EPA proposes the following measures to avoid and minimize the adverse effects associated with geophysical survey activities:

GP-1 When conducting geophysical surveys within areas occupied by listed species, appropriate equipment will be selected that minimizes physical damage to species, their PCEs, and their habitats. Geophysical surveys undertaken within or adjacent to areas occupied, or presumed to be occupied by listed species, will be performed with care by field-trained personnel and under the supervision of a Service-approved biologist.

Vernal Pool Branchiopods

GP-2 Gamma scanning surveys undertaken within areas occupied by Riverside fairy shrimp or vernal pool fairy shrimp will be delayed until the dry phase as determined by a Service-approved biologist. Gamma scanning surveys within areas of suitable habitat during the dry phase will be conducted on foot, and only activities that do not disturb biota or soil structure will be permitted.

California Red-legged Frog

GP-3 Gamma scanning surveys conducted within aquatic or riparian habitats, and upland habitats within 300 ft (91 m) thereof, will be supervised by a Service-approved biologist. Gamma scanning surveys of intermittent aquatic habitats will only be conducted when the intermittent water body is dry.

Soil Sampling Avoidance and Minimization Measures

The EPA proposes the following measures to avoid and minimize the adverse effects associated with soil sampling activities:

SS-1 The locations of soil sampling surveys will be selected to avoid listed species. Where listed species are likely to be adversely affected, and cannot be avoided, The EPA will coordinate with the Service to identify activities and/or avoidance and minimization measures that will not adversely affect the species.

SS-2 If it is necessary to conduct soil sampling surveys in areas occupied by listed species, the soil sampling crew will coordinate with a Service-approved biologist to identify: 1) a specific location within or adjacent to the occupied habitat that will avoid or minimize the effect to the species, and 2) appropriate equipment that will avoid or minimize physical damage to species, their PCEs and habitats. Soil sampling surveys undertaken within or adjacent to areas occupied, or presumed to be occupied by listed species, will be performed with care by field-trained personnel and under the supervision of a Service-approved biologist.

Monitoring Well Sampling Avoidance and Minimization Measure
The EPA proposes the following measure to avoid and minimize the effects associated with monitoring well sampling activities:

MWS-1 In the event that a monitoring well is located within or adjacent to areas occupied or presumed to be occupied by listed species, the monitoring well sampling crew will coordinate with a Service-approved biologist to identify a means of access that avoids or minimizes physical damage to listed species, their PCEs, and their habitats.

Surface Water and Sediment Sampling Avoidance and Minimization Measure
The EPA proposes the following measure to avoid and minimize the effects associated with surface water and sediment sampling activities:

SWSS-1 In the event that surface water and sediment sampling activities are located within or adjacent to areas occupied or presumed to be occupied by listed species, the sampling crew will coordinate with a Service-approved biologist to identify a means of access that avoids or minimizes physical damage to listed species, their PCEs, and their habitats.

ANALYTICAL FRAMEWORK FOR THE JEOPARDY DETERMINATION

Jeopardy Determination

The jeopardy analysis in this biological opinion relies on four components: (1) the *Status of the Species*, which evaluates the range-wide conditions of the coastal California gnatcatcher, California red-legged frog, vernal pool fairy shrimp, Riverside fairy shrimp, Braunton's milkvetch, spreading navarretia, California Orcutt grass, and Lyon's pentachaeta, the factors responsible for those conditions, and their survival and recovery needs; (2) the *Environmental Baseline*, which evaluates the conditions of the coastal California gnatcatcher, California red-legged frog, vernal pool fairy shrimp, Riverside fairy shrimp, Braunton's milkvetch, spreading navarretia, California Orcutt grass, and Lyon's pentachaeta in the action area, the factors responsible for those conditions, and the relationship of the action area to the survival and recovery of the coastal California gnatcatcher, California red-legged frog, vernal pool fairy shrimp, Riverside fairy shrimp, Braunton's milkvetch, spreading navarretia, California Orcutt grass, and Lyon's pentachaeta; (3) the *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the coastal California gnatcatcher, California red-legged frog, vernal pool fairy shrimp, Riverside fairy shrimp, Braunton's milkvetch, spreading navarretia, California Orcutt grass, and Lyon's pentachaeta; and (4) the *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the coastal California gnatcatcher, California red-legged frog, vernal pool fairy shrimp, Riverside fairy shrimp, Braunton's milkvetch, spreading navarretia, California Orcutt grass, and Lyon's pentachaeta.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed Federal action in the context of the current status of the coastal California gnatcatcher, California red-legged frog, vernal pool fairy shrimp, Riverside fairy shrimp, Braunton's milkvetch, spreading navarretia, California Orcutt grass, and Lyon's pentachaeta, taking into account any cumulative effects, 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 coastal California gnatcatcher, California red-legged frog, vernal pool fairy shrimp, Riverside fairy shrimp, Braunton's milkvetch, spreading navarretia, California Orcutt grass, or Lyon's pentachaeta in the wild.

The jeopardy analysis in this biological opinion places an emphasis on consideration of the range-wide survival and recovery needs of the coastal California gnatcatcher, California red-legged frog, vernal pool fairy shrimp, Riverside fairy shrimp, Braunton's milkvetch, spreading navarretia, California Orcutt grass, and Lyon's pentachaeta and the role of the action area in the survival and recovery of these species 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 biological opinion does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 Code of Federal Regulations (CFR) 402.02. Instead, we have relied on 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 biological opinion relies on four components: (1) the *Status of Critical Habitat*, which evaluates the range-wide condition of designated critical habitat for the California red-legged frog and Braunton's milkvetch in terms of primary constituent elements (PCEs), the factors responsible for that condition, and the intended recovery function of the critical habitat overall; (2) the *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) the *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated and interdependent activities on the PCEs and how that will influence the recovery role of the 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 critical habitat of the California red-legged frog and Braunton's milkvetch are evaluated in the context of the range-wide condition of the critical habitat, 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 and Braunton's milkvetch.

The analysis in this biological opinion places an emphasis on using the intended range-wide recovery function of critical habitat for the California red-legged frog and Braunton's milkvetch 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 OF THE SPECIES/CRITICAL HABITAT

Coastal California Gnatcatcher

The Service listed the coastal California gnatcatcher as threatened on March 30, 1993 (58 FR 16742). Pursuant to section 4(d) of the Act, on December 10, 1993, the Service defined specific conditions associated with certain land use activities under which incidental take of gnatcatchers associated with loss of their habitat will not be a violation of section 9 of the Act (58 FR 65088). The proposed action does not fall within the parameters allowing incidental take exemption under 4(d) of the Act. We published a revised designation of critical habitat for this subspecies on December 19, 2007 (72 FR 72009).

The coastal California gnatcatcher is a small, long-tailed member of the thrush family (Muscicapidae) that is endemic to cismontane southern California and northwestern Baja California, Mexico (Atwood 1980, 1988, 1990, 1991; American Ornithologists' Union (AOU) 1983, 1989). Its body plumage is dark blue-gray above and grayish-white below, while the tail is mostly black above and below. The male has a distinctive black cap that is absent during the winter, and both sexes have a distinctive white eye-ring. Vocalizations of this species include a call consisting of a rising and falling series of three kitten-like mew notes. The gnatcatcher is distinguished from the black-tailed gnatcatcher (*Polioptila melanura*) by its darker body plumage, less extensive white on tail feathers (rectrices 5 and 6), and longer tail.

The gnatcatcher typically occurs in or near coastal sage scrub, which is composed of relatively low-growing, dry-season deciduous, and succulent plants. Characteristic plants of these communities include California sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), laurel sumac (*Malosma laurina*), lemonade berry (*Rhus integrifolia*), bush penstemon (*Keckiella antirrhinoides*), sages (*Salvia* spp.), encelia or brittlebush (*Encelia* spp.), and opuntia or prickly-pear cactus (*Opuntia* spp.) (Atwood 1990, Beyers and Wirtz 1997, Braden et al. 1997a, Weaver 1998).

Because coastal sage scrub is patchily distributed and variable in both structure and composition throughout the range of the species, gnatcatchers are not uniformly distributed within available coastal sage scrub. Rather, gnatcatchers occur most frequently within California sagebrush-dominated stands of coastal sage scrub (Atwood 1990; Atwood et al. 1998a, 1999; Beyers and Wirtz 1997), particularly on mesas, gently sloping areas, and along the lower slopes of the coast

ranges (Atwood 1990). Weaver (1998) found that gnatcatcher densities in northern San Diego County are highest in areas where California buckwheat or California encelia (*Encelia californica*) are co-dominant with sagebrush.

Gnatcatchers are found in moderately dense stands of coastal sage scrub (Atwood 1980, 1988). Beyers and Wirtz (1997) found that nesting territories typically have greater than 50 percent shrub cover and an average shrub height that exceeds 2.3 ft (0.7 m). The relative density of shrub cover influences gnatcatcher territory size, with territory size increasing as shrub cover decreases, probably due to limited resource availability. Gnatcatchers will use sparsely vegetated coastal sage scrub as long as perennial shrubs are available, although there appears to be a minimum cover threshold below which the habitat becomes unsuitable (Beyers and Wirtz 1997).

Gnatcatchers also use chaparral, grassland, and riparian plant communities where they occur adjacent to or intermixed with coastal sage scrub (Campbell et al. 1998). The use of non-coastal sage scrub habitat is thought to be most common in areas where gnatcatchers in high density are adjacent to productive non-coastal sage scrub habitat areas. Both adults and juvenile gnatcatchers have been observed foraging in non-coastal sage scrub habitats for extended periods of time, especially from midsummer to fall, when volume and quality of drought-deciduous coastal sage scrub foliage declines (Campbell et al. 1998, Preston et al. 1998a). Use of these habitats appears to be less frequent during the breeding season; however, breeding territories have been documented in non-sage scrub habitats (e.g., chaparral, grassland, and ruderal habitats). Potential factors contributing to the gnatcatcher's use of alternative habitats may include more abundant food resources, higher survival rates during dispersal, fire avoidance, and cooler microclimate during heat stress (Campbell et al. 1998).

Other parameters that contribute to the quality of habitat for the gnatcatcher include slope, aspect, temperature, and precipitation. In an evaluation of a model used to predict habitat quality for the gnatcatcher, Winchell and Doherty (2008) found higher gnatcatcher occupancy probabilities corresponded with areas that had less than 40 percent slopes, annual precipitation less than or equal to 1.1 ft (0.34 m), and an average January minimal temperature of greater than or equal to 41 degrees Fahrenheit (F) (5 degrees Celsius (C)). Slope, temperature, and precipitation were also found to have a stronger influence on occupancy than patch size (Winchell and Doherty 2008).

Several studies have suggested that gnatcatchers nest infrequently on very steep slopes (greater than 40 percent) (Bontrager 1991, Odgen Environmental and Energy Services Company 1992), and Grishaver et al. (1998) demonstrated that nests were more likely to be successful on shallow slopes (less than 19.9 percent slope) than on steeper slopes. However, over a landscape of varied topography, steep slopes are part of gnatcatcher territories (Odgen Environmental and Energy Services Company 1992). Nesting may be less frequent on steep slopes because these areas are more prone to erosion than gradual slopes and are therefore less likely to meet the minimum vegetation cover threshold necessary for the habitat to be considered suitable for the gnatcatcher (Beyers and Wirtz 1997). The grade of the slope may also affect the type of plant community

present, thereby reducing the suitability of the area for nesting. North- and east-facing slopes tend to support chaparral rather than coastal sage scrub communities, whereas gnatcatchers are primarily found in coastal sage scrub (Weaver 1998).

The gnatcatcher is primarily insectivorous. Based on fecal sample analysis, its diet consists of small arthropods, especially leaf-hoppers (Homoptera), and spiders (Araneae), while true bugs (Hemiptera), wasps, bees, and ants (Hymenoptera) are minor components (Burger et al. 1999). Both adults and young consume more sessile than active prey items (Burger et al. 1999).

Gnatcatchers are non-migratory and exhibit strong site tenacity (Atwood 1990). Gnatcatcher pairs strongly defend territories during the breeding season against other gnatcatchers and predators, and some will defend territories throughout the year (Preston et al. 1998a). Breeding season territories range in size from less than 2.5 ac (1 ha) to 25 ac (10 ha) (Atwood et al. 1998a, Preston et al. 1998a), with mean territory size generally greater for inland populations than coastal populations (Preston et al. 1998a). During the non-breeding season, gnatcatchers have been observed to wander in adjacent territories and unoccupied habitat increasing their home range size to approximately 78 percent larger than their breeding territory (Preston et al. 1998a).

The gnatcatcher breeding season extends from late-February through early-August with the peak of nesting attempts occurring from mid-March through mid-May (Grishaver et al. 1998, Atwood and Bontrager 2001). Nests are constructed over a 4- to 10-day period and are most often placed in perennial species of coastal sage scrub about 3 ft (1.2 m) above the ground (Atwood 1990). Gnatcatchers typically lay clutches of three to five eggs (Atwood 1990, Galvin 1998, Grishaver et al. 1998), and clutch sizes may be influenced by the amount of precipitation immediately preceding nest initiation (Patten and Rotenberry 1999). The egg incubation period is 14 days, and the nestling period is 10 to 15 days (Grishaver et al. 1998). Both sexes participate in all phases of the nesting cycle, and gnatcatcher pairs may produce more than one brood in one nesting season (Atwood 1990, Grishaver et al. 1998).

Juveniles stay within their natal territories up to 5 weeks after fledging from the nest (Grishaver et al. 1998), with juveniles subsequently dispersing to find their own foraging and nesting territories. Juveniles have been observed to disperse up to 6.2 mi (10.0 km) from their natal territory (Atwood and Bontrager 2001), but they generally disperse less than 1.9 mi (3.0 km) on average (Bailey and Mock 1998, Galvin 1998, Atwood and Bontrager 2001). Dispersing gnatcatchers are apparently able to traverse highly human-modified landscapes for at least short distances (Bailey and Mock 1998). Juveniles begin to establish territories as early as late spring and territories are established by the end of October (Preston et al. 1998a).

Similar to other passerine species, gnatcatcher mortality is highest for the youngest age class, with much of this attributable to predation of young in nests (Atwood 1990, Braden et al. 1997b) and high mortality rates among dispersing juveniles, as indicated by low re-sighting of banded birds (Bailey and Mock 1998, Galvin 1998). Sources of mortality for gnatcatchers have not been well-studied, although physiological stress during cold, wet winter months when food availability may be low is probably the main source of mortality among adults and dispersing

juveniles (Atwood 1990, Atwood and Bontrager 2001). Mean average survivorship of gnatcatchers during their first year is estimated to be 29 percent, with annual survivorship for adults 57 percent, although there is probably a high annual variation within and between populations (Atwood and Bontrager 2001). The oldest documented individual was a female at least 8 years old (Atwood and Bontrager 2001).

Gnatcatchers develop vocalizations within 2 weeks of fledging (Grishaver et al. 1998). Male gnatcatchers call more frequently than females; the greatest vocalization rates occur in February, just prior to nest building (mean 238 vocalizations per hour) and lowest in June during brooding of nestlings (mean 67 vocalizations per hour) (Preston et al. 1998b). Calls have been recorded in association with mobbing potential predators, during pair interactions (i.e., pair bonding, copulation, nest-building, or delivery of food to nestlings), and following the loss of a mate during the breeding season (Atwood 1988, Preston et al. 1998b, Atwood and Bontrager 2001).

The gnatcatcher is found on the coastal slopes of southern California, from southern Ventura County southward through Los Angeles, Orange, Riverside, San Bernardino, and San Diego Counties into Baja California, Mexico to approximately 30 degrees North latitude near El Rosario (AOU 1957; Atwood 1980, 1990; 65 FR 63680; 68 FR 20228). Within its range, the distribution of coastal California gnatcatcher is further defined by relatively narrow elevation limits (Atwood and Bolsinger 1992). Atwood and Bolsinger (1992) found that of 324 sites occupied by the gnatcatcher between 1960 and 1990, 84 percent were located below 820 ft (250 m) elevation and 97 percent occurred below 1,640 ft (500 m) elevation. In general, inland populations of the gnatcatcher can be found below 1,640 ft (500 m) elevation and coastal populations tend to be found below 820 ft (250 m) elevations. Atwood and Bontrager (2001) estimated approximately 94 percent of the gnatcatchers in the United States are found in Orange, western Riverside, and San Diego counties. Relatively isolated populations also remain in portions of its former range in Los Angeles, San Bernardino, and southern Ventura counties.

The abundance of gnatcatchers at a given locale can fluctuate extensively on an annual basis (Atwood et al. 1998b, Erickson and Miner 1998, Preston et al. 1998a). These fluctuations can be relatively extreme, resulting in population sizes that double or halve through an annual cycle (Atwood and Bontrager 2001). Population fluctuations appear to be influenced by precipitation (Atwood et al. 1998a, Erickson and Miner 1998, Patten and Rotenberry 1999), with over-winter survivorship being negatively affected and subsequent productivity being positively affected by high winter precipitation. Conversely clutch size is reduced when rainfall is low during egg formation, likely due to a reduction in abundance of insects and seeds from the lower availability of water (Patten and Rotenberry 1999). Robust populations can persist through these cycles; however, the extreme fluctuations exhibited by gnatcatchers make smaller populations more susceptible to extirpation (Leigh 1975, 1981).

Overall, loss of scrub and ruderal vegetation occupied by the California gnatcatcher (e.g., as a result of grading or wildfire), even at a relatively small scale, may result in the temporary "packing" of birds (as well as other wildlife species) into remaining habitat. Short-term effects of "packing" may increase gnatcatcher density within remaining habitat areas, increase

intraspecific competition, and may reduce breeding success of displaced birds during the first season following habitat loss. First-year breeding declines may result from increased stress associated with breaking and re-establishment of pair-bonds, reconfiguration of use areas, and increase in competition for nest sites and other limited resources.

In 1993, the Service estimated that approximately 2,562 pairs of gnatcatchers remained in the United States. Of these, 30 pairs (1.2 percent) occurred in Los Angeles County, 757 pairs (29.5 percent) occurred in Orange County, 261 pairs (10.2 percent) occurred in Riverside County, and 1,514 pairs (59.1 percent) occurred in San Diego County. In October 1996, the Service estimated the total number of gnatcatchers in the United States at 2,899 pairs (Service 1996). Because the amount of coastal sage scrub available to the gnatcatcher is believed to have decreased from 1993 to 1996, the increase in estimated abundance from 1993 to 1996 may have reflected increased sampling effort and stochastic effects rather than an upward trend in the gnatcatcher population. Furthermore, both of these estimates were based on summing observations that were made over the span of several years without the benefit of a consistent, probability-based sampling design that can be used to generate an associated margin of error for the population estimates and that takes into account annual population fluctuations (Winchell and Doherty 2008).

In 2002, the Service implemented a probability-based sampling scheme to estimate the gnatcatcher population within 81,036 ac (32,794 ha) of coastal scrub and scrub-chaparral ecotone plant communities on accessible public and quasi-public lands of Orange and San Diego counties (Winchell and Doherty 2008). Within this area during the spring of 2002, the average number of gnatcatchers estimated over four sample periods was 1,324, resulting in an average density of 0.016 gnatcatcher pairs/ac (0.040 gnatcatcher pairs/ha) (Winchell and Doherty 2008). However, Winchell and Doherty (2008) stated that extrapolation of these results to infer the size of the 2002 gnatcatcher population outside the 81,036 ac (32,794 ha) sampled would be speculative and necessitate the assumption that areas outside the sampled area have the same habitat quality for the gnatcatcher, which is probably not the case.

As previously discussed, gnatcatchers are distributed from southern Ventura County to Baja California and several large core populations of gnatcatchers on private and public lands were not included within the 2002 survey area. For example, the U.S. Marine Corps documented approximately 642 gnatcatcher territories in approximately 8,260 ac (3,342 ha) of habitat on Marine Corps Base Camp Pendleton (MCBCP), in 2006. Additional core populations are located in Los Angeles and Riverside counties (72 FR 72010).

Historically, coastal California gnatcatchers have been documented at six sites in Ventura County in the California Natural Diversity Data Base (CNDDB) (2010a). Recent surveys and observations have documented coastal California gnatcatchers at multiple sites in southern Ventura County (CNDDB 2010a, Abravaya 2010). Coastal California gnatcatchers were documented at the western base of the Santa Monica Mountains in August 2009, in Little Simi Valley in June 2008, and at California Lutheran University in Thousand Oaks in February 2010

(CNDDB 2010a, Abravaya 2010) and were heard on the SSFL site by Service biologist Robert McMorran on December 2, 2009, during a site visit (McMorran 2010).

Fires throughout the coastal California gnatcatcher's range have likely caused a temporary reduction in the overall gnatcatcher population because of the temporary loss of gnatcatcher occupied habitat; however, post-fire conversion of habitat to grasslands has the potential to more permanently impact gnatcatcher populations, particularly in areas without active habitat management programs in place.

For example, in 2007, approximately 28,173 ac (11,401 ha) of coastal sage scrub burned in Orange County in the vicinity of Santiago Canyon and approximately 84,202 ac (34,075 ha) of coastal sage scrub burned in San Diego County in several separate locations. The 2007 Orange County fire was particularly devastating to historically occupied gnatcatcher habitat in the central portion of the Central and Coastal NCCP/HCP Reserve. However, gnatcatcher populations remain to the north and south of the Santiago Canyon burn area and are connected to the burn area through habitat corridors. Assuming habitat recovers in the burn area and recurring fire is not too frequent, we anticipate this area to be reoccupied by gnatcatchers over the long term.

In November 2008, the 28,889-ac (11,691-ha) Freeway Fire burned through occupied gnatcatcher habitat in the Puente-Chino Hills, including approximately 7,789 ac (3,152 ha) within Unit 9 of designated critical habitat. Although the extent of damages to habitat have not yet been evaluated, it is likely that the number and distribution of gnatcatcher territories have been substantially altered by the fire. We estimate 37 of the 46 known gnatcatcher territories in the Puente-Chino Hills were located within the fire perimeter, including 22 territories located within Unit 9. We anticipate that remaining source populations of gnatcatchers may serve an important role in facilitating the recovery of impacted gnatcatcher populations within and adjacent to the burn areas.

Gnatcatchers were considered locally common in the mid-1940s, but they had declined substantially in the United States by the 1960s (Atwood 1980). The species was listed as threatened on March 30, 1993, because of habitat loss and fragmentation resulting from urban and agricultural development (58 FR 16742).

The direct loss of habitat reduces the amount of breeding, sheltering and foraging area available, thereby proportionally reducing the population size and overall reproductive capacity of the species. Directly associated with development is an increase in recreational use of habitats, fire frequency, waste dumping, air pollution, exotic plant and animal species, predators, Brown-headed cowbird (*Molothrus ater*) parasitism, domestic pets, and night lighting, all of which can have adverse impacts on the quality of habitat for the gnatcatcher. In addition, changes in global climate conditions have the potential to alter the quality and distribution of habitats suitable for the gnatcatcher; however, it is unclear how climate change will affect the coastal California gnatcatcher's habitat If southern California becomes drier, suitable habitat may be converted to more xeric vegetation. If the region experiences higher winter rainfall, the reproductive success of the species could be negatively affected.

As habitat patches become smaller and more isolated they are less likely to support viable local populations over the long term due to the low potential for recolonization after disturbance (Sartain and Alberts 2008). While juvenile gnatcatchers are capable of dispersing long distances (up to 14 mi (22 km)) as modeled by Bailey and Mock (1998) across fragmented and highly disturbed sage scrub habitat, generally the species disperses short distances through contiguous undisturbed habitat (Bailey and Mock 1998, Famolaro and Newman 1998, Galvin 1998). Populations likely will experience increased juvenile mortality in fragmented habitats where dispersal distances are greater than average (Atwood et al. 1998b). Such mortality is particularly likely if dispersal is across non- or sub-optimal habitats (Soulé 1991).

Repeated surveys of fragmented scrub habitats in San Diego have demonstrated the number of scrub-specialist bird species in a habitat fragment is positively correlated with the size of the fragment (Soulé et al.1988, Crooks et al. 2001, Sartain and Alberts 2008). Although the loss and degradation of habitat within fragments was hypothesized to contribute to extinctions in some cases, extinctions were also recorded in recently isolated fragments that retained a high proportion (greater than 75 percent) of native shrub cover (Crooks et al. 2001). Crooks et al. (2001) estimated a fragment size of 292 ac (118 ha) resulted in a 95 percent probability of gnatcatcher occurrence after 100 years of isolation.

The increase in wildfire frequency in Southern California as a result of urbanization is contributing substantially to the loss, degradation, and fragmentation of coastal sage scrub (Keeley and Fotheringham 2001). Fire is a natural component of coastal sage scrub ecology (Holland and Keil 1995); however, high fire frequencies may significantly reduce the viability of affected gnatcatcher subpopulations (Dudek and Associates 2000). In addition to the direct mortality that may occur as a result of the fire, recently burned areas are used infrequently by surviving gnatcatchers due to loss of shrub cover, and 4 to 5 years may be the minimum period of vegetation recovery necessary before gnatcatchers re-establish territories within burned areas (Wirtz et al. 1997, Atwood and Bontrager 2001). Frequent fires can alter the composition of coastal sage scrub communities by breaking the reproductive cycles of some species, like California sagebrush and California buckwheat (Zedler et al. 1983, Malanson and Westman 1985, Holland and Keil 1995) and can lead to the conversion of coastal sage scrub into grasslands (Callaway and Davis 1993, Zedler et al. 1983, Westman and O'Leary 1986, Talluto and Suding 2008).

Throughout the range of the species in southern California, coastal sage scrub is being type-converted to nonnative grassland and other ruderal (weedy) habitats (Allen et al. 2000, Allen et al. 1998, Minnich and Dezzani 1998, Allen 2004). Minnich and Dezzani (1998) documented the decrease in coastal sage scrub over the past 60 years in an area of Riverside County by re-sampling vegetation plots mapped 60 years earlier. They found only 40.1 percent of the coastal sage scrub originally mapped was still extant, 41.9 percent was now open coastal sage scrub mixed with a continuous layer of exotic annual grasses, and the remaining 18 percent of plots were entirely converted to exotic annual grassland. Minnich and Dezzani (1998) hypothesized that the type conversion from shrublands to grasslands was due to a combination of factors including competitive displacement by exotic annual grasses, increased fire frequency, nitrogen

deposition due to air pollution, and other anthropogenic disturbances. In a similar study (using the same vegetation plots), Talluto and Suding (2008) confirmed that scrub cover has declined substantially in the last 70 years, with a corresponding increase in annual grassland. They found coastal sage scrub in areas with high fire frequency is most at risk of conversion to grasslands. Other factors associated with increased grass cover included high levels of nitrogen deposition, north facing slopes, high silt, high pH, high water holding capacity, deep soils, and certain soil types (Talluto and Suding 2008).

Invasive ant species such as the Argentine ant (*Linepithema humile*) are known to be abundant in landscaped residential areas and can move up to approximately 1,300 ft (0.4 km) from an urbanized edge (Suarez et al. 1998). Irrigation practices associated with landscaping contribute to overall wetter soil conditions, thereby creating more favorable conditions for invasive ant species (Suarez et al. 1998, Holway and Suarez 2006). Argentine ants are documented predators on gnatcatcher nestlings (Sockman 1997, Atwood and Bontrager 2001). In addition, Argentine ants can alter the native arthropod community, thereby significantly reducing their diversity and abundance (Bolger et al. 2000). A reduction in the native arthropod community could result in reduced food resources for the gnatcatcher. Incorporation of xeric vegetation into urban landscaping to reduce irrigation requirements and containment of urban run-off will decrease the abundance of Argentine ants in fragmented habitats and potentially increase the abundance of native ants (Holway and Suarez 2006).

Predation is more prevalent along habitat edges. Numerous nest predators (e.g., raccoons (*Procyon lotor*), rats (*Rattus* spp.), and striped skunks (*Mephitis mephitis*)) thrive on the edges of developed areas where poorly stored trash and debris are available. These animals, in addition to domestic pets such as house cats, may opportunistically prey on gnatcatchers in adjacent habitat. Predation is the most common cause of gnatcatcher nest failure, accounting for up to 66 percent of nest failures in some areas (Braden et al. 1997b, Grishaver et al. 1998). Despite the paucity of empirical evidence, increased night light levels in developed areas may increase predation risk to gnatcatchers by increasing visibility for predators. Nest-predator species such as corvids and raptors do well in human-modified environments (e.g., American kestrels (*Falco sparverius*), American crows (*Corvus brachyrhynchos*), and ravens (*Corvus corax*)). For example, American crows frequently benefit from inhabiting areas influenced by artificial lighting (Gorenzel and Salmon 1995), and increased populations of crows can have detrimental effects to other native bird species (Longcore and Rich 2004), including the gnatcatcher.

Brood parasitism by the brown-headed cowbird is also more prevalent along habitat edges. Fast food restaurants, livestock and equestrian centers, and large areas of turf grass associated with residential developments, parks and school grounds all provide foraging opportunities for cowbirds. Brown-headed cowbirds were shown to significantly reduce breeding success of gnatcatchers at five sites in Riverside County (monitored between 1992 and 1995) by increasing nest abandonment (Braden et al. 1997b). Cowbird trapping was found to be effective at reducing nest parasitism; however, because nests were lost to predation versus parasitism at a 3:1 ratio, the negative effects of parasitism were outweighed by the much larger effects of predation.

Global climate change is well documented (Intergovernmental Panel on Climate Change (IPCC) 2007). Current climate change predictions for terrestrial areas in the Northern Hemisphere indicate warmer air temperatures, more intense precipitation events, and increased summer continental drying (Field et al. 1999, Cayan et al. 2006, IPCC 2007). However, predictions of climatic conditions for smaller sub-regions such as southern California remain uncertain. It is unknown at this time if climate change in southern California will result in a warmer trend with localized drying, higher precipitation events, or other effects.

We do know that the distribution of coastal sage scrub has changed substantially in response to climate change since the Pleistocene (Axelrod 1978). Genetic evidence suggests the range of the gnatcatcher has expanded northward since this time period (Zink et al. 2000), likely in response to changes in the vegetation and climatic conditions. The current range of the gnatcatcher appears to be correlated with climatic variables such as January mean minimum temperature and annual precipitation (Mock 1998, Winchell and Doherty 2008). Monitored populations have also been found to decline greatly after cold winter storms, likely due to adult and juvenile mortality (Erickson and Miner 1998). Since the historical range of the gnatcatcher appears to have shifted in response to changes in climatic conditions and the current range of the gnatcatcher is, to some extent, delimited by climatic gradients, we can expect that if future changes in regional climatic conditions occur, the gnatcatcher in response will shift its range as it did historically.

California Red-legged Frog

The Service listed the California red-legged frog as threatened on May 23, 1996 (61 FR 25813). In 2006, the Service finalized a special rule pursuant to section 4(d) of the Act, for existing routine ranching activities (71 FR 19244). We published a revised designation of critical habitat for this subspecies on March 17, 2010 (75 FR 12816). We completed a recovery plan for the subspecies in 2002 (Service 2002).

Detailed information on the biology of California red-legged frogs can be found in Storer (1925), Stebbins (2003), and Jennings et al. (1992). This species is the largest native frog in the western United States, ranging from 1.5 to 5.1 inches (38 to 129.5 mm) long. The abdomen and hind legs of adults are largely red; the back is characterized by small black flecks and larger irregular dark blotches with indistinct outlines on a brown, gray, olive, or reddish background color. Dorsal spots usually have light centers, and dorsolateral folds are prominent on the back. Tadpoles range from 0.6 to 3.1 inches (1.5 to 79 mm) long and are dark brown and yellow with dark spots.

The California red-legged frog uses a variety of habitat types, including various aquatic systems, riparian, and upland habitats. The diet of California red-legged frogs is highly variable. Hayes and Tennant (1985) found invertebrates to be the most common food item of adults. Vertebrates, such as Pacific treefrogs (*Hyla regilla*) and California mice (*Peromyscus californicus*), represented over half of the prey mass eaten by larger frogs (Hayes and Tennant 1985). Feeding activity probably occurs along the shoreline and on the surface of the water. Hayes and Tennant

(1985) found juveniles to be active diurnally and nocturnally, whereas adults were largely nocturnal.

California red-legged frogs breed from November through March; earlier breeding has been recorded in southern localities (Storer 1925). Males appear at breeding sites from 2 to 4 weeks before females (Storer 1925). California red-legged frogs are often prolific breeders, typically laying their eggs during or shortly after large rainfall events in late winter and early spring. Female California red-legged frogs deposit egg masses on emergent vegetation so that the masses float on the surface of the water (Hayes and Miyamoto 1984). Egg masses contain about 2,000 to 5,000 moderately-sized, 0.08 to 0.11 inch (2 to 3 mm) in diameter, dark reddish brown eggs (Storer 1925, Jennings and Hayes 1985). Eggs hatch in 6 to 14 days (Storer 1925). Larvae undergo metamorphosis between 3.5 to 7 months after hatching (Storer 1925, Wright and Wright 1949). Sexual maturity can be attained at 2 years of age by males and 3 years of age by females and is usually reached at 3 to 4 years of age (Jennings and Hayes 1985); adults may live 8 to 10 years (Jennings et al. 1992) although the average life span is considered to be much lower. Juveniles have been observed to be active diurnally and nocturnally, whereas adults are mainly nocturnal.

California red-legged frogs spend most of their lives in and near sheltered backwaters of ponds, marshes, springs, streams, and reservoirs. Deep pools with dense stands of overhanging willows and an intermixed fringe of cattails are considered optimal habitat. California red-legged frogs breed in aquatic habitats. Eggs, larvae, transformed juveniles, and adults also have been found in ephemeral creeks and drainages and in ponds that do not have riparian vegetation. California red-legged frogs frequently breed in artificial impoundments such as stock ponds, if conditions are appropriate. Although California red-legged frogs successfully breed in streams and riparian systems, high seasonal flows and cold temperatures in streams often make these sites risky environments for eggs and tadpoles. The importance of riparian vegetation for this species is not well understood. When riparian vegetation is present, California red-legged frogs spend considerable time resting and feeding in it; the moisture and camouflage provided by the riparian plant community likely provide good foraging habitat and may facilitate dispersal in addition to providing pools and backwater aquatic areas for breeding. Accessibility to sheltering habitat is essential for the survival of California red-legged frogs within a watershed, and can be a factor limiting population numbers and distribution.

Juvenile and adult California red-legged frogs may disperse long distances from breeding sites throughout the year. They can be encountered living within streams at distances exceeding 1.8 mi (2.9 km) from the nearest breeding site, and have been found up to 400 ft (122 m) from water in adjacent dense riparian vegetation (Bulger et al. 2003). Some California red-legged frogs have moved long distances over land between water sources during winter rains. Adult California red-legged frogs have been documented to move more than 2 mi (3.2 km) in northern Santa Cruz County “without apparent regard to topography, vegetation type, or riparian corridors” (Bulger et al. 2003). Most of these overland movements occur at night. These individual frogs were observed to make long-distance movements that are straight-line, point to point migrations over variable upland terrain rather than using riparian corridors for movement

between habitats. For the California red-legged frog, suitable habitat is considered to include all aquatic and riparian areas within the range of the species and includes any landscape features that provide cover and moisture (61 FR 25813).

California red-legged frogs have been found at elevations that range from sea level to about 5,000 ft (1,524 m). In the Sierra Nevada Mountains, California red-legged frogs typically occur below 4,000 ft (1,220 m) in elevation (61 FR 25813).

The historical range of the California red-legged frog extended coastally from southern Mendocino County and inland from the vicinity of Redding, California, southward to northwestern Baja California, Mexico (Jennings and Hayes 1985, Storer 1925). The California red-legged frog has been extirpated or nearly extirpated from 70 percent of its former range. Historically, this subspecies was found throughout the Central Valley and Sierra Nevada foothills. California red-legged frogs have been documented in 46 counties in California. Currently they are known from three disjunct regions and remain in only 238 streams or drainages in 31 counties in California and one region in Baja California, Mexico (Grismer 2002, Fidenci 2004, Smith and Krofta 2005, Service 2009). The most secure aggregations of California red-legged frogs are found in aquatic sites that support substantial riparian and aquatic vegetation and lack non-native predators. Over-harvesting, habitat loss, non-native species introduction, and urban encroachment are the primary factors that have negatively affected the California red-legged frog throughout its range (Jennings and Hayes 1985, Hayes and Jennings 1988). Habitat loss and degradation, combined with over-exploitation and introduction of exotic predators, were important factors in the decline of the California red-legged frog in the early to mid-1900s. Continuing threats to the California red-legged frog include direct habitat loss due to stream alteration and loss of aquatic habitat, indirect effects of expanding urbanization, competition or predation from non-native species including the bullfrog (*Rana catesbeiana*), catfish (*Ictalurus* spp.), bass (*Micropterus* spp.), mosquitofish (*Gambusia affinis*), red swamp crayfish (*Procambarus clarkii*), and signal crayfish (*Pacifastacus leniusculus***)**. Chytrid fungus (*Batrachochytrium dendrobatidis*) is a waterborne fungus that can decimate amphibian populations, and is considered a threat to California red-legged frog populations.

Although the presence of California red-legged frogs is correlated with still water deeper than approximately 1.6 ft (0.5 m), riparian shrubbery, and emergent vegetation (Jennings and Hayes 1985), there are numerous locations in the species' historical range where these elements are well represented yet California red-legged frogs appear to be absent. The cause of local extirpations does not appear to be restricted solely to loss of aquatic habitat. The most likely causes of local extirpation are thought to be changes in faunal composition of aquatic ecosystems (i.e., the introduction of non-native predators and competitors) and landscape-scale disturbances that disrupt California red-legged frog population processes, such as dispersal and colonization. The introduction of contaminants or changes in water temperature may also play a role in local extirpations. These changes may also promote the spread of predators, competitors, parasites, and diseases.

Vernal Pool Fairy Shrimp

The Service listed the vernal pool fairy shrimp (*Branchinecta lynchi*) as threatened on September 19, 1994 (59 FR 48136). We designated critical habitat for the vernal pool fairy shrimp on August 6, 2003 (68 FR 46683). We published a revised final rule for critical habitat with a re-evaluation of non-economic exclusions on March 8, 2005 (70 FR 11140). Economic exclusions from the 2003 final rule were evaluated and published on August 11, 2005 (70 FR 46923). We published administrative revisions with species-by-unit designations on February 10, 2006 (71 FR 7117). The 2003 final critical habitat designation was remanded on November 2, 2006. The court ordered the Service to reconsider its decision and issue a new critical habitat rule. During this time, the existing critical habitat was to remain in place. On May 31, 2007 (72 FR 30269) we published a clarification of the economic and non-economic exclusions for the 2005 final critical habitat designation for 4 vernal pool crustaceans and 11 vernal pool plants in California and southern Oregon. The recovery plan for vernal pool ecosystems of California and southern Oregon (December 15, 2005) also addresses this species; however, populations in coastal San Luis Obispo County were not known at the time the recovery plan was made final. The following account summarizes information contained in the final rules for listing and designation of critical habitat, as well as the recovery plan and also as supplemented by information that has become available since the publication of the listing rules and completion of the recovery plan.

The vernal pool fairy shrimp is a small freshwater crustacean in the family Branchinectidae of the order Anostraca. Adults range in size from 0.4 to 1.0 inch (11 to 25 mm) and are distinguished from a similar species, the Colorado fairy shrimp (*Branchinecta coloradensis*), by the male's ridge-like outgrowth on the basal segment of the antennae and the female's shorter, pyriform brood pouch.

Habitat for vernal pool fairy shrimp consists of vernal pools and ephemeral wetlands that pond for that period of time sufficient to complete their life cycle. Under optimal conditions this can be as little as 18 days; however, 41 days is more typical of usual seasonal conditions. The species often occurs in habitat that exhibits an unpredictable and short-lived inundation pattern and includes vernal pools and vernal pool-like depressions, depressions in sandstone rock outcrops, earth slumps, and grassy swales and depression basins. Upland vegetation communities associated with vernal pool fairy shrimp habitat include native and non-native grassland, alkaline grassland, alkaline scrub, and coastal sage scrub.

Anostracans, including the vernal pool fairy shrimp, are non-selective filter-feeders that filter suspended solids from the water column. Detritus, bacteria, algal cells, and other items between 0.000012 to 0.00039 inch (0.3 to 100 microns) may be filtered and ingested. Vernal pool fairy shrimp co-occur with other fairy shrimp species rarely, and when they do, they are never the numerically dominant species. Vernal pool fairy shrimp have been observed with the versatile fairy shrimp (*Branchinecta lindahli*) and Santa Rosa Plateau fairy shrimp (*Linderiella santarosae*) as well as the federally-listed conservancy fairy shrimp (*Branchinecta conservatio*) and longhorn fairy shrimp (*Branchinecta longiantenna*). Fairy shrimp are food for a wide variety of wildlife, including beetles, insect larvae, frogs, salamanders, toad tadpoles, shorebirds,

ducks, and even other fairy shrimp. Freshwater crustaceans, including the vernal pool fairy shrimp, have a two-stage life cycle with the majority of their life cycle spent in the cyst (egg) stage. Vernal pool fairy shrimp females produce an unknown number of cysts per clutch and over their lifetime. The cysts are either dropped to the pool bottom or remain in the brood sac until the female dies and sinks. Fairy shrimp cysts are capable of withstanding heat, cold, and prolonged desiccation and may persist in the soil for an unknown number of years until conditions are favorable for successful hatching. The cysts hatch when the vernal pools/seasonal depressions fill with rainwater. Not all cysts are likely to hatch in a season, thus providing a mechanism for survival if the inundation period is too short in a given year. This species can mature quickly, allowing it to persist in short-lived shallow pools; however, the species also persists later into the spring when pool inundation persists.

Although vernal pool fairy shrimp are more widely distributed than most other fairy shrimp species, the species is generally uncommon throughout its range and rarely abundant where it is found. The species currently occurs predominantly in a variety of vernal pool and ephemerally ponded habitats in the Central Valley and Coast Range of California, with a limited number of sites in the Transverse Range and on the Santa Rosa Plateau and in Hemet, Riverside County. There is also one disjunct occurrence in Jackson County, southern Oregon. California counties where extant records occur include Alameda, Butte, Contra Costa, El Dorado, Fresno, Glenn, Kings, Los Angeles, Madera, Merced, Monterey, Napa, Placer, Riverside, Sacramento, San Benito, San Joaquin, San Luis Obispo, Santa Barbara, Shasta, Solano, Stanislaus, Tehama, Tulare, Ventura, and Yuba. Elevations at which the species is typically found range from 33 to 4,000 ft (10 to 1,220 m), although it has been found at 5,600 ft (1,700 m) in the Los Padres National Forest.

Within ephemerally ponded and vernal pool habitat on the Central Coast of California (e.g., Monterey, San Luis Obispo, and Santa Barbara counties), vernal pool fairy shrimp are known to occupy in at least 55 basins on Fort Hunter Liggett, at least 46 basins at Camp Roberts, Soda Lake at the Carrizo Plain National Monument, several areas in the vicinity of Paso Robles, at least two sites in the Los Padres National Forest, at least 60 natural or man-made features at the Unocal-Chevron tank farm and an isolated nearby area, at least two vernal pools at the Santa Maria Airport, and in at least 12 complexes on Vandenberg Air Force Base. Branchinectid cysts presumed to represent vernal pool fairy shrimp have also been found in seasonal depressions at the San Luis Obispo County Regional Airport. A number of these sites were discovered after the publication of the listing and critical habitat rules and recovery plan.

Maintaining the integrity of surrounding upland habitat is critical to the proper ecological functioning of vernal pool fairy shrimp habitat. Habitat loss and fragmentation is the largest threat to the survival and recovery of vernal pool fairy shrimp and other species restricted to vernal pool and other ephemeral wetland habitats. Habitat loss is generally a result of urbanization, agricultural conversion, and mining although loss also occurs in the form of habitat alteration and degradation as a result of changes to natural hydrology, competition from invasive species, incompatible grazing regimes (including insufficient grazing for prolonged periods), infrastructure projects (e.g., roads, water storage and conveyance, utilities), recreational activities

(e.g., off-highway vehicles and hiking), erosion, mosquito abatement activities, climatic and environmental change, and contamination.

Riverside Fairy Shrimp

The Service listed the Riverside fairy shrimp as endangered on August 3, 1993 (58 FR 41391). We published a final rule designating critical habitat for the species on May 30, 2001 (66 FR 29384). Critical habitat for this species was vacated on October 30, 2002, by order of the Federal District Court for the District of Colombia. We published a revised critical habitat designation on April 12, 2005 (70 FR 19153). The Recovery Plan for Vernal Pools of Southern California was completed in September 1998 and included Riverside fairy shrimp (Service 1998).

The Riverside fairy shrimp is a small freshwater crustacean of the family Streptocephalidae that is endemic to ephemeral basins and vernal pool habitat in southern California and northern Baja California, Mexico (Eriksen and Belk 1999). In southern California, the range of the species is currently restricted to Riverside, Orange, Los Angeles, San Diego, and Ventura counties. Loss of vernal pool habitat in San Diego County is estimated at around 95 to 97 percent because of intensive cultivation and urbanization (Bauder and McMillan 1998). Lack of historical data precludes the same depth of analysis for Los Angeles, Riverside and Orange counties, but losses are estimated at nearly 100 percent (58 FR 41384).

The distribution of the Riverside fairy shrimp is limited (Eng et al. 1990, Simovich and Fugate 1992). Riverside fairy shrimp populations are found in Ventura, Los Angeles, Riverside, Orange, and San Diego Counties in California (69 FR 19154, CNDDB 2010b). The northern distribution limits extend to Cruzan Mesa, Los Angeles County, and the former Carlsberg Ranch, Ventura County (66 FR 29384, CNDDB 2010b). The southern distribution limits for the species extend into Baja California, Mexico, where it is found at Valle de las Palmas south of Tecate, and Bajamar, north of Ensenada (Brown et al. 1993). With the exception of the Riverside County populations, all populations are within 3.1 mi (5 km) of the coast (Eriksen and Belk 1999). All known populations lie between 98 and 1,362 ft (30 and 415 m) in elevation (Eriksen and Belk 1999).

The Riverside fairy shrimp is distinguished from similar species by its red colored cercopods (anterior appendages) which occur on all of the ninth and 30 to 40 percent of the eighth abdominal segments (Eng et al. 1990). Adult fairy shrimp may grow to a length of 0.5 to 1.0 inch (13 to 25 mm) (Eng et al. 1990). They feed by filtering suspended solids from the water column (Eriksen and Belk 1999). Riverside fairy shrimp require 48 to 56 days to reach sexual maturity in contrast to other fairy shrimp that can reach maturity in less than 2 weeks (Hathaway and Simovich 1996). Fairy shrimp mate upon reaching maturity, and female Riverside fairy shrimp produce between 17 and 427 cysts over their lifetime (Simovich and Hathaway 1997). The cysts are either dropped by the females to settle into the mud at the bottom of the pool, or they remain in the brood sac until the female dies and sinks to the bottom (Eriksen and Belk, 1999). Fairy shrimp cysts may persist in the soil for several years until conditions are favorable

for successful reproduction (66 FR 29384). The cysts will hatch in 7 to 12 days when water temperatures are between 50 and 68 degrees F (10 and 20 degrees C) (Hathaway and Simovich 1996). Not all cysts are likely to hatch in a season, thus providing a mechanism for survival if the inundation period is too short in a given year (Simovich and Hathaway 1997).

The Riverside fairy shrimp is restricted to vernal pools and vernal pool-like ephemeral basins. Vernal pools are a type of ephemeral wetland that occurs within a range that extends from southern Oregon through California into northern Baja California, Mexico (Service 1998). They require a unique combination of climatic, topographic, geologic, and evolutionary factors for their formation and continued existence. Vernal pools form in regions with Mediterranean climates where shallow depressions fill with water during fall and winter rains and then dry up when the water evaporates in the spring (Collie and Lathrop 1976; Holland 1976, 1988; Holland and Jain 1977, 1988; Thorne 1984). Downward percolation of water within the pools is prevented by the presence of an impervious subsurface layer consisting of claypan, hardpan, or volcanic stratum (Holland 1976, 1988). Seasonal inundation makes vernal pools too wet for adjacent upland plant species adapted to drier soil conditions, while rapid drying during late spring makes pool basins unsuitable for typical marsh or aquatic species that require a more permanent source of water. Upland vegetation communities associated with vernal pools include needlegrass grassland, annual grassland, coastal sage scrub, maritime succulent scrub and chaparral (Service 1998).

Because of its long maturation, the Riverside fairy shrimp is found in deep (greater than 25 centimeters in depth), vernal pools (58 FR 41391, Eng et al. 1990). Water within pools supporting fairy shrimp may be clear, but more commonly it is moderately turbid (Eriksen and Belk 1999). Typically, pools supporting this species have low total dissolved solids and alkalinity (means of 77 and 65 parts per million, respectively), corroborated by pH at neutral or just below (7.1-6.4) (Eng et al. 1990, Gonzalez et al. 1996, Eriksen and Belk 1999). Riverside fairy shrimp may also be found in disturbed vernal pool habitats where basins have been compacted or artificially deepened and, therefore, hold water for longer periods of time. Although basins supporting populations often appear to be artificially created or enhanced, such basins are located within soils that are capable of seasonal ponding and are often surrounded by naturally occurring vernal pool complexes. These “artificial basins” function in the same manner as naturally occurring vernal pools by filling with late fall, winter and/or spring rains that gradually dry up during the spring and/or summer (Service 1998).

Threats to the Riverside fairy shrimp can be divided into three major categories: (1) direct destruction of vernal pools as a result of construction, vehicle traffic, domestic animal grazing, dumping, and deep plowing; (2) indirect threats which degrade or destroy vernal pools over time including altered hydrology (e.g., damming, draining), invasion of alien species, habitat fragmentation, and associated deleterious effects resulting from adjoining urban land uses; and (3) potentially catastrophic long-term threats including the effect of isolation on genetic diversity and locally adapted genotypes, air and water pollution, drastic climatic variations, and changes in nutrient availability (58 FR 41391, Bauder 1986).

Conservation efforts for the Riverside fairy shrimp should address the major causes of decline for the species; habitat loss and degradation resulting from both direct and indirect impacts to vernal pools, and long-term threats resulting from the greatly reduced distribution of the species. Existing vernal pools occupied by fairy shrimp and their associated watersheds should be secured from further loss and degradation in a configuration that maintains habitat function and species viability (Service 1998).

Braunton's Milkvetch

The Service listed Braunton's milkvetch as endangered on January 29, 1997 (62 FR 4172). We designated critical habitat for this species on November 14, 2006 (71 FR 66374). The Recovery Plan for Six Plants Surrounding the Los Angeles Basin was completed in September 1999 and included Braunton's milkvetch (Service 1999).

Braunton's milkvetch is a robust, short-lived perennial in the pea family (Fabaceae). It is one of the tallest members of the genus *Astragalus*, reaching a height of 60 inches (1.5 m). It has a thick taproot and woody basal stem from which numerous stems arise. Braunton's milkvetch has light purple flowers that are clustered in racemes (stems with rows of flowers) 1.5 to 5.5 inches (38 to 140 mm) long, each with 35 to 60 flowers. The fruits are beaked, slightly curved pea-like pods 2.5 to 3.5 inches (64 to 89 mm) long. The woolly stems and leaves and two-chambered pods distinguish Braunton's milkvetch from the only other perennial species of *Astragalus* in the area, locoweed *(A. trichopodus*), which is strigose (covered with sharp, stiff-appressed hairs) or glabrous (without hairs), and has single-chambered pods (Barneby 1964).

Braunton's milkvetch is believed to be a limestone endemic, although limestone outcrops are rare within the limits of known distribution of the species. There is some evidence that the species may occur in other soils, such as the specimen collected from a location along a fire road in Monrovia, California; however, most known locations of the species are composed of calcareous soils.

Fire is believed to stimulate germination of Braunton's milkvetch, as the plants sometimes appear after prescribed burns. The natural frequency of fire in the habitat of Braunton's milkvetch is estimated to be once every 20 to over 100 years, with an average interval of 70 years (Minnich 1989, O'Leary 1990). The plants have a life span of 2 to 3 years, and depending on fire interval, a given population may be visible only once in 20 to 50 years or longer. In some parts of its range, higher fire frequencies have resulted from the increasing human population in southern California and associated arson and accidental fires. Conversely, fire suppression may have also increased the interval in some locations. Disruption of fire cycles that stimulate the species' germination may be detrimental as either the seed bank may become less viable or depleted by seed predation if fires become infrequent, or if fires increase in frequency, the natural community may be altered to where the plants and animals associated with Braunton's milkvetch decline and the species' life history needs are not met.

The plants may also germinate after mechanical disturbance, such as occurred at Oak Park in Ventura County, in 1997, when an unknown seed bank was excavated and spread for a development site. More than 1,000 individual plants germinated, but were subsequently graded again to accommodate a baseball park. This predilection of Braunton's milkvetch to germinate after disturbance (fire or mechanical) and the ability of the seeds to lie dormant for long periods complicate attempts to manage the species. Unless the plants are already known from the location or are visible, a ground disturbance may have an adverse effect on the species before it is known to be present as a seed bank (e.g., if the seeds are excavated and buried). When Braunton's milkvetch germinates in an area following disturbance, or if such germination is anticipated, steps should be taken to manage the germinated plants and the habitat to conserve the seed bank that will be formed when the plants complete their life cycle.

Braunton's milkvetch is currently known from four metapopulations (i.e., a group of smaller populations linked by genetic interchange) in Ventura, Los Angeles, and Orange Counties. One metapopulation is found along the south slope of the Simi Hills of eastern Ventura and western Los Angeles Counties. Two occurrences (one metapopulation) are known from Santa Ynez Canyon in the Santa Monica Mountains, Los Angeles County, which probably represents the type locality from above Sherman (now West Hollywood). Another metapopulation is known from Coal and Gypsum Canyons in the Santa Ana Mountains, Orange County (CNDDB 1994). Historical collections were taken from south of Clamshell Canyon north of Monrovia and eight individuals were reported during the preparation of the Cloverleaf Canyon Specific Plan for the area in 1983 (CNDDB 2010c), thus representing the fourth metapopulation.

Because reproduction of Braunton's milkvetch is stimulated by fire events, the total number of individuals varies with current fire cycles. Locations reported for the species have supported from three to 2,000 individual plants. Habitat for Braunton's milkvetch in the Cleveland National Forest, where the species was once numerous, was surveyed by endangered plant specialists from the Rancho Santa Ana Botanic Garden with negative results (Mistretta 1992). Another population that burned in 1982, supported more than 400 individuals in 1985, but only supported one plant by 1988. In these cases, biologists believe the seed bank is still intact and will germinate following the next fire.

Most of the habitat for Braunton's milkvetch is on lands in private ownership in areas with expanding development. Four public agencies, the California Department of Parks and Recreation, the Conejo Open Space Conservation Agency, the Rancho Simi Parks and Recreation District, and the National Park Service have small colonies within their jurisdictions. All protected habitat occurs in the immediate vicinity of urban development. Braunton's milkvetch is threatened by direct loss from urban development, fragmentation of habitat and reduced capabilities for sustained ecological processes, fragmented ownership of single populations resulting in different landscape treatments, alteration in fire cycles, and stochastic (random) extinction due to small population sizes and/or low numbers of individuals (CNDDB 1994).

Spreading Navarretia

The Service listed spreading navarretia as threatened on October 13, 1998 (63 FR 54975). We designated critical habitat for spreading navarretia on October 18, 2005 (70 FR 60694). We published a proposed revised designation of critical habitat for this species on June 10, 2009 (74 FR 27587). The Recovery Plan for Vernal Pools of Southern California was completed in September 1998 and included spreading navarretia (Service 1998).

Spreading navarretia, a member of the phlox family (Polemoniaceae), is a low, mostly spreading or ascending, annual herb, 4 to 6 inches (102 to 152 mm) tall. The lower portions of the stems are mostly glabrous (bare). The leaves are soft and finely divided, 0.4 to 2.0 inches (1 to 5 cm) long, and spine-tipped when dry. The flowers are white to lavender white with linear petals and are arranged in flat-topped, compact, leafy heads. The fruit is an ovoid, 2-chambered capsule (Day 1993; Moran 1977).

There are approximately 30 species in the genus *Navarretia*, several of which occur within the range of spreading navarretia. Of these, two occur in habitat suitable for spreading navarretia, and these are needleleaf navarretia *(Navarretia intertexta)* and prostrate navarretia *(Navarretia prostrata)*. Spreading navarretia can be confused with, and has been misidentified as, prostrate navarretia (Moran 1977). Spreading navarretia is distinguished by its linear or narrowly ovate corolla lobes, erect habit, cymose inflorescences, the size and shape of the calyx, and the position of the corolla relative to the calyx (Day 1993).

Spreading navarretia is primarily associated with vernal pools (63 FR 54975, Day 1993). This species occasionally occurs in ditches and other artificial depressions, which often occur in degraded vernal pool habitat (Moran 1977). Spreading navarretia also occurs in vernal pools in alkali grassland habitat along the San Jacinto River in Riverside County (Bramlet 1993).

Spreading navarretia flowers from May through June. No studies have been conducted for this species regarding reproduction. Specific data regarding pollinators and seed viability are lacking. The fruit of this species consists of indehiscent capsules 0.8 to 1.2 inches (2 to 3 mm long) containing 5 to 25 seeds. The seeds become mucilaginous when wet (Moran 1977). Dispersal in this species has not been studied. After fruiting, this species fades rapidly and can be difficult to detect late in the dry season or in dry years. The number of individuals of spreading navarretia at a given population site varies annually in response to the timing and amount of rainfall and temperature.

Spreading navarretia is distributed from northwestern Los Angeles County and western Riverside County, south through coastal San Diego County, California to northwestern Baja California, Mexico. It is found at elevations between 98 and 4,265 ft (30 and 1,300 m) (Day 1993; Munz 1974; CNPS 2001; CNDDB 2003). Spreading navarretia is declining throughout much of its range (Reiser 1996). Fewer than 30 populations exist in the United States. Nearly 60 percent of the known populations are concentrated in three locations: Otay Mesa in southern San Diego County, along the San Jacinto River in western Riverside County, and near Hemet in

Riverside County (63 FR 54975, Service 1998). The two largest populations occur in Riverside County and have been estimated to support 375,000 and 100,000 individuals. However, each of these populations occupies less than 8 ac (3 ha) of habitat. Most of the populations contain fewer than 1,000 individuals and occupy less than 1 ac (0.5 ha) of habitat. We estimate that less than 300 ac (120 ha) of habitat in the United States is occupied by this species (63 FR 54975, Service 1998). In Mexico, spreading navarretia is known from fewer than 10 populations clustered in three areas: along the international border, on the plateaus south of the Rio Guadalupe, and on the San Quintin coastal plain (Moran 1977).

Spreading navarretia is threatened by habitat destruction and fragmentation from urban and agricultural development, pipeline construction, alteration of hydrology and floodplain dynamics, excessive flooding, channelization, off-road vehicle activity, trampling by cattle and sheep, weed abatement, fire suppression practices (including discing and plowing), and competition from alien plant species (63 FR 54975, Service 1998). Spreading navarretia has been subjected to loss or degradation of habitat due to urban development, conversion to agriculture, off-road vehicle use, and grazing. The species has been affected indirectly by alterations in hydrology, invasion of non-native species, and deleterious effects resulting from habitat fragmentation and adjoining urban land uses.

The conservation needs of spreading navarretia include managed conservation of known occurrences in Ventura, Los Angeles, San Diego, Orange, and Riverside Counties, California in a manner that provides for long-term viability of the occurrences at these locations. Any newly discovered locations should be conserved in the same manner. Western Riverside County is important to the species continued survival and recovery because this area includes some of the largest remaining known localities for the species, the most inland extent of the species' range, and the largest remaining valley vernal pool in southern California, which is occupied by the species. Actions that would modify the hydrology supporting the species habitat or increase the likelihood of deleterious effects from any identified threat should be avoided.

California Orcutt Grass

The Service listed California Orcutt grass as endangered on August 3, 1993 (58 FR 41391). The State of California listed the species as endangered in September, 1979. Critical habitat has not been designated for this species. The Recovery Plan for Vernal Pools of Southern California was completed in September 1998 and included California Orcutt grass (Service 1998).

California Orcutt grass is one of five species in the genus *Orcuttia* in the family Poaceae (Reeder 1993). This species, first collected by Charles Orcutt, was described by George Vasey (1886). At the time, two other varieties were recognized (*Orcuttia californica* var. *viscida* and *Orcuttia californica* var. *inaequalis*). Reeder (1982) elevated all of the varieties to species status. This small, annual, bright gray-green grass reaches about 4 inches (102 mm) in height and secretes sticky exudate. A secretion on all leaves is first glistening and watery, but as the plant matures, the secretion becomes thicker, denser and brownish. This secretion, believed to aid in water conservation during the warm spring and hot summer months, is aromatic and bitter tasting and

may serve to deter animal predation (Crampton 1959; Griggs 1981). Inflorescences consist of seven spikelets arranged in two ranks, with the upper spikelets overlapping on a somewhat twisted axis. California Orcutt grass is differentiated from other species in the genus by the following characteristics: teeth of lemma (bract enclosing the floret) 0.2 inch (5 mm) long or less; the teeth sharp-pointed or with awns 0.2 inch (5 mm) long or less; culms (stems) usually prostrate; caryopsis (fruit) 0.06 to 0.07 inch (1.5 to 1.8 mm) long; plants sparingly pilose (bearing soft and straight spreading hairs); and spikelets remote on the axis below, crowded toward the apex.

All known Californica Orcutt grass localities are associated with vernal pools (Crampton 1959, Reeder 1982, CNPS 2001, Service 1998). California Orcutt grass tends to grow in the deeper and wetter portions of the vernal pool basins, but this annual does not show much growth until the basins become somewhat desiccated (58 FR 41391, Reiser 1996). Griggs and Jain (1983) observed that individual plants found in deeper portions of the pools tend to be more fully developed and larger than individuals at the pool margins. Although water chemistry requirements are not well-known, California Orcutt grass often occurs with the Riverside fairy shrimp; therefore, the water quality requirements for these species are possibly similar.

California Orcutt grass flowers from April through June (Munz 1974) and appears to be strongly adapted to wind pollination. The stamens are 0.8 to 1.2 inches (20 to 30 mm) long and the species is protandrous (i.e., anthers develop before the stigma is receptive). In combination with the protandry, this species is believed to be an outcrosser and not self-pollinating (Griggs and Jain 1983). *Orcuttia* floral spikelets are of indeterminate growth, the duration of which is dependent on the duration of favorable environmental conditions.

Griggs (1981) observed in the field that, following pool inundation, fungi covered the seeds which germinated approximately two weeks later. Griggs (1981) experimented with various methods of seed gemination in the laboratory, observing that only when fungi covered the seeds did germination occur (often at a rate of 90 to 100 percent). Studies conducted by Keeley (1988) revealed that anaerobic conditions promote germination of California Orcutt grass fruits, but fungicide treatment appears to inhibit germination (fungal growth developed on the seeds in all other treatments). A dependence on fungus and anaerobic conditions for germination is consistent with conditions in water-filled vernal pools and may explain how germination is cued during years of sufficient rainfall (Keeley 1988).

Studies of other *Orcuttia* species indicate that the number of fruits produced per plant is highly variable within a population, and variation in seed production between seasons can show a two- or three-fold difference. This is not unexpected given the dependence of *Orcuttia* species on a synchrony of environmental conditions (timing and duration of rainfall, temperature, etc.) (Griggs and Jain 1983). California Orcutt grass seeds can remain dormant for at least 3 to 4 years and possibly longer, germinating in the spring only after flooding of the vernal pools (Griggs 1981; Griggs and Jain 1983). California Orcutt grass remains intact and upright upon senescence. The first heavy rainstorms of the late fall or early winter cause the plants to fall apart, releasing the fruit formed the previous summer. The fruits either become firmly attached

to the muddy surface of the pool or sink to the bottom if the pool is inundated (Griggs 1981). California Orcutt grass seedlings grow for several weeks submerged, producing leaves that float on the surface. After the pools have dried California Orcutt grass produces a new set of foliage that will last for one to two months until flowering and fruiting have occurred (Griggs 1981, Keeley 1988).

At the time of listing (58 FR 41391), California Orcutt grass was known from approximately five locations. It is currently reported as known from fewer than 20 occurrences in California according to the CNPS (CNPS 2010) and is currently assumed to be extant at 31 occurrences according to the CNDDB (CNDDB 2010d). The species has been reported from six occurrences in Los Angeles County, although three of these occurrences are considered to be extirpated (CNDDB 2010d). The species is reported from three occurrences in Ventura County that are all considered to be extant (CNDDB 2010d). The current range of California Orcutt grass is from the Carlsberg vernal pool located in Moorpark in Ventura County, south to the vernal pools around San Quintin, Baja California, Mexico (Service 1998). It ranges in elevation between 50 and 2,050 ft (15 and 625 m) (Reeder 1993; CNPS 2010).

In Los Angeles County, the species is known from two localities near Santa Clarita and Woodland Hills. In Ventura County, the species is known from the Carlsberg vernal pool located in Moorpark. In Riverside County, the species occurs at the Santa Rosa Plateau, Skunk Hollow, the Murrieta area, and the Hemet area. In San Diego County, California Orcutt grass is found in two pools on Marine Corps Air Station Miramar in Carlsbad and in four pool complexes on Otay Mesa. In Baja California, Mexico, the species has been detected on Mesa de Colonet and in pools at San Quintin.

California Orcutt grass and its habitat are threatened by habitat destruction and fragmentation from urban and agricultural development, pipeline construction, alteration of hydrology and flood plain dynamics, excessive flooding, off road vehicle activity, trampling by cattle and sheep, weed abatement, fire suppression practices (including discing and plowing), competition from alien plant species as well as other vernal pool species, and deleterious effects resulting from habitat fragmentation and adjoining urban land uses such as sedimentation and unseasonal runoff (Service 1998).

The conservation needs of California Orcutt grass include conservation and management of known occurrences in Ventura, Los Angeles, San Diego, and Riverside Counties, California in a manner that provides for long-term viability of the species. Newly discovered ephemeral pools that support the species should be conserved in the same manner. Western Riverside County is important to the continued survival and recovery of California Orcutt grass because this area includes the most inland extent of the species' range and the largest remaining valley vernal pool in southern California, which is occupied by the species. Actions that would modify the hydrology supporting the species' habitat or increase the likelihood of deleterious effects from any identified threat should be avoided.

Recovery efforts necessary for the survival and recovery of California Orcutt grass are addressed in the Recovery Plan for Vernal Pools of Southern California. The recovery plan states that existing vernal pools occupied by California Orcutt grass should be secured from further loss and degradation in a configuration that maintains habitat functions and species viability.

Lyon's Pentachaeta

The Service listed Lyon's pentachaeta as endangered on January 29, 1997 (62 FR 4172). We designated critical habitat for this species on November 14, 2006 (71 FR 66374). The Recovery Plan for Six Plants Surrounding the Los Angeles Basin was completed in September 1999 and included Lyon's pentachaeta (Service 1999).

Lyon's pentachaeta is an annual herb in the sunflower family (Asteraceae). Its yellow flower heads bloom in late spring (April to June) on stems that grow up to 18 inches (0.46 m) tall. It is distinguished from other members of the genus by its pubescent phyllaries, larger numbers of pappus bristles, and its reddish branches originating from the upper portion of the plant. The corollas of the ray flowers are typically curled, and the leaves are narrowly linear with ciliate margins. No other members of the genus *Pentachaeta* occur in the area where *P. lyonii* is found.

Lyon's pentachaeta is self-incompatible, meaning that it is dependent on cross-pollination for effective seed set (Fotheringham and Keeley 1998). Known pollinators of the species include digger bees (Family Apidae), andrenid bees (*Andrena* spp.), and megachilid bees (*Ashmeadiella californica californica*); (Fotheringham and Keeley 1998, Braker and Verhoeven 1998). The single-seeded fruits have a deciduous pappus which limits their dispersal by wind; however, the fruits most likely are attractive to small mammals which could disperse them through caching.

Lyon's pentachaeta occurs in saddles between hills, on the tops of small knolls, or in flat areas at the base of slopes at elevations ranging from 280 to 2,060 ft (85 to 628 m) (Fotheringham and Keeley 1998, CNDDB 2005). It occurs in areas with a large percentage of bare ground (at least 60 percent), low proportion of vegetative cover (less than 25 percent), and does not compete well with dense annual grasses or shrubs (Keeley 1995, Fotheringham and Keeley 1998). It occurs within pocket grasslands underlain by clay soils that mosaic with fire-adapted chaparral and coastal sage scrub, although seeds do not require fire-related cues to germinate (such as heat, smoke, and charates) (Keeley and Baer-Keeley 1992, Keeley 1995). The pocket grasslands are composed of native and nonnative grasses including purple needlegrass (*Nassella pulchra*), wild oat (*Avena* spp.), and bromes (*Bromus* spp.); and herbs such as mustard (*Brassica* spp.), filaree (*Erodium* spp.), nest straw (*Stylocline* spp.), and plantain (*Plantago erecta*). Common species associated with chaparral communities in this area are chamise (*Adenostoma fasciculatum*), California lilac (*Ceanothus* spp.), manzanita (*Arctostaphylos* spp.), sages, California buckwheat, laurel sumac, sugar bush (*Rhus ovata*), and yucca (*Yucca whipplei*) (Hanes 1988). Common species associated with coastal sage scrub are California sagebrush, sages, California buckwheat, lemonade berry, California encelia, and goldenbush (*Isocoma menziesii*) (Mooney 1988).

Lyon's pentachaeta only occurs in the Santa Monica Mountains in eastern Ventura and western Los Angeles Counties and in the western Simi Hills in Ventura County. Based on historical records, it once occurred on the Palos Verdes Peninsula and on Santa Catalina Island; the species has not been seen at these locations since 1910 and 1855, respectively, and is assumed to be extirpated. At the time of listing in 1997, there were 29 known occurrences of Lyon's pentachaeta (62 FR 4172). Four of these are reported to have been extirpated since the time of listing, although the habitat remains (CNDDB 2005). Five occurrences were reported since listing; four of these are in the Santa Monica Mountains and one is in the western Simi Hills along Montclef Ridge. Currently, there are 30 known occurrences of Lyon's pentachaeta; 21 of these are on private lands, 8 on local agency lands (i.e., city and regional parks and a water district), and 1 on Federal lands (Santa Monica Mountains National Recreation Area).

Habitat alteration and destruction, and direct removal of plants, from urban development are the greatest threats to Lyon's pentachaeta, as most known occurrences are in the direct vicinity of urban areas. Indirect effects of urban development include habitat fragmentation, which reduces gene flow between sites, reduction in insect pollinators, and changes to the structure and composition of pocket grassland communities that displace Lyon's pentachaeta (i.e., introduction of competitive weeds, changes in local hydrology, and increased gopher activity) (Conservation Biology Institute 2000). The species was listed as endangered because of these threats, the limited and fragmented distribution, and the poor record of past mitigation efforts.

Arias et al. (unpubl.) conducted genetic studies on seven populations of Lyon's pentachaeta scattered throughout the species' range and found that the sampled populations generally exhibited low genetic diversity. However, of all the sampled populations, the Triangle Ranch site population (referred to in the report as the Agoura Ranch population) exhibited the greatest genetic diversity within the population and was genetically distinct from the other populations. For rare plant species with restricted ranges such as Lyon's pentachaeta, genetic diversity should be maximized and preserved so the species can persist and cope with environmental changes.

The recovery plan for Lyon's pentachaeta recommends the following: (1) protect and secure populations and habitat on protected lands; (2) use biological constraints analysis to avoid effects prior to development design; (3) educate landowners about ways to conserve the species on their land; (4) establish rare plant reserves that include Lyon's pentachaeta; (5) manage and monitor protected areas to maximize their ability to support Lyon's pentachaeta;(6) look for new populations of the species in potential habitat and confirm historical locations; (7) conduct scientific research to define life history and population dynamics, such as the influence of disturbance, dispersal mechanisms, pollinators, and ways to maintain open areas within habitat; (8) collect and store Lyon's pentachaeta seeds in a seed bank to maintain genetic diversity; and (9) develop outreach programs for private lands, protected lands, and lead agencies (Service 1999).

The recovery plan also states that Lyon's pentachaeta should be evaluated for reclassification to threatened status when 10 populations of 10,000 individuals or more from current sites are: (1) fully protected and managed with the primary intention of preserving the populations in

perpetuity; (2) shown to be self-sustaining over a minimum of 15 years or longer; (3) seed collected from all populations is stored at a certified Center for Plant Conservation botanic garden; and (4) reliable seed germination and propagation techniques for the species are understood. The species should be evaluated for delisting when 20 populations meet the above criteria.

Critical Habitat for the California Red-legged Frog

The Service designated revised critical habitat for the California red-legged frog on March 17, 2010 (75 FR 12816). The revised critical habitat encompasses 1,636,609 ac (662,312 ha) in 27 California counties.

In accordance with section 3(5)(A)(i) of the Act and Federal regulations at 50 CFR 424.12, in determining which areas to designate as critical habitat, we consider those physical and biological features (primary constituent elements) that are essential to the conservation of the subspecies, and within areas occupied by the subspecies at the time of listing, that may require special management considerations and protection. These include, but are not limited to: space for individual and population growth and for normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, and rearing (or development) of offspring; and, habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species.

For critical habitat of the California red-legged frog, we identified the following features essential to the conservation of the species: aquatic breeding habitat, aquatic non-breeding habitat, upland habitat, and dispersal habitat. Aquatic breeding habitat consists of standing bodies of fresh water (with salinities less than 4.5 parts per thousand (ppt)), 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. The aquatic non-breeding habitat consists of freshwater pond and stream habitats, as described above, that may not hold water long enough for the species to complete its aquatic life cycle but which provide for shelter, foraging, predator avoidance, and aquatic dispersal of juvenile and adult California red-legged frogs. Other wetland habitats considered to meet these criteria include, but are not limited to: plunge pools within intermittent creeks, seeps, quiet water refugia within streams during high water flows, and springs of sufficient flow to withstand short-term dry periods.

For the purposes of the critical habitat designation, upland habitat was defined as upland areas adjacent to or surrounding breeding and non-breeding aquatic and riparian habitat up to a distance of 1 mi (1.6 km) in most cases (i.e., depending on surrounding landscape and dispersal barriers) including various vegetational types such as grassland, woodland, forest, wetland, or riparian areas that provide shelter, forage, and predator avoidance for the California red-legged frog. 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 aquatic, wetland, or riparian habitat. These upland features contribute to: (1) filling of aquatic, wetland,

or riparian habitats; (2) maintaining suitable periods of pool inundation for larval frogs and their food sources; and (3) providing 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), small mammal burrows, or moist leaf litter. Dispersal habitat was defined as accessible upland or riparian habitat within and between occupied or previously occupied sites that are located within 1 mi (1.6 km) of each other, and that support movement between such sites. Dispersal habitat includes various natural habitats, and altered habitats such as agricultural fields, that do not contain barriers (e.g., heavily traveled roads 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 lakes or reservoirs over 50 ac (20 ha) in size, or other areas that do not contain those features identified in aquatic breeding habitat, aquatic non-breeding habitat, or upland habitat as essential to the conservation of the species.

The subject project occurs partially within designated critical habitat, in Unit VEN-3, Upper Las Virgenes Canyon. Approximately 0.84 ac (0.34 ha) of the 5,000-ac (2,024-ha) Upper Las Virgenes Canyon Unit is within the proposed project area. This represents approximately 0.017 percent (by area) of the Upper Las Virgenes Canyon Unit and approximately 0.00019 percent of the total revised proposed critical habitat throughout the range of the species. This critical habitat unit is described in greater detail in the Environmental Baseline section of this document.

Critical Habitat for Braunton's Milkvetch

The Service designated critical habitat for Braunton's milkvetch on approximately 3,300 ac (1,337 ha) in Ventura, Los Angeles, and Orange Counties, California on November 14, 2006 (71 FR 66374)**.**

In designating critical habitat of Braunton's milkvetch, we identified the following features essential to the conservation of the species: (1) calcium carbonate soils derived from marine sediment; (2) a low proportion (less than 10 percent) of shrub cover directly around the plant; and (3) chaparral and coastal sage scrub communities characterized by periodic disturbances that stimulate seed germination (e.g., fire, flooding, erosion) and reduce vegetative cover.

The subject project occurs in and adjacent to the Northern Simi Hills Unit (Unit 1) of designated critical habitat. Critical habitat Unit 1 as a whole contains a total of 434ac (175 ha), of which 70 ac (28 ha) comprise Subunit 1d. Approximately 60 ac (24 ha) of critical habitat Subunit 1d are within the project area. This represents approximately 85.7 percent (by area) of Critical Habitat Subunit 1d in the Northern Simi Hills Unit, approximately 13.8 percent of the Northern Simi Hills Unit, and approximately 1.8 percent of the total critical habitat throughout the range of the species. This area contains all three PCEs: calcium carbonate soils derived from marine sediment; a low proportion (less than 10 percent) of shrub cover directly around the plant; and chaparral and coastal sage scrub communities characterized by periodic disturbances that stimulate seed germination (e.g., fire, flooding, erosion) and reduce vegetative cover. This

critical habitat unit is described in greater detail in the Environmental Baseline section of this document.

ENVIRONMENTAL BASELINE

The implementing regulations for section 7(a)(2) of the Act define the "action area" as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). For the purposes of this biological opinion, we consider the action area to be all areas where people and equipment will be working or staging as described in the Description of the Proposed Action portion of this biological opinion (both on and off the SSFL property) and areas 1,500 ft (457 m) upstream or downstream from work sites in drainages that occur in the project area.

As noted previously, the proposed project area is located on and adjacent to a portion of the Santa Susana Field Laboratory (SSFL) in an unincorporated area of the Simi Hills in southeastern Ventura County, California. The proposed project occurs within and adjacent to Area IV of the SSFL (Area IV), and an adjacent undeveloped area to the north referred to as the Northern Buffer Zone (NBZ). Area IV consists of 290 ac (117 ha) owned by The Boeing Company (Boeing), where upon U.S. Department of Energy (USDOE) and its contractors once operated several nuclear reactors and associated research fuel facilities and laboratories. The NBZ consists of 182 ac (74 ha). The SSFL site (including Area IV and NBZ) supports the following vegetation communities: northern mixed chaparral (265.9 ac (107.7 ha)), coast live oak woodland/savannah (62.9 ac (25.5 ha)), formerly disturbed - mulefat dominated (3.0 ac (1.2 ha)), formerly disturbed - revegetated (13.5 ac (5.5 ha)), formerly disturbed - weed dominated (51.8 ac (20.9 ha)), California walnut woodland (8.7 ac (3.5 ha)), steep dipslope grassland (7.7 ac (3.1 ha), Venturan coastal scrub (3.1 ac (1.3 ha)), disturbed riparian (0.2 ac (0.1 ha)), non-native annual grassland (8.6 ac (3.5 ha)), and unvegetated disturbed/developed (46.2 ac (18.7 ha) (Science Applications International Corporation (SAIC) 2009).

Coastal California Gnatcatcher

The SSFL site (Area IV in particular) supports approximately 151 ac (61 ha) of potential suitable habitat for the coastal California gnatcatcher within Area IV and NBZ, with approximately 3.1 ac (1.3 ha) of this area classified as Venturan coastal scrub (SAIC 2009, HydroGeoLogic and Envicom 2010). Because the Topanga Fire burned much of the site in October 2005, several other plant communities onsite are recovering from this fire and contain aspects of habitat suitable for coastal California gnatcatchers including northern mixed chaparral, coast live oak woodland/savanna, steep dipslope grassland, and California walnut woodland.

Focused surveys for coastal California gnatcatcher have not been conducted on the SSFL site (HydroGeoLogic and Envicom 2010). Coastal California gnatcatchers were heard on the SSFL site by Service biologist Robert McMorran on December 2, 2009, during a site visit (McMorran 2010). The number of coastal California gnatcatchers and their status onsite is not known (i.e., whether they are resident in established territories or dispersing individuals) (HydroGeoLogic

and Envicom 2010). HydroGeoLogic and Envicom (2010) estimated that the SSFL site could contain up to between 12 and 122 breeding pairs of coastal California gnatcatchers. Based on the amount of suitable habitat onsite, the number of coastal California gnatcatchers currently known to occur in Ventura County, and recent observations of coastal California gnatcatchers onsite, we believe that the action area likely contains 1 to 10 coastal California gnatcatcher individuals. According to information from our records and the CNDDB, other nearby records for the coastal California gnatcatcher to the project area are located approximately 3.9 mi (6.4 km) south in Las Virgenes Canyon; approximately 9.2 mi (15 km) west near Little Simi Valley, northwest of State Route 23 and Tierra Rejada Road, Moorpark; and approximately 10 mi (16 km) west near California Lutheran University (CNDDB 2010a).

California Red-legged Frog

No records of California red-legged frogs occur within the project area. Protocol level surveys have not been performed onsite for California red-legged frogs (HydroGeoLogic and Envicom 2010). We are aware of two records of California red-legged frogs within 3 mi (4.7 km) of the project area to the south (75 FR 12816, CNDDB 2010e). Revised designated critical habitat occurs onsite and we believe that it is possible that California red-legged frogs could occur within the action area based on the nearby records, conditions onsite, and information contained in the revised critical habitat designation.

Since the California red-legged frog was listed as threatened on May 23, 1996 (61 FR 25813), the Ventura Fish and Wildlife Office has completed numerous formal consultations on the effects of proposed projects on the California red-legged frog in Ventura, and Los Angeles Counties. None of the projects subject to these consultations were expected to appreciably reduce the environmental baseline for the California red-legged frog in the action area of this project. The actions were generally small, short-term, and included post-project restoration.

Vernal Pool Fairy Shrimp

No records of vernal pool fairy shrimp are known from the SSFL action area; however focused surveys for the species have not been conducted. Additionally, while no vernal pools have been identified at the site, focused surveys for vernal pools or other suitable habitat have not yet been conducted either (HydroGeoLogic and Envicom 2010). The biological assessment indicates that two man-made ponds are known to occur onsite, and several areas that might develop small pools, road ruts, or ditches in disturbed areas that could support vernal pool species also occur at SSFL (HydroGeoLogic and Envicom 2010). Occurrences of the species with Los Angeles County include the Cruzan Mesa vernal pools approximately 25 mi (40 km) to the northeast. Occurrences in Ventura County include the Carlsberg vernal pools approximately 10 mi (16 km) west and two locations approximately 30 mi (50 km) northwest within the Los Padres National Forest (Service 2005, HydroGeoLogic and Envicom 2010). Because the action area falls within the range of the species, populations are known to occur in the region, and areas capable of supporting suitable habitat occur onsite, it is possible that vernal pool fairy shrimp occur within the action area.

Riverside Fairy Shrimp

No records of Riverside fairy shrimp are known from the SSFL action area; however focused surveys for the species have not been conducted. Additionally, while no vernal pools have been identified at the site, focused surveys for vernal pools or other suitable habitat have not yet been conducted either (HydroGeoLogic and Envicom 2010). The biological assessment indicates that two man-made ponds are known to occur onsite, and several areas that might develop small pools, road ruts, or ditches in disturbed areas that could support vernal pool species also occur at SSFL (HydroGeoLogic and Envicom 2010). Riverside fairy shrimp are known to occur in the Carlsberg vernal pools approximately 10 mi (16 km) west of the project area (Service 1998, HydroGeoLogic and Envicom 2010). Because the action area falls within the range of the species, a population is known to occur in the region, and areas capable of supporting suitable habitat occur onsite, it is possible that Riverside fairy shrimp occur within the action area.

Braunton's Milkvetch

Braunton's milkvetch currently occurs within the action area for the proposed project (SAIC 2009, CNDDB 2010c, HydroGeoLogic and Envicom 2010). Several hundred plants were reported in 2006 at in critical habitat Subunit 1d at SSFL after a fire burned the site in October 2005 (HydroGeoLogic and Envicom 2010, 71 FR 66374). Biologists of SWCA Environmental Consultants conducted an assessment of Braunton's milkvetch in critical habitat Subunit 1d in June, 2006 (HydroGeoLogic and Envicom 2010). After sampling approximately 5.4 percent of the critical habitat within the SSFL site, surveyors extrapolated that there were approximately 33,500 individuals onsite (MWH Global, Inc. 2009, HydroGeoLogic and Envicom 2010). More recently, SAIC (2009) conducted a survey in the critical habitat Subunit 1d within Area IV (a smaller area than the SWCA survey encompassed). SAIC estimated there to be approximately 18,500 individuals within a comparable area (HydroGeoLogic and Envicom 2010). Braunton's milkvetch is also known from locations 2.3 mi (3.7 km) to the east, 1.7 mi (2.7 km) to the south, and 1.3 mi (2.1 km) to the west of the project area (CNDDB 2010c).

Spreading Navarretia

No records of spreading navarretia are known from the action area; however focused surveys for the species have not been conducted. Additionally, while no vernal pools have been identified at the site, focused surveys for vernal pools or other suitable habitat have not yet been conducted either (HydroGeoLogic and Envicom 2010). The biological assessment indicates that two man-made ponds are known to occur onsite, and several areas that might develop small pools, road ruts, or ditches in disturbed areas that could support vernal pool species also occur at SSFL (HydroGeoLogic and Envicom 2010). Spreading navarretia is known to occur in Los Angeles County at the Cruzan Mesa vernal pools approximately 25 mi (40 km) to the northeast and above Plum Canyon approximately 24 mi (38 km) to the northeast (63 FR 54975, Service 1998, CNDDB 2010f, HydroGeoLogic and Envicom 2010). Because the action area falls within an area that contains vernal pools and vernal pool species, populations are known to occur in the

region, and areas capable of supporting suitable habitat occur onsite, it is possible that spreading navarretia occurs within the action area.

California Orcutt Grass

No records of California Orcutt grass are known from the action area; however focused surveys for the species have not been conducted. Additionally, while no vernal pools have been identified at the site, focused surveys for vernal pools or other suitable habitat have not yet been conducted either (HydroGeoLogic and Envicom 2010). The biological assessment indicates that two man-made ponds are known to occur onsite, and several areas that might develop small pools, road ruts, or ditches in disturbed areas that could support vernal pool species also occur at SSFL (HydroGeoLogic and Envicom 2010). California Orcutt grass is known to occur in the Cruzan Mesa vernal pools in Los Angeles County approximately 25 mi (40 km) to the northeast, in Moorpark near the junction of State Route 23 and Tierra Rejada Road approximately 9.2 mi (15 km) to the west, just east of Tierra Rejada Valley approximately 7.5 mi (12 km) west, and in Thousand Oaks approximately 8 mi (13 km) southwest (Service 1998, CNDDB 2010d). California Orcutt grass has also been reported from the Newhall area approximately 15 mi (24 km) to the northwest in Los Angeles County (CNDDB 2010d). Because the action area falls within the range of the species, populations are known to occur in the region, and areas capable of supporting suitable habitat occur onsite, it is possible that California Orcutt grass occurs within the action area.

Lyon's Pentachaeta

No records of Lyon's pentachaeta are known from the action area; however focused surveys for the species have not been conducted. The biological assessment indicates that suitable habitat occurs onsite and presumes that Lyon's pentachaeta does occur onsite (HydroGeoLogic and Envicom 2010). Lyon's pentachaeta is known to occur in the Tierra Rejada Hills and Montclef Ridge areas of the western Simi Hills and Santa Rosa Hills approximately 10 mi (16 km) to the west, and in the vicinity of Ladyface [Mountain] in the City of Agoura Hills approximately 6 mi (10 km) to the south, on the northern slope of the Santa Monica Mountains (CNDDB 2010g, HydroGeoLogic and Envicom 2010). Because is known to occur in the vicinity and based on the nearby records for Lyon's pentachaeta, conditions onsite, and information in the biological assessment (HydroGeoLogic and Envicom 2010), it is possible that Lyon's pentachaeta occurs within the action area.

Critical Habitat for the California Red-legged Frog

The action area occurs partially within the Upper Las Virgenes Canyon Unit (Unit VEN-3) of the designated critical habitat for the California red-legged frog (75 FR 12816). Approximately 1 ac (0.4 ha) of the Upper Las Virgenes Canyon Unit are within the action area. We consider the Upper Las Virgenes Canyon Unit essential for the conservation of the species because it is currently occupied by the species and provides connectivity between coastal populations and populations in the Transverse Ranges. Further, the Upper Las Virgenes Canyon Unit contains

aquatic habitat for breeding and non-breeding activities (PCE 1 and PCE 2), and upland habitat for shelter, foraging, and dispersal activities (PCE 3 and PCE 4). The physical and biological features essential to the conservation of California red-legged frog in the Upper Las Virgenes Canyon Unit may require special management considerations or protection due to predation by nonnative species, off-road vehicle use, and conversion of native habitat by introduced invasive plant species, which may alter aquatic or upland habitats and thereby result in the direct or indirect loss of egg masses or direct death of adults. As noted above, the action area also contains several of the PCEs described in the revised designation of critical habitat for the California red-legged frog (75 FR 12816).

Critical Habitat for Braunton's Milkvetch

The action area occurs partially in and adjacent to the Northern Simi Hills Unit (Subunit 1d) of designated critical habitat for Braunton's milkvetch (71 FR 66374). Unit 1 as a whole contains a total of 434ac (175 ha), of which 70 ac (28 ha) are in Subunit 1d. Approximately 60 ac (24 ha) of Subunit 1d are within the action area. We consider the Simi Valley Unit essential for the conservation of the species because it is occupied and these plants represent a previously unknown portion of the species' range and inclusion of multiple populations within the entire range increases a species' chance of persistence (71 FR 66374, Noss et al. 1997). Threats that may require special management in this unit include road maintenance, which could result in disturbances that are too frequent and prevent replenishment of the seed bank, invasion of nonnative plants which could crowd out Braunton's milkvetch, cattle grazing, and recreation activities such as equestrian and foot traffic, which could result in trampling of plants. Subunit 1d contains at least two of the PCEs (2 and 3); whether it contains PCE 1 is unknown; however, geologic maps of the Los Angeles area indicate that the formations on the SSFL site contain clay shale and fractured mudrock, gray limestone concretions common in shale, and benthic foraminifera from mudstones with molluscan and gastropod faunas (U.S. Geological Survey 2005), which are all indicative of calcareous components. "Whitish" soils, generally indicative of calcareous substrates, were observed onsite on the hill within the critical habitat unit (Mark A. Elvin, Service Biologist, pers. obs. 16 September 2009). The action area is currently occupied by the species with population estimates ranging from between several hundred to over 30,000 individuals over the last four years (MWH Global, Inc. 2009; SAIC 2009; CNDDB 2010c; HydroGeoLogic and Envicom 2010).

EFFECTS OF THE ACTION

General Effects

In general, the radiological characterization (gamma scanning, geophysical survey, surface and subsurface soil sampling, groundwater monitoring well sampling, surface water and sediment sampling, and other support activities) of Area IV and NBZ of the SSFL should have beneficial effects on the species analyzed in this biological opinion over the long term because it will determine whether radiological contaminants are present in surface soils, and subsurface soils, groundwater, surface water, and sediment within SSFL Area IV and the NBZ; and if found,

determined whether they are a threat to human health and safety or to listed species. These data may enable the EPA and the Service to improve surface and subsurface water and soil quality and habitat for the species covered in this biological opinion as well as other listed and sensitive species (e.g., Santa Susana tarplant). Some of the activities proposed by EPA at SSFL will have temporary negative effects on some or all of the species described in this biological opinion. All project related activities in the action area (gamma scanning, geophysical survey, surface and subsurface soil sampling, groundwater monitoring well sampling, surface water and sediment sampling, and other support activities) could result in direct or indirect adverse effects to listed species that are short- or long-term. The movement, installation, and removal of equipment and people could crush and injure or kill the less mobile individuals of any of species. In addition, ground disturbance (e.g., vegetation removal, installation of equipment, driving to and from data collection sites, monitoring of equipment) could also kill or injure some species.

Coastal California Gnatcatcher

All project-related activities in the action area (gamma scanning, geophysical survey, surface and subsurface soil sampling, groundwater monitoring well sampling, surface water and sediment sampling, and other support activities) could adversely affect coastal California gnatcatchers. These activities could have direct or indirect effects to coastal California gnatcatchers within the action area. As mentioned above in the Environmental Baseline section, we estimate that the action area likely contains 1 to 10 coastal California gnatcatcher individuals.

The project activities could result in disturbance or possibly direct injury or mortality of resident or nesting coastal California gnatcatchers, including, but not limited to, harassment to individuals, disturbance of nesting behavior resulting in unsuccessful breeding and nest formation, abandonment of an active nest by adult birds, mortality of eggs and young birds within a nest, dispersal of adults to other suitable habitat because of temporary loss or degradation of habitat within the action area (1 to 5 years for habitat regeneration in areas of vegetation trimming), and reduction in the value of the habitat for cover and foraging. The temporary loss of habitat for cover, forage, and reproduction could cause individuals to disperse to other suitable habitat. Although breeding pairs or resident coastal California gnatcatchers would likely relocate to nearby suitable habitat, direct mortality of these birds and direct disturbance to nesting will likely be avoided because of the implementation of the avoidance and minimization measures proposed by the EPA. Protocol surveys for coastal California gnatcatchers will be conducted and prior to all activities that would directly impact or disturb habitat within the area designated in Figure 1. If protocol surveys indicate resident territorial use within the action area, then all activities within the occupied suitable habitat will be postponed until breeding activity has ended, based upon continuing observations, or after August 30. This is expected to result in a substantial reduction in the magnitude adverse impacts by preventing disturbances to nesting pairs, but the species may still be impacted by the temporary loss of habitat.

Coastal California gnatcatchers are highly territorial and a loss of habitat due to mowing and cutting of vegetation outside of the nesting season may cause the birds to seek out another area in

which to forage and nest, either permanently or until the vegetation on the site regenerates. Such relocation may adversely affect the birds by causing an increase in energy expenditure necessary to locate, establish and defend a new territory. If the species is identified during additional surveys or monitoring of the proposed project, a count or an estimation of population size would be necessary to determine the number of individuals potentially impacted by the project.

During the duration of the project, some activities may attract non-native predators or increase the numbers of native predators that could prey upon coastal California gnatcatchers. Food-related trash and open containers attract raccoons, coyotes (*Canis latrans*), ravens, and other predators. Any increase in normal predation levels could have great effects on the small population of coastal California gnatcatchers that could occupy the site. This potential impact would be minimized or avoided by the careful control of waste products at all work sites as discussed in the Description of the Proposed Action section above and in the Terms and Conditions section below.

The project could indirectly affect the species' habitat through introduction of non-native plants, increased fire frequency or fire suppression (i.e., brush clearance), the loss of large predators that control the numbers of small and medium predators that prey upon birds (e.g., raccoon, Virginia opossum (*Didelphis virginiana*), striped skunk), and human intrusions.

In summary, the proposed activities could harass all gnatcatchers within the action area, but are not likely to result in the death of any gnatcatcher individuals; therefore, the effects are likely to be minimal. Only a small portion of habitat of the entire range of the coastal California gnatcatcher would be affected by the project.

California Red-legged Frog

No records of California red-legged frogs are currently known from within the project area, however, if California red-legged frogs occur in the action area, all project related activities (gamma scanning, geophysical survey, surface and subsurface soil sampling, groundwater monitoring well sampling, surface water and sediment sampling, and other support activities) could adversely affect California red-legged frogs through temporary or permanent disturbance to riparian or upland habitat. Direct adverse effects to California red-legged frogs in the action area may include injury or mortality from being crushed by heavy equipment, vegetation removal or scientific investigation debris, or worker foot traffic. These impacts should be reduced by the avoidance and minimization measures proposed by the EPA. Additionally, attempting to avoid work activities during the dispersal season would further reduce the likelihood of adverse impacts.

Survey, capture, and relocation are intended to reduce the potential for injury or mortality that may occur should California red-legged frogs be found in the action area. Relocating California red-legged frogs out of harm's way would reduce injury or mortality from equipment, foot traffic, or ground disturbance; however, injury or mortality of individuals may occur as a result of improper handling, containment, or transport of individuals or from releasing them into

unsuitable habitat (i.e., where exotic predators are present). Observations of diseased and parasite-infected amphibians are now frequently reported. This has given rise to concerns that releasing amphibians following a period of captivity, during which time they can pick up infections of disease agents, may cause an increased risk of mortality in wild populations. Amphibian pathogens and parasites can also be carried between habitats on the hands, footwear, or equipment of fieldworkers, which can spread them to localities containing species which have had little or no prior contact with such pathogens or parasites. Use of a Service-approved biologist, who is authorized to relocate any California red-legged frogs found alive during project activities, would help minimize injury and reduce or prevent improper handling, containment, or transport of California red-legged frogs found alive during these activities.

Project activities, including noise and vibration, may cause California red-legged frogs to leave the work area. This disturbance may increase the potential for predation and desiccation. Minimizing the area disturbed by project activities may reduce the potential for dispersal resulting from the action. California red-legged frogs are more likely to disperse overland in mesic conditions. As long as no substantial rainfall (equal to or greater than 0.5 inch of rain in a 24-hour period) occurs during project activities, California red-legged frogs are unlikely to be at risk.

Chytrid fungus is a water-borne fungus that can be spread through direct contact between aquatic animals and by a spore that can move short distances through the water. The fungus only attacks the parts of an animal's skin that have keratin (thickened skin), such as the mouthparts of tadpoles and the tougher parts of adults' skin, such as the toes. It can decimate amphibian populations, causing fungal dermatitis, which usually results in death in 1 to 2 weeks. Infected animals may spread the fungal spores to other ponds and streams before they die. Once a pond has become infected with chytrid fungus, the fungus stays in the water for an undetermined amount of time. Infected equipment or footwear could introduce chytrid fungus into areas where it did not previously occur. If this occurs in the action area, many California red-legged frogs could be affected. This potential impact would be reduced or avoided by implementing the declining amphibian population task force code of practice as discussed in the terms and conditions section below.

The potential exists for uninformed workers to intentionally or unintentionally injure or kill California red-legged frogs. The potential for this impact to occur would be reduced by informing workers of the presence and protected status of these species and the measures that are being implemented to protect it during project activities as described in the project description section of this biological opinion.

Trash left during or after project activities could attract predators to work sites, which could, in turn, prey on California red-legged frogs. For example, feral cats (*Felis catus*) and raccoons are attracted to trash and could prey opportunistically on California red-legged frogs. This potential impact would be reduced or avoided by the careful control of waste products at all work sites as discussed in the Terms and Conditions section below.

The proposed action could affect a small number of California red-legged frogs during project implementation. Because of the small amount of potentially suitable habitat in the action area, the timing of the proposed activities, and because the EPA has proposed measures to protect this species, we anticipate that few, if any, California red-legged frogs are likely to be killed or injured during this work.

In summary, the effects from implementing the proposed action on the California red-legged frog are likely to be minimal. Only a small portion of habitat of the entire range of California red-legged frogs would be affected by the project and California red-legged frogs are not currently known from the action area.

Vernal Pool Fairy Shrimp and Riverside Fairy Shrimp

No records of Riverside fairy shrimp or vernal pool fairy shrimp are currently known from within the project area, however, if Riverside fairy shrimp or vernal pool fairy shrimp occur in the action area, all project related activities (gamma scanning, geophysical survey, surface and subsurface soil sampling, groundwater monitoring well sampling, surface water and sediment sampling, and other support activities) could have adverse affects to Riverside fairy shrimp or vernal pool fairy shrimp from temporary or permanent disturbance to ponded areas or riparian or upland habitat in their watersheds. Several (nine) vernal pools have been reported onsite that contain fairy shrimp (Powell 2010) but they occur in rocky outcrop areas that will not likely be affected by project related activities. Not all of the vernal pools or vernally inundated areas have been mapped within the action area, but any additional ponded areas that could provide habitat for listed vernal pool branchiopods will be mapped and surveyed (Vanderwier 2010).

Direct adverse effects to Riverside fairy shrimp or vernal pool fairy shrimp in the action area may include injury or mortality from being crushed or dispersed out of the vernal pool by heavy equipment, vegetation removal or scientific investigation debris, or worker foot traffic. Soil particles surrounding fairy shrimp cysts may provide cushioning for some cysts, allowing greater weight to be applied before crushing occurs. However, Hathaway et al. (1996) found that small forces less than one Newton (the force required to accelerate a mass of one kilogram at a rate of one meter per second per second (or 2.2 pounds at a rate of 3.3 ft per second per second), which is approximately the effect of the earth's gravity on 3.5 ounces (100 grams), crushed even the sturdiest fairy shrimp cysts. In addition, many fairy shrimp cysts that survive disturbance with only external damage to the cyst shell may later become unviable due to sun exposure or sand abrasion (Hathaway et al. 1996). Soil excavation within occupied habitat could kill, crush, or otherwise injure Riverside fairy shrimp or vernal pool fairy shrimp or their cysts.

Project activities could also adversely affect the habitat to such an extent that it may affect the natural hydrology and not allow the habitat to pond for a period of time sufficient for the Riverside fairy shrimp or vernal pool fairy shrimp to complete its life cycle. For example, boreholes from subsurface soil sampling could break through a hard-pan where water ponded which could then prevent water from ponding and could cause the loss of the vernal pool. We expect that changes in the duration of inundation of any vernal pools on the SSFL project site

would be more likely to adversely affect Riverside fairy shrimp than vernal pool fairy shrimp, because they require deeper pools and a longer inundation period. The EPA proposes to fill the boreholes with bentonite. Bentonite is a very fine clay with positive and negative charges on its surface, and it is attracted to oppositely charged surfaces, such as gill membranes and could adhere to them. This makes bentonite particularly detrimental to aquatic organisms because affected organisms may suffocate if exposed to high concentrations of the slurry and overwhelm the animal's ability to clear impacted gill filaments through physiological processes (National Marine Fisheries Service 2003). Project activities occurring in occupied habitat during the wet season could kill and injure individual shrimp or cysts. Hathaway et al. (1996) found that even less force (than one Newton) caused crushing when wet; 70 percent of vernal pool fairy shrimp cysts crushed under the weight of a microscope slide. Avoiding work activities in ponded areas during the wet season would reduce adverse impacts.

The proposed project activities could have indirect effects (e.g., dust, runoff, and erosion) to Riverside fairy shrimp or vernal pool fairy shrimp because any ground disturbance (e.g., surface and subsurface soil sampling, surface water and sediment sampling, and other support activities) adjacent to or within their watershed could cause increased erosion or siltation of the vernal habitats or they could alter the soil hydrology of vernal pool habitat that is down slope of the action. Altering the hydrology could change the inundation period of the vernal pools or ponded areas where Riverside fairy shrimp or vernal pool fairy shrimp may occur and could result in their desiccation and death. Altering vernal pool habitat conditions could also allow invasive, non-native species to establish in these areas. These indirect effects could have long-term or permanent effect to Riverside fairy shrimp or vernal pool fairy shrimp.

These impacts (both direct and indirect) should be reduced by the avoidance and minimization measures proposed by the EPA as stated in the Description of the Proposed Action section of this biological opinion.

In summary, the effects on Riverside fairy shrimp or vernal pool fairy shrimp from implementing the proposed action are likely to be minimal. Only a small portion of habitat of the entire range of Riverside fairy shrimp or vernal pool fairy shrimp would be affected by the project and neither Riverside fairy shrimp nor vernal pool fairy shrimp are currently known to occur within the action area.

Braunton's Milkvetch

All project related activities in the action area (gamma scanning, geophysical survey, surface and subsurface soil sampling, groundwater monitoring well sampling, surface water and sediment sampling, and other support activities) could adversely affect Braunton's milkvetch. These activities could have direct or indirect effects to Braunton's milkvetch within the action area. As mentioned above in the Environmental Baseline section in this biological opinion, the action area is estimated to contain between 18,500 and 33,500 Braunton's milkvetch individuals.

Direct adverse effects to Braunton's milkvetch in the action area may include injury or mortality from being cut or pruned during brush removal, soil sampling, water sampling, or other support activities; collection of seed and its temporary removal from the population; or crushing by heavy equipment, vegetation removal, or scientific investigation debris, or worker foot traffic. Soil excavation within occupied habitat could kill, crush, or otherwise injure Braunton's milkvetch or their seeds or damage the soil structure necessary for the survival of the plants. Vegetation removal to allow access for scanning equipment is expected to result in the cutting of many plants to within 6 to 18 inches (152 to 457 mm) from the ground. This may also result in reduced reproductive success of these individuals and could cause dispersal of the seed to areas outside of suitable habitat.

Indirect effects to Braunton's milkvetch may occur as a result of the proposed project or any of its related activities, such as brush clearance, invasion of exotic plant species, and disruption of pollinator biology. The project could also cause indirect effects, such as introduction of non-native plants, increased fire frequency, and human intrusions. The proposed temporary clearing of vegetation for this project could cause a type conversion of the habitat that supports Braunton's milkvetch because frequent temporary loss of scrub habitat (i.e., fire, vegetation clearing) can lead to the conversion of scrub habitats to grasslands in southern California (Zedler et al. 1983, Malanson and Westman 1985, Holland and Keil 1995). The vegetation clearing associated with this project, combined with the loss of vegetation in the Topanga Fire that swept through the SSFL site in October 2005 (HydroGeoLogic and Envicom 2010), could increase the chances of type conversion of upland scrub habitat that supports Braunton's milkvetch in the action area (Callaway and Davis 1993, Zedler et al. 1983, Westman and O'Leary 1986, Talluto and Suding 2008). The vegetation clearing associated with this project could also increase the predation on Braunton's milkvetch by reducing available forage to resident herbivores and allowing increased herbivore access by removing adjacent vegetation and cover that might protect it from being eaten. Non-native plants that out compete Braunton's milkvetch may be introduced from project equipment, project debris, and worker foot traffic.

The potential for these impacts (both direct and indirect) to occur should be reduced by informing workers of the presence and protected status of Braunton's milkvetch and by the implementation of the avoidance and minimization measures proposed by the EPA (e.g., marking and surveying potential habitat for Braunton's milkvetch prior to project activities, delay project activities until the dormant season for the species) as stated in the Description of the Proposed Action section of this biological opinion. Additionally, attempting to avoid work activities during the dispersal season would further reduce adverse impacts.

In order for the EPA to characterize surface soil for gamma activity covering 100 percent of the accessible areas of Area IV and the NBZ to identify and characterize elevated areas of gamma radiation, they would need to remove vegetation over much of the area. They would need to remove some vegetation to within 6 to 18 inches (152 to 457 mm) from the ground over much of the action area (up to 100 percent of the area). This may necessitate the cutting of all vegetation, including all Braunton's milkvetch plants, in flatter areas, such as the approximately 5.5 ac (2.2 ha) within the borrow pit area. The EPA proposes to use less intrusive methods to survey for

gamma radiation in all areas outside of the "flatter areas," which they anticipate to be substantially less damaging to the standing live individuals. The EPA anticipates that they would directly adversely affect approximately 5 percent of the standing live individuals detected during the 2009 survey efforts, (HydroGeoLogic and Envicom 2010). However, project activities could directly (or indirectly) adversely affect all Braunton's milkvetch plants within the action area. This equates to plants within approximately 2 percent of the area designated as critical habitat for the species (71 FR 66374) and up to 65 percent of the individuals estimated at all of the known populations (CNDDB 2010c).

With the implementation of the avoidance and minimization measures proposed by the EPA, it is likely that a maximum of up to two-thirds of the Braunton's milkvetch plants on the SSFL project site could be directly adversely affected by the proposed project. This would equate to up to approximately 12,000 to 22,000 Braunton's milkvetch plants. If one-third or more of the Braunton's milkvetch plants within the action area need to be cut to implement the proposed activities; the EPA will collect, store, and preserve the seed from all of the plants targeted to be cut prior to their removal or trimming. The EPA will store and preserve these seeds until the Radiological Study Project is completed and no additional ground disturbance is necessary at this site. If radiation levels require remediation (and additional ground disturbing activities after the completion of the Radiological Study Project), the EPA will store and preserve the seeds until such time that the additional ground disturbing activities are completed and the collected seeds will be sown back to the areas from which they were collected (Cooper 2010b).

While the loss of two-thirds of or adverse effects to all of the Braunton's milkvetch plants in the action area for the SSFL project would result in considerable effects to Braunton's milkvetch, these adverse effects would be limited to a small portion of the range (2 percent of the area designated as critical habitat) of the species and they would be temporary effects (a 1-year loss in growth and reproduction) to the species, but the seed bank and long-term viability of the population would be maintained because of the avoidance and minimizations measures (e.g., seed collection, storage, and replacement) proposed by the EPA. Even if two-thirds of the Braunton's milkvetch plants within the action area are cut; this would still leave an estimated 6,000 to 11,000 plants within the action area. This equates to approximately 50 percent more plants than have been reported at any other Braunton's milkvetch occurrence (CNDDB 2010c).

In summary, the effects on Braunton's milkvetch from implementing the proposed action may be considerable within the action area, but they will be temporary or short in duration. In addition, measures proposed by the EPA will ensure that the long-term viability of the population will not be compromised because the seed bank will be maintained, and adverse effects caused by this project will not occur throughout a significant portion of the range of the species (only plants in approximately 2 percent of the range of Braunton's milkvetch would be affected by the project).

Spreading Navarretia and California Orcutt Grass

No records of spreading navarretia or California Orcutt grass are currently known from within the project area, however, if spreading navarretia or California Orcutt grass occur in the action

area, all project related activities (gamma scanning, geophysical survey, surface and subsurface soil sampling, groundwater monitoring well sampling, surface water and sediment sampling, and other support activities) could adversely affect spreading navarretia or California Orcutt grass through temporary or permanent disturbance to ponded areas or riparian or upland habitat in their watersheds. Several (nine) vernal pools have been reported onsite that contain fairy shrimp (Powell 2010) but they occur in rocky outcrop areas that may not be able to support these plant species. Not all of the vernal pools or vernally inundated areas have been mapped within the action area, but any additional ponded areas that could provide habitat for listed vernal pool branchiopods will be mapped and surveyed and the VFWO will be notified (Vanderwier 2010).

Direct adverse effects to spreading navarretia or California Orcutt grass in the action area may include injury or mortality from being crushed or having seeds dispersed out of the vernal pool by heavy equipment, vegetation removal or scientific investigation debris, or worker foot traffic. Soil excavation within occupied habitat could kill, crush, or otherwise injure spreading navarretia or California Orcutt grass or their seeds.

Attempting to avoid work activities in ponded areas during the wet season would reduce adverse impacts. The proposed project activities could have indirect effects (e.g. dust, runoff, and erosion) to spreading navarretia or California Orcutt grass because any ground disturbance (e.g., surface and subsurface soil sampling, surface water and sediment sampling, other support activities) adjacent to or within their watershed could cause increased erosion or siltation of the vernal habitats or they could alter the soil hydrology of vernal pool habitat that is down slope of the action. Altering the hydrology could change the inundation period of the vernal pools or ponded areas where spreading navarretia or California Orcutt grass may occur and could result in their desiccation and death. Altering vernal pool habitat conditions could also allow invasive, non-native species to establish in these areas. These indirect effects could have long-term or permanent effect to spreading navarretia or California Orcutt grass.

Project activities occurring in occupied habitat during the wet season could kill and injure individual plants or seeds. Project activities could also adversely affect the habitat to such an extent that it may affect the natural hydrology and not allow the habitat to pond for a period of time sufficient for spreading navarretia or California Orcutt grass to complete their life cycles. For example, boreholes from subsurface soil sampling could break through a hard-pan where water ponded which could then prevent water from ponding and could cause the loss of the vernal pool. We expect that changes in the duration of inundation of any vernal pools on the SSFL project site would be more likely to adversely affect California Orcutt grass than spreading navarretia, because California Orcutt grass requires deeper pools and a longer inundation period.

These impacts (both direct and indirect) should be reduced by the avoidance and minimization measures proposed by the EPA as stated in the Description of the Proposed Action section of this biological opinion.

In summary, the effects from implementing the proposed action on spreading navarretia or California Orcutt grass are likely to be minimal. Only a small portion of habitat of the entire

range of spreading navarretia or California Orcutt grass would be affected by the project and neither spreading navarretia nor California Orcutt grass are currently known to occur within the action area.

Lyon's Pentachaeta

No records of Lyon's pentachaeta are currently known from within the project area, however, if Lyon's pentachaeta occurs in the action area, all project related activities (gamma scanning, geophysical survey, surface and subsurface soil sampling, groundwater monitoring well sampling, surface water and sediment sampling, and other support activities) could adversely affect Lyon's pentachaeta through temporary or permanent disturbance to its habitat.

Direct adverse effects to Lyon's pentachaeta in the action area may include injury or mortality from being crushed by heavy equipment, vegetation removal or scientific investigation debris, or worker foot traffic. Soil excavation within occupied habitat could kill, crush, or otherwise injure Lyon's pentachaeta or their seeds or damage the soil structure or microbiotic crusts that are important for this species. Indirect effects to Lyon's pentachaeta may occur as a result of the proposed project or any of its related activities, such as brush clearance, invasion of exotic plant species, and disruption of pollinator biology. Non-native plants that out compete Lyon's pentachaeta may be introduced from project equipment, project debris, and worker foot traffic.

The potential for these impacts (both direct and indirect) to occur should be reduced by informing workers of the presence and protected status of Lyon's pentachaeta and by the implementation of the avoidance and minimization measures proposed by the EPA (e.g., marking and surveying potential habitat prior to project activities, delay project activities until the dormant season for the species) as stated in the Description of the Proposed Action section of this biological opinion. Additionally, attempting to avoid work activities during the dispersal season would further reduce adverse impacts.

In summary, the effects from implementing the proposed action on Lyon's pentachaeta are likely to be minimal. Only a small portion of habitat of the entire range of Lyon's pentachaeta would be affected by the project and Lyon's pentachaeta is not currently known to occur within the action area.

Critical Habitat for the California Red-legged Frog

Approximately 1 ac (0.4 ha) of designated critical habitat in the Upper Las Virgenes Canyon Unit is within the action area and would be affected by the proposed project. The action area also contains several PCEs described in the revised designation of critical habitat for the California red-legged frog (75 FR 12816), as discussed in the Environmental Baseline section of this biological opinion.

California red-legged frogs are not known to occur in the action area. However, project activities could temporarily reduce the overall quality of the California red-legged frog critical

habitat by disturbing up to 1 ac (0.4 ha) of revised designated critical habitat due to vegetation clearing, surface and subsurface soil sampling, groundwater monitoring well sampling, surface water and sediment sampling, and other support activities ground disturbance. The project could also indirectly affect the habitat through introduction of non-native plants, increased fire frequency or fire suppression (i.e., brush clearance), type conversion of habitat, and human intrusions. The proposed temporary clearing of vegetation for this project could cause a type conversion of the habitat because frequent temporary loss of scrub habitat (i.e., fire, vegetation clearing) can lead to the conversion of scrub habitats to grasslands in southern California (Zedler et al. 1983, Malanson and Westman 1985, Holland and Keil 1995). The vegetation clearing associated with this project, combined with the loss of vegetation in the Topanga Fire that burned the SSFL site in October 2005 (HydroGeoLogic and Envicom 2010), could increase the chances of type conversion of upland scrub habitat within the revised designation of critical habitat for the California red-legged frog in the action area (Callaway and Davis 1993, Zedler et al. 1983, Westman and O'Leary 1986, Talluto and Suding 2008). The potential for this impact to occur would be reduced by implementing the measures to protect critical habitat during project activities, as described in the Description of the Proposed Action section of this biological opinion. The potential exists for uninformed workers to intentionally or unintentionally adversely affect California red-legged frog critical habitat. The potential for this impact to occur would be reduced by informing workers of the presence and protected status of these species and its critical habitat and implementing the measures to protect it during project activities as described in the project description section of this biological opinion.

The proposed action would affect a small amount of California red-legged frog critical habitat during project implementation. These areas of habitat could be used by California red-legged frogs for sheltering and feeding and therefore function as upland habitat essential for the conservation of the subspecies. The project activities would temporarily disturb upland vegetation and soils associated with California red-legged frog critical habitat and these areas would be temporarily disturbed and lost for sheltering and foraging activities of California red-legged frogs. These areas represent approximately 0.020 percent of the Upper Las Virgenes Canyon Unit (1.0 ac of 5,000 ac) and 0.000061 percent of the entire revised designated critical habitat (1.0 ac of 1,636,609 ac) (75 FR 12816). Because of the small amount of critical habitat in the action area, the timing of the proposed activities, and because the EPA has proposed measures to protect this species and its critical habitat, we anticipate that there will be few long-term adverse effects to critical habitat as a result of the proposed action.

In summary, the effects on designated critical habitat for the California red-legged frog from implementing the proposed action are likely to be minimal. Only a small portion of the entire critical habitat designation for the California red-legged frog would be affected by the project and therefore the function and conservation role of upland habitat within revised designated critical habitat for the California red-legged frog will not be substantially affected by the proposed project activities.

Critical Habitat for Braunton's Milkvetch

The action area occurs partially in and adjacent to the Northern Simi Hills Unit (Subunit 1d) of designated critical habitat for Braunton's milkvetch (71 FR 66374). Unit 1 as a whole contains a total of 434ac (175 ha), of which 70 ac (28 ha) are in Subunit 1d. Approximately 60 ac (24 ha) of critical habitat for Braunton's milkvetch in Subunit 1d are within the action area and would be directly affected by the proposed project. As noted in the Environmental Baseline section of this biological opinion, the action area also contains at least two of the PCEs described in the designation of critical habitat for Braunton's milkvetch (71 FR 66374).

Braunton's milkvetch currently occurs in the action area. Project activities are expected to temporarily reduce the overall quality of Braunton's milkvetch critical habitat by disturbing up to 60 ac (24 ha) of designated critical habitat through vegetation clearing, surface and subsurface soil sampling, groundwater monitoring well sampling, surface water and sediment sampling, and ground disturbance associated with other support activities. The project could also indirectly affect the critical habitat through introduction of non-native plants, increased fire frequency or fire suppression (i.e., brush clearance), and human intrusions. The proposed temporary clearing of vegetation for this project could cause a type conversion of the habitat because frequent temporary loss of scrub habitat (i.e., fire, vegetation clearing) can lead to the conversion of scrub habitats to grasslands in southern California (Zedler et al. 1983, Malanson and Westman 1985, Holland and Keil 1995). The vegetation clearing associated with this project, combined with the loss of vegetation in the Topanga Fire that burned the SSFL site in October 2005 (HydroGeoLogic and Envicom 2010), could increase the chances of type conversion of upland scrub habitat within the designated critical habitat for Braunton's milkvetch in the action area (Callaway and Davis 1993, Zedler et al. 1983, Westman and O'Leary 1986, Talluto and Suding 2008). All of the vegetation communities in critical habitat Subunit 1d appear to have burned when the Topanga Fire burned the area in October 2005 (HydroGeoLogic and Envicom 2010). The potential for habitat type conversion to occur would be reduced by implementing the proposed measures to protect critical habitat during project activities, as described in the Description of the Proposed Action section of this biological opinion. In particular, the use of the large, fork-lift-mounted scanning equipment (ERGS), which requires the most intensive vegetation clearing (up to 100 percent), will be restricted to flatter areas, which are either not occupied by Braunton's milkvetch or only have a few plants (HydroGeoLogic and Envicom 2010). We anticipate that approximately 6.0 ac (2.4 ha) of the 60 ac (24 ha) of critical habitat for Braunton's milkvetch within the action area have less than a 10 percent slope (approximately 5.5 ac (2.2 ha) are within the borrow pit area) and will be subjected to cutting of all vegetation to within 6 to 18 inches (152 to 457 mm) from the ground. Most of the area within critical habitat for Braunton's milkvetch will be scanned with the use of mule-mounted gamma scanning equipment (MMGS), wheel-mounted gamma scanning equipment (WMGS), or hand-held gamma scanning equipment (HHGS), which will be easier to control, and will require substantially less vegetation removal (HydroGeoLogic and Envicom 2010). We anticipate that approximately 50 ac (20 ha) of the 60 ac (24 ha) of critical habitat for Braunton's milkvetch within the action area will be subjected to selective trimming or cutting of vegetation to allow the MMGS, WMGS, or HHGS to gain access to scan the ground. Approximately 7.3 ac (3.0 ha) of

the 60 ac (24 ha) of critical habitat for Braunton's milkvetch within the action area for the project occurs in a disturbed and disked field that does not contain native vegetation and we anticipate that there will be no direct adverse effects to the habitat in this area. Based on the project description and estimates in the biological assessment (HydroGeoLogic and Envicom 2010), we believe that this will result in trimming, cutting, or clearing of less than 5 percent of the vegetation (and Braunton's milkvetch individuals) within critical habitat for Braunton's milkvetch. The potential also exists for uninformed workers to intentionally or unintentionally adversely affect Braunton's milkvetch critical habitat. The potential for this impact to occur would be reduced by informing workers of the presence and protected status of this species and its critical habitat and implementing the measures to protect it during project activities as described in the Description of the Proposed Action section of this biological opinion.

As noted previously, the proposed action would affect approximately 60 ac (24 ha) of critical habitat for Braunton's milkvetch during project implementation. These areas are currently occupied by living Braunton's milkvetch plants and an unknown amount of Braunton's milkvetch seeds. The project activities would temporarily disturb vegetation and soils associated with Braunton's milkvetch critical habitat. These areas represent approximately 85.7 percent (in area) of Subunit 1d in the Northern Simi Hills Unit, approximately 13.8 percent of the Northern Simi Hills Unit, and approximately 1.8 percent of the total critical habitat throughout the range of the species (71 FR 66374). Because of the timing of the proposed activities, and because the EPA has proposed additional avoidance and minimization measures to protect critical habitat, we anticipate that most of the adverse effects will be temporary or of short duration and there will be few long-term adverse effects to critical habitat caused by this project.

In summary, the effects from implementing the proposed action on designated critical habitat for Braunton's milkvetch are likely to be temporary or of short duration and we anticipate that there will be few, if any, long-term adverse effects. Only a small portion of the entire range of designated critical habitat for Braunton's milkvetch would be affected by the project and, therefore, the function and conservation role of habitat within designated critical habitat for Braunton's milkvetch will not be substantially affected by the proposed project activities.

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. We believe that it is reasonably likely that future actions may occur within the action area and that these potential future actions may adversely affect listed species or designated critical habitat for listed species. However, the scope of any potential future actions and the action agency for any future investigation(s) and remedial actions are not known at this time. The need for consultation regarding future actions will be determined at which time their scope has been defined based on data obtained in this project.

CONCLUSION

After reviewing the current status of the coastal California gnatcatcher, California red-legged frog, vernal pool fairy shrimp, Riverside fairy shrimp, Braunton's milkvetch, spreading navarretia, California Orcutt grass, Lyon's pentachaeta, critical habitat for the California red-legged frog, and critical habitat for Braunton's milkvetch, the environmental baseline for each of these species and critical habitats within the action area, the effects of the proposed radiological characterization (gamma scanning, geophysical survey, surface and subsurface soil sampling, groundwater monitoring well sampling, surface water and sediment sampling, and other support activities) of Area IV and NBZ of the SSFL, and the cumulative effects, it is the Service's biological opinion that the proposed project is not likely to jeopardize the continued existence of the coastal California gnatcatcher, California red-legged frog, vernal pool fairy shrimp, Riverside fairy shrimp, Braunton's milkvetch, spreading navarretia, California Orcutt grass, Lyon's pentachaeta, nor destroy or adversely modify critical habitat for the California red-legged frog or Braunton's milkvetch.

We have reached these conclusions because:

1. In comparison with the amount of habitat available to the California red-legged frog and Braunton's milkvetch elsewhere in Ventura County and throughout the range of the species, only a small amount of habitat would be temporarily disturbed and we do not expect any habitat to be permanently lost due to effects from this project;

2. Few, if any, coastal California gnatcatchers, California red-legged frogs, vernal pool fairy shrimp, Riverside fairy shrimp, spreading navarretia, California Orcutt grass, or Lyon's pentachaeta are likely to be killed or injured during project activities;

3. While a considerable number of Braunton's milkvetch plants may be adversely affected, (A) we expect that it is likely that only approximately 5 percent of the plants within the action area will be directly adversely affected, (B) if up to two-thirds of the plants within the action area are directly affected, this site will still retain more Braunton's milkvetch plants than any other single occurrence, and (C) adverse effects to this species would be minimized so that the long-term survival of this population is not considerably affected (i.e., the seed bank will persist).

4. The EPA has proposed measures to reduce or avoid adverse effects caused by the proposed project on the coastal California gnatcatcher, California red-legged frog, vernal pool fairy shrimp, Riverside fairy shrimp, Braunton's milkvetch, spreading navarretia, California Orcutt grass, Lyon's pentachaeta, critical habitat for the California red-legged frog, and critical habitat for Braunton's milkvetch.

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. The Act defines take as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The Service defines harm to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. The Service defines harass as intentional or negligent actions that create 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. The Service defines incidental take 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 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 EPA so that they become binding conditions of any grant or permit issued by the EPA as appropriate, for the exemption in section 7(o)(2) to apply. The EPA has a continuing duty to regulate the activity covered by this incidental take statement. If the EPA does not ensure their contractors adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the EPA 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)].

The activities conducted pursuant to the project description may cause the injury or death of coastal California gnatcatchers. The number of coastal California gnatcatchers so affected would be low, but the exact number is unknown because the population is likely to fluctuate, and coastal California gnatcatchers have only been reported from the site once (McMorran 2010). Within the EPA's scope of analysis, the project would have temporary, direct effects to up to approximately 3.1 ac (1.3 ha) of the area classified as Venturan coastal scrub and approximately 151 ac (61 ha) of additional potential suitable habitat for the coastal California gnatcatcher within Area IV and NBZ (SAIC 2009, HydroGeoLogic and Envicom 2010). Because the mean territory size during the breeding season generally ranges from 12 to 27 ac (4.8 to 11 ha) per pair (Preston et al. 1998a), we anticipate the 3.1 ac (1.3 ha) of Venturan coastal scrub and additional potential suitable habitat to support one to five pairs of coastal California gnatcatchers. Consequently, we believe that 10 coastal California gnatcatchers could be taken in the form of harassment through the disturbance of breeding habitat within the area defined as the project area defined under the EPA's scope of analysis; however, even after implementing the conservation measures proposed by the EPA, project related activities have the potential to take up to five eggs or nestlings of coastal California gnatcatchers in the form of mortality if their nest is not detected during nesting bird surveys.

The proposed activities may subject California red-legged frogs to: temporary disturbance of habitat; injury or death of individuals not relocated out of harm's way; spread of pathogens (e.g., chytrid fungus); the capture, handling, and transportation of individuals to move them out of harm's way; and temporary habitat loss. We cannot determine the precise number of California red-legged frogs that may be killed, injured, harassed, or harmed as a result of the project activities undertaken by the EPA. Numbers and locations of California red-legged frogs within any given population vary from year to year. Incidental take of California red-legged frogs would be difficult to detect because of their small body size and finding dead or injured specimens is unlikely, especially while below ground in burrows. However, because of the limited amount of suitable habitat for California red-legged frogs within the work area and the fact that the EPA has proposed to use the protective measures described in the Description of the Proposed Action section of this document, we anticipate that few, if any, California red-legged frogs are likely to be killed or injured during this work.

Vernal pool fairy shrimp and Riverside fairy shrimp cysts, adults, and juveniles would be subject to take in the form of being crushed, buried or displaced from any occupied habitat as a result of proposed project activities. Because of their small size, finding dead or injured vernal pool fairy shrimp or Riverside fairy shrimp is unlikely. We anticipate that all vernal pool fairy shrimp or Riverside fairy shrimp within the action area would be injured or killed as a result of the proposed project. Vernal pool fairy shrimp and Riverside fairy shrimp may be taken only within the boundaries of the action area. However, because of the limited suitable habitat for these species within the action area and the fact that the EPA has proposed the protective measures described in the Description of the Proposed Action section of this document, we anticipate that few, if any, vernal pool fairy shrimp and Riverside fairy shrimp are likely to be killed or injured during this work.

This biological opinion does not exempt any activity from the prohibitions against take contained in section 9 of the Act that is not incidental to the action as described in this biological opinion. Take that occurs outside of demarcated work areas or from any activity not described in this biological opinion is not exempted from the prohibitions against take described in section 9 of the Act.

REASONABLE AND PRUDENT MEASURES

We believe the following reasonable and prudent measures are necessary and appropriate to minimize take of the coastal California gnatcatcher, California red-legged frog, vernal pool fairy shrimp, and Riverside fairy shrimp:

1. The applicant must use Service-approved biologists to monitor activities and conduct appropriate surveys for coastal California gnatcatchers, California red-legged frogs, vernal pool fairy shrimp, and Riverside fairy shrimp.

2. The EPA must ensure that the level of incidental take that occurs during project implementation is commensurate with the analysis contained herein.

3 Service-approved biologists will conduct surveys for coastal California gnatcatchers within the identified gnatcatcher habitat area (see Figure 1) prior to any activities within this area. If any coastal California gnatcatchers are found nesting within the project area and may be affected by project activities, such activities must be halted until the nesting cycle is completed.

4 Biologists must be authorized by the Service before they capture and move California red-legged frogs in the action area.

5 Service-approved biologists must conduct worker environmental awareness education sessions covering the listed species addressed in this biological opinion.

6 Specific activity restrictions must be implemented to avoid or minimize adverse effects on the coastal California gnatcatcher, California red-legged frog, vernal pool fairy shrimp, and Riverside fairy shrimp.

Our evaluation of the effects of the proposed action includes consideration of the measures to minimize the adverse effects of the proposed action on the on the listed species that were developed by the EPA and repeated in the Description of the Proposed Action portion of this biological opinion. Any subsequent changes in these measures proposed by the EPA may constitute a modification of the proposed action and may warrant reinitiation of formal consultation, as specified at 50 CFR 402.16. These reasonable and prudent measures are intended to supplement the protective measures that were proposed by the EPA as part of the proposed action.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, the EPA must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

1. The following term and condition implements reasonable and prudent measure 1:

The qualifications of individuals that would be conducting surveys and monitoring of the coastal California gnatcatcher, California red-legged frog, vernal pool fairy shrimp, and Riverside fairy shrimp and their habitats must be provided to the Service for our review and approval at least 15 days prior to project activities within the vicinity of the species' habitat. No project activities will begin in areas that could support listed species until the EPA has received approval from the Service that the biologist(s) are qualified to conduct the work.

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

a. We are unable to anticipate with certainty the number of coastal California gnatcatchers that may be killed or injured within the action area. Therefore, the EPA must contact us if more than one adult coastal California gnatcatcher is found dead or injured, one active nest is destroyed, or 10 coastal California gnatcatchers are taken through harassment caused by the disturbance of habitat within the action area. The cause of death or injury must be determined by a Service-approved biologist. Project activities that are likely to cause additional take must cease during this review period.

b. We are unable to anticipate with certainty the number California red-legged frogs that may be killed or injured within the action area. Therefore, the EPA must contact us if more than one California red-legged frog is found dead or injured. The cause of death or injury must be determined by a Service-approved biologist. Project activities that are likely to cause additional take must cease during this review period.

3. The following terms and conditions implement reasonable and prudent measure 3:

a. If vegetation removal or other project activities occur within the designated gnatcatcher areas (see Figure 1) during the peak of the coastal California gnatcatcher nesting season (mid-March through mid-May), the EPA must not remove vegetation within 400 ft (122 m) of any active coastal California gnatcatcher nest. The authorized biologist must have the authority to halt activities that he/she determines may affect any nesting coastal California gnatcatchers detected within the action area.

b. Surveys must be conducted by the authorized biologist(s) walking through suitable habitat areas, within the limits described below, while watching and listening for coastal California gnatcatchers. If necessary, the authorized biologist(s) may use playback of recorded coastal California gnatcatcher calls to elicit a response, as described in the Service's coastal California gnatcatcher survey protocol.

4. The following term and condition implements reasonable and prudent measure 4:

A Service-approved biologist must survey all potential California red-legged frog habitat within the project area prior to the start of project activities in that habitat. If California red-legged frogs are located in the project area and are likely to be adversely affected by project activities, they must be relocated out of harm's way by the Service-approved biologist to an appropriate location, pre-determined by the EPA with Service approval.

5. The following term and condition implements reasonable and prudent measure 5:

The Service-approved biologist(s) must conduct a training session(s) for all construction personnel prior to any construction activities. At a minimum, the training must include a description of the coastal California gnatcatcher, California red-legged frog, vernal pool

fairy shrimp, and Riverside fairy shrimp, and their associated habitats; the general provisions of the Act; the necessity for adhering to the provisions of the Act; the penalties associated with violating the provisions of the Act; the specific measures that are being implemented to conserve the various listed species as they relate to the project; and the boundaries within which the project may be accomplished.

6. The following terms and conditions implement reasonable and prudent measure 6:

a. To ensure that diseases are not conveyed between work sites by Service-approved biologists, the fieldwork code of practice developed by the Declining Amphibian Populations Task Force must be followed at all times. A copy of the code of practice is enclosed. The Service-approved biologist may substitute a bleach solution (0.5 to 1.0 cup of bleach to 1.0 gal of water) for the ethanol solution. Care must be taken so that all traces of the disinfectant are removed before entering the next aquatic habitat.

b. The work area must be kept clean to avoid attracting predators. All food-related trash items must be enclosed in sealed containers and regularly removed from the project area. Pets must not be brought on site.

c. Biologists approved by the Service must monitor project activities to ensure that damage to onsite swales and depression features, their watersheds, and surrounding uplands is minimized to the maximum extent practicable.

d. Project activities adjacent to swales and other depression features will be timed to avoid wet weather to minimize potential impacts (e.g., siltation). As such, project activities will occur only when the soil is dry to the touch both at the surface and 1 inch below, unless otherwise approved by the Service.

e. All equipment maintenance, staging, and dispensing of fuel, oil, or coolant, or any other such activities must occur outside of areas with swales and depression features. These areas must be located in previously compacted and disturbed areas to the maximum extent practicable in such a manner as to prevent any runoff from entering Waters of the U.S. and depression features. Project equipment must be checked for leaks prior to operation and repaired as necessary.

f. Disposal or temporary placement of excess fill, brush, or other debris must not be allowed in Waters of the U.S., their banks, or any depression features or their watersheds.

REPORTING REQUIREMENTS

The EPA must provide us a written annual report by May 1 for each year that activities are conducted pursuant to this biological opinion. The annual report must include documentation of the impacts of the proposed activities on the federally listed species or critical habitat addressed

within this biological opinion; results of biological surveys and observation records; documentation of the number of individuals of federally listed species harassed (e.g., flushed or relocated from an area) or injured or killed; the date, time, and location of any form of take; approximate size and age of those individuals subject to take; a description of relocation sites; and the acreages of habitat for the federally listed species that were temporarily disturbed and permanently lost. The report should also include a discussion of those problems encountered implementing the terms and conditions and other protective measures, recommendations for modifying the terms and conditions to enhance the conservation of federally listed species, and any other pertinent information. These reports will assist us in evaluating future measures for the protection of federally listed species.

DISPOSITION OF DEAD OR INJURED SPECIMENS

Within 3 days of locating any dead or injured coastal California gnatcatcher, California red-legged frog, vernal pool fairy shrimp, and Riverside fairy shrimp, the EPA must notify the Ventura Fish and Wildlife Office by telephone ((805) 644-1766) and in writing (2493 Portola Road, Suite B, Ventura, California 93003). The report must include the date, time, location of the carcass, a photograph, cause of death or injury (if known), and any other pertinent information.

Care must be taken in handling dead specimens to preserve biological material in the best possible state for later analysis. Should any injured listed species survive, the Service must be contacted regarding their final disposition. The remains of listed species must be placed with educational or research institutions holding the appropriate State and Federal permits, such as the Santa Barbara Natural History Museum (Contact: Paul Collins, Santa Barbara Natural History Museum, Vertebrate Zoology Department, 2559 Puesta Del Sol, Santa Barbara, California 93460, (805) 682-4711, extension 321).

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use 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. We recommend the following conservation measures to promote recovery of the coastal California gnatcatcher, California red-legged frog, vernal pool fairy shrimp, Riverside fairy shrimp, Braunton's milkvetch, spreading navarretia, California Orcutt grass, and Lyon's pentachaeta:

1. We recommend that the EPA relocate any native reptiles and amphibians found within the action area to nearby suitable habitat, conducting such activities in a manner that complies with State laws. This would help conserve the native wildlife in the region.

2. Non-native predators of the California red-legged frog, such as bullfrogs, should be permanently removed from the wild during project activities, if they can be captured and if such activities are in compliance with State laws.

3. To the extent possible, the EPA should schedule project activities (especially those that would be conducted at night) to avoid rainy weather.

4. We recommend that in the event that large areas of native vegetation need to be removed, clear-cut, or dug up (such as by any project related activities or potential future actions related to radiation surveys or remediation), seed be collected from the various species (sensitive and common) before the vegetation is removed, and that this seed be used for restoration efforts onsite to maintain genetic diversity of the local flora and to reduce long-term adverse effects.

The Service requests notification of the implementation of any conservation recommendations, so that we may be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats.

REINITIATION NOTICE

This concludes formal consultation on the Santa Susana Field Laboratory Area IV Radiological Study Project in Ventura County, California. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have any questions, please contact Mark A. Elvin of my staff at (805) 644-1766, extension 258.

Sincerely,

/s/: Diane K. Noda

Diane K. Noda
Field Supervisor

Enclosure

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The Declining Amphibian Populations Task Force Fieldwork Code of Practice

A. Remove mud, snails, algae, and other debris from nets, traps, boots, vehicle tires, and all other surfaces. Rinse cleaned items with sterilized (e.g., boiled or treated) water before leaving each work site.

B. Boots, nets, traps, and other types of equipment used in the aquatic environment should then be scrubbed with 70 percent ethanol solution and rinsed clean with sterilized water between study sites. Avoid cleaning equipment in the immediate vicinity of a pond. wetland, or riparian area.

C. In remote locations, clean all equipment with 70 percent ethanol or a bleach solution, and rinse with sterile water upon return to the lab or "base camp". Elsewhere, when washing-machine facilities are available, remove nets from poles and wash in a protective mesh laundry bag with bleach on the "delicates" cycle.

D. When working at sites with known or suspected disease problems, or when sampling populations of rare or isolated species, wear disposable gloves and change them between handling each animal. Dedicate sets of nets, boots, traps, and other equipment to each site being visited. Clean them as directed above and store separately at the end of each field day.

E. When amphibians are collected, ensure that animals from different sites are kept separately and take great care to avoid indirect contact (e.g., via handling, reuse of containers) between them or with other captive animals. Isolation from unsterilized plants or soils which have been taken from other sites is also essential. Always use disinfected and disposable husbandry equipment.

F. Examine collected amphibians for the presence of diseases and parasites soon after capture. Prior to their release or the release of any progeny, amphibians should be quarantined for a period and thoroughly screened for the presence of any potential disease agents.

G. Used cleaning materials and fluids should be disposed of safely and, if necessary, taken back to the lab for proper disposal. Used disposable gloves should be retained for safe disposal in sealed bags.

The Fieldwork Code of Practice has been produced by the Declining Amphibian Populations Task Force with valuable assistance from Begona Arano, Andrew Cunningham, Tom Langton, Jamie Reaser, and Stan Sessions.

For further information on this Code, or on the Declining Amphibian Populations Task Force, contact John Wilkinson, Biology Department, The Open University, Walton Hall, Milton Keynes, MK7 6AA, UK. E-mail: DAPTF@open.ac.uk Fax: +44 (0) 1908-654167