

APPENDIX J
U.S. FISH AND WILDLIFE SERVICE
BIOLOGICAL OPINION



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:
08EVEN00-2018-F-0407

August 31, 2018

John Jones, Director
Energy Technology Engineering Center
U.S. Department of Energy
4100 Guardian Street, Suite 160
Simi Valley, California 93063

Subject: Biological Opinion for the Cleanup of Area IV of the Santa Susana Field Laboratory, Ventura County, California (2018-F-0407)

Dear Mr. Jones:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of the U.S. Department of Energy's (DOE) proposal for soil cleanup, groundwater cleanup, building and infrastructure removal, and habitat restoration within Area IV and the northern buffer zone of the Santa Susana Field Laboratory (SSFL) under DOE's jurisdiction and its effects on the federally endangered least Bell's vireo (*Vireo bellii pusillus*), Riverside fairy shrimp (*Streptocephalus woottoni*) and Braunton's milkvetch (*Astragalus brauntonii*) and its designated critical habitat and the federally threatened coastal California gnatcatcher (*Poliophtila californica californica*), California red-legged frog (*Rana draytonii*), and vernal pool fairy shrimp (*Branchinecta lynchi*), in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 et seq.). We received your request for formal consultation on January 31, 2018.

In 2010, the California Department of Toxic Substances control signed an Administrative Order on Consent (AOC) with DOE that defines the remediation standards for DOE's administrative units within the SSFL. The AOC requires "no contaminants shall remain in the soil above local background levels." For purposes of section 7 consultation, the AOC provides that impacts to species or habitat protected under the Endangered Species Act may be considered as possible exemptions from the cleanup standard specified herein only to the extent that the federal Fish and Wildlife Service, in response to a request by DOE for consultation, issues a Biological Opinion with a determination that implementation of the cleanup action would violate Section 7(a)(2) or Section 9 of the ESA, and no reasonable and prudent measures or reasonable and prudent alternatives exist that would allow for the use of the specified cleanup standard in that portion of the site. In areas covered by an exemption, soil cleanup would occur in areas where contamination poses a risk to human health or the environment as oppose to soil cleanup to background levels.

We have based this biological opinion on information that accompanied your January 31, 2018, request for consultation, including the revised biological assessment (BA) with attachments, dated January 30, 2018 (DOE 2018); Geographic Information System (GIS) data supporting the BA (DOE 2017); other clarifications and responses to questions, meetings, telephone calls, and electronic messages between DOE and the Service; and your July 20, 2018, letter clarifying the project description on which you requested formal consultation. Upon request, a record of this consultation can be made available at the Ventura Fish and Wildlife Office.

You determined the proposed project may affect, but is not likely to adversely affect, critical habitat for the federally threatened California red-legged frog. We concur with your determination regarding this critical habitat because (1) there is only a small amount of designated California red-legged frog critical habitat within the project boundary, approximately 0.6 acre at the upslope periphery of the 5,000-acre VEN-3 critical habitat unit; (2) the proposed project site is a long distance (approximately 3 miles) from aquatic portions of the drainage that have been known to support California red-legged frog breeding; and (3) you have proposed protective measures to avoid and minimize effects to the designated California red-legged frog critical habitat.

We note that you made No Effect determinations for the following species in your BA and letter requesting initiation of consultation: the federally endangered California condor (*Gymnogyps californianus*), Quino checkerspot butterfly (*Euphydryas editha quino*), California Orcutt grass (*Orcuttia californica*), and Lyon's pentachaeta (*Pentachaeta lyonii*); the federally threatened Conejo dudleya (*Dudleya parva*), Santa Monica Mountains dudleya (*Dudleya cymosa* subsp. *ovatifolia* [inclusive of *D. cymosa* subsp. *agourensis*]), marcescent dudleya (*Dudleya cymosa* subsp. *marcescens*), and spreading navarretia (*Navarretia fossalis*); and the San Fernando Valley spineflower (*Chorizanthe parryi* var. *fernandina*) which, at the time, was proposed threatened. The regulations implementing section 7(a)(2) of the Endangered Species Act (50 Code of Federal Regulations (CFR) 402) do not require our concurrence with a "no effect" determination made by a Federal agency. Consequently, we are not providing our concurrence with your determination on the effects of the proposed project on these species; however, we appreciate and thank you for informing us of these determinations and considering them in your analysis. We will not discuss these species for the remainder of this biological opinion.

Abbreviations/Acronyms/Definitions

The following abbreviations, acronyms, and terms occur frequently throughout this document. We define them here for clarification.

Act	Endangered Species Act of 1973, as amended
AOC	Administrative Order on Consent
BA	Biological Assessment
BMP	Best Management Practices
CDFW	California Department of Fish and Wildlife
CFR	<i>Code of Federal Regulations</i>

CNDDDB	California Natural Diversity Data Base
CO	Consent Order
Corps	U.S. Army Corps of Engineers
DOE	U.S. Department of Energy
DTSC	California Department of Toxic Substance Control
EPA	U.S. Environmental Protections Agency
FR	Federal Register
GIS	Geographic Information System
LUT	Look Up Table
MBTA	Migratory Bird Treaty Act
NASA	National Aeronautics and Space Administration
NBZ	Northern buffer zone
NPDES	National Pollutant Discharge Elimination System
PEIR	Programmatic Environmental Impact Report
RMHF	Radioactive Materials Handling Facility
SAIC	Science Applications International Corporation
SBZ	Southern buffer zone
SCE	Southern California Edison
Service	U.S. Fish and Wildlife Service
SSFL	Santa Susana Field Laboratory
SWPPP	Storm Water Pollution Prevention Plan
U.S.	United States

Consultation History

2009-2011	Consultation with U.S. Environmental Protection Agency (EPA) regarding radiological scanning project in Area IV of SSFL (EPA 2010, Service 2010a).
2009-2018	Numerous meetings and project coordination calls with the DOE, Service, California Department of Fish and Wildlife (CDFW), and California Department of Toxic Substances Control (DTSC). See the BA (DOE 2018) for a more detailed description of the consultation history.
2013	National Aeronautics and Space Administration (NASA) Site Area II remediation project consultation (NASA 2013, Service 2013).
2015-2016	The Boeing Company (Boeing) and DOE jointly participated in the production of the draft biological assessment, dated August 19, 2017, regarding the site remediation project.
Feb. 2, 2017	We responded to a request from DOE for technical assistance on potential effects to the Braunton's milkvetch and its critical habitat during cleanup activities within Area IV. We provided the following recommendations for minimizing impacts from the cleanup and remediation on Braunton's milkvetch:

"We recommend that DOE and DTSC consider exercising an exemption to the AOC [Administrative Order on Consent] within Braunton's milk-vetch habitat, such that cleanup actions are only conducted in areas where contamination poses a risk to human health or the environment. We understand the intent of cleanup to background as remediating the site to conditions which existed prior to the industrial activities; however, there is the possibility that chemicals may exist in the soil at concentrations that are above background but pose no appreciable risk to humans or the environment. In these instances, soil excavation would pose a far greater environmental risk than allowing low levels of soil contamination to persist. We recommend that DOE conduct human health and ecological risk assessments to identify areas where soil contamination exceed risk thresholds, and target soil excavation in those areas only."

Dec. 12, 2017 We commented to DTSC in a letter regarding the effects of cleanup activities on listed species and critical habitat identified in the DTSC draft Environmental Impact Report:

"Biological resources will be severely impacted in all areas that are subject to excavation of soil, import of backfill, and implementation of restoration. We do not expect that the biological resources that exist before the project can be replaced with the same ecological integrity following the extensive AOC background cleanup."

The Service recommended that, in line with the AOC provisions referenced above, DTSC exercise biological exemption in sensitive habitat to focus soil excavation in areas where chemicals and radionuclides pose a hazard to human health and the environment. The Service recommended that DTSC exercise biological exemptions in Braunton's milk-vetch habitat, coastal California gnatcatcher habitat, and for the protection of migratory birds.

Referencing its February 2, 2017, letter, concerning Braunton's milkvetch and its critical habitat, the Service reiterated

"We concluded that the effects to Braunton's milkvetch and its critical habitat would be substantial, and recommended a biological [exemption] to limit soil removal in Braunton's milkvetch habitat to only the soils that contain contamination to levels that pose a risk to human health and the environment."

Aug. 28, 2017 DOE sent a letter and draft BA requesting initiation of formal consultation.

Oct. 30, 2017 The Service responded with a request for additional information.

Dec. 18, 2017 DOE provided additional information.

Jan. 17, 2018 The Service and DOE discussed the effects determinations and information necessary to finalize the BA. The Service requested a final copy of the BA.

Jan. 31, 2018 DOE submitted a revised request for consultation and a Final revised BA with attachments that addressed the information requested.

Mar. 8, 2018 We sent an acknowledgement letter identifying that all information necessary for the consultation was received, and indicating that consultation was initiated effective January 31, 2018. We also requested a 60-day extension via phone conversation, to which DOE verbally agreed.

July 16, 2018 We met with DOE onsite and discussed issues regarding the proposed project and the different options for the cleanup process, specifically the differences between effects from a background-based cleanup process (with a cleanup to background standards) versus a risk-based cleanup process (with a cleanup to human and environmental health standards).

July 20, 2018 We received a letter from DOE clarifying the scope of the project description, specifically requesting consultation on the proposed process identified in the BA for the protection of listed species. In the BA, DOE identified a systematic process approach that would allow cleanup of chemicals and radionuclides to levels protective of human and ecological health within the proposed exemption area for the protection of Braunton's milkvetch and its critical habitat.

July 24, 2018 We had a conference call with DOE to clarify the scope of the consultation. We agreed that the consultation on the proposed project would include an exemption for Braunton's milkvetch and a range of exemptions for all other listed species (i.e. ranging from no additional exemptions to all proposed exemptions).

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

Background

The Santa Susana Field Laboratory (SSFL) is located in Ventura County, California, on approximately 2,850 acres in the hills between Chatsworth and Simi Valley. The SSFL was developed as a remote site to test rocket engines and conduct nuclear research. Rockwell

International's Rocketdyne Division began rocket engine testing in the Area I portion of SSFL in 1947. Rockwell created Atomics International in the early 1950s to conduct nuclear research in Area IV for the Atomic Energy Commission (a predecessor agency of the Department of Energy (DOE)) and commercial entities. In 1996, Rockwell International sold its aerospace and defense business, including Area IV of SSFL, to Boeing.

The SSFL is divided into four administrative areas and two contiguous buffer zones north and south of the administrative areas. Figure 1 shows SSFL and the surrounding communities, including the layout of SSFL (Areas I, II, III, and IV and the adjacent buffer zones) and land ownership. The majority of Area I is owned and operated by Boeing. Area II and a 42-acre parcel within Area I are owned by the Federal Government and administered by the NASA. Areas III, IV, and the contiguous buffer zone areas to the north and south are owned by Boeing. DOE does not own any land at SSFL but is the owner of 18 buildings in Area IV and is responsible for building demolition and cleanup of soils and groundwater in Area IV and the Northern Buffer Zone (NBZ).

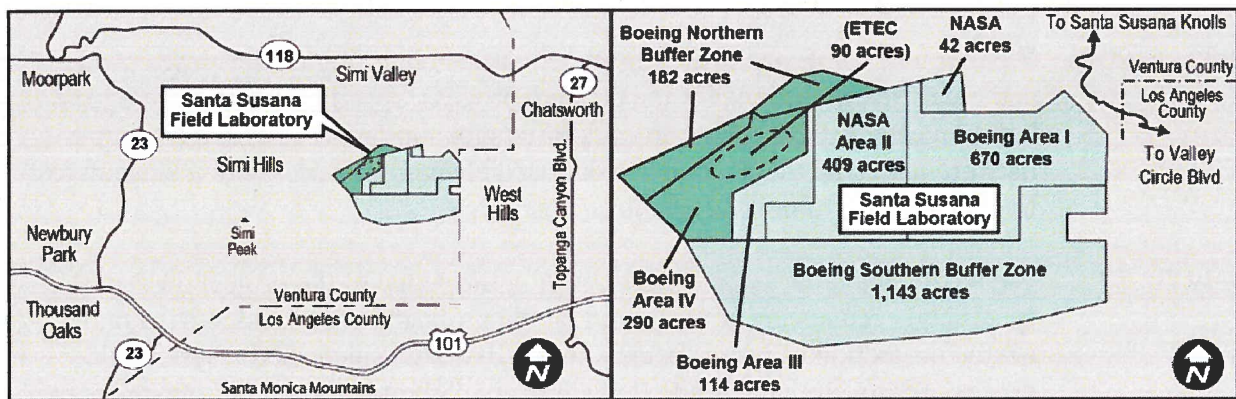


Figure 1. Santa Susana Field Laboratory, surrounding communities, and administrative units onsite (DOE 2018).

Starting in the mid-1950s, the Atomic Energy Commission funded nuclear energy research on a 90-acre parcel of land in what is now SSFL Area IV, which was leased from Rocketdyne. The Energy Technology Engineering Center (ETEC) was established by the Atomic Energy Commission on this parcel in the early 1960s. In support of that mission, DOE built and operated 10 small nuclear reactors for various research activities over the years. As a result of operating these research reactors and conducting nuclear research, chemicals and radionuclides were released into the soil, bedrock, and groundwater.

Cleanup activities have been ongoing since the 1960s. DOE decontaminated and demolished several of its structures and facilities in Area IV to the standards in effect at the time decommissioning occurred. By 1980, all reactor operations had ceased, and nuclear research at ETEC was terminated in 1988. DOE has removed all nuclear materials from the site. By the time non-nuclear liquid metals research ended in 1998, many facilities had been decontaminated, decommissioned, and demolished, and contaminated materials had been removed.

In 2007, DTSC issued the Consent Order (CO) for Corrective Action (DTSC 2007) to DOE, NASA, and Boeing (as respondents), pursuant to DTSC's authority over hazardous waste under the California Health and Safety Code, Section 25187. The 2007 order requires the respondents to clean up all chemically contaminated soils and groundwater at SSFL to risk-assessment-based levels. The SSFL Standardized Risk Assessment Methodology (MWH Americas, Inc. 2014) describes a risk-assessment methodology for determining the areas that would need remediation. A hypothetical future suburban residential land use was identified for the evaluation of risk; other plausible receptors (such as recreational users or workers) were also identified.

In 2010, DOE entered into the 2010 AOC (DTSC 2010a) with DTSC. The 2010 AOC superseded the 2007 CO with respect to soil remediation and changed the framework for the soils characterization and cleanup process for Area IV and the NBZ. The 2010 AOC stipulated that the soils cleanup standard would be based on Look Up Table (LUT) values, which are: (1) for chemicals, local background concentrations or method detection limits for those chemicals whose method detection limits exceed local background concentrations, and (2) for radionuclides, local background concentrations or minimum detection limits for radionuclides whose detection limits exceed local background concentrations. The 2010 AOC indicates that, for soil remediation decisions, DOE is to compare the concentration of any chemical or radionuclide in each individual sample (not an average of samples in an area) with its respective LUT value. Thus, any soil samples that exceed the LUT values for any chemicals or radionuclides would require a cleanup action to be taken.

The 2010 AOC (DTSC 2010a) identified characterization activities for both chemical and radiological contaminants and requires DOE to prepare a Soils Remedial Action Implementation Plan (SRAIP) describing where soil cleanup will occur, any areas proposed for exemptions to protect biological or cultural resources, and any areas proposed for in situ or onsite treatment to achieve cleanup goals. The 2010 AOC specifies that no "leave-in-place" alternative (onsite burial or landfill) is allowed. Chemicals and radionuclides in soil brought in as backfill also must meet the LUT values. Verification of cleanup levels and the acceptability of the backfill are required by DTSC for chemicals and by the U.S. Environmental Protection Agency (EPA) for radioactive constituents.

Not all of the energy research conducted in Area IV was performed for DOE; some energy research was performed by Boeing and its predecessors for other customers. DOE has responsibility for cleanup of soils in the 290-acre Area IV. DOE shares responsibility with NASA for cleanup of soil in the 182-acre NBZ; NASA is responsible for cleanup of contamination in the NBZ that emanates from areas that it administers (DTSC 2010b). DOE shares responsibility with Boeing for groundwater remediation in Area IV and the NBZ, as defined in the 2007 CO (DTSC 2007). Boeing is responsible for management decisions regarding the Area IV buildings it owns.

The California DTSC has prepared a Programmatic Environmental Impact Report (PEIR) under the California Environmental Quality Act to evaluate the potential impacts of proposed remedial actions at SSFL from the combined actions of Boeing, NASA, and DOE. The Draft PEIR was

released for public review during the fall of 2017. The Final PEIR is currently under development and must be completed before Boeing, NASA, and DOE can begin their soil cleanups.

Project Overview

As described above, Boeing, NASA, and DOE are Responsible Parties for the investigation and cleanup of contaminants released from past activities at the SSFL project site. The proposed project only focuses on activities conducted by DOE, and does not cover cleanup actions by Boeing or NASA. The proposed project involves DOE's cleanup and remediation of approximately 472 acres of the 2,850-acre SSFL site and adjacent offsite locations.

In April 2017, Boeing recorded a Conservation Easement over nearly 2,400 acres of the SSFL that it owns in favor of the North American Land Trust that expressly prohibits the Boeing-owned property from ever being developed or used for residential, commercial, industrial or agricultural purposes. This includes all of Area IV and all of the NBZ. Open space is the only future use of the property (Boeing 2017).

The proposed project consists of the following components, which would be conducted in accordance with applicable laws, orders, regulations, and agreements with the State of California:

- Soil cleanup - clean up or treat radiologically and chemically impacted soil and dispose of contaminated materials and resulting waste;
- Groundwater cleanup - clean up or treat radiologically and chemically impacted groundwater and dispose of contaminated materials and resulting waste;
- Building and infrastructure removal - demolish and remove existing buildings and infrastructure; and
- Habitat restoration - restore the environment affected by the removal and transport of contaminated materials and waste.

The descriptions of DOE's cleanup activities are based on current information (as included in DOE's draft Environmental Impact Statement, its final BA, and its July 20, 2018, letter clarifying the proposed project description on which DOE requested consultation), and the descriptions are expected to become more detailed over time as sampling, plans, and analyses develop. The approaches and technologies continue to be evaluated and refined as the nature and extent of the contaminants becomes clearer. A variety of remedial technologies would be needed to address the multiple affected media and the wide variety of contaminants present.

Soil Cleanup

This activity is anticipated to be conducted for up to 20 years and would include removing vegetation, grubbing to clear debris, excavating soils and transporting waste for off-site disposal. Supporting activities to facilitate soil excavation and disposal include improving roads as necessary, stockpiling soils, loading and unloading trucks. Soil excavation and disposal activities

are anticipated to occur in the areas identified in pink and blue in Figure 2. Approximately 1,413,000 cubic yards of soil within 227 acres of Area IV and the NBZ would be subject to excavation under the AOC, if no exemptions were exercised for the protection of biological and cultural resources.

Soil removal would be the primary method for cleanup of soil to address the AOC LUT values, with onsite treatment (monitored natural attenuation) used where feasible for selected, low-concentration chemicals such as petroleum hydrocarbons. Vegetation would need to be cleared before soil could be excavated. Clearing and grubbing (removing belowground components such as roots) would be performed as necessary. Soil would be removed on a systematic basis until all of the soil removal required to meet AOC LUT values is accomplished. Following confirmation that cleanup standards have been met, excavated areas would be backfilled and graded, slopes would be stabilized, and disturbed areas would be revegetated using native plant species. It was assumed that approximately 75 percent of the soil volume removed would be backfilled to accomplish contouring and slope stabilization. Backfill would be trucked to the site.

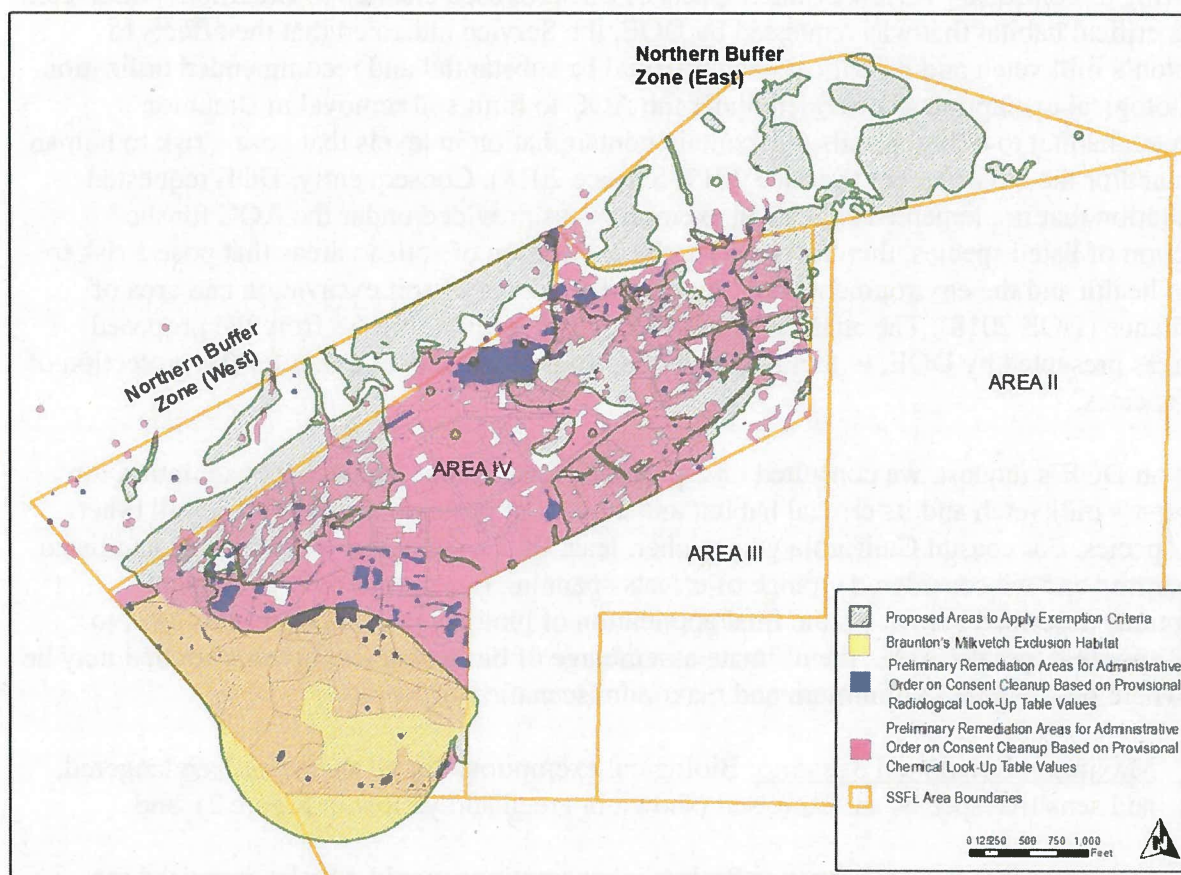


Figure 2. Areas in purple are subject to soil excavation, per the AOC look-up table exceedances. Areas in yellow represent the “minimum exemption scenario” and the areas shown in yellow and green represent the “maximum exemption scenario” (adapted from DOE 2017).

Suitable sources of backfill meeting AOC LUT values have not been located. Because the AOC LUT values are very low, finding soil meeting LUT levels, especially soil that is comparable to

the existing local soil (i.e. that would support the native plant communities), is expected to remain a challenge. If a source of backfill that meets all of the AOC LUT values cannot be reasonably found, then DTSC, DOE, and EPA would enter into a consultation process, and DTSC would determine the best available source of backfill (DTSC 2010a). DOE would not proceed with large-scale excavation of soil until an acceptable source of backfill material is identified. Up to 25 workers would be involved with soil removal activities at any one time, not including the truck drivers hauling the debris off site.

The DOE proposed areas to be protected by biological and cultural exemptions (green and yellow areas in Figure 2). These areas include habitat for threatened, endangered, and sensitive species and culturally sensitive areas. During the development of the BA, DOE requested technical assistance regarding the extent of effects from soil cleanup on listed species. Because of the potential magnitude of effects to Braunton's milkvetch and its critical habitat, this was a focal species of the discussion.

Following a preliminary review of the impacts of this proposed cleanup to Braunton's milkvetch and its critical habitat that was requested by DOE, the Service indicated that the effects to Braunton's milkvetch and its critical habitat would be substantial and recommended utilization of a biological exemption as provided under the AOC to limit soil removal in Braunton's milkvetch habitat to only the soils that contain contamination in levels that pose a risk to human health and/or the environment (Service 2017, Service 2018). Consequently, DOE requested consultation that implemented biological exemptions as provided under the AOC for the protection of listed species, thereby targeting the excavation of soils to areas that pose a risk to human health and the environment, and lowering the amount of soil excavation and area of disturbance (DOE 2018). The analysis in this biological opinion follows from the proposed action, as presented by DOE, to include the requested biological exemption for the protection of listed species.

Based on DOE's request, we consulted on a proposed project that included an exemption for Braunton's milkvetch and its critical habitat and a range of possible exemptions for all other listed species. For coastal California gnatcatcher, least Bell's vireo, red-legged frogs, and listed fairy shrimp and we considered a range of effects spanning two scenarios of biological exemptions described below. As the final application of biological exemptions is subject to DTSC approval, per the AOC, the ultimate assemblage of biological exemptions applied may lie somewhere between these minimum and maximum scenarios:

Maximum Exemption Scenario: Biological exemptions for all threatened, endangered, and sensitive species are exercised (shown in green and yellow in Figure 2), and

Minimum Exemption Scenario: Biological exemptions would only be exercised for Braunton's milkvetch and its critical habitat (shown in yellow in Figure 2).

Under DOE's revised proposed action, in areas covered by a biological exemption, such as within occupied habitat for Braunton's milkvetch (including areas where a seedbank occurs),

DOE would not take action unless it is demonstrated that levels of chemical or radiological constituents in the soil would pose a risk to human health or the environment in consideration of the future land use as open space habitat as required by the legally-binding conservation easement on Boeing-owned property which includes Area IV and the NBZ. DOE has developed a process for addressing impacted soil within AOC exemption areas.

Within the areas in which the exemption process would be applied, DOE would remove chemical and radioactive constituents in the soil that pose a risk to human health or ecological resources as determined using a traditional risk assessment, while minimizing disturbance to the surrounding areas. Areas in which the exemption process would be applied include areas with TPH soil that DOE proposes to leave in place and remediate through monitored natural attenuation.

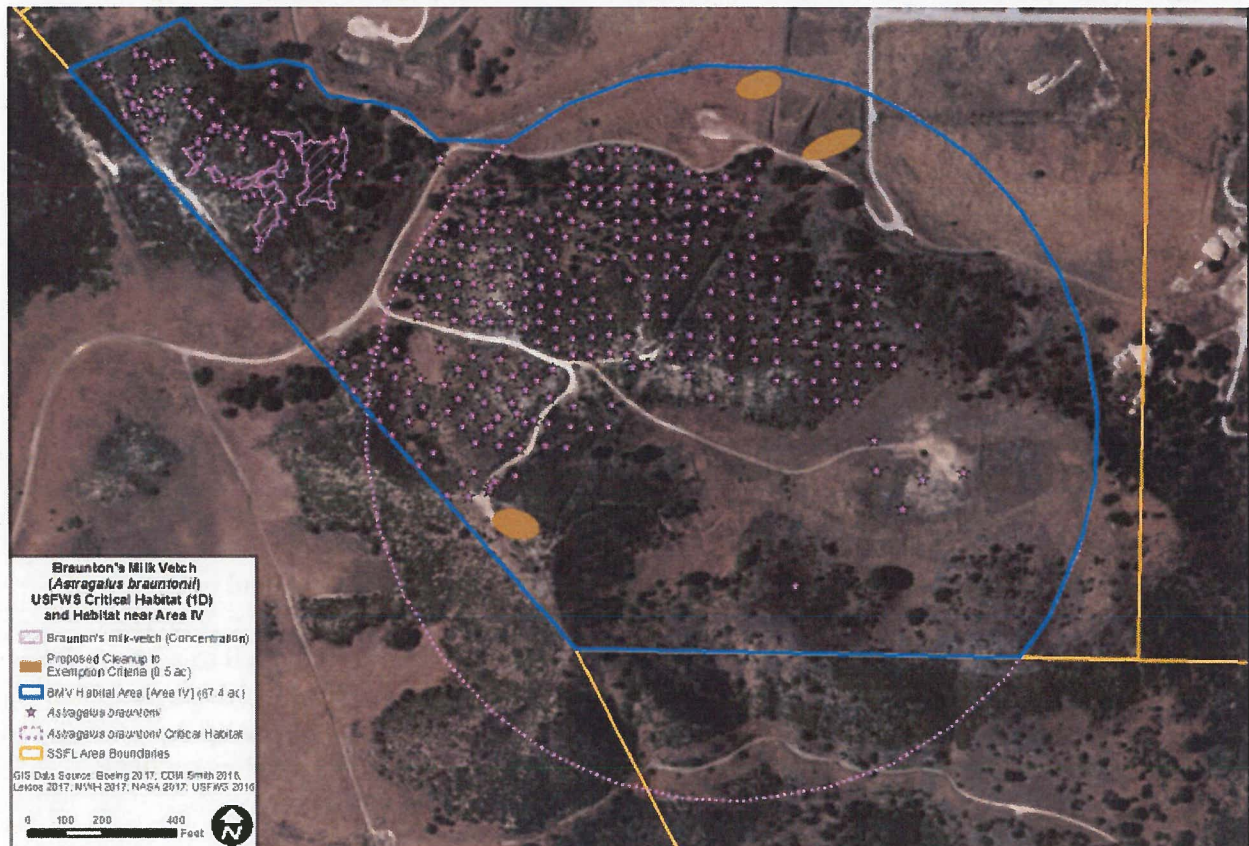


Figure 3. Orange/brown polygons identify locations where soil excavation and disposal would be conducted within Brauntion's milk vetch habitat of Area IV (outlined in blue). The purple circle identifies critical habitat for Brauntion's milkvetch, and the purple stars represent the locations where plants have been observed over time (one star may represent multiple plants).

In general, the sampling data will be reviewed to determine where soil impacts from contaminants are possible based on exceedance of a Look Up Table (LUT) value and an Ecological and/or Human Health risk-based screening level. These exceedance locations will be reviewed individually to determine whether the benefits from remediation would offset the

habitat destruction associated with the soil removal. If it appears that remediation is needed based on the risk evaluation, then a qualified biologist will visit these locations within the proposed exemption area and assess the habitat condition and occurrence of sensitive plants. If the habitat is in “good condition” (supporting a preponderance of native species, soil profile appears intact) and/or the sensitive plant species is present at the exceedance, then the assumption will be made that the elevated level of the chemical is not adversely affecting the biota and species of concern sufficiently to warrant removal, under the assumption that human health risk is also being protected. For Braunton’s milkvetch habitat, the results of the preliminary application of the risk-based process described above (and included in the final BA), would require the excavation and disposal of soil in the areas shown in orange in Figure 3.

Following confirmation that cleanup standards have been met, excavated areas would be backfilled and graded, slopes would be stabilized, and disturbed areas would be revegetated using native plant species. It was assumed that approximately 75 percent of the soil volume removed would be backfilled to accomplish contouring and slope stabilization.

Groundwater cleanup

Groundwater at the project site has been contaminated from surficial releases and spills, and dissolved contaminants have subsequently been transported by groundwater flow. The same risk-based groundwater cleanup requirements apply to all areas throughout the site. Groundwater cleanup will be required to some extent in each of the administrative areas but the locations of localized surface facilities required for groundwater cleanup have not been determined. Existing wells and infrastructure would be used whenever available. Additionally, there is some flexibility in siting new wells and pipelines enabling them to be placed in previously disturbed areas with existing access.

Groundwater monitoring in Area IV would include the installation of five additional monitoring wells. Groundwater treatment methods would generally involve installation and operation of localized pumps and treatment units near existing wellheads. In the Radioactive Materials Handling Facility (RMHF) area, DOE proposes that bedrock would be removed to address the Strontium-90 source, impacting up to 0.25 acre of previously disturbed habitat through excavation, stockpiling, and operation of equipment. Treatment options involving dewatering would include extraction and treatment of groundwater and disposal of treated water in an environmentally safe manner, in compliance with permit conditions.

Buildings and Infrastructure Removal

Buildings/Facilities

The proposed action includes removal of existing facilities, buildings, support structures, and infrastructure no longer in use at the SSFL properties, over the course of 2 years. Demolition and removal of some of the SSFL facilities, buildings and infrastructure will require the mobilization and operation of heavy construction equipment and the generation, transport, and disposal of large volumes of debris and waste to offsite treatment, storage, and/or disposal facilities. The

scale of these operations will depend on the size of the facility and the area affected by facility operations. The schedules for these activities may overlap with portion of the soil and groundwater cleanup program, exacerbating the biological impacts of these activities.

Roads

The project site includes a network of paved and unpaved roads with dirt roads that will be used to access remote, undeveloped areas during wildfires and to conduct monitoring activities. It is expected that most roads will remain in place for the duration of the proposed action, except for those associated with specific buildings or facilities that can be removed without affecting ongoing access needs for remediation, monitoring and safety.

Water Supply

Water is supplied from municipal sources via pipeline to SSFL at the main gate and is supplied to the Boeing offices in Area I. Potable water for Area III and IV is supplied by truck. As part of the site closure activities, the majority of formerly used water supply wells will be properly abandoned by their owners, in accordance with existing regulations. Some existing wells may be used for monitoring, extraction, or injection as part of the final groundwater cleanup.

Electrical

Southern California Edison (SCE) would provide electricity to the project site from the Chatsworth Substation, located in Area IV, and electricity would be distributed to smaller substations in Area I via aboveground transmission lines. At the present time, electricity either is not supplied to or it has been disconnected from most buildings; however, the majority of the existing transmission lines and transformers are still in service and/or energized. The SCE substation, along with easements for its electrical system, would remain until SCE decides otherwise. Unneeded electrical infrastructure may be removed.

Sewer Pipelines

All onsite sewage treatment plants have been removed. The remaining sewer pipelines are vitreous clay and cast iron, with ductile iron and steel force mains. Pipeline diameters range from 2 to 10 inches, with the majority of the segments being 4 and 6 inches in diameter. The pipelines are generally 3 to 5 feet below grade, with some pipelines up to 10 feet deep. Some sewer system pipelines are also above the ground surface. All aboveground sewer pipelines would be removed, and below ground sewer pipelines would be either removed or decommissioned in place.

Leach Fields

Several inactive sanitary leach fields are located within the SSFL site. If these leach fields are co-located with soil requiring cleanup, they would be removed during site cleanup requirements; otherwise, they would be left in place. Boeing is currently attempting to locate 8 of the 19 inactive leach fields for which location information is uncertain. The site of the former RMHF leach field in Area IV has been affected by Strontium-90 and remediation is currently under investigation by DOE. Investigation of other leach fields has been completed and those with impacts above applicable cleanup requirements will be addressed. Specific cleanup methods for leach fields will be defined in the remediation planning documents.

Existing Surface Water Treatment Systems

Stormwater treatment at the project site is governed by the Waste Discharge Requirements and National Pollutant Discharge Elimination System (NPDES) permit issued to Boeing by the Los Angeles Regional Water Quality Control Board. Although the current NPDES permit is issued to Boeing, it governs the entire SSFL area and the DOE supports compliance with its provisions because discharges from their activities are also covered by the permit. Active treatment is performed on water collected in the onsite ponds using two surface water treatment systems that employ filters and chemical treatment. A passive biofilter system has been implemented that uses soil, naturally occurring bacteria, and native plants to filter the surface water. Each Responsible Party has implemented drainage culvert modifications, stream bank stabilization, revegetation of disturbed soil areas, installation of detention bioswales, and placement of smaller-scale erosion control measures to comply with NPDES requirements. Surface drainage that would lead offsite into the NBZ is captured at the outfalls and piped back to Silvernale Pond for detention and treatment. The DOE expects that this system would remain in place for the duration of onsite remediation and treatment.

Restoration of the Affected Environment

The proposed action requires the removal, hauling, and disposal of impacted soils to approved off-site locations. DOE estimates backfill volume to be approximately 75 percent of the total excavation volume within Area IV and the NBZ, which would have implications for restoration (e.g. re-contouring the land and drainages, revegetation/habitat restoration). Restoration actions would further require the replacement of removed impacted soils with non-impacted backfill, sourced and hauled from off-site locations. Borrow sites for backfill have not been identified for DOE, but they would either be from existing sites operating under permits or new sites that would need separate environmental review and permitting.

DOE proposes to develop a revegetation and habitat restoration plan that would address all revegetation efforts associated with the soil disturbances. Restoration activities would occur following all cleanup and backfill activities and are anticipated to be conducted for 5 years or more. The plan would include specific erosion control measures, irrigation requirements, species composition, seed mix origins and ratios for particular habitats, weed control, water regimes, maintenance activities, success criteria, and monitoring requirements. DOE proposes to develop the plan with input from the Service and the California Department of Fish and Wildlife. Full parameters for the development of the revegetation and habitat restoration plan are outlined in Conservation Measure 9 (see Appendix A).

Protective Measures

The proposed action incorporates a number of general and species-specific measures DOE and its contractors would implement to avoid, minimize, and/or compensate for adverse effects on federally listed and proposed species and designated critical habitat. A summary of the protective measures is provided below, full text is shown in Appendix A.

Conservation Measure 1. Biological Monitoring during Project Construction and Pre-Project Clearance Surveys. One or more qualified Project Biologists (monitoring team), approved by the Service, CDFW, and U.S. Army Corps of Engineers (Corps) would be retained by DOE for the duration of construction activities. The Project Biologist will be on site as needed during building demolition and clearing and grubbing of vegetation in habitats that have the potential to support sensitive species, including federally or state-listed species. The monitoring team will include a Project Biologist and staff members qualified to perform particular tasks under the direction of the Project Biologist.

Conservation Measure 2. Site Access Restrictions to Minimize Impacts to Sensitive Biological Resources.

- a) The project work areas will be accessed using existing roads to the extent possible.
- b) The demolition, remediation, and restoration contractors will stage equipment in areas away from sensitive habitat areas and endangered species.
- c) Where access must be through native habitats, the project biologist will be consulted to determine the least environmentally damaging and safe access route to the site.
- d) Limits of the action area will be clearly marked and delineated in the field by the biologist. No unauthorized personnel or equipment (including off-road vehicle access) will be allowed.
- e) Disturbance in the 2010 AOC proposed biological exemption areas would be kept to a minimum.
- f) Biologically sensitive areas will be clearly marked on plans and on site and avoided by personnel and equipment.
- g) Before project initiation, the project boundary, including temporary features such as staging areas, will be clearly marked with flagging, fencing, or signposts.
- h) DOE will cease all construction activities from sunset and to sunrise to the maximum extent practicable.
- i) All trash will be disposed of properly or removed from the site regularly. Following initial project construction, all equipment, waste, and construction debris will be removed from the site, and the soil will be re-contoured prior to habitat restoration.

Conservation Measure 3. Environmental Education Program. All members of action related crews will participate in an Environmental Education Program to be administered by the Project Biologist. The Education Program will be conducted during all project phases for any new crew personnel brought to the site. Species-specific training will be administered to crews who will be performing activities within areas occupied, or presumed to be occupied, by listed species.

Conservation Measure 4. Vehicle and Operation Restrictions to Prevent Unintentional Fire. Trucks will carry water and shovels or fire extinguishers in the field, and wildfires will be prevented by exercising care when driving and by not parking vehicles in grass or other dry vegetation where catalytic converters can ignite it.

Conservation Measure 5. Conduct Vegetation Removal or Heavy Equipment Operation Adjacent to Vegetated Habitat Outside of Nesting Season for Those Species Protected by the Migratory Bird Treaty Act.

a) Project activities involving heavy equipment in or adjacent to vegetated areas will not be scheduled during the nesting season for song birds, between February 15 and August 31 to avoid potential impacts on nesting birds, whenever feasible. Areas within the project site where migratory birds roost or nest will be surveyed by qualified biologist prior to vegetation removal. If nesting birds are identified that may be affected by the proposed activities, then an appropriate work buffer will be established or work will be delayed until nesting activity has been completed to ensure that the nesting bird activity is not adversely impacted.

b) A qualified biologist will perform a nesting bird survey and confirm that active nests would not be affected.

Conservation Measure 6. Minimize the Potential for Establishment of Invasive Plant Species. Project activities will minimize the potential for invasive plant species (i.e. weeds) or soil pathogens to become established in disturbed areas and spread into restoration areas or natural areas. Equipment and/or vehicles used for remediation activities in off-road locations will utilize dry-truck cleaning measures (e.g. rumble strips, brushing) upon entering SSFL and/or the project site.

Conservation Measure 7. Avoid, Minimize, and Mitigate for Disturbance to Corps Jurisdictional Wetlands and Waters of the U.S. and wetlands and waters under CDFW jurisdiction.

a) No dumping or fill will be placed in any Clean Water Act (CWA) Section 404 Waters of the U.S. except as authorized by a permit from the Corps.

b) Erosion and sediment control best management practices (BMPs) would be implemented during soil remediation, building demolition, and any other ground disturbance activities.

c) When soil disturbance occurs during the rainy season (November 1 to May 1), erosion and sedimentation BMPs will be installed and maintained immediately downslope of work areas.

d) Natural ephemeral drainages that are within the soil disturbance areas will be reconstructed as soon as possible to restore drainage patterns.

e) If man-made drainage features need to be restored to pre-disturbance condition, they will be restored in a manner that mimics the natural drainage on the site.

- f) Protective measures will include a sequence of (1) seeking to avoid impacts, (2) minimizing impacts in space and/or time, and (3) providing compensation for impacts that are unavoidable.

Conservation Measure 8. Avoid and Minimize Disturbance to Sensitive Upland Vegetation.

Disturbance to Venturan coastal sage scrub, dipslope grassland, sandstone outcrops (including vegetated sandstone outcrops), chaparral, southern California walnut woodland, coast live oak woodland, southern willow scrub, mulefat scrub, and coast live oak riparian woodland, will be avoided and minimized to the extent practicable. Proper functioning of these habitats is necessary to support overall ecosystem functioning on SSFL including the site's ability to support endangered, threatened, and sensitive species and designated critical habitat.

Conservation Measure 9. Develop a Revegetation and Habitat Restoration Plan. A qualified biologist will prepare a site-specific Revegetation and Habitat Restoration Plan (RHRP), in consultation with the Service and CDFW that includes a description of existing conditions in the action area, areas of impact, site preparation and revegetation methods, maintenance and monitoring criteria, performance standards, and adaptive management practices.

The RHRP will be developed and approved by appropriate agencies prior to the initiation of ground disturbance or construction activities. The RHRP will address all revegetation efforts associated with the soil disturbances. It will include specific irrigation requirements, species composition, seed mix origins and ratios for that particular habitat, weed control, water regimes, maintenance activities, success criteria, and monitoring requirements.

Conservation Measure 10. Develop a Tree Management and Preservation Plan. A Tree Management and Preservation Plan will be developed to offset tree impacts through a sustainable, customized plan that is suitable for the site's unique opportunities for tree preservation, enhancement, and establishment. The plan will identify trees protected by Ventura County, including coast live oak (*Quercus agrifolia*), sycamore (*Platanus racemosa*), historical and heritage trees (protected trees), or special-status trees (e.g. southern California black walnut [*Juglans californica*]) that could be impacted within or adjacent to remediation areas, as well as those located outside of the project footprint that would be preserved.

Conservation Measure 11. Soil Stabilization. In conjunction with reseeding and when topsoil is unavailable, soil stabilization BMPs will be used when and where applicable. An updated Storm Water Pollution Prevention Plan (SWPPP) will guide erosion control measures for all project activities (e.g. demolition and remediation activities). Dust control measures would be developed and implemented to minimize fugitive dust and limit soil losses due to wind.

Conservation Measure 12. Avoidance and Minimization of Impacts to Braunton's milkvetch, Santa Susana tarplant, other Sensitive Plant Species and Associated Critical Habitat.

- a) Prior to access, excavation, demolition, remediation, installation of equipment, or any other activity associated with the proposed project, the Project Biologist will survey all

proposed remediation, staging, and access areas, plus a buffer of 100 feet, for presence of federally and state-listed threatened or endangered plants and other sensitive plant species.

b) Remediation access routes will be adjusted as needed to maximize avoidance of impacts to individuals or populations of Braunton's milkvetch or any other sensitive plant species and associated critical habitat.

c) Dust migration in or adjacent to areas that support sensitive species will be minimized during excavation activities when weather conditions require the use of dust control measures.

d) The project biologist will flag the locations of sensitive plants that occur within 100 feet of a proposed demolition or remediation area and work with the project team to avoid or minimize impacts to the species.

e) Where impacts to Braunton's milkvetch or other sensitive plant species are unavoidable, a salvage, propagation, and replanting program will be developed and implemented as part of the RHRP.

Conservation Measure 13. Avoidance of Vernal Pools and Vernal Rock Pools Potentially Occupied by Listed Vernal Pool Species including Riverside Fairy Shrimp and/or Vernal Pool Fairy Shrimp.

a) Surveys would be conducted during the appropriate season(s) to determine the presence of federally listed Riverside and vernal pool fairy shrimp prior to any work within 250 feet of vernal pools or vernal rock pools, and depression features that support a hydroperiod sufficient to complete the fairy shrimp lifecycle. Surveys must be conducted by a Service approved biologist.

b) Occupied fairy shrimp habitat (vernal pools and vernal rock pools) within 250 feet of the project footprint will be clearly identified in the field with flagging or exclusion fencing.

c) Any demolition or remediation that could indirectly affect vernal pools or potential suitable habitat for federally listed fairy shrimp associated with vernal pools, rock pools, and vernal pool watersheds will occur outside of the rainy season (about November 1 to June 1) and in dry conditions only.

d) Fueling of equipment and vehicle washing will be allowed only in designated areas and will not occur within 100 feet of any vernal pool or vernal rock pool or other aquatic habitat, including intermittent drainages.

e) Stockpiled soils will be placed on top of heavy-duty plastic sheeting on areas with an impervious surface. All stockpiles will be covered with material adequate to prevent soil transport by wind or rainwater. Covers will be maintained in good condition.

Conservation Measure 14. Avoidance of California Red-legged Frog and associated Critical Habitat. A qualified biologist will conduct pre-demolition and pre-remediation surveys within work areas containing suitable habitat, as well as biological monitoring during demolition and remediation activities. If the California red-legged frog is discovered in work zones before or during demolition and remediation activities, the species will be avoided; demolition and remediation activities will be immediately halted; and consultation will be initiated with the Service to determine an appropriate response before demolition and remediation activities can begin/restart.

Conservation Measure 15. Avoidance of Least Bell's Vireo. Any required clearing of woody riparian vegetation will take place outside of the breeding season for the least Bell's vireo (March 15 to August 31). If avoidance is not practicable, the measures will be implemented to minimize effects to least Bell's vireos. Pre-project surveys, when applicable, will adhere to the Service's (2001) least Bell's vireo survey guidelines as a recognized method to determine presence or absence of the species and its habitat and be conducted during the April 10 to July 31 ideal survey window within one year in advance of construction activity. If an active nest occurs within 300 feet of the proposed project activity, then project activities other than the use of existing roads will be delayed until after young fledge from the nest.

Conservation Measure 16. Avoidance of Coastal California Gnatcatcher. Prior to any clearing of vegetation or soil removal in Venturan coastal sage scrub or other suitable habitat for the coastal California gnatcatcher, the Service's presence/absence survey protocol (Service 1997a) will be implemented.

- a) Pre-activity surveys in all suitable coastal California gnatcatcher habitats will be conducted by a qualified biologist. If an active nest occurs within 300 feet of the proposed activity, the project activities in the vicinity of the nest (other than the use of existing roads) will be delayed until after young fledge from the nest.
- b) A qualified biologist will monitor nest progress and activities in and adjacent to coastal California gnatcatcher habitat to ensure compliance.

Conservation Measure 17. Environmental Mitigation Requirements and Monitoring Program. DOE will be in consultation with oversight agencies including the Service, CDFW, Corps, DTSC, and County of Ventura, as appropriate, and will be responsible for coordinating and implementing the conservation and protection measures and permit requirements.

ANALYTICAL FRAMEWORK FOR THE JEOPARDY AND ADVERSE MODIFICATION DETERMINATIONS

Jeopardy Determination

Section 7(a)(2) of the Endangered Species Act requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. "Jeopardize the continued existence of" means "to engage in an action that

reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species” (50 CFR 402.02).

The jeopardy analysis in this biological opinion relies on four components: (1) the Status of the Species, which describes the range-wide condition of the least Bell’s vireo, coastal California gnatcatcher, California red-legged frog, Riverside fairy shrimp, vernal pool fairy shrimp, and Braunton’s milkvetch, the factors responsible for that condition, and its survival and recovery needs; (2) the Environmental Baseline, which analyzes the condition of the least Bell’s vireo, coastal California gnatcatcher, California red-legged frog, Riverside fairy shrimp, vernal pool fairy shrimp, and Braunton’s milkvetch in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the least Bell’s vireo, coastal California gnatcatcher, California red-legged frog, Riverside fairy shrimp, vernal pool fairy shrimp, and Braunton’s milkvetch; (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 least Bell’s vireo, coastal California gnatcatcher, California red-legged frog, Riverside fairy shrimp, vernal pool fairy shrimp, and Braunton’s milkvetch; and (4) the Cumulative Effects, which evaluates the effects of future, non-Federal activities, that are reasonably certain to occur in the action area, on the least Bell’s vireo, coastal California gnatcatcher, California red-legged frog, Riverside fairy shrimp, vernal pool fairy shrimp, and Braunton’s milkvetch.

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 least Bell’s vireo, coastal California gnatcatcher, California red-legged frog, Riverside fairy shrimp, vernal pool fairy shrimp, and Braunton’s milkvetch, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to reduce appreciably the likelihood of both the survival and recovery of the least Bell’s vireo, coastal California gnatcatcher, California red-legged frog, Riverside fairy shrimp, vernal pool fairy shrimp, and Braunton’s milkvetch in the wild by reducing the reproduction, numbers, and distribution of that species.

Adverse Modification Determination

Section 7(a)(2) of the Act requires that Federal agencies insure that any action they authorize, fund, or carry out is not likely to destroy or to adversely modify designated critical habitat. A final rule revising the regulatory definition of “destruction or adverse modification” was published on February 11, 2016 (81 FR 7214). The final rule became effective on March 14, 2016. The revised definition states:

“Destruction or adverse modification means a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features.”

The “destruction or adverse modification” analysis in this biological opinion relies on four components: (1) the Status of Critical Habitat, which describes the range-wide condition of the critical habitat in terms of the key components (i.e. essential habitat features, primary constituent elements, or physical and biological features) that provide for the conservation of the listed species, the factors responsible for that condition, and the intended value of the critical habitat overall for the conservation/recovery of the listed species; (2) the Environmental Baseline, which analyzes the condition of the critical habitat in the action area, the factors responsible for that condition, and the value of the critical habitat in the action area for the conservation/recovery of the listed species; (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 key components of critical habitat that provide for the conservation of the listed species, and how those impacts are likely to influence the conservation value of the affected critical habitat; and (4) Cumulative Effects, which evaluate the effects of future non-Federal activities that are reasonably certain to occur in the action area on the key components of critical habitat that provide for the conservation of the listed species and how those impacts are likely to influence the conservation value of the affected critical habitat.

For purposes of making the “destruction or adverse modification” determination, the Service evaluates if the effects of the proposed Federal action, taken together with cumulative effects, are likely to impair or preclude the capacity of critical habitat in the action area to serve its intended conservation function to an extent that appreciably diminishes the rangewide value of critical habitat for the conservation of the listed species. The key to making that finding is understanding the value (i.e. the role) of the critical habitat in the action area for the conservation/recovery of the listed species based on the Environmental Baseline analysis.

STATUS OF THE SPECIES AND ITS CRITICAL HABITAT

Least Bell's Vireo

Legal Status

The least Bell's vireo was federally listed as endangered in 1986 (51 Federal Register (FR) 16474), and critical habitat was designated in 1994 (59 FR 4845). Although a final recovery plan has not been published, a draft recovery plan was completed in 1998 (Service 1998a). The Service issued a 5-year review in 2006 (Service 2006) in which we recommended downlisting to threatened status because of a 10-fold increase in population size since listing, expansion of locations with breeding pairs throughout southern California, and conservation and management of suitable breeding habitat throughout its range. The final rule for designation of critical habitat describes 10 localities, encompassing approximately 38,000 acres, in six counties in California. Critical habitat is designated in Ventura County; however, it is not designated in the project area and will not be discussed further in this biological opinion. Additional information on the least Bell's vireo may be found in Wilbur (1980), Garrett and Dunn (1981), Zembal et al. (1985), Miner (1989), Pike and Hays (1992), and Service (1998).

Natural History

The least Bell's vireo is a small, migratory songbird that nests and forages almost exclusively in riparian woodland. It is one of four subspecies (American Ornithologists' Union 1957), and each is isolated from another throughout the year (Hamilton 1962, Service 1998a). Least Bell's vireos are site-tenacious across breeding seasons and highly territorial. They typically inhabit structurally diverse woodlands along watercourses that feature dense cover within 3 to 6 feet of the ground and a dense, stratified canopy (Goldwasser 1981, Salata 1983, Gray and Greaves 1984, Service 1998a). The understory of the habitat is typically dominated by mulefat (*Baccharis salicifolia*), California wild rose (*Rosa californica*), poison oak (*Toxicodendron diversiloba*), sandbar willow (*Salix hindsiana*), young individuals of other willow (*Salix*) species, and several perennial species (Service 1998a). Important canopy species include mature arroyo willow (*Salix lasiolepis*) and black willow (*Salix gooddingii*), and occasional cottonwood (*Populus* spp.), western sycamore, and coast live oak.

Least Bell's vireos feed primarily on insects, especially lepidopteran (butterfly) larvae within willow stands or associated riparian vegetation (Miner 1989, Brown 1993). The feeding behavior consists largely of gleaning prey from leaves or woody surfaces while perched or hovering, and less frequently by aerial pursuit (Salata 1983, Miner 1989). Least Bell's vireos concentrate most of their foraging between 0 to 20 feet above ground level (Salata 1983, Miner 1989).

Least Bell's vireos generally arrive in breeding areas in southern California from mid-March to early April, with males arriving before females and older birds arriving before first-year breeders (Service 1998a). Least Bell's vireos generally remain on the breeding grounds until late September, although some post-breeding migration may begin as early as late July (Service 1998a). Males establish and defend breeding territories by singing and chasing intruders (Barlow 1962, Beck 1996, Service 1998a). Although territories typically range in size from 0.5 to 7.5 acres (Service 1998a), no relationship appears to exist between size and quality of the territory (Newman 1992). Most passerine birds, including least Bell's vireo, tend to be most active 1 hour prior to sunrise until 4 hours after sunrise and again in the late evening hours until 1 hour after sunset (Ralph et al. 1993, Gill 1995).

Nest building commences a few days after pair formation, with the female selecting a nest site and both sexes constructing the nest (Pitelka and Koestner 1942, Barlow 1962, Service 1998a). Nests are typically suspended in forked branches within 3 feet above the ground and with no preference for any particular plant species as the nest host (Nolan 1960, Barlow 1962, Gray and Greaves 1984, Service 1998a). Typically 3 or 4 eggs are laid on successive days shortly after nest construction (Service 1998a). The eggs are incubated by both parents for approximately 14 days with the young remaining in the nest for another 10 to 12 days (Pitelka and Koestner 1942, Nolan 1960, Barlow 1962). Each nest appears to be used only once (Greaves 1987). Least Bell's vireos may attempt up to five nests within a breeding season, but they are typically limited to one or two successful nests within a breeding season (Service 1998a).

Multiple long-term monitoring studies indicate that approximately 59 percent of nests successfully produce fledglings, with an average of 1.8 chicks fledging per nest (Service 1998a).

Although nests appear to be more accessible to terrestrial predators because of their relatively low placement (Franzreb 1989), western scrub-jays (*Aphelocoma californica*) account for the majority of documented predation (Peterson 2002, Peterson et al. 2004). Predation rates can exceed 60 percent of the total nests in an area within a year (Kus 1999), but typical nest predation rates average around 30 percent (Franzreb 1989), which is comparable to predation rates for other North American passerines (Martin and Clobert 1996, Grishaver et al. 1998, Ferree 2002).

Nest parasitism by brown-headed cowbirds (*Molothrus ater*) is another major source of failure for nests of least Bell's vireos (Franzreb 1989; Service 1998a; Kus 1999, 2002; Griffith and Griffith 2000; Sharp 2002). The nests that are parasitized are either abandoned or fledge cowbirds chicks rather than least Bell's vireos. Cowbirds did not historically occur within the range of the least Bell's vireo, which may explain why least Bell's vireos have not evolved adequate defenses to avoid loss of productivity due to their parasitism (Franzreb 1989, Kus 2002). Cowbird trapping and focused nest monitoring can substantially reduce parasitism or its effects (Franzreb 1989, Service 1998a, Griffith and Griffith 2000, Kus 2002).

Cowbird trapping has proven a successful tool to halt least Bell's vireo population declines over the short term within a limited area, but Kus and Whitfield (2005) have argued that trapping may not be the best method for long-term recovery of the least Bell's vireo because maintaining cowbird populations at low levels may not allow the least Bell's vireo to evolve resistance to cowbird parasitism. The best way to manage this threat over the long term is not apparent, and additional research is needed to determine whether there are any alternatives to the intensive cowbird trapping programs currently being implemented (Service 2006).

Fledgling least Bell's vireos expand their dispersal distances from approximately 35 feet the first day to approximately 200 feet several weeks after fledging (Hensley 1950, Nolan 1960). This distance has been shown to increase to at least 1 mile prior to their first fall migration (Gray and Greaves 1984). Banding records indicate that while most first-year breeding individuals return to their natal drainage after winter migration, some disperse considerable distances to other breeding locations (Greaves and Labinger 1997, Service 1998a, Kus and Beck 1998). Movement by least Bell's vireos between drainages within San Diego County is not uncommon (Kus and Beck 1998). Additionally, several least Bell's vireos banded as nestlings in San Diego County have been sighted as breeding adults in Ventura County, and the opposite movement from Ventura to San Diego has been observed also (Greaves and Labinger 1997). The maximum, documented dispersal distance is approximately 130 miles (Service 1998a). Although movement between sites by older birds may occur, site fidelity by least Bell's vireos after the first breeding season is generally high. Most dispersal occurs prior to the first breeding season (Service 1998a).

Rangewide Status

The least Bell's vireo historically occurred from Tehama County in northern California to northwestern Baja California, Mexico, and eastward to Owens Valley, Death Valley and the Mojave River (Grinnell and Miller 1944, Service 1998a). Although previously considered to be abundant locally, regional declines were observed by the 1940s (Grinnell and Miller 1944), and

it was believed to be extirpated from California's Central Valley by the early 1980s (Franzreb 1989). Except for a few outlying pairs, by 2002 the least Bell's vireo was mostly restricted to southern California south of the Tehachapi Mountains and northwestern Baja California (Wilbur 1980, Garrett and Dunn 1981, Franzreb 1989, U.S. Geological Survey (USGS) 2002). The largest current concentrations of least Bell's vireos are in San Diego County along the Santa Margarita River on Camp Pendleton and in Riverside County at the Prado flood control basin (Service 2006).

Historically, the San Joaquin and Sacramento Valleys were considered to be the center of the least Bell's vireo's breeding range (60 to 80 percent of the historical population; 51 FR 16474), but the least Bell's vireo has not yet meaningfully re-colonized those areas. In 2005 and 2006, the first breeding pair of least Bell's vireos detected in the San Joaquin Valley since listing successfully bred at the San Joaquin National Wildlife Refuge in Stanislaus County (Service 2006). There have been no sightings of least Bell's vireos in the Sacramento Valley since prior to listing, and it is unlikely that breeding has occurred within recent years in the Sacramento Valley (Service 2006).

At the time of listing (51 FR 16474), 99 percent of the remaining least Bell's vireos were in southern California (Santa Barbara County and southward), with 77 percent in San Diego County. Ninety-nine percent still remain in southern California (Service 2006), although 54 percent are in San Diego County and 30 percent in Riverside County. Thus, despite a significant increase in overall numbers, the species remains mostly restricted to the southern portion of its historical range (Service 2006).

The least Bell's vireo's decline is due to destruction or degradation of habitat, river channelization, water diversions, lowered water tables, gravel mining, agricultural development, and cowbird parasitism (51 FR 16474, 59 FR 4845, Service 1998a). Habitat losses have fragmented most remaining populations into small, disjunct, widely dispersed subpopulations (Franzreb 1989). Habitat fragmentation negatively affects abundance and distribution of neotropical migratory songbirds by increasing incidence of nest predation and parasitism (Whitcomb et al. 1981, Small and Hunter 1988, Yahner and DeLong 1992, Sharp 2002, Peterson 2002). Males establish breeding territories that range from 0.5 to 4.2 acres (Franzreb 1989). Least Bell's vireos nesting in smaller areas or areas with degraded habitat have lower productivity (e.g. hatching success) than those in areas with high quality habitat (Pike and Hays 1992). Since listing, the least Bell's vireo population in California has increased 10-fold as indicated by the number of known territories (from 291 to 2,968 known territories; Service 2006). The population has grown during each 5-year period since listing, although the rate of increase has slowed over the last 10 years. Population growth has been greatest in San Diego County and Riverside County, with lesser but substantial increases in Orange County, Ventura County, San Bernardino County, and Los Angeles County. The population in Santa Barbara County has declined since listing in 1986. Kern, San Luis Obispo, Monterey, San Benito and Stanislaus Counties have each had a few isolated individuals and/or breeding pairs since listing, but these counties have not supported sustained populations.

Least Bell's Vireo Recovery

Draft Recovery Plan for the Least Bell's Vireo

The 1998 draft recovery plan for the least Bell's vireo states that the goal of recovery efforts is the reclassification of the subspecies from endangered to threatened and, ultimately, delisting of the subspecies. The draft plan states that reclassification to threatened status may be considered when there are stable or increasing population/metapopulations of least Bell's vireos for a period of 5 consecutive years, each consisting of several hundred or more breeding pairs at the following sites: Tijuana River, Dulzura/Jamul Creek/Otay River, Sweetwater River, San Diego River, San Luis Rey River, Camp Pendleton/Santa Margarita River, Santa Ana River, an Orange County/Los Angeles County metapopulation, Santa River, Santa Ynez River, and an Anza Borrego Desert metapopulation. The draft plan states that each of these populations and metapopulations should be protected and managed.

The draft plan states that delisting of the least Bell's vireo may be considered when the subspecies meets the criterion for downlisting and there are stable or increasing least Bell's vireo population/metapopulations for a period of 5 consecutive years established at the following currently unoccupied areas of the species' historical range: Salinas River, a San Joaquin Valley metapopulation, and a Sacramento Valley metapopulation. The draft plan states that each of these populations and metapopulations should be protected and managed.

Lastly, the draft plan states that threats to the least Bell's vireo at the aforementioned sites should be reduced or eliminated so that these populations/metapopulations are capable of persisting without significant human intervention, or perpetual endowments are secured for cowbird trapping and exotic plant control in riparian habitat occupied by the least Bell's vireos.

The draft recovery plan describes a strategy for reclassification, recovery, and delisting. Instrumental to this strategy is securing and managing riparian habitat within the historical breeding range of the least Bell's vireo, annual monitoring and rangewide surveys, and research activities necessary to monitor and guide the recovery effort.

Coastal California Gnatcatcher

Legal Status

The Service listed the coastal California gnatcatcher as threatened on March 30, 1993 (58 FR 16742) and published a final rule designating critical habitat for the coastal California gnatcatcher on October 24, 2000 (65 FR 63680). As a result of various lawsuits and court decisions, the Service re-proposed critical habitat on April 24, 2003 (68 FR 20228), and the final rule designating critical habitat was published on December 19, 2007 (72 FR 72010).

In September 2010, the Service completed a 5-Year Review addressing the status of the coastal California gnatcatcher (Service 2010b). In the 5-Year Review, we found that implementation of large-scale, multi-species, regional Natural Community Conservation Plans/Habitat Conservation Plans (NCCPs/HCPs) has reduced the magnitude of threats associated with urban

and agricultural development; however, the threat of habitat type-conversion is increasing due to multiple factors. Because of the increased magnitude of the threat of habitat type conversion, the 5-Year Review recommended no change to the listing status of the species.

On June 11, 2014, we received a petition requesting the coastal California gnatcatcher be delisted. After reviewing the available information, the Service determined the petitioned action was not warranted (81 FR 59952) and the coastal California gnatcatcher remains listed as threatened.

Natural History

The coastal California gnatcatcher is endemic to cismontane southern California and northwestern Baja California, Mexico (Atwood 1991). It typically occurs in or near coastal sage scrub, comprising 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*), snapdragon penstemon (*Keckiella antirrhinoides*), sages (*Salvia* spp.), sunflowers (*Encelia* spp.), and cacti (*Opuntia* spp.) (Weaver 1998). The coastal California gnatcatcher may also use chaparral, grassland, and riparian plant communities where they occur adjacent to or intermixed with coastal sage scrub, especially during the non-breeding season (Campbell et al. 1998). Potential factors contributing to the coastal California 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); however, coastal California gnatcatchers are closely tied to sage scrub habitats for reproduction (Atwood 1993).

The coastal California 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) and wasps, bees, and ants (Hymenoptera) are minor components (Burger et al. 1999).

Coastal California gnatcatchers are non-migratory and exhibit strong site tenacity (Atwood 1993). Breeding season territories range widely in size, from less than 2.5 acres to 37 acres (Atwood et al. 1998, Preston et al. 1998), with mean territory size generally greater for inland populations than coastal populations (Preston et al. 1998). The mean territory size for inland areas during the breeding season generally ranges from 12 to 27 acres per pair (Preston et al. 1998). During the non-breeding season, coastal California 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. 1998).

The breeding season of the coastal California gnatcatcher extends from late-February through early August, with the peak of nesting attempts occurring from mid-March through mid-May (Atwood and Bontrager 2001). Most coastal California gnatcatchers first breed at 1 year of age (Atwood and Bontrager 2001). Nests are constructed over a 4- to 10-day period and are most often placed in California sagebrush about 3 feet above the ground (Atwood 1993). Clutch size

averages approximately 4 eggs (Atwood and Bontrager 2001). 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 some pairs may produce more than one brood in one nesting season (Atwood and Bontrager 2001).

Juveniles stay within their natal territories 21 to 35 days after fledging from the nest (Grishaver et al. 1998), with juveniles subsequently dispersing to find their own foraging and nesting territories, if available. Juveniles usually disperse less than 6.2 miles from their natal territory (Atwood and Bontrager 2001), but they generally disperse less than 2 miles on average (Bailey and Mock 1998; Galvin 1998; Atwood and Bontrager 2001). Dispersing coastal California gnatcatchers are apparently able to traverse human-modified landscapes for at least short distances (Bailey and Mock 1998). Juveniles begin to vie for territories as early as late spring, and will have established territories by the end of October (Preston et al. 1998).

Similar to other songbirds, mortality of coastal California gnatcatchers is highest for the youngest age class, with much of this attributable to predation of young in nests. Mean average survivorship of coastal California 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. The oldest documented individual was a female at least 8 years old (Atwood and Bontrager 2001).

Rangewide Status

The range of the coastal California gnatcatcher extends from southern Ventura and San Bernardino counties, California, south to near El Rosario, Mexico, at about 30 degrees north latitude (Service 2010b). The northern and eastern limits of the coastal scrub vegetation communities used by the coastal California gnatcatcher are bound by mountainous areas, while the southern limit is defined by the transition to the Vizcaíno Desert. Most of the coastal California 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 (Atwood and Bontrager 2001). The current overall range is roughly the same as it was at the time of listing (Service 2010b). While the species' overall distribution has not changed much over time, the amount of suitable habitat within that range has declined which led to the species' listing as threatened in 1993 (58 FR 16742).

Coastal California gnatcatchers were considered locally common in the mid-1940s, but they had declined substantially in the United States by the 1960s (Atwood and Bontrager 2001). In 1993, the Service estimated that about 2,562 coastal California gnatcatcher pairs remained in the United States, with the highest densities occurring in Orange and San Diego counties (58 FR 16742). In a study using more rigorous sampling techniques, Winchell and Doherty (2008) found a mean of 1,324 pairs of coastal California gnatcatchers over four sampling periods in an 111,006-acre area on public and quasi-public lands in Orange and San Diego counties. Their sampling frame covered only a portion of the U.S. range, focusing on the coast, and was limited to 1 year. Although it is not valid to extrapolate beyond the sampling area, especially in light of

known differences in population densities across the range of the coastal California gnatcatcher (Atwood 1992), we conclude it is likely there are more coastal California gnatcatchers in the U.S. portion of the range than was suggested by earlier estimates. For example, new locations are being recorded in Ventura and Los Angeles counties where the species was thought to be extirpated or only present in very low numbers. We are not aware of any recent estimates of coastal California gnatcatcher populations in Baja California.

The population estimates described above are based on surveys conducted prior to catastrophic fires in San Diego County in 2003 and San Diego and Orange counties in 2007. These fires may have temporarily reduced the overall coastal California gnatcatcher population because of the temporary loss of coastal California gnatcatcher occupied habitat. In the 2007 fires, a total of approximately 112,375 acres of coastal sage scrub burned in several separate locations.

The 5-Year Review for coastal California gnatcatcher includes a detailed evaluation of the current threats and conservation needs of the species. The species was listed in 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. Habitats that are fragmented have reduced biological integrity due to the increased potential for human-generated disturbance. Directly associated with development is an increase in recreational use of habitats, fire frequency, waste dumping, air pollution, exotic plant and animal species, predators, cowbird parasitism, domestic pets, and night lighting, all of which can have adverse impacts on the quality of habitat for the coastal California gnatcatcher.

Several stressors, including livestock grazing, anthropogenic atmospheric pollutants, and wildfire, promote habitat type conversion within the range of the coastal California gnatcatcher. Wildfire in particular is a major contributor because it promotes a feedback loop. That is, wildfire allows non-native grasses to outcompete re-growing native shrubs, which leads to an increase in non-native grasses, which makes the area more susceptible to wildfire, which allows the process to repeat, but with successively fewer native shrubs with each iteration. The number of wildfires has increased dramatically as urbanization (with its multitude of ignition sources) has come into greater contact with open space areas. Thus, the threat of habitat type conversion has increased throughout the range of the coastal California gnatcatcher since listing (Service 2010b).

Coastal California Gnatcatcher Recovery

The Service has not developed a recovery plan for the coastal California gnatcatcher. The 5-year review (Service 2010b) and the final rule on the petition to delist the species (59 FR 59952) both contain information relative to this discussion, so we rely on those documents to assess the coastal California gnatcatcher's current recovery status and needs. The final rule on the delisting petition analyzes a 50-year timeframe with regard to the current threats to the coastal California gnatcatcher (59 FR 59952).

Long-term management is required to address the numerous threats posed by the interface between the coastal California gnatcatcher's habitat and the urban interface. Some long-term management actions that will address identified threats include development and implementation of fire management plans, homeowner education programs (for residences adjacent to occupied habitat), predator control, cowbird trapping, routine invasive vegetation removal, limited public access in areas of high quality habitat, and control of irrigation water and other urban runoff adjacent to preserved habitat. Monitoring of the species distribution over time will assist in determining the effectiveness of management actions at reducing threats and will allow for changes in approach in the event that threats have not been adequately reduced.

Development continues throughout the range of the coastal California gnatcatcher. However, the implementation of regional NCCPs/HCPs in southern California has directed growth into certain areas, while establishing habitat preserves consisting of large "core" areas of coastal California gnatcatcher habitat and connecting "linkage" areas. Five regional plans are finalized and once fully implemented should preserve in perpetuity over 182,976 acres of coastal California gnatcatcher habitat (Service 2010b). Preserved habitat will be managed for the benefit of the coastal California gnatcatcher, thereby reducing the magnitude of the threat to the species due to habitat loss. Large Federal landholdings that support coastal California gnatcatcher habitat also contribute to core and linkage areas. These lands include Marine Corps Base Camp Pendleton, Marine Corps Air Station Miramar, Cleveland National Forest, and San Diego National Wildlife Refuge.

Another recovery concern is habitat type conversion. This occurs when native habitat is disturbed (e.g. fire, discing) that does not result in permanent ground disturbance but allows other plant communities (usually invasive, exotics plants) to convert the habitat into areas unsuitable for occupancy by coastal California gnatcatchers. Type conversion can affect all areas of habitat, even in those areas otherwise considered preserved. Because habitat type conversion is a threat of high magnitude, particularly given the increasing occurrence of wildfire, the 5-year review (Service 2010b) concluded that additional time is needed to evaluate the adequacy of existing management programs for reducing this threat.

California Red-legged Frog

Legal Status

The California red-legged frog was federally listed as threatened on May 23, 1996 (61 FR 25813). Revised critical habitat for the California red-legged frog was designated on March 17, 2010 (75 FR 12816). The Service issued a recovery plan for the species on May 28, 2002 (Service 2002).

Natural History

The California red-legged frog uses a variety of habitat types, including various aquatic systems, riparian, and upland habitats. They have been found at elevations ranging from sea level to approximately 5,000 feet. California red-legged frogs use the environment in a variety of ways, and in many cases they may complete their entire life cycle in a particular area without using

other components (i.e. a pond is suitable for each life stage and use of upland habitat or a riparian corridor is not necessary). Populations appear to persist where a mosaic of habitat elements exists, embedded within a matrix of dispersal habitat. Adults are often associated with dense, shrubby riparian or emergent vegetation and areas with deep (greater than 1.6 feet) still or slow-moving water; the largest summer densities of California red-legged frogs are associated with deep-water pools with dense stands of overhanging willows and an intermixed fringe of cattails (*Typha latifolia*) (Hayes and Jennings 1988). Hayes and Tennant (1985) found juveniles to seek prey diurnally and nocturnally, whereas adults were largely nocturnal.

California red-legged frog breed in aquatic habitats; larvae, juveniles, and adult frogs have been collected from streams, creeks, ponds, marshes, deep pools and backwaters within streams and creeks, dune ponds, lagoons, and estuaries. They frequently breed in artificial impoundments such as stock ponds, given the proper management of hydro-period, pond structure, vegetative cover, and control of exotic predators. While frogs successfully breed in streams and riparian systems, high spring flows and cold temperatures in streams often make these sites risky egg and tadpole environments. An important factor influencing the suitability of aquatic breeding sites is the general lack of introduced aquatic predators. 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.

During periods of wet weather, starting with the first rains of fall, some individual California red-legged frogs may make long-distance overland excursions through upland habitats to reach breeding sites. In Santa Cruz County, Bulger et al. (2003) found marked California red-legged frogs moving up to 1.7 miles through upland habitats, via point-to-point, straight-line migrations without apparent regard to topography, rather than following riparian corridors. Most of these overland movements occurred at night and took up to 2 months. Similarly, in San Luis Obispo County, Rathbun and Schneider (2001) documented the movement of a male California red-legged frog between two ponds that were 1.78 miles apart in less than 32 days; however, most California red-legged frogs in the Bulger et al. (2003) study were non-migrating frogs and always remained within 426 feet of their aquatic site of residence (half of the frogs always stayed within 82 feet of water). Rathbun et al. (1993) radio-tracked three California red-legged frogs near the coast in San Luis Obispo County at various times between July and January; these frogs also stayed rather close to water and never strayed more than 85 feet into upland vegetation. Scott (2002) radio-tracked nine California red-legged frogs in East Las Virgenes Creek in Ventura County from January to June 2001, which remained relatively sedentary as well; the longest within-channel movement was 280 feet and the farthest movement away from the stream was 30 feet.

After breeding, California red-legged frogs often disperse from their breeding habitat to forage and seek suitable dry-season habitat. Cover within dry-season aquatic habitat could include boulders, downed trees, and logs; agricultural features such as drains, watering troughs, spring boxes, abandoned sheds, or hay-ricks, and industrial debris. California red-legged frogs use small mammal burrows and moist leaf litter (Rathbun et al. 1993, Jennings and Hayes 1994); incised stream channels with portions narrower and deeper than 18 inches may also provide habitat (61

FR 25814). This type of dispersal and habitat use, however, is not observed in all California red-legged frogs and is most likely dependent on the year-to-year variations in climate and habitat suitability and varying requisites per life stage.

Although the presence of California red-legged frogs is correlated with still water deeper than approximately 1.6 feet, riparian shrubbery, and emergent vegetation (Jennings and Hayes 1994), California red-legged frogs appear to be absent from numerous locations in the species' historical range where these elements are well represented. 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.

Rangewide Status

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 (Storer 1925, Jennings and Hayes 1985, Shaffer et al. 2004). The California red-legged frog has sustained a 70 percent reduction in its geographic range because of several factors acting singly or in combination (Davidson et al. 2001).

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 (*Lithobates [Rana] catesbeianus*), catfish (*Ictalurus* spp.), bass (*Micropterus* spp.), mosquito fish (*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.

A 5-year review of the status of the California red-legged frog was initiated in May 2011, but has not yet been completed.

California Red-legged Frog Recovery

The 2002 final recovery plan for the California red-legged frog (Service 2002) states that the goal of recovery efforts is to reduce threats and improve the population status of the California red-legged frog sufficiently to warrant delisting. The recovery plan describes a strategy for delisting, which includes: (1) protecting known populations and reestablishing historical

populations; (2) protecting suitable habitat, corridors, and core areas; (3) developing and implementing management plans for preserved habitat, occupied watersheds, and core areas; (4) developing land use guidelines; (5) gathering biological and ecological data necessary for conservation of the species; (6) monitoring existing populations and conducting surveys for new populations; and (7) establishing an outreach program. The California red-legged frog will be considered for delisting when:

1. Suitable habitats within all core areas are protected and/or managed for California red-legged frogs in perpetuity, and the ecological integrity of these areas is not threatened by adverse anthropogenic habitat modification (including indirect effects of upstream/downstream land uses).
2. Existing populations throughout the range are stable (i.e. reproductive rates allow for long-term viability without human intervention). Population status will be documented through establishment and implementation of a scientifically acceptable population monitoring program for at least a 15-year period, which is approximately 4 to 5 generations of the California red-legged frog. This 15-year period should coincide with an average precipitation cycle.
3. Populations are geographically distributed in a manner that allows for the continued existence of viable metapopulations despite fluctuations in the status of individual populations (i.e. when populations are stable or increasing at each core area).
4. The species is successfully reestablished in portions of its historical range such that at least one reestablished population is stable/increasing at each core area where California red-legged frog are currently absent.
5. The amount of additional habitat needed for population connectivity, recolonization, and dispersal has been determined, protected, and managed for California red-legged frogs.

The recovery plan identifies eight recovery units based on the assumption that various regional areas of the species' range are essential to its survival and recovery. The recovery status of the California red-legged frog is considered within the smaller scale of recovery units as opposed to the overall range. These recovery units correspond to major watershed boundaries as defined by USGS hydrologic units and the limits of the range of the California red-legged frog. The goal of the recovery plan is to protect the long-term viability of all extant populations within each recovery unit.

Within each recovery unit, core areas have been delineated and represent contiguous areas of moderate to high California red-legged frog densities that are relatively free of exotic species such as bullfrogs. The goal of designating core areas is to protect metapopulations that, combined with suitable dispersal habitat, will support long-term viability within existing populations. This management strategy allows for the recolonization of habitat within and

adjacent to core areas that are naturally subjected to periodic localized extinctions, thus assuring the long-term survival and recovery of the California red-legged frog.

Riverside Fairy Shrimp

Legal Status

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 Columbia. 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 1998b).

Natural History

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 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 (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 Fahrenheit (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 1998b). 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 (Holland and Jain 1988). 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 and Jain 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 1998b).

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 1998b).

Rangewide Status

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, California Natural Diversity Data Base [CNDDB] 2010a). The northern distribution limits extend to Cruzan Mesa, Los Angeles County, and the former Carlsberg Ranch, Ventura County (66 FR 29384, CNDDB 2010a). 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 Baja mar, north of Ensenada (Brown et al. 1993). All known populations lie between 98 and 1,362 feet in elevation (Eriksen and Belk 1999).

Riverside Fairy Shrimp Recovery

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 1998b).

Vernal Pool Fairy Shrimp

Legal Status

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 (Service 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.

Natural History

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 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 and 0.00039 inch 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.

Rangewide Status

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 ephemeral 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 feet, although it has been found at 5,600 feet in the Los Padres National Forest.

Within ephemeral 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.

Vernal Pool Fairy Shrimp Recovery

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.

Braunton's Milkvetch

Legal Status

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). Braunton's milkvetch is included in The Recovery Plan for Six Plants Surrounding the Los Angeles Basin, which we completed in September 1999 (Service 1999). We completed a 5-year review for this species in 2009 (Service 2009).

Natural History

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. It has a thick taproot and woody basal stem from which numerous stems arise. Several similar perennial *Astragalus* species occur within the range of Braunton's milkvetch. The woolly stems and leaves and its two-chambered pods help distinguish Braunton's milkvetch from the other similar *Astragalus* in its range, (e.g. locoweed (*A. trichopodus*), Pomona milkvetch (*A. pomonensis*), Douglas' milkvetch (*A. douglasii*), which are glabrous to slightly pubescent (Barneby 1964, Wojciechowski and Spellenberg 2012).

Braunton's milkvetch is associated with chaparral and coastal sage scrub plant communities. It generally occurs along the tops of knolls between 800 and 2,100 feet in elevation (Fotheringham and Keeley 1998, CNDDDB 2016). 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 (CNDDDB 2016, without page numbers); 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 (Van de Water and Safford 2011, O'Leary 1990). The average frequency of fires in natural areas of the Santa Monica Mountains from 1925 through 2001 was once every 32 years (Witter

et al. 2007). The plants have a life span of 2 to 5 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, 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.

Braunton's milkvetch plants may also germinate after mechanical disturbance; such occurred at Oak Park in Ventura County in 1997, when a previously undiscovered seed bank was excavated and spread at a development site. More than 1,000 individual plants germinated, but they were graded to accommodate a baseball park before they could set seed. 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 impact 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.

For additional information regarding Braunton's milkvetch and its biology, see the recovery plan (Service 1999), the 5-year review (Service 2009), and the final listing rule (62 FR 4172).

Rangewide Status

Braunton's milkvetch is endemic to coastal southern California and is known from five disjunct geographic areas in Ventura, Los Angeles, and Orange Counties, California. These areas include: (1) the Simi Hills in eastern Ventura and western Los Angeles Counties; (2) eastern Santa Monica Mountains in Los Angeles County; (3) San Gabriel Mountains in Monrovia, Los Angeles County; and (4) Santa Ana Mountains in Orange County. Braunton's milkvetch historically occurred in the coastal plains of the greater Santa Monica region of southwestern/central western Los Angeles County from Cienega to Pacific Palisades.

Between the time of listing in 1997, and the completion of the 5-year review in 2009, seven additional occurrences had been added to the CNDDb (2007, 2010b). In the CNDDb database, "occurrences" are groups of plants that are geographically separated from other groups, by at least 400 meters. Since 2009, an additional 22 occurrences have been added to the CNDDb (2018), most of those new occurrences were based on herbarium specimens that were collected previously but databased recently. There are currently 37 known, extant occurrences within these 5 geographic areas. There are 5 occurrences that are considered extirpated and an additional 4 occurrences have not been observed in 25 or more years and may also be extirpated.

Approximately 70 percent of the Braunton's milkvetch occurrences consist of 25 or fewer plants during most years, but they can contain hundreds to thousands of plants following a disturbance event, e.g. wildfire (CNDDDB 2018). Following a disturbance event, most Braunton's milkvetch occurrences decline back to fewer than 25 plants within several years. Approximately 40 percent of the occurrences have shown declines to 10 or fewer plants within several years after a known disturbance event.

Because of the unique life history, ecological, and edaphic soil conditions that this species exhibits/requires, it is difficult to determine the true size (or magnitude) of given occurrence, population, or metapopulation. These conditions also make it difficult to determine the relative size of an occurrence compared to any other occurrence, and it makes it difficult to determine which population(s) qualify as a core population. For this species, we use three different methods to compare an occurrence's relative size to other occurrences:

- Largest Number of Plants Method – compares the largest number of plants ever recorded at each occurrence.
- Average Number of Plants Method – compares the average number of plants observed over time at each occurrence (excluding years where no plants were observed).
- Post-competition Event Number of Plants Method – compares only populations that were all impacted by the same the number of plants in a given occurrence during the year(s) immediately following an event that removes competition from other vegetation. For example, this method may compare all occurrences that were affected by a fire to determine population size in the year(s) following a competition removal event).

Braunton's Milkvetch Recovery

The recovery plan for Braunton's milkvetch (Service 1999) states that it should be evaluated for downlisting to threatened when: (1) all current sites (including seedbanks) with the species are fully protected and managed with the primary intention of preserving the populations in perpetuity; (2) seed collected from all populations is stored at a certified Center for Plant Conservation botanical garden; and (3) reliable seed germination and propagation techniques for the species are understood. It should be evaluated for delisting when populations are shown to be self-sustaining over a minimum of 15 years or longer, because life history data shows that this species grows for 5 years and exists as seed banks from 15 to 95 years.

Three of these recovery criteria have not been met and approximately half of the known occurrences still remain unprotected (Service 2009). Braunton's milkvetch continues to be threatened by direct loss of habitat and populations from urban development, fragmentation of habitat, fragmented ownership of individual populations, alterations of fire cycles, and extinction events from naturally occurring events due to small population sizes (Mistretta 1992, Skinner and Pavlik 1994). Many of the Braunton's milkvetch occurrences (and the species as a whole) appear to have a declining trend; however, we do not have sufficient data that are comparable qualitatively, spatially, or temporally to determine this with certainty. The threats to Braunton's

milkvetch are pervasive and difficult to overcome. It will take considerable conservation efforts to recover this species. Based on this information, Braunton's milkvetch remains threatened with extinction.

Braunton's Milkvetch Designated Critical Habitat

The Service designated critical habitat for Braunton's milkvetch on November 14, 2006 (71 FR 66374). We designated approximately 3,300 acres within 6 units in Ventura, Los Angeles, and Orange Counties, California. The designated critical habitat identifies Braunton's milkvetch habitat area containing the Primary Constituent Elements (PCEs) to support and maintain self-sustaining populations and metapopulations throughout its range.

The Braunton's milkvetch critical habitat PCEs are: (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 final rule (71 FR 66374) designated critical habitat at all known Braunton's milkvetch occurrences that still contained the PCEs. This was deemed necessary to reduce fragmentation and help maintain genetic connectivity between populations and increase the chance of recolonization from neighboring patches if one patch becomes extirpated. According to Noss et al. (1997), a species distributed across multiple sites within its range is less susceptible to extinction than another similar species confined to far fewer sites.

Much of the areas within designated critical habitat for Braunton's milkvetch continue to be threatened by direct loss of habitat from urban development, fragmentation of habitat, alterations of fire cycles, and type conversion of habitat. We do not have the comparative data (qualitative, spatial, or temporal) to say with certainty, but the trend for critical habitat appears to be consistent with that of the plant, which is decreasing.

In the final rule (71 FR 66374), the Service also outlined an analytical framework for applying the Jeopardy and Adverse Modification standards for actions involving effects to Braunton's milkvetch. The framework emphasizes the importance of core area populations for the survival and recovery of the species. With regard to the Jeopardy standard, the rule states, "Generally, if a proposed Federal action is incompatible with the viability of the affected core area population(s), inclusive of associated habitat conditions, a jeopardy finding is warranted because of the relationship of each core area population to the survival and recovery of the species as a whole". With regard to the Adverse Modification standard, the rule states, "the key factor related to the adverse modification determination is whether, with implementation of the proposed Federal action, the affected critical habitat would remain functional (or retain the current ability for the primary constituent elements to be functionally established) to serve the intended conservation role for the species. Generally, the conservation role of *A. Brauntonii* critical habitat units are to support viable core area populations."

For specific or additional information regarding the PCEs essential to the conservation of Braunton's milkvetch, see the Recovery Plan (Service 1999), 5-Year Review (Service 2009), and the final critical habitat rule (71 FR 66374).

ENVIRONMENTAL BASELINE

Action Area

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). The action area for this biological opinion comprises all areas within and adjacent to 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). This primarily comprises Area IV of the SSFL (Area IV) and an adjacent undeveloped area to the north referred to as the NBZ, but it also includes access and staging areas in other parts of the SSFL site (i.e. in Areas I, II, III, and/or Southern Buffer Zone), as well as offsite areas where listed species could be adversely affected by soil or groundwater remediation, noise, dust, nighttime lighting, sedimentation, and changes and water quality or quantity.

Existing Conditions and Habitat Characteristics in the Action Area

The proposed project area is located in and adjacent to a portion of the SSFL in an unincorporated area of the Simi Hills in southeastern Ventura County, California. The entire SSFL site comprises approximately 2,850 acres of open, mostly undisturbed, hilly terrain and developed areas, which include roads, buildings, and other infrastructure associated with its past use as a scientific research and test facility. The geologic units within the SSFL site are predominantly the Chatsworth Formation, which forms conspicuous tilted sandstone outcrops jutting upward from the landscape, with smaller areas of sedimentary rock representing the Santa Susana, Simi Conglomerate, Las Virgenes, and Calabasas formations. Alluvial sediments have accumulated over about 11 percent of the project site, generally limited to topographic lows and ephemeral streams. Vegetation throughout the project site is composed mainly of shrub-dominated plant communities, oak woodland and savanna, and annual grassland. Substantial portions of the site are located within areas of exposed bedrock or previously developed areas with sparse vegetation (Figure 4).

Numerous ephemeral stream channels and drainages are present throughout the SSFL site. Most surface water is intermittently present only during the winter rainy season and is conveyed offsite via one of four drainage areas: the Northwestern, Northern, Happy Valley, and Southern. Vegetation and wildlife habitats on the SSFL site include widespread plant communities characteristic of the region such as chaparral, grasslands, oak and walnut woodlands, as well as communities that are localized in distribution and are associated with the prominent sandstone outcrops on SSFL and nearby areas.

As described above, the Action Area only consists of a portion of the SSFL site, in and immediately adjacent to Area IV and the NBZ. Area IV consists of approximately 290 acres and the NBZ consists of approximately 182 acres (DOE 2018, Table 3-1).

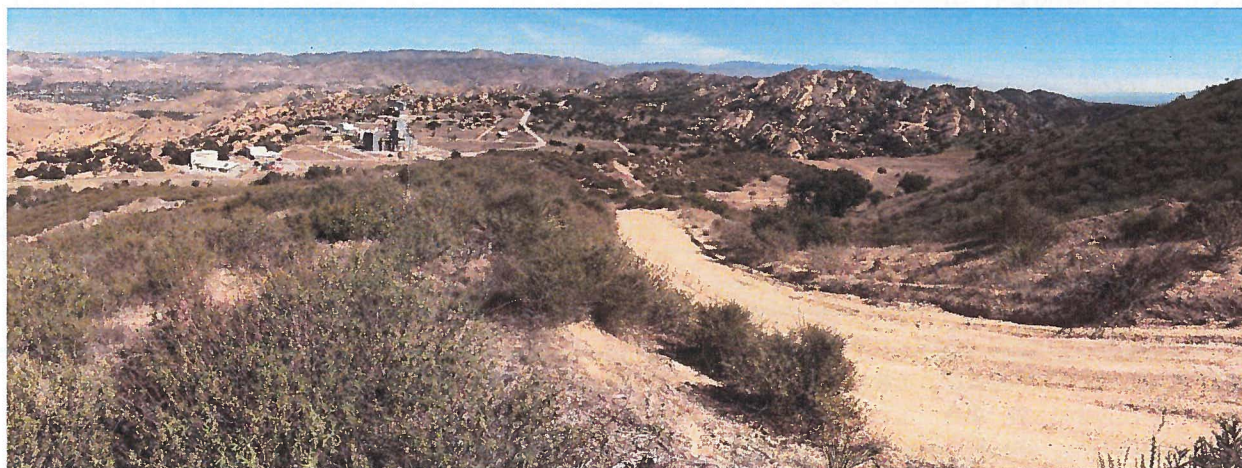


Figure 4. Habitat within Area IV and the NBZ, from Braunton's milkvetch critical habitat looking into Area IV (buildings on the left) and Area III (rock outcrops and rocket test stand in the distance on the right).

Previous Consultations in the Action Area

We have issued one individual biological opinion for projects that had an action area that overlapped the current action area. We issued a biological opinion to the U.S. Environmental Protection Agency (EPA) (Service 2010a, 8-8-10-F-12) for their implementation of the Santa Susana Field Laboratory Area IV Radiological Study Project, Ventura County, California [EPA Contract # EP-S7-05-05]. We determined that the proposed project was not likely to jeopardize the continued existence of Braunton's milkvetch, Lyon's pentachaeta, spreading navarretia, California Orcutt grass Riverside fairy shrimp, vernal pool fairy shrimp, California red-legged frog, and coastal California gnatcatcher or adversely modify critical habitat for California red-legged frogs and Braunton's milkvetch. To the best of our knowledge, the EPA completed the proposed action. A post-project report stated that the EPA action impacted 129 individual Braunton's milkvetch plants (HydroGeoLogic and Envicom 2012, DOE 2018). The number of Braunton's milkvetch plants onsite consisted of approximately 33,500 plants in 2006 (following the Topanga fire), 18,500 plants in 2009, before the project began, and a few hundred plants in 2011, at the end of the project (HydroGeoLogic and Envicom 2012, CNDDDB 2018, DOE 2018).

Status of the Species and Critical Habitat in the Action Area

Least Bell's Vireo

Least Bell's vireo has been documented at SSFL, but not in the action area. A single individual least Bell's vireo was observed in August 2011, in Area II by NASA consultants (Service 2013). It was observed in coyote brush adjacent to coast live oak woodland (DOE 2018 as in NASA

2014). A protocol survey (Werner 2012) conducted on Area IV did not find least Bell's vireos, nor have any additional individuals been observed during other field surveys and monitoring conducted on SSFL.

There are approximately 45.1 acres of riparian habitat on the entire SSFL site that could support least Bell's vireos. These areas are comprised of coast live oak riparian woodland, southern willow scrub, and mulefat scrub (Table 4-1 of the BA). Area IV and the NBZ have about 0.97 of an acre of riparian habitat (Figure 5) in seasonal drainages and fragmented mulefat riparian scrub that support potential habitat for least Bell's vireo (DOE 2017). These areas, including the suitable habitat within the action area, would likely support one to a few single least Bell's vireos that are roosting or moving through the area (DOE 2018). While there is a sufficient quantity of habitat to support a breeding pair (at least 0.5 of an acre), the likelihood of nesting activity is low because most of the suitable habitat is in small patches, fragmented, or degraded. However, these habitat areas may support unpaired least Bell's vireos, during migration or during the residency season. Furthermore, due to the long duration of the proposed action, habitat conditions and the status of the species may change over time such that vireos may nest within the project area or become more common in the vicinity of the proposed project.

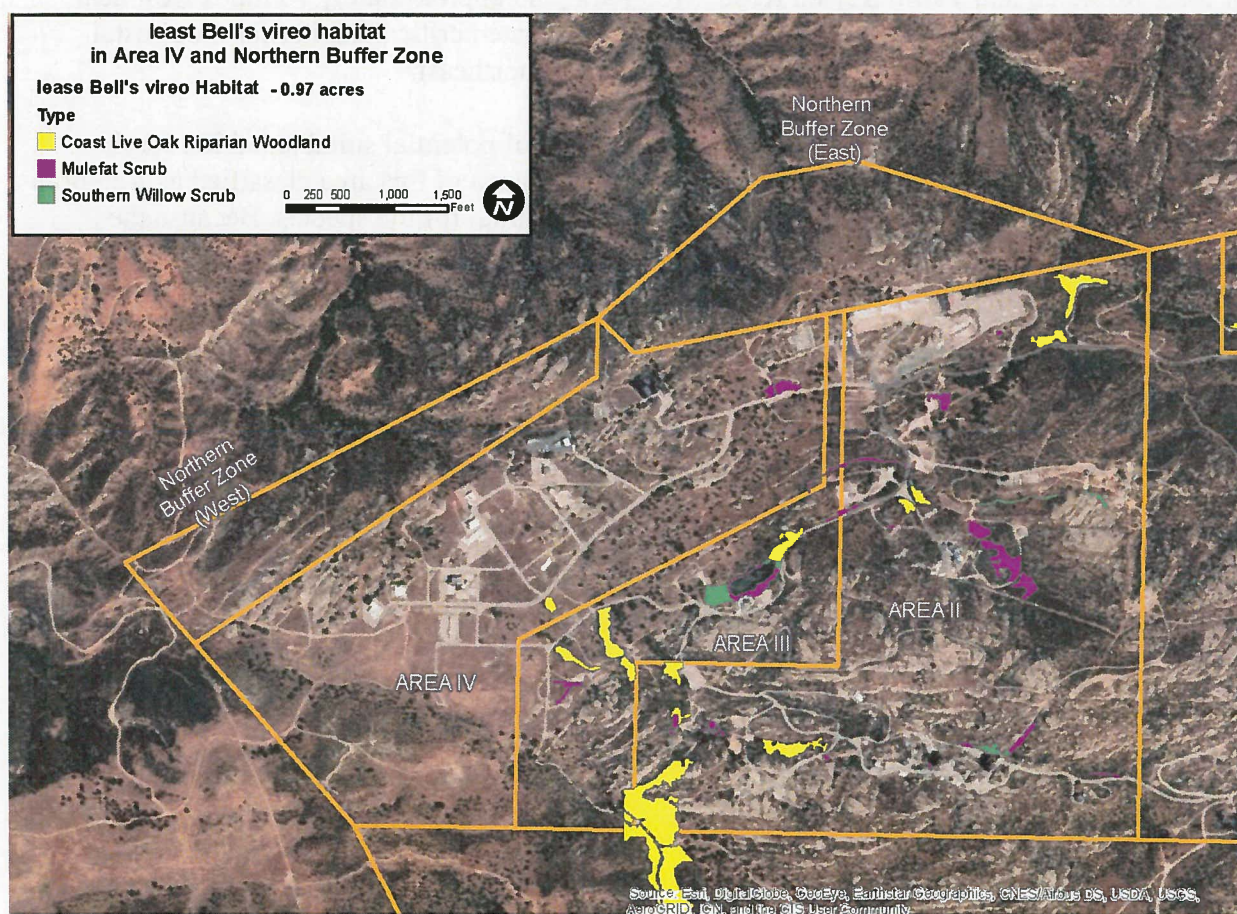


Figure 5. Potentially suitable habitat for least Bell's vireo.

Coastal California Gnatcatcher

While no coastal California gnatcatchers were detected during protocol level surveys on the SSFL site in 2010, 2011, or 2012 (EPA 2010); coastal California gnatcatcher was heard during a site visit in Area IV by Service biologist Robert McMorran on December 2, 2009 (McMorran, pers. obs. 2009). 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 (EPA 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 habitat at that time. The mean territory size for inland areas during the breeding season generally ranges from 12 to 27 acres per pair (Preston et al. 1998). Based on the 33.2 acres of Venturan coastal sage scrub and an additional 247 acres of potential suitable scrub habitat, and the proximity of the action area to other occupied habitats, the action area may support 20 to 46 coastal California gnatcatcher individuals (or 10 to 23 pairs) throughout the life of the project if all suitable habitat is occupied. 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 miles south in Las Virgenes Canyon; approximately 9.2 miles west near Little Simi Valley, northwest of State Route 23 and Tierra Rejada Road, Moorpark; and approximately 10 miles west near California Lutheran University (CNDDB 2010c). Designated critical habitat for the coastal California gnatcatcher occurs 2.5 miles to the north and northeast.

Area IV and the NBZ supports approximately 280 acres of potential suitable habitat for the coastal California gnatcatcher, with approximately 33.2 acres of this area classified as Venturan coastal scrub (DOE 2017) which is the most preferred habitat for the species. 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. Because the project duration is expected to be greater than 20 years, habitat conditions for coastal California gnatcatcher will change over time and the acres of suitable habitat within the action area will also change. The Service considers the following plant communities to be potentially suitable for use by coastal California gnatcatchers on the SSFL site: Ventura coastal sage scrub, coast live oak woodland, California walnut woodland, steep dipslope grassland, and chaparral. For the purposes of this consultation, we consider all of these vegetation communities, totaling 280 acres, within Area IV and the NBZ, to be potentially suitable for California gnatcatchers. The current spatial distribution of these vegetation categories within the action area is shown in Figure 6.

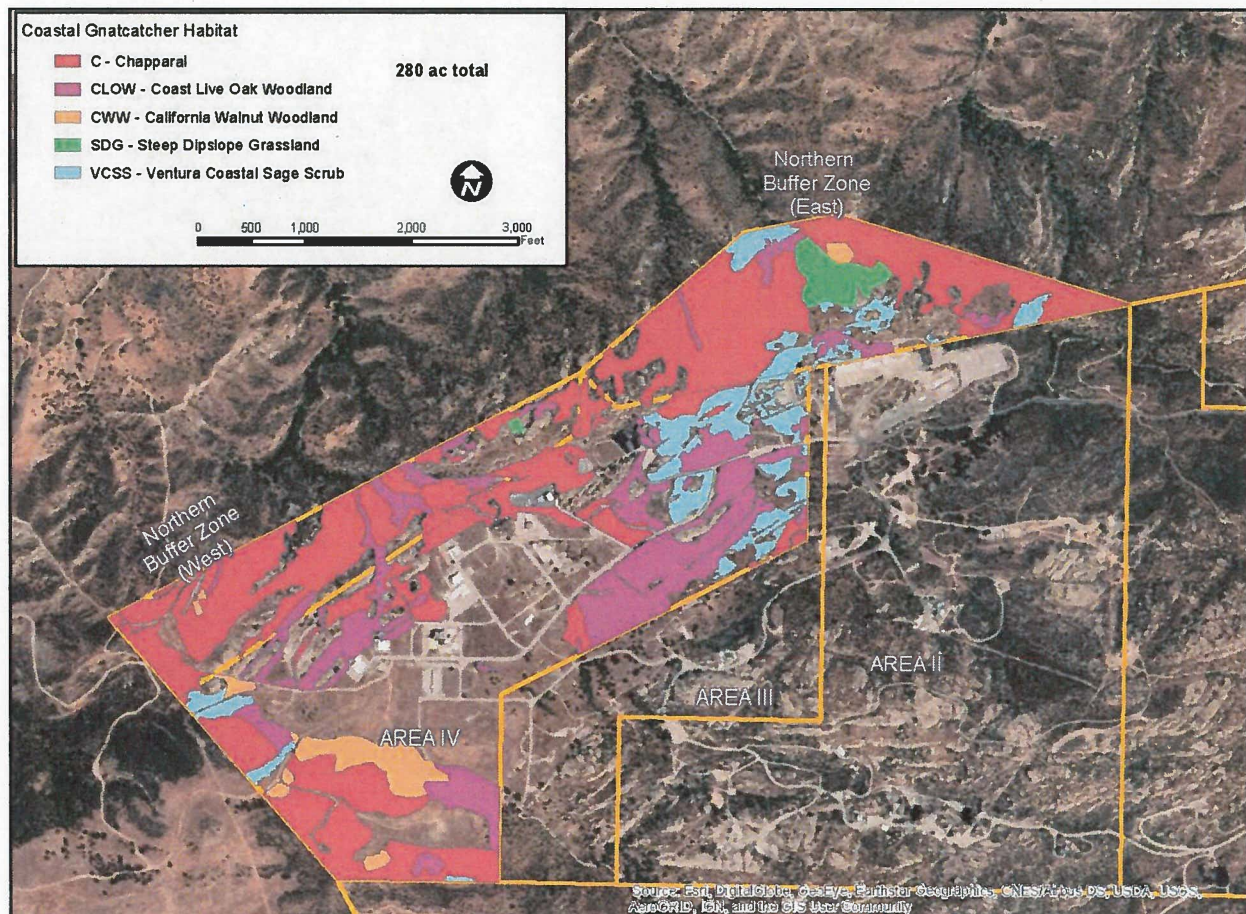


Figure 6. Potential suitable habitat for coastal California gnatcatcher within Area IV and the NBZ (Adapted from DOE 2017).

California Red-legged Frog

California red-legged frogs have not been documented within the action area, nor have they been recorded during biological surveys on the SSFL (DOE 2018). Protocol level surveys have not been performed onsite for California red-legged frogs (EPA 2010). The nearest recorded California red-legged frog observations in the CNDDDB are in East Las Virgenes Creek and nearby in the main stem of Las Virgenes Creek (CNDDDB 2010d). We are aware of two records of California red-legged frogs within 3 miles of the project area to the south (75 FR 12816, CNDDDB 2010d) (Figure 7).

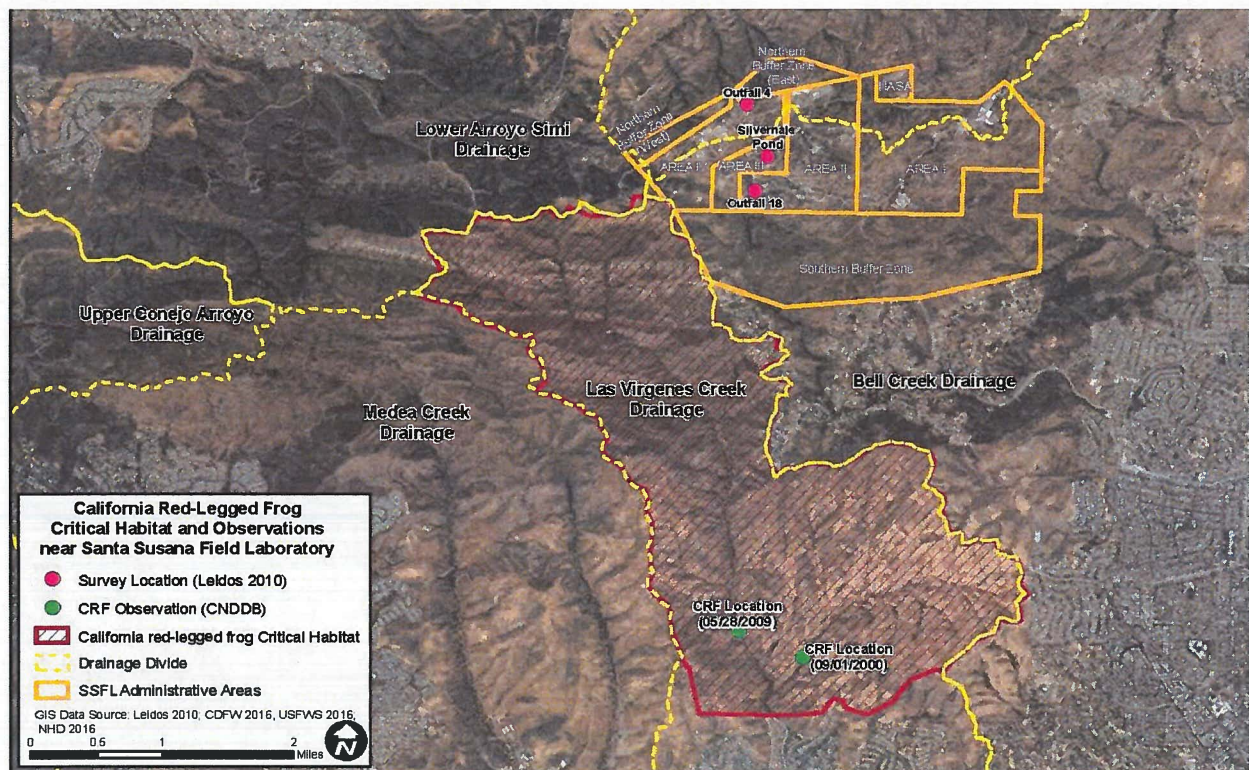


Figure 7. Known California red-legged frog occurrences (in green) and designated critical habitat (in red cross-hatch), relative to the Santa Susana Field Lab (DOE 2018).

Ponded areas may attract California red-legged frogs, regardless of habitat conditions or water quality. Currently within Area IV, ponded habitats occur at the SRE pond (shown as “outfall 4” in Figure 7). This and other ponded features that currently exist, or that may be created in the future for the remediation of groundwater, may attract California red-legged frogs to the site. During the life of this project, California red-legged frogs may occur traversing the action area during dispersal. Although California red-legged frogs may be attracted to ponded features at the site, based on the current conditions in the action area (the low quality of suitable breeding habitat, and relatively long distance from known occupied habitat), we anticipate that the likelihood that California red-legged frogs would breed within Area IV and NBZ during the life of the project is low.

Riverside Fairy Shrimp and Vernal Pool Fairy Shrimp

Riverside fairy shrimp and vernal pool fairy shrimp have not been documented within the action area; however, protocol level surveys have not been conducted within the action area for this species (DOE 2018). Fairy shrimp habitat assessments have been conducted only on portions of SSFL, including portions of Area IV, the NBZ, and NASA (DOE 2018, NASA 2013). In 2010, four vernal pools were identified in Area IV and three were documented to contain versatile fairy shrimp, an unlisted species (Padre 2010); however, protocol level surveys were not conducted for listed fairy shrimp species. Subsequent habitat surveys were conducted in 2014 that noted

fairy shrimp presence in some pools, but protocol surveys were not conducted and the fairy shrimp were not identified. The locations of potential vernal pool habitats are shown in Figure 8.

There are no documented occurrence of Riverside fairy shrimp or vernal pool fairy shrimp within the SSFL site. The nearest documented occurrence of Riverside fairy shrimp is west of Simi Valley at Tierra Rejada Preserve (Service 2008b). Riverside fairy shrimp and vernal pool fairy shrimp are both known to occur in the Carlsberg vernal pools approximately 9 miles northwest of the project area (Service 1998b, EPA 2010). Because the action area falls within the range of the species, it is known to occur in the region, and areas capable of supporting fairy shrimp occur onsite, Riverside fairy shrimp and vernal pool fairy shrimp may occur within the action area during the duration of the proposed project.

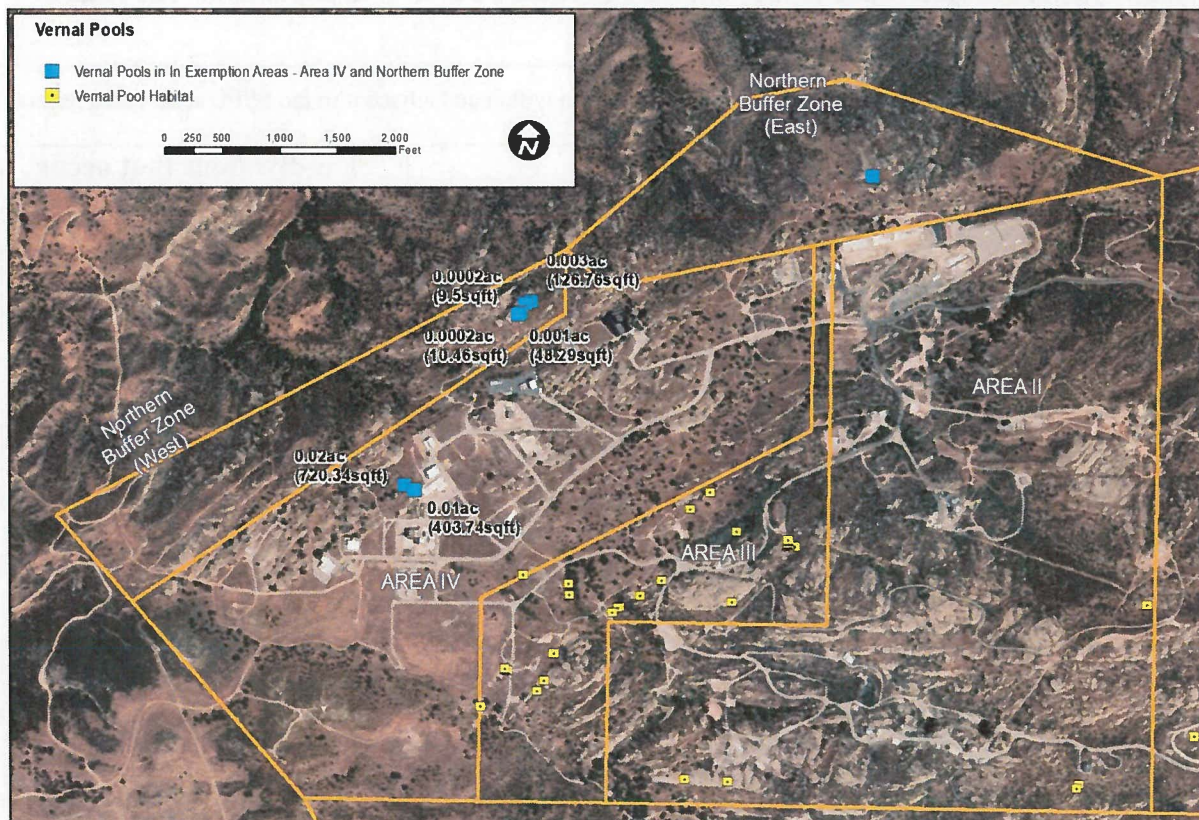


Figure 8. Locations of known or potential habitat for fairy shrimp (Adapted from DOE 2017).

Braunton's Milkvetch

Braunton's milkvetch currently occurs within the action area for the proposed project, primarily in Area IV within chaparral scrub, coastal sage scrub, and coast live oak and walnut woodlands. Common associated species here include chamise (*Adenostoma fasciculatum*), sugar bush (*Rhus ovata*), manzanita (*Arctostaphylos* spp.), Malibu baccharis (*Baccharis malibuensis*), chaparral yucca (*Hesperoyucca whipplei*) and black sage (*Salvia mellifera*) (SAIC 2009, EPA 2010, CNDDDB 2018, DOE 2018). Biologists for DOE observe that the cycle of growth, flowering, and

production of seed to replenish the seed bank at SSFL is approximately 4 to 5 years with some individuals possibly living longer (DOE 2018). Plants have been noted onsite in all stages of growth.

Because of the unique life history, ecological, and edaphic soil conditions that this species requires, it is difficult to determine the true size (or magnitude) of any Braunton's milkvetch occurrence. This variability also makes it difficult to determine the relative size of an occurrence compared to any other occurrence. As described above, the final critical habitat rule emphasizes an analytical framework for the Jeopardy and Adverse Modification standards that rely on "core area populations". We applied three different methods to compare the relative size of the Santa Susana Field Lab occurrence to other 41 occurrences listed in the CNDDB. We conducted this analysis to help determine whether the action area contains a core area population. The results are summarized in Table 1.

Table 1. Three methods of calculating the size of the population within and adjacent to the SSFL action area relative to the entire known population.

Calculation Method	% individuals that occur on SSFL
<i>Largest number of plants method:</i> Using the largest number of plants ever documented at each of the 42 occurrences (CNDDB 2018), the maximum number of plants at SSFL is 33,500 among a total observed population of 55,538 plants.	60% of all known plants
<i>Average number of plants method:</i> Using the average number of plants observed at each of the 42 occurrences (for years when the number of plants is greater than 0), the average population at SSFL is 10,421 plants compared to an average at all sites of 402 plants.	62% of all known plants
<i>Post-competition method:</i> Considering only populations that were burned by the Topanga fire and were surveyed in the years immediately following the fire, the SSFL site supported 33,500 plants, compared with the next highest population of 4,400 plants.	78% of all plants from 7 populations affected by the Topanga fire

The CNDDB refers to the SSFL Braunton's milkvetch plants to element occurrence (EO) number 7 (CNDDB 2018). The CNDDB attributes a herbarium specimen from 1949 (*O. Kappler* 2037, UCR-11596) to this occurrence, which indicates its presence in 1949. The CNDDB also attributes three plants found in 1999 (along a proposed access road alignment in Burro Flats) to this occurrence. An estimation of several hundred plants were reported from critical habitat Subunit 1d at SSFL after a wildfire (the Topanga Fire) burned the site in October 2005 (EPA 2010, 71 FR 66374). Biologists estimated that, after the fire, this Braunton's milkvetch occurrence was estimated to occupy approximately 16.6 acres, (MWH Global, Inc. 2009). At that time, there were also two isolated plants noted in other parts of the SSFL site, one in the southern portion of Unit 1d and another just west of Unit 2f (MWH Global, Inc. 2009).

Later in 2006, biologists with SWCA Environmental Consultants conducted a detailed population analysis by counting plants within 10 quadrats, then extrapolating to the occupied 16.6 acres (EPA 2010). From this sample, they determined that there were 33,500 plants within these 16.6 acres onsite (MWH Global, Inc. 2009). Subsequent Braunton's milkvetch surveys were conducted October – November 2009 in critical habitat Unit 1d within Area IV (SAIC 2009). According to the 2009 surveys, the areas occupied by individual Braunton's milkvetch plants were similar to those reported from the 2006 surveys, except that the area occupied by Braunton's milkvetch expanded slightly to the north. They determined that Braunton's milkvetch occupied approximately 17.5 acres and contained approximately 18,500 plants (SAIC 2009). Beyond this area, two isolated plants were documented in formerly developed areas of Area IV (SAIC 2009). Biologists with SAIC theorized that these two plants may have been transported as seeds when soil from an established borrow area within Braunton's milkvetch critical habitat was taken to backfill other remediated sites on the SSFL (SAIC 2009).

By 2009, Braunton's milkvetch plants in Area IV appeared to be nearing the end of their life span (SAIC 2009). In 2006, most (49.4 percent) of the plants were small (less than 10 centimeters) and by 2009 the majority of the plants were large (greater than 70 centimeters) and thought to be fully mature (MWH Global, Inc. 2009). During 2009, no seedling recruitment of the stand from the previous spring season was noted and a majority of the plants (greater than 50 percent) appeared to be dead based on their dried out brittle condition and lack of live tissue; especially those on south-facing slopes in the occupied area.

From 2010 to 2012, the EPA conducted a radiological study (EPA 2010, Service 2010a) involving vegetation cutting, gamma scanning, geophysical survey, surface and subsurface soil sampling, groundwater monitoring well sampling, and surface water and sediment sampling within the critical Habitat Unit 1d. In our biological opinion form this consultation, we estimated that approximately 5 percent of the 2009 living Braunton's milkvetch plants, or approximately 462 plants, were anticipated to be impacted by the radiological study (HydroGeoLogic and Envicom 2012).

During the two years of the radiological project activities, 129 live Braunton's milkvetch were directly impacted (HydroGeoLogic and Envicom 2012). Of these impacts, four plants were destroyed by vegetation clearance activities or by mule-mounted gamma scanning. Damage was described as uprooted plants, trimmed, destroyed, stem cuts, damaged root base, or soil disturbed by mule hoof prints. There was no record of any impacts made to plants that were senescent to dead. Evaluating the impacts of project activities on the Braunton's milkvetch population based on the conclusions of the BO, project activities impacted 0.4 to 0.7 percent of the estimated 18,500 to 33,500 Braunton's milkvetch plants on the project site in 2009 and 2006 respectively. Therefore, project impacts to this species were below the amount expected to be affected as anticipated in the biological opinion and there was no record of any seed being collected.

During spring 2011, and subsequently in 2012 and 2013, Braunton's milkvetch germinated in a previously undocumented location that had been cleared of chaparral vegetation in late 2010 for the radiological survey, resulting in hundreds of new emergent plants on a hill along the property

boundary north of critical habitat Unit 1d. The hill, unburned by the 2005 Topanga fire, had been covered with dense chaparral, scrub, and oak woodland vegetation prior to U.S. Environmental Protection Agency's (EPA) vegetation clearing activities. The Braunton's milkvetch plants that emerged, presumably had been in the seedbank and were stimulated to germinate by removal of the thick vegetation and ground disturbance associated with the vegetation clearing and subsequent radiological survey. The number of plants that established on the hill subsequent to clearing in 2011 was estimated to be a few hundred Braunton's milkvetch plants (HydroGeoLogic and Envicom 2012).

In March 2014, about 100 plants were observed by Leidos biologists. At least 40 plants (of the 100 observed) had multiple flowering stalks that had not been browsed and appeared to have set seed based on the presence of open bracts (where seed pods had been, but were no longer present). Some plants appeared to have been browsed by mule deer (EPA 2010, Leidos 2016, DOE 2018). To minimize further damage to the plants, DOE and Leidos biologists put protective fencing around a total of 13 surviving plants in 2014 and 2015 (Leidos 2016). Two additional plants were recorded but not fenced due to the difficulty of isolating the plant without destroying native vegetation. As of November 2015, results suggest the protective fencing was effective and had minimized browsing damage to those Braunton's milkvetch plants. All plants protected did not show any new evidence of browsing, appeared healthy (determined by evidence of new growth), and many showed signs of flowering, suggesting that they set seed; though this was only a visual observation and cannot be confirmed. In June 2017, the remaining Braunton's milkvetch fenced plants and known suitable habitat in Area IV was surveyed. Based on the information known about the biology of the plant it was expected that most plants had completed their life cycle and had gone dormant and that the next germination would occur after some type of event that removed competition from other vegetation. However, approximately 70 new plants were recorded. Most of the plants were located on the hill adjacent to critical habitat, but some were also documented within critical habitat. As of 2018, there were 80 Braunton's milkvetch plants living, and an additional 20 were fenced (DOE 2018, Schoenwetter personal communication 2018). Surveys of a portion of Area IV in 2018 recorded six individual plants, all within protective fencing (R.A. Burgess, biologist, in litt. 2018). However, the surveys did not include the portion of the site where the approximately 70 new plants had been recorded in 2017.

On other portions of SSFL, there have been numerous biological surveys and monitoring activities conducted, especially in Areas I, II, III, and the Southern Buffer Zone (SBZ) (DOE 2018). These surveys have resulted in no additional observations of Braunton's milkvetch plants within SSFL. Although select areas of SSFL have been the subject of focused surveys for Braunton's milkvetch, e.g. Area IV, NBZ, there have been no site-wide focused surveys for Braunton's milkvetch to determine if it occurs outside the known areas (Padre 2014; NASA 2014, DOE 2018).

Braunton's milkvetch is also known from locations 2.3 miles to the east, 1.7 miles to the south, and 1.3 miles to the west of the project area (CNDDDB 2018). If soil and underlying bedrock conditions are suitable, it is possible that Braunton's milkvetch could occur elsewhere on SSFL,

such as within the SBZ, the northeastern portion of Area II, and the southern portion of Area I (NASA 2014, DOE 2018).

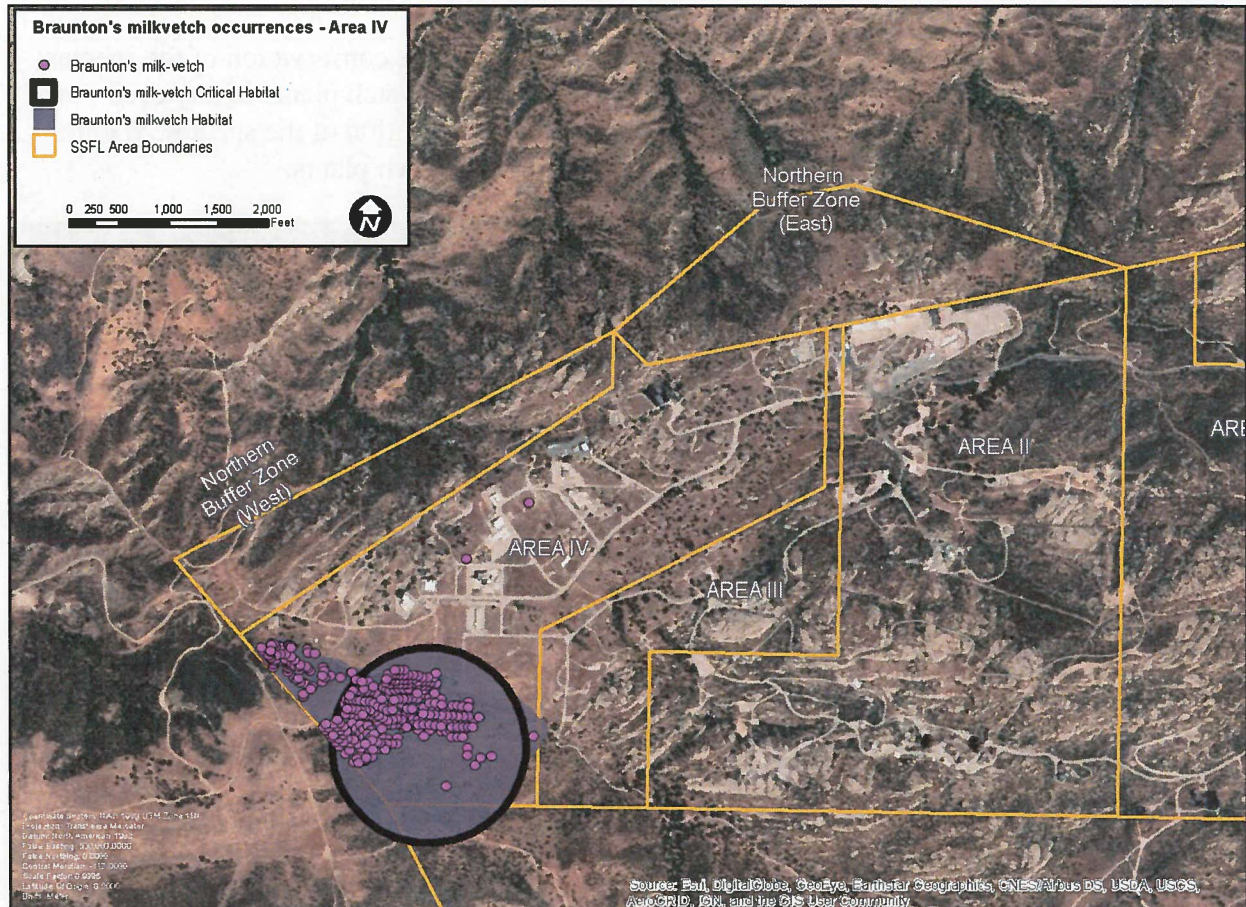


Figure 9. Locations of Braunton's milkvetch, individual plants (pink dots), critical habitat subunit 1d (circle). Braunton's milkvetch habitat is shown in grey shading, and includes 69.14 acres within Area IV. Map adapted from DOE 2018 and DOE 2017.

Condition of Braunton's Milkvetch Designated Critical Habitat in the Action Area

The action area includes a majority of designated critical habitat Subunit 1d, within the Northern Simi Hills Unit, designated Unit 1 (71 FR 66374). Unit 1 as a whole contains approximately 434 acres, Subunit 1d contains approximately 70 acres. Approximately 56 acres of Subunit 1d are within the action area (Figure 10). At the time the critical habitat rule was finalized, Subunit 1d was known to contain at least two of the PCEs (2 and 3); but whether it contained PCE 1 was unknown. 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 (USGS 2005), which are all indicative of calcareous components. Furthermore, "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) indicating the presence of PCE 1 within Subunit 1d.

We consider the Northern Simi Hills Unit (Unit 1) essential for the conservation of the species because it supports the largest known number of Braunton's milkvetch plants of any occurrence and these plants represent the core of the northernmost metapopulation of the species. Within Unit 1, Subunit 1d contains an overwhelming majority of the known plants.

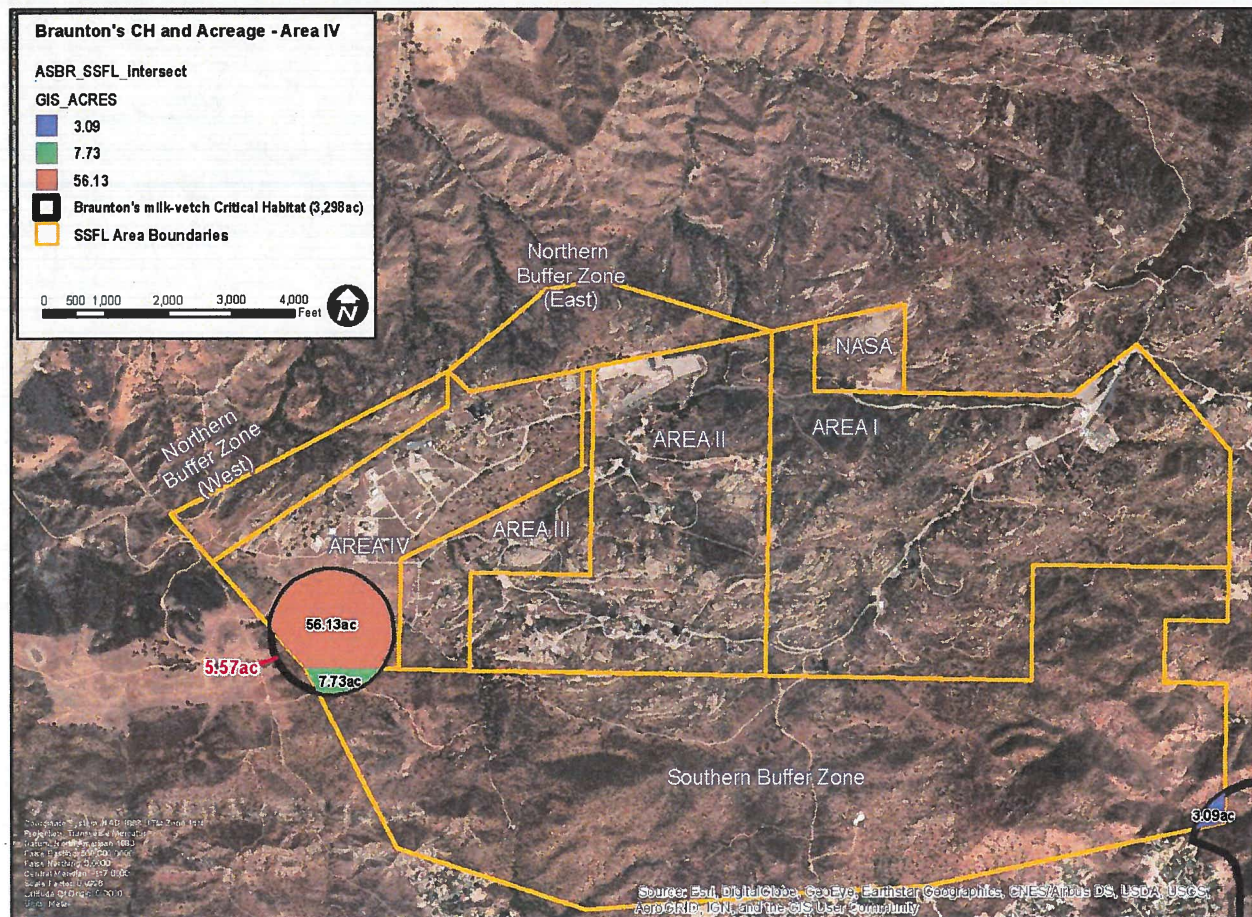


Figure 10. Braunton's milkvetch critical habitat subunit 1d within Area IV (56.13 acres), southern buffer zone (7.73 acres), and outside the SSFL boundary (5.57 acres). An additional 3.09 acres of critical habitat within subunit 1f occurs in the southern buffer zone.

EFFECTS OF THE ACTION

General Effects

In general, soil cleanup, groundwater cleanup, and building/infrastructure removal within Area IV and NBZ of the SSFL would be conducted over a period up to 20 years, and habitat restoration activities would take an additional 5 years or more. This section analyzes the effects to listed species and critical habitat from the wide breadth of activities necessary to implement the proposed action. We describe the general nature of the effects from the cleanup and restoration actions, but recognize that exact methods of achieving these actions may vary through time. For this analysis, we assume that location of listed species as well as the location and condition of suitable habitat for those species will change over time. DOE's suite of proposed conservation measures are designed to be flexible to adapt these changing conditions to minimize impacts to listed species over the course of the project. DOE has also proposed biological exemptions under the AOC for the protection of listed species, and this analysis considers a range of exemptions between "minimum exemption scenario" including only biological exemptions focused on protecting Braunton's milkvetch, and "maximum exemption scenario" focusing on Braunton's milkvetch and a suite of other state and federally protected species.

Least Bell's Vireo

All project-related activities (i.e. soil cleanup, groundwater cleanup, building and infrastructure removal, and restoration) that occur within portions of the action area that support least Bell's vireo habitat could adversely affect least Bell's vireos. Area IV and the NBZ contain about 0.97 acre of potential habitat for least Bell's vireos to roost or forage (SAIC 2009). We do not expect that the habitat in Area IV and the NBZ is likely to support a breeding pair or a nest; however, one to a few individual least Bell's vireos may occasionally occur within the action area. These individuals would be expected to be roosting or moving through the area. We expect that all least Bell's vireo habitat may be removed as a result of project implementation; however, some habitat may be replaced in the future, if restoration efforts are successful. Due to the long duration of the proposed project, habitat conditions and the distribution of the species will likely change over time. Riparian habitat onsite may become more abundant, and least Bell's vireo use of the action area could increase as a result.

DOE proposes to implement Conservation Measure 15, which directs removal of suitable habitat for least Bell's vireo to occur outside of the breeding season (March 15 – August 31). If the breeding season cannot be avoided, surveys pursuant to Service protocol for detecting presence/absence of least Bell's vireo will be conducted. If least Bell's vireos are detected, DOE would postpone habitat removal until after the breeding season. As stated above, we consider the probability of occurrence to be low, especially for breeding. However, should least Bell's vireos nesting occur onsite, removal of habitat outside of the breeding season could adversely affect the pair returning to their territory the following year. Due to the small amount of suitable habitat onsite (0.97 acres) and the typical range of territory sizes (0.5 to 7.5 acres), we anticipate this

adverse effect to be limited to a maximum of one pair, or two individuals, and that other suitable nesting habitat could be found outside of the action area.

Least Bell's vireo individuals or pairs that do occur within the action area during project implementation may be impacted by predators, night lighting, and noise. Human presence may attract predators to an area. Predators as well as parasitic cowbirds may be able to "home in" on least Bell's vireos that become agitated by human presence and destroy or parasitize vireo nests (The Nature Conservancy 1997, Chace et al. 2002). Trash left during or after project activities could attract predators including coyotes (*Canis latrans*) and raccoons (*Procyon lotor*) that could prey on least Bell's vireo eggs or nestlings. This potential impact would be reduced or avoided by the proposed control and removal of trash during the project, outlined in Conservation Measure 2.

Nighttime lighting and activity could cause behavioral disturbance and temporary avoidance of the area by least Bell's vireos, and in turn could preclude nesting in illuminated riparian habitat, cause nighttime disorientation, and increase vulnerability to predators. Conservation Measure 2 directs activities to occur during daylight hours, unless night work is required and outlines lighting guidelines to minimize wildlife impacts.

Activities including excavation, compaction and grading occurring within or adjacent to riparian habitat may produce noise and negatively affect least Bell's vireos. Many songbirds, including the least Bell's vireo, are sensitive to prolonged, loud noises; construction-related noise and vibrations can adversely affect breeding and nesting behavior and reduce nesting success. If construction noise increases after a least Bell's vireo has established a nest or breeding territory near the project, nest abandonment could occur, resulting in a failed breeding attempt, death of eggs and fledglings, and exposure of adults to increased predation risk. Moreover, least Bell's vireos rely on auditory signals in the form of songs, alarm and scolding calls to establish and defend territories, attract a mate, feed and care for young at the nest, and locate and evade potential predators (Scherzinger 1979). Increased ambient noise levels may hinder the ability of the species to cue in on these signals. Regional Environmental Consultants (RECON, 1989) estimated that noise levels above 60 dB from March 15 to September 15 may impact least Bell's vireo reproductive success. The Service uses 60 decibels (dB) as a practical threshold above which substantial impacts to the least Bell's vireo may occur. Limiting noise levels in occupied riparian habitat by establishing adequate buffers and phasing of work would reduce these impacts.

Effects on Recovery of the Least Bell's Vireo

The action area lies outside of currently and historically occupied sites for which recovery targets were established in the draft recovery plan. Project impacts would affect a small amount of marginal least Bell's vireo habitat (less than 1 acre), and would result in minimal or no change in population numbers and distribution. No long-term effects to the species or to recovery are expected as a result of the proposed project. Therefore, we expect that effects on recovery of the least Bell's vireo will be minimal.

Summary of Effects on the Least Bell's Vireo

The proposed activities would adversely affect all least Bell's vireos within the action area, primarily in the form of habitat removal, exposure to predators, night lighting, and construction noise. However, the likelihood that the species would be present is low, and the DOE has proposed avoidance and minimization measures to reduce potential impacts. Based on these factors, the likelihood that any least Bell's vireos would be killed or injured is low. These effects may be minimized by implementing the proposed biological exemption, which would focus soil removal only in areas where contamination poses a risk to human health and/or the environment. Under the "maximum exemption scenario," effects to least Bell's vireo habitats may be reduced if soil contamination does not pose a risk to human health or the environment within the habitat that supports least Bell's vireo. Under the "minimum exemption scenario," effect to this species would not be reduced because no least Bell's vireo habitat is included in this exemption (i.e. least Bell's vireo habitat does not overlap with Braunton's milk-vetch habitat).

Coastal California Gnatcatcher

Coastal California gnatcatchers have been reported in the action area, but were not detected during protocol level surveys. All project-related activities (i.e. soil cleanup, groundwater cleanup, building and infrastructure removal, and restoration) that occur within portions of the action area that support habitat for coastal California gnatcatchers could adversely affect the species. Area IV and the NBZ support approximately 280 acres of potential suitable habitat for the coastal California gnatcatcher with approximately 33.2 acres of this area classified as Venturan coastal scrub, which is preferred by the species (DOE 2017). As indicated in the Environmental Baseline section, we anticipate that between 20 and 46 individual coastal California gnatcatchers (or 10 to 23 pairs) may occur within the action area, if the suitable habitat were fully occupied. Currently, we expect that the habitat is not fully occupied; however, due to changing habitat conditions over time, additional populations within close proximity to the site (~3.9 miles away), and long duration of the project, the species may increase their use of the site at some point during project implementation.

DOE proposes to implement biological exemptions for the protection of listed species, but the extent of the biological exemptions that will be implemented range between the "minimum exemptions scenario" and "maximum exemptions scenario." Under the "minimum exemptions scenario," approximately 46 acres of potential coastal California gnatcatcher habitat that overlaps Braunton's milkvetch habitat will be subject to the risk-based cleanup process (green areas in Figure 11). Within this 46-acre area, we anticipate that a maximum of 0.5 acre would be affected, during the risk-based cleanup in Braunton's milk-vetch habitat (Figure 3). This scenario assumes that no other biological exemptions will be exercised; therefore, we anticipate that a total of approximately 72 acres of coastal California gnatcatcher habitat would be impacted by the cleanup (71.4 acres shown in purple in Figure 11, plus 0.5 acre shown in orange in Figure 3). Based on the mean range of inland breeding territory sizes for coastal California gnatcatchers, we anticipate that between 6 and 12 individuals (or 3 to 6 breeding pairs) may be impacted by the proposed project under this scenario.

Under the “maximum exemptions scenario” a majority of coastal California gnatcatcher habitat would be subject to the risk-based cleanup process, thereby reducing the total amount of habitat impacted by soil cleanup activities. The amount of coastal California gnatcatcher habitat impacted under this scenario would be less than 72 acres; however, a precise calculation depends on the results of DOE’s risk-based process that would be applied in these areas. Similarly, the number of coastal California gnatcatchers expected to be impacted by this scenario is lower than between 6 and 12 individuals (or 3 to 6 breeding pairs).

Based on these two possible scenarios for how biological exemptions will be applied, we will assume that up to 72 acres of coastal California gnatcatcher habitat may be affected by project activities. We anticipate that this habitat may support between 6 and 12 coastal California gnatcatcher individuals (or 3 to 6 breeding pairs) over the life of the project.

The project activities could result in disturbance or possibly direct injury or mortality of transitory, resident, or nesting coastal California gnatcatchers, including, but not limited to, disturbance of individuals or 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, and reduction in the value of the habitat for cover and foraging. The loss or degradation of habitat for cover, forage, and reproduction could cause individuals to abandon their territory to disperse to other suitable habitat.

Coastal California gnatcatchers are non-migratory and highly territorial. A loss of habitat due to excavation or other disturbance 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. Unlike migratory species, coastal California gnatcatchers remain in their local habitat year-round. Habitat-disturbing activities can be timed to avoid the breeding season, but the species may occupy suitable habitat year-round.

These effects would be reduced through the implementation of Conservation Measure 16. The Service interprets this measure to mean that DOE will conduct surveys pursuant to Service guidance for all activities that disturb Venturan coastal sage scrub, and will avoid active nests until chicks have fledged. Additionally, other vegetation classes suitable for coastal California gnatcatchers will also be subject to this level of survey prior to disturbance. A qualified biologist familiar with coastal California gnatcatchers must determine which habitat areas may support the species at the time when surveys are needed. The coastal California gnatcatcher habitat areas outlined in Figure 6 are an estimate only. The spatial distribution and assemblage of vegetation throughout the action area will change over time, making this habitat assessment a critical step in appropriately targeting surveys to the most likely locations where coastal California gnatcatchers may occur. All potentially suitable habitat, as identified by the qualified biologist, will be surveyed prior to any ground disturbing activities through either breeding or non-breeding season surveys. This measure will minimize the likelihood of killing or injuring coastal California

gnatcatcher during project actions; however, there is a low possibility that a nest could go undetected during surveys and may be adversely affected.

The project could also indirectly affect suitable coastal California gnatcatcher habitat through introduction of non-native plants, increased fire frequency or fire suppression (i.e. brush clearance), and human intrusions. These indirect effects would make the habitat less suitable for coastal California gnatcatchers. 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, ravens (*Corvus corax*), crows (*Corvus brachyrhynchos*), 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.

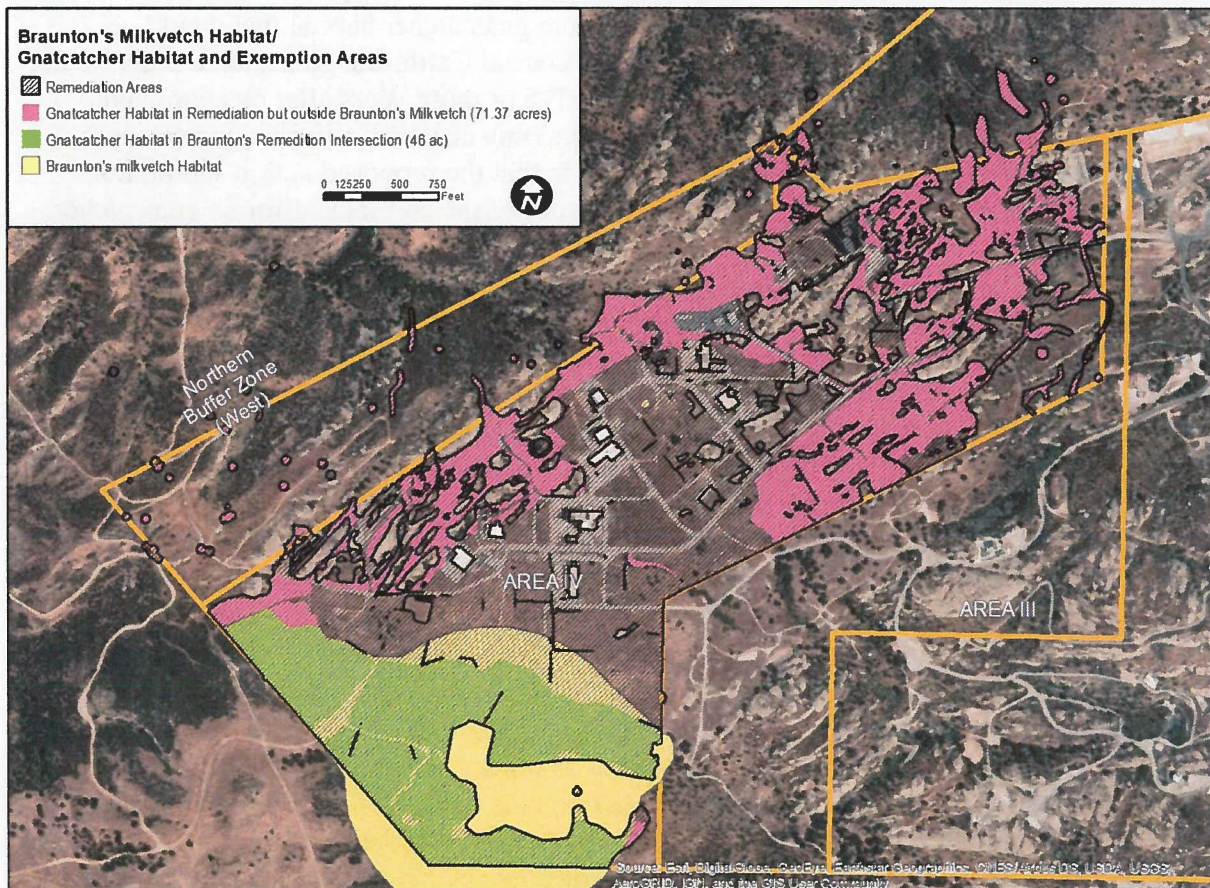


Figure 11. Potential Coastal California gnatcatcher habitat covered by the “minimum exemption scenario” shown in green, and habitat covered by the “maximum exemption scenario” shown in purple and green (Adapted from DOE 2017).

Due to the large amount of potentially suitable habitat for coastal California gnatcatchers within the action area, and based on the range of effects we analyzed, we estimate that up to 72 acres of habitat for coastal California gnatcatchers may be disturbed by project activities during soil cleanup, groundwater cleanup, building and infrastructure removal, and restoration. We estimate that between 6 and 12 individuals (or 3 to 6 breeding pairs) may be affected by these activities. Implementing the “maximum exemptions scenario” would reduce this impact by targeting soil cleanup in areas where soil contamination poses a risk to human health or the environment, and thereby reducing effects to coastal California gnatcatchers that occupy those habitats.

Effects on Recovery of the Coastal California Gnatcatcher

A recovery plan for the coastal California gnatcatcher has not been prepared. According to the Spotlight Species Action Plan (SSAP) for the coastal California Gnatcatcher, the action area is not within any regional NCCP/ HCP. Therefore, we do not expect the proposed action to interfere with the goals of the SSAP. In general the action area is at the northern edge of the coastal California gnatcatcher’s distribution and likely represents the species at the extreme of its historical range. We estimate that the coastal California gnatcatcher habitat that would be affected by project activities likely contains up to 12 coastal California gnatcatcher individuals; however, the action area would eventually be restored (5 or more years after cleanup) and preserved as open space, and would remain available to any coastal California gnatcatchers should they attempt to colonize this area. We conclude that the proposed action should not reduce the contribution of the action area to the recovery of the coastal California gnatcatcher.

Summary of Effects on the Coastal California Gnatcatcher

The proposed activities would affect all coastal California gnatcatchers within the action area, but with the implementation of the conservation measures, nesting activities will be avoided (unless nests go undetected during surveys). Non-nesting individuals are able to disperse into and use unaffected suitable habitat; therefore, the likelihood that the proposed project would result in the direct death of any gnatcatcher individuals is low. Because a small portion of habitat of the entire range of the coastal California gnatcatcher would be affected by the project and the likelihood of mortality is low, we do not expect the effects to be substantial.

California Red-legged Frog

California red-legged frogs have not been observed in the action area to date. Over the life of the project, California red-legged frogs may be attracted to ponded habitat at SSFL, including the SRE (Sodium Reactor Experiment) pond, as well as to other ponded features that may be created in the future. All project-related activities in the action area (e.g. soil cleanup, groundwater cleanup, building and infrastructure removal, and restoration) could adversely affect California red-legged frogs. Although California red-legged frogs may be attracted to ponded features at the site, based on the current conditions in the action area (the low quality of suitable breeding habitat, and relatively long distance from known occupied breeding habitat), we anticipate that the likelihood that California red-legged frogs would breed within Area IV and NBZ during the life of the project is low. However, during the life of the proposed project, it is possible that California red-legged frogs may occur traversing the action area during dispersal.

The proposed activities may have direct effects on the California red-legged frog through injury or mortality from animals being crushed by heavy equipment, vehicles, debris, and worker foot traffic and activities such as excavation, stockpiling of materials and fill, and vegetation clearing. Individuals could become trapped and die in upland sheltering habitat or exposed to predators if burrows are crushed or covered. California red-legged frogs may experience a significant disruption of normal behavioral patterns from worker foot traffic and activities and their associated noise and vibration to the point that reaches the level of harassment. This disruption could cause individuals to leave or avoid suitable habitat and may increase the potential for predation, desiccation, competition for food and shelter, or strike by vehicles. The DOE would minimize these effects by implementing Conservation Measure 14, which includes conducting surveys for California red-legged frogs before disturbing potential suitable habitat.

California red-legged frogs can disperse overland in mesic conditions if substantial rainfall (greater than 0.5 inch of rain in a 24-hour period) occurs. During such periods of rainfall, we expect a higher likelihood of California red-legged frogs occurring within the action area. Any amphibians moving through the action area would be at risk of injury or death caused by vehicles, equipment, or workers, and fencing could entrap frogs and interfere with their movement. The DOE would minimize these effects by implementing Conservation Measure 1, which outlines provisions for biological monitoring within work zones.

Capture and relocation of California red-legged frogs could result in injury or death as a result of improper handling, containment, transport, or release into unsuitable habitat. Although survivorship for translocated California red-legged frogs has not been estimated, survivorship of translocated wildlife in general is reduced due to intraspecific competition, lack of familiarity with the location of potential breeding, feeding, and sheltering habitats, and increased risk of predation. Using qualified biologists, limiting the duration of handling, and requiring proper transport of individuals should reduce these impacts, and overall the relocation of individuals from work areas should reduce the level of mortality that otherwise would occur if individuals were not removed.

Soil and sand stockpiles and erosion control materials such as straw bales stored onsite can attract California red-legged frogs seeking upland refugia, and lead to injury or death if individuals become entrapped or are present when these materials are moved. The DOE would minimize these effects by implementing Conservation Measure 1, which outlines provisions for biological monitoring in work zones.

Accidental spills of hazardous materials or careless fueling or oiling of vehicles or equipment could degrade water quality or upland habitat to a degree where California red-legged frogs are injured or killed. Additionally, trash left during or after Project activities could attract predators to the work site, which could in turn prey upon California red-legged frogs. For example, raccoons and feral cats (*Felis catus*) are attracted to trash and also prey opportunistically on the California red-legged frog. The DOE would minimize these effects by implementing Conservation Measure 2, which directs all trash to be disposed of properly and limits the location of site activities that occur in sensitive habitat areas.

Uninformed workers could disturb, injure, or kill California red-legged frogs. The potential for this to occur would be reduced by educating workers on the presence and protected status of these species and the measures that are being implemented to protect them during Project activities. The use of flagging to demarcate work areas would further reduce these potential impacts by preventing workers from encroaching into environmentally sensitive habitat. The DOE would minimize these effects by implementing Conservation Measure 3, which outlines an environmental education program for all crews working on site, with additional education for crews working in habitat occupied or potentially occupied by listed species.

The proposed activities may have direct and indirect effects on the California red-legged frog through a reduction in dispersal habitat quality through vegetation removal. The proposed project may also involve the creation of ponded features through backfilling/re-contouring activities following remediation, or from groundwater cleanup or surface water control facilities that act as an attractive nuisance to California red-legged frogs during their operation. These effects would be minimized by implementing the proposed biological exemptions, and thereby focusing soil removal only in areas where contamination poses a risk to human health and/or the environment. The “maximum exemption scenario” would provide the greatest reduction in effects to habitats that the California red-legged frog may utilize onsite, and the “minimum exemption scenario” would provide somewhat less reduction in adverse effects because of the higher level of cleanup and greater disturbance to habitat.

Effects on Recovery of the California Red-legged Frog

The Service’s (2002) recovery plan divides the California red-legged frog recovery units into 35 core areas. The proposed project is adjacent to, but not within, Recovery Core Area 27. The conservation needs for these units include protecting existing populations, protecting habitat connectivity, controlling non-native predators, reducing the impacts of agriculture, improving water quality and reducing impacts of urbanization. The proposed project is expected to result in long-term (up to 20 years of cleanup plus an additional 5 years or more for restoration) impacts to all California red-legged frogs and California red-legged frog habitat within the action area, which is anticipated to be a small number of individuals. With the implementation of the proposed avoidance and minimization measures, the project’s direct and indirect effects on the California red-legged frog would likely be low and not diminish the chances of recovery for the species within Core Recovery Area 27.

Summary of Effects on the Red-legged Frog

In summary, construction activities and dispersal habitat removal could adversely affect California red-legged frogs. However, the number of individuals that are likely to use the site is small. With the implementation of the proposed avoidance and minimization measures, the direct and indirect effects of the project on the California red-legged frog would likely be low. Therefore, these effects are not likely to substantially diminish the chances of recovery for the California red-legged frog within Core Recovery Area 27 or species-wide.

Riverside Fairy Shrimp and Vernal Pool 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 (e.g. soil cleanup, groundwater cleanup, building and infrastructure removal, and habitat restoration) that impact their habitat could have adverse effects to Riverside fairy shrimp or vernal pool fairy shrimp from temporary and permanent disturbance to ponded areas or riparian or upland habitat in their watersheds. Fairy shrimp were observed in three of the four pools mapped on one sandstone outcrop in Area IV of the SSFL (Padre 2010). While few of the proposed project activities are expected to occur in rocky outcrop areas, three of the pools in Area IV are expected to be affected by project activities (DOE 2018). All known vernal pools occur within the proposed “maximum exemption scenario” footprint, and may be protected if this scenario is applied (Figure 12). No habitat suitable for listed vernal pool species is contained within the proposed “minimum exemption scenario,” and therefore this scenario does not reduce effects to listed vernal pool species. Any work within habitat suitable for listed vernal pool species could kill or injure fairy shrimp adults or cysts, or change the hydrology of the feature such that it may no longer support the species.

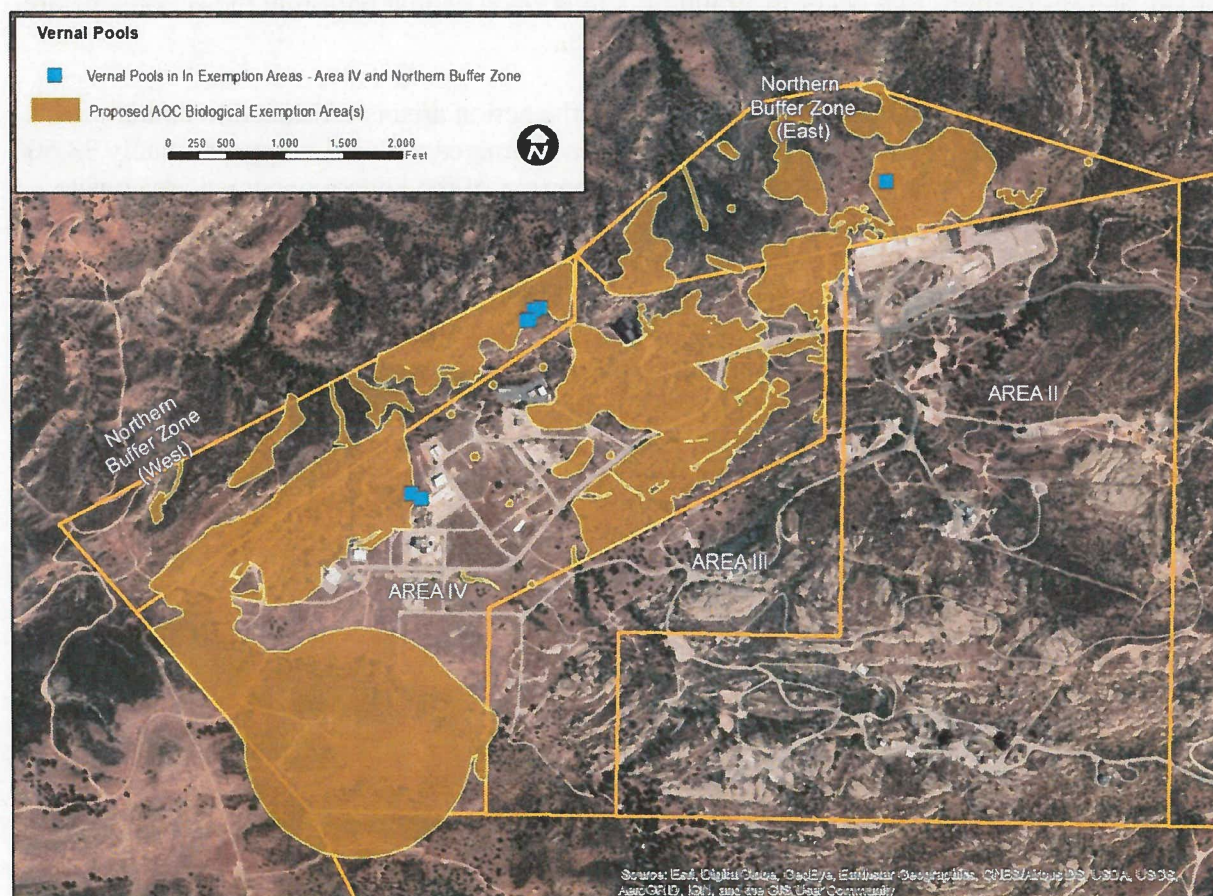


Figure 12. Location of vernal pools (blue) relative to proposed “maximum exemption scenario” (brown polygons) (Adapted from DOE 2017).

Effects on Recovery of the Riverside Fairy Shrimp and Vernal Pool Fairy Shrimp

The Service's (2005) recovery plan divides recovery units for the different vernal pool species into vernal pool regions that are geographically oriented. The SSFL does not occur within any of the vernal pool recovery regions (Service 2005). Because the proposed project would affect a small area and number of pools and the proposed project does not occur within a vernal pool recovery region, the proposed project is not likely to affect the recovery of either the Riverside fairy shrimp or the vernal pool fairy shrimp.

Summary of Effects on the Riverside Fairy Shrimp and Vernal Pool Fairy Shrimp

With the implementation of the proposed avoidance and minimization measures, the direct and indirect effects of the project on the Riverside fairy shrimp and the vernal pool fairy shrimp would likely be low and are not likely to appreciably diminish the chances of recovery for either the Riverside fairy shrimp or the vernal pool fairy shrimp species-wide.

Braunton's Milkvetch

All project related activities (e.g. soil cleanup, groundwater cleanup, building and infrastructure removal, and restoration) that occur in Braunton's milkvetch habitat within in the action area are likely to have direct and indirect effects to the species.

As described in the Environmental Baseline section, the action area is estimated to contain the largest Braunton's milkvetch occurrence and has been estimated to contain approximately 33,500 above-ground plants during suitable conditions in a portion of the known occupied area onsite. This is the largest number of Braunton's milkvetch plants ever reported at a single site. This occurrence is over 6.5 times larger than the second largest occurrence (5,092 plants) and approximately 28 times larger than the average occurrence (~1,200 plants). Braunton's milkvetch occurs throughout the region in smaller numbers, including areas adjacent to the SSFL site, such as the Upper Las Virgenes Canyon Open Space Reserve and Sage Ranch Park, located in the Simi Hills, Ventura and Los Angeles Counties, California. Braunton's milkvetch individuals (seeds and plants) may occur throughout the action area, but above-ground plants are generally concentrated in the southwestern portion of Area IV.

Based on mapping conducted during previous surveys and the implementation of the biological exemption for the protection of Braunton's milkvetch, a small amount of known occupied habitat (0.5 of an acre) would be subject to soil cleanup. According to the BA (DOE 2018), there are approximately 1,000 to 2,000 Braunton's milkvetch plants per acre during the growth phase of this short-lived perennial. With the implementation of the biological exemption for Braunton's milkvetch, DOE expects to remove 0.5 acre (or 0.7 percent of the occupied habitat onsite).

Acknowledging the limitations using the rounded numbers for plant densities, the DOE cleanup would result in the loss of approximately 500 to 1,000 plants as a result of soil removal alone. The loss of 500 to 1,000 plants onsite represents approximately between 0.65 and 0.86 percent of the Braunton's milkvetch plants rangewide (based on the three plant estimation methods discussed in the Status of the Species section above).

An additional 5 acres of occupied Braunton's milkvetch habitat may be temporarily disturbed by supporting activities necessary to implement the soil cleanup, groundwater cleanup, and restoration activities. We do not anticipate soil removal within these areas (causing no loss of the seedbank), and that through implementing Conservation Measure 12, living plants within this 5 acre area would be almost entirely avoided. We expect that over the life of the project Braunton's milkvetch plants may germinate in disturbed work areas, and that these plants may be impacted by project activities. We expect that up to 100 living plants may be adversely affected by these activities through crushing, trimming, or other damage.

As noted in the Status of the Species section above, Braunton's milkvetch plants tend to germinate after events that remove competition or cause mechanical disturbance. The proposed project may stimulate the germination of seeds within the action area during soil excavation, vegetation removal, and other ground disturbance activities. This would result in additional plants germinating and being injured or killed during project activities because the excavation of contaminated soils alone is expected to take up to 20 years to complete.

Direct adverse effects to Braunton's milkvetch plants 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 to allow access for remediation activities, 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. These activities are expected to result in the removal of up to 1,000 plants (i.e. 0.5 acres affected, with estimated 2,000 plants per acre).

Direct adverse effects to Braunton's milkvetch seeds in the action area may include injury or mortality from being removed or crushed. Removal of soil from areas occupied by Braunton's milkvetch seeds could also remove the seeds to areas that lack suitable conditions for germination and survival, thus causing their inevitable death.

In areas subject to excavation, we expect all biological and abiotic factors necessary for Braunton's milkvetch germination, growth, reproduction, recruitment, and survival to be removed from the areas affected by soil removal, rendering it unsuitable for the reestablishment of Braunton's milkvetch. Even with the implementation of the proposed habitat restoration and revegetation measures, as well as additional minimization and avoidance measures, impacts to Braunton's milkvetch would be reduced, but would still remain substantial in the 0.5 acre area subject to soil cleanup. DOE expects the backfill volume to be approximately 75 percent of the total volume that would be removed from Area IV and the NBZ. Backfill and soil deposition within occupied habitat could kill, crush, or otherwise injure Braunton's milkvetch plants or seeds or it could damage the soil structure necessary for the survival of the plants. Vegetation removal immediately adjacent to the existing roads and trails may result in the accidental cutting or removing of Braunton's milkvetch plants. These activities are expected to result in reduced reproductive success of Braunton's milkvetch plants too.

The removal of vegetation associated with this project could also increase the predation on Braunton's milkvetch by reducing available forage to resident herbivores and increase herbivore access to Braunton's milkvetch by removing adjacent vegetation and cover that might protect it from being eaten. Nonnative plants that out compete Braunton's milkvetch may be introduced from project equipment, project debris, and worker foot traffic. Pollinators may be affected or lost due to these activities.

Indirect effects to Braunton's milkvetch may occur as a result of the proposed project or any of its related activities, such as dust deposition from soil cleanup activities or invasion of nonnative plant species. Dust migration is associated with coating the flowers' female parts, which could reduce the reproductive success of Braunton's milkvetch plants that are not removed. Nonnative plants that out-compete Braunton's milkvetch may be introduced from project equipment, project debris, and worker foot traffic. The DOE would only use clean soil for fill and restoration efforts to try to prevent introducing seeds of nonnative invasive plants; however, disturbance to the periphery of the roads and access routes may lead to an increase in nonnative invasive plants in the action area because the disturbance may open up new patches of habitat for existing invasive species in the action area to colonize.

The potential for these impacts (both direct and indirect) to occur should be reduced by implementing the proposed protective measures (see Appendix A). These include general measures, such as monitoring activities, environmental education, and habitat and species specific measures (particularly Conservation Measure 12), such as habitat restoration, soil stabilization, seed salvage, plant salvage, propagation, and replanting.

The Braunton's milkvetch occurrence on the SSFL is the largest known population for the species and consists of well over half of all of the known Braunton's milkvetch plants throughout its range. It has been estimated to contain between 60 and 78 percent of all Braunton's milkvetch individuals (plants and seeds) in existence. With the expected loss of 0.5 acre (0.7 percent of the occupied habitat for this occurrence), we do not expect the survival of this occurrence to be reduced considerably, but we do expect to lose all of the plants and the entire seed bank within the 0.5 of an acre, as well as additional plants in adjacent areas to other direct and indirect effects. This loss of individuals, coupled with the loss of the precise environmental and soil (edaphic) necessities for this species from a small area (0.5 acre), is expected to have relatively low adverse effect on this population's long-term viability. In the 5 acre area subject to temporary disturbance, a relatively small number of plants (up to 100) may be adversely affected; however the seedbank and habitat conditions will remain suitable to support the species in the future. Based on the level of this effect to this population, we do not expect the effects to be substantial to the species as a whole.

Effects on Recovery of Braunton's Milkvetch

The recovery plan for Braunton's milkvetch recommends the following: (1) Protect and secure all current sites (including seedbanks); (2) Manage and monitor protected areas where plants occur; (3) Survey historic locations and other potential habitat where plant species may occur; (4) Conduct biological and ecological research to define life history strategies, population

dynamics, and to guide recovery/conservation efforts; and (5) Develop public outreach plans to enhance the public's understanding of conservation needs of these endangered species (Service 1999). The goal of the Recovery Plan for Six Plants from the Mountains Surrounding the Los Angeles Basin, which includes Braunton's milkvetch, is to stabilize, protect, and/or restore all populations in their current locations (including seed banks). Accomplishing the conservation and preservation of all Braunton's milkvetch populations would allow for its reclassification to threatened status.

We expect that the proposed project would not substantially affect the recovery of Braunton's milkvetch, because: (1) most of the Braunton's milkvetch individuals would be left in place at the SSFL (including its seedbank) and would be covered by a conservation easement; (2) the SSFL Braunton's milkvetch population would be covered under the restoration program for the proposed project; (3) the Braunton's milkvetch plants in the action area would be surveyed/monitored as part of the restoration and management plan; (4) biological and ecological research would be possible because greater than 99 percent of the plants are expected to survive; and (5) the proposed project would not preclude the development of public outreach plans to enhance the public's understanding of conservation needs of this endangered species.

In addition, measures proposed by the DOE (and Boeing) will promote the long-term viability of the population because the site will be conserved in perpetuity, and adverse effects caused by this project will not occur throughout a significant portion of the range of the species (only plants in less than 1 percent of the range of Braunton's milkvetch would be affected by the project).

Summary of Effects on Braunton's Milkvetch

With the implementation of the biological exemption for the protection of Braunton's milkvetch and the proposed conservation measures, the direct and indirect effects of the project on Braunton's milkvetch would likely be low and are not likely to appreciably diminish the chances of recovery for the species or species-wide.

Braunton's Milkvetch Designated Critical Habitat

The action area encompasses approximately 56.1 acres of 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 434 acres, of which 70 acres are in Subunit 1d (71 FR 66374). With the implementation of the biological exemption for Braunton's milkvetch and its critical habitat, approximately 0.5 of an acre of critical habitat would be directly removed by implementation of the proposed project. As noted in the Environmental Baseline section of this biological opinion, the action area also contains three of the PCEs described in the designation of critical habitat for Braunton's milkvetch (71 FR 66374).

Project activities are expected to remove the PCEs from approximately 0.5 of an acre, within the 56.1 acres of designated critical habitat for Braunton's milkvetch in Area IV. The proposed project may also temporarily disturb up to 5 acres of designated critical habitat through vegetation clearing and ground disturbance associated with support activities for the soil cleanup,

groundwater cleanup, or habitat restoration. 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. These effects would be minimized by DOE's Conservation Measure 9 and 12 which includes developing and implementing a habitat restoration plan, and minimizing impacts to Braunton's milkvetch and its critical habitat.

Summary of Effects on the Braunton's Milkvetch Designated Critical Habitat

In summary, the proposed action would remove the PCEs from approximately 0.5 acre (in 3 separate polygons) of the 56.13 acres of critical habitat for Braunton's milkvetch during project implementation. These areas are occupied by living Braunton's milkvetch plants and an unknown amount of Braunton's milkvetch seeds. These areas contain the primary biological features of Braunton's milkvetch critical habitat. The project activities would remove all vegetation and soils associated with Braunton's milkvetch critical habitat in these areas (0.5 acre). We expect additional temporary disturbance of up to 5 acres of designated critical habitat through vegetation clearing and ground disturbance associated with support activities for the soil cleanup, groundwater remediation, and/or habitat restoration 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. We do not consider future Federal actions that are unrelated to the proposed action 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

The regulatory definition of "to jeopardize the continued existence of the species" focuses on assessing the effects of the proposed action on the reproduction, numbers, and distribution, and their effect on the survival and recovery of the species being considered in the biological opinion. For that reason, we have used those aspects of the least Bell's vireo, coastal California gnatcatcher, California red-legged frog, Riverside fairy shrimp, vernal pool fairy shrimp, and Braunton's milkvetch status as the basis to assess the overall effect of the proposed action on the species.

Least Bell's Vireo

Reproduction

Removal of riparian vegetation would reduce availability of breeding or non-breeding habitat. Few least Bell's vireos are expected to be present in the action area and breeding is not anticipated given the small amount and marginal quality of riparian habitat and near-absence of the species in prior surveys. To minimize the project's effects on reproduction of the least Bell's vireo, the DOE proposes to conduct surveys, set protective buffers around nests, control trash that may attract nest predators, and contact the Service if least Bell's vireos are detected. These actions should effectively reduce any project related impacts to the species reproduction. Proposed habitat restoration may attract least Bell's vireos and lead them to breed on the site in the future. Therefore, we expect the local effect of the proposed action on reproduction of the least Bell's vireo to be minimal in the short-term and minimal or potentially positive in the long-term, and conclude that the proposed action will not appreciably reduce the species' ability to reproduce rangewide.

Numbers

The area of direct impacts encompasses a small fraction of least Bell's vireo foraging and breeding habitat available locally and regionally. DOE also proposes measures to reduce indirect impacts that could disturb individuals or nests, such as establishing buffers around nests and limiting nighttime work. The species has been observed only once in the action area, but occurs regularly in the surrounding region. We expect through implementation of the proposed conservation measures, adverse effects from the project would be minimal, and no least Bell's vireos would be killed or injured by the proposed action. The proposed action would eventually restore riparian habitat that could lead to a net long term gain in habitat quantity and quality, if restoration efforts are successful. This may attract least Bell's vireos to the project site in the future and promote local occupancy. Cleanup and restoration activities could adversely affect least Bell's vireos attracted to the project site, but implementation of protective measures should minimize these impacts. Therefore, we have determined that implementation of the proposed action is not expected to appreciably reduce the numbers of the least Bell's vireos locally or rangewide, and it may eventually increase the numbers of least Bell's vireos onsite over the long term, pending successful restoration.

Distribution

The proposed action would temporarily reduce the habitat available to the least Bell's vireo. However, the amount of habitat reduced is small, suitable habitat would remain available around the project site, and the overall distribution of the least Bell's vireo would remain unchanged. Accordingly, the proposed action would have a negligible effect on the distribution of the least Bell's vireo. Therefore, we have determined that the proposed action would not appreciably reduce the distribution of the least Bell's vireo.

Recovery

The proposed action does not occur in any of the planned recovery areas for the least Bell's vireo (e.g. recovery units, critical habitat units). The proposed action site contains a very small amount

of riparian habitat that is of marginal quality. Direct effects to least Bell's vireos are unlikely. Accordingly, the proposed action would have a negligible effect on recovery efforts for the least Bell's vireo. Therefore, we have determined that the proposed action would not appreciably reduce the likelihood of recovery of the least Bell's vireo.

After reviewing the current status of the least Bell's vireo, the environmental baseline for the action area, the effects of DOE's proposed cleanup and restoration within Area IV and the NBZ of the SSFL and the cumulative effects, it is the Service's biological opinion that soil cleanup, groundwater cleanup, building and infrastructure removal, and habitat restoration on the Santa Susana Field Laboratory (SSFL) on the portion of the site under DOE's jurisdiction, including Area IV and the northern buffer zone, as proposed, is not likely to jeopardize the continued existence of the least Bell's vireo.

Coastal California Gnatcatcher

Reproduction

Removal of scrub vegetation would reduce availability of breeding and home range habitat. Few coastal California gnatcatchers are expected to be present currently; however, a more numerous population may move into the site over the life of the project. To minimize the project's effects on reproduction of the coastal California gnatcatchers, the DOE proposes to conduct surveys, set protective buffers around nests, and control trash that may attract nest predators. These measures should reduce project related impacts to the species reproduction; however, if a nest goes undetected during surveys there is the potential for the loss of eggs or young during the implementation of the action. Furthermore, DOE has proposed biological exemptions that include substantial portions of potentially suitable habitat for coastal California gnatcatchers, thereby reducing the overall impact to habitat that could be used for reproduction. Proposed habitat restoration may bring back suitable habitat for coastal California gnatcatchers following cleanup activities. Therefore, we expect the local effect of the proposed action on reproduction of the coastal California gnatcatchers to be minimal, and conclude that the proposed action will not appreciably reduce the species' ability to reproduce rangewide.

Numbers

The area of direct impacts encompasses a small portion of coastal California gnatcatchers foraging and breeding habitat available locally and regionally. DOE also proposes measures to reduce indirect impacts that could disturb individuals or nests, such as establishing buffers around nests and limiting nighttime work. The species has been reported in the action area, but not during protocol level surveys. It occurs nearby in the surrounding region. We expect that with the proposed conservation measures, adverse effects from the project would be minimal and few coastal California gnatcatchers would be killed or injured by the proposed action. Cleanup and restoration activities could adversely affect coastal California gnatcatchers attracted to the project site, but implementation of protective measures should minimize these impacts. Therefore, we have determined that implementation of the proposed action is not expected to appreciably reduce the numbers of coastal California gnatcatchers locally or rangewide.

Distribution

The proposed action would temporarily reduce the habitat available to the coastal California gnatcatcher. However, suitable habitat would remain available around the project site and the overall distribution of the coastal California gnatcatcher would remain substantially unchanged. Accordingly, the proposed action would have a negligible effect on the distribution of the coastal California gnatcatcher. Therefore, we have determined that the proposed action would not appreciably reduce the distribution of the coastal California gnatcatcher.

Recovery

The proposed action occurs near, but not within planned recovery areas for the coastal California gnatcatcher (e.g. critical habitat units). The proposed action site contains a limited amount of scrub habitat that is of marginal to medium quality. Direct impacts to coastal California gnatcatchers would be low. Accordingly, the proposed action would have a negligible effect on recovery efforts for the coastal California gnatcatcher. Therefore, we have determined that the proposed action would not appreciably reduce the likelihood of recovery of the coastal California gnatcatcher.

After reviewing the current status of the coastal California gnatcatcher, the environmental baseline for the action area, the effects of DOE's proposed cleanup and restoration within Area IV and the NBZ of the SSFL and the cumulative effects, it is the Service's biological opinion that the soil cleanup, groundwater cleanup, building and infrastructure removal, and habitat restoration on the Santa Susana Field Laboratory (SSFL) within the portion of the site under DOE's jurisdiction, including Area IV and the NBZ, as proposed, is not likely to jeopardize the continued existence of the coastal California gnatcatcher.

California Red-legged Frog

Reproduction

We do not expect that the proposed action would affect reproduction of the California red-legged frog. Removal of riparian vegetation would reduce availability of potential breeding habitat. Few California red-legged frogs are expected to be present in the action area and breeding is not anticipated given the small amount and marginal quality of riparian habitat, the absence of the species in prior surveys, and the distance from known breeding locations (greater than 3 miles). To minimize the project's effects on reproduction of the California red-legged frog, the DOE proposes to conduct surveys to detect and avoid individuals, control trash that may attract predators, and implement additional protective measures (see Appendix A). These actions should effectively reduce any project related impacts to the species reproduction. Creation of management of any ponded water features may attract California red-legged frogs and lead them to attempt to breed on the site in the future. Therefore, we expect the local effect of the proposed action on reproduction of the California red-legged frog to be minimal, and conclude that the proposed action will not appreciably reduce the species' ability to reproduce rangewide.

Numbers

The proposed action may result in a small reduction in numbers of the California red-legged frog due to the potential for individuals to be killed during project activities. Cleanup and restoration activities could adversely affect California red-legged frogs attracted to the project site, but implementation of conservation measures should minimize these impacts. Therefore, we expect that implementation of the proposed action is not likely to appreciably reduce the numbers of California red-legged frogs locally or rangewide.

Distribution

The proposed action would temporarily reduce the habitat (upland dispersal and riparian non-breeding) available to the California red-legged frog. However, suitable habitat would remain available around the project site and the overall distribution of the California red-legged frog would remain unchanged. Any individuals found within the area to be excavated would likely be relocated any individuals not detected could be injured or killed. We anticipate the number of individuals in the action area would be few if any. Accordingly, the proposed action would have a negligible effect on the distribution of the California red-legged frog. Therefore, we have determined that the proposed action would not appreciably reduce the distribution of the California red-legged frog.

Recovery

We expect the proposed action to have little to no effect on recovery of the California red-legged frog. The action area is adjacent to, but not within, Recovery Core Area 27. The proposed action is expected to result in long-term (up to 20 years) impacts to all California red-legged frogs and California red-legged frog habitat within the action area. With the implementation of the proposed avoidance and minimization measures, the project's direct and indirect effects on the California red-legged frog would likely be low and not diminish the chances of recovery for the species within Core Recovery Area 27. The open space status of the area would contribute to habitat connectivity in the area, which is beneficial to the recovery of the species.

After reviewing the current status of the California red-legged frog, the environmental baseline for the action area, the effects of DOE's proposed cleanup and restoration within Area IV and the NBZ of the SSFL and the cumulative effects, it is the Service's biological opinion that the soil cleanup, groundwater cleanup, building and infrastructure removal, and habitat restoration on the Santa Susana Field Laboratory (SSFL) on the portion of the site under DOE's jurisdiction, including Area IV and the northern buffer zone, as proposed, is not likely to jeopardize the continued existence of the California red-legged frog.

Riverside Fairy Shrimp and Vernal Pool Fairy Shrimp

Reproduction

Removal of vernal mesic habitat would reduce availability of breeding habitat for both Riverside fairy shrimp and vernal pool fairy shrimp. Few Riverside fairy shrimp and vernal pool fairy shrimp are expected to be present in the action area. To minimize the project's effects on reproduction of the Riverside fairy shrimp and vernal pool fairy shrimp, DOE proposes to

conduct surveys and set protective buffers around pools. Furthermore, DOE has proposed biological exemptions for the protection of vernal pools. These measures should effectively reduce project related impacts to the species reproduction. Therefore, we expect the local effect of the proposed action on reproduction of Riverside fairy shrimp and vernal pool fairy shrimp to be minimal, and conclude that the proposed action will not appreciably reduce the species' ability to reproduce rangewide.

Numbers

The area of direct impacts encompasses a small fraction of Riverside fairy shrimp and vernal pool fairy shrimp habitat available locally and regionally. DOE also proposes measures to reduce indirect impacts that could disturb individuals or pools, such as establishing buffers around pools. The species have not been documented in the action area, but they occur in the surrounding region. We do not have estimates to the number of individuals that could be affected by project activities; however, we expect that with the proposed conservation measures adverse effects from the project would be minimal, and few, if any, Riverside fairy shrimp or vernal pool fairy shrimp would be killed or injured by the proposed action. Cleanup and restoration activities could adversely affect Riverside fairy shrimp and vernal pool fairy shrimp should they occur the project site, but implementation of protective measures would minimize these impacts. Therefore, we have determined that implementation of the proposed action is not expected to appreciably reduce the numbers of Riverside fairy shrimp or vernal pool fairy shrimp locally or rangewide.

Distribution

The proposed action would temporarily reduce vernal pool habitat available to the Riverside fairy shrimp and vernal pool fairy shrimp. However, suitable habitat would remain available around the project site and the overall distribution of the Riverside fairy shrimp and vernal pool fairy shrimp would remain unchanged. Accordingly, the proposed action would have a negligible effect on the distribution of the Riverside fairy shrimp and vernal pool fairy shrimp. Therefore, we have determined that the proposed action would not appreciably reduce the distribution of either the Riverside fairy shrimp or the vernal pool fairy shrimp.

Recovery

We expect the proposed action to have little to no effect on recovery of either the Riverside fairy shrimp or the vernal pool fairy shrimp. The SSFL does not occur within any of the vernal pool recovery regions (Service 2005). Because the proposed action would affect a small area and number of pools, no Riverside fairy shrimp or vernal pool fairy shrimp have been documented onsite, and the proposed action does not occur within a vernal pool recovery region, the proposed action is not likely to appreciably affect the recovery of either the Riverside fairy shrimp or the vernal pool fairy shrimp.

After reviewing the current status of the Riverside fairy shrimp and vernal pool fairy shrimp, the environmental baseline for the action area, the effects of DOE's proposed cleanup and restoration within Area IV and the NBZ of the SSFL and the cumulative effects, it is the Service's biological opinion that the soil cleanup, groundwater cleanup, building and

infrastructure removal, and habitat restoration on the Santa Susana Field Laboratory (SSFL) on the portion of the site under DOE's jurisdiction, including Area IV and the northern buffer zone, as proposed, is not likely to jeopardize the continued existence of the Riverside fairy shrimp.

Braunton's Milkvetch

Reproduction

The proposed action, including a biological exemption for the protection of Braunton's milkvetch, would affect reproduction in the 0.5 acre area that would be subject to soil cleanup. This represents a small area of this core population (0.5 acre) out of the 69.14 acres of suitable Braunton's milkvetch habitat within the action area. An additional 5 acres may be affected by support activities that would affect vegetation and live plants, but is not anticipated to remove the soil and seedbank that supports the core population. Therefore, we do not expect the proposed action to appreciably reduce the reproduction within the action area or throughout the range of the species.

Numbers

Only a small area (0.5 of an acre) containing plants would be removed by the proposed action. Using estimates from the BA, the 0.5 acre could support up to between 500 and 1,000 Braunton's milkvetch plants. This is a small percentage compared to the 33,500 that were reported at one time for this site. Therefore, we do not expect the proposed action to appreciably reduce the numbers of Braunton's milkvetch within the action area or throughout the range of the species.

Distribution

The proposed action would remove a small amount of Braunton's milkvetch habitat (0.5 of an acre). However, up to 68.64 acres of Braunton's milkvetch habitat would remain available within the action area and the overall distribution of Braunton's milkvetch would remain unchanged. Accordingly, the proposed action would have a small effect on the distribution of Braunton's milkvetch. Therefore, we have determined that the proposed action would not appreciably reduce the distribution of Braunton's milkvetch.

Recovery

We expect that the proposed action would not substantially affect the recovery of Braunton's milkvetch, because: (1) most of the Braunton's milkvetch individuals would be left in place at the SSFL (including its seedbank) and would be covered by a conservation easement; (2) the SSFL Braunton's milkvetch population would be covered under the restoration program for the proposed action; (3) the Braunton's milkvetch plants in the action area would be surveyed/monitored as part of the restoration and management plan; (4) biological and ecological research would be possible because greater than 99 percent of the plants are expected to survive; and (5) the proposed action would not preclude the development of public outreach plans to enhance the public's understanding of conservation needs of this endangered species. In addition, measures proposed by the DOE (and Boeing) will ensure that the long-term viability of the population because the site will be conserved in perpetuity, and adverse effects caused by this

project will not occur throughout a significant portion of the range of the species (only plants in less than 1 percent of the range of Braunton's milkvetch would be affected by the project). Therefore, the proposed action is not likely to appreciably affect the recovery of Braunton's milkvetch.

After reviewing the current status of Braunton's milkvetch, the environmental baseline for the action area, the effects of DOE's proposed cleanup and restoration within Area IV and the NBZ of the SSFL (inclusive of the biological exemption in Braunton's milkvetch habitat and all of the protective measures DOE has committed to implement), and the cumulative effects, it is the Service's biological opinion that the soil cleanup, groundwater cleanup, building and infrastructure removal, and habitat restoration on the Santa Susana Field Laboratory (SSFL) on the portion of the site under DOE's jurisdiction, including Area IV and the northern buffer zone, as proposed, is not likely to jeopardize the continued existence of Braunton's milkvetch. This conclusion is contingent upon the implementation of the biological exemption for Braunton's milkvetch, if the exemption for Braunton's milkvetch is not applied, impacts would be much greater and that would invalidate this analysis.

Braunton's Milkvetch Critical Habitat

After reviewing the current status of Braunton's Milkvetch critical habitat, the environmental baseline of critical habitat in the action area, the effects of DOE's proposed cleanup (inclusive of the biological exemption in Braunton's milkvetch critical habitat, and all of the protective measures DOE has committed to implement), and the cumulative effects, it is the Service's biological opinion that the DOE's Cleanup of Area IV of the Santa Susana Field Laboratory Project, as proposed, is not likely to result in the destruction or adverse modification of critical habitat of Braunton's milkvetch because:

1. The proposed action would have small permanent effects on habitat areas that have the PCEs (calcium carbonate soils, low proportion of shrub cover, and that contains chaparral and coastal sage scrub communities), totaling 0.5 acres out of 56.1 acres within the action area and of approximately 3,300 acres of all Braunton's milkvetch designated critical habitat); and
2. The proposed action would have little effect on the conservation value and function of the habitat and the PCEs within this critical habitat unit because the permanent impacts would be small (approximately 0.5 acre), temporary impacts within an additional 5 acre area are anticipated to have only minor adverse effects to the PCEs, and DOE would implement protective measures for Braunton's milkvetch critical habitat.

This conclusion is contingent upon the implementation of the exemption process for Braunton's milkvetch, if the exemption process for Braunton's milkvetch is not applied, impacts would be much greater and that would invalidate this analysis.

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 wildlife species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not the purpose of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

In June 2015, the Service finalized new regulations implementing the incidental take provisions of section 7(a)(2) of the Act. The new regulations also clarify the standard regarding when the Service formulates an Incidental Take Statement [50 CFR 402.14(g)(7)], from "...if such take may occur" to "...if such take is reasonably certain to occur." This is not a new standard, but merely a clarification and codification of the applicable standard that the Service has been using and is consistent with case law. The standard does not require a guarantee that take will result; only that the Service establishes a rational basis for a finding of take. The Service continues to rely on the best available scientific and commercial data, as well as professional judgment, in reaching these determinations and resolving uncertainties or information gaps.

AMOUNT OR EXTENT OF TAKE

Least Bell's vireo

We anticipate that few least Bell's vireos could be taken as a result of the proposed action. We expect the incidental take to be in the form of harm from effects associated with noise, vibration and visual disturbance from project activities, lighting from night work if unavoidable, and attraction of nest predators and cowbirds to the project site. All least Bell's vireos occurring within the action area would be subject to these effects.

Additionally, Least Bell's vireo adults and juveniles may be killed or injured outright by the removal of vegetation, or if disturbed by work activities and displaced from the action area into unfamiliar habitat, they may be forced into less suitable habitat where they would be at increased risk of predation, starvation, or other injury.

We cannot quantify the precise number of least Bell's vireos that may be taken as a result of DOE's proposed action because least Bell's vireos move over time; for example, animals may enter or leave the action area over the duration of the project (20 years) and after the time of pre-construction surveys. Least Bell's vireos may be difficult to detect due to their preference for dense riparian habitat, and death or injury of individuals displaced to areas outside of the action

area would be difficult to observe. Finding a dead or injured least Bell's vireo may also be unlikely due to their small size, potentially large territory, and the likelihood that dead individuals would be quickly scavenged. We anticipate the protective measures proposed by DOE are likely to prevent mortality or injury of most individuals.

Consequently, we are unable to reasonably anticipate the actual number of least Bell's vireos that would be taken by the proposed project; however, we must provide a level at which formal consultation would have to be reinitiated. The Environmental Baseline and Effects Analysis sections of this biological opinion indicate that we expect few, if any, least Bell's vireos to be observed in the action area, and that adverse effects to the species would likely be low given the nature of the proposed activities. Therefore, we anticipate that take of least Bell's vireos would also be low. We also recognize that for every least Bell's vireo found dead or injured, other individuals may be killed or injured that are not detected, so when we determine an appropriate take level we are anticipating that the actual take would be higher and we set the number below that level.

Therefore, the Service anticipates two (2) least Bell's vireos, as adult, subadult, or egg, could be taken as a result of the proposed action through death or injury. Project activities that are likely to cause additional take should cease as the exemption provided pursuant to section 7(o)(2) may lapse and any further take could be a violation of section 4(d) or 9. We do not anticipate, nor do we exempt, take for any other activities not analyzed in this consultation for the least Bell's vireo.

Coastal California Gnatcatcher

The proposed action may cause the injury or death of coastal California gnatcatchers. The number of coastal California gnatcatchers affected would be low, but the exact number is unknown because the population is likely to fluctuate through time, and coastal California gnatcatchers have only been reported from the site (McMorran 2010), but not confirmed by formal surveys. The project would have direct effects by removing up to 71.4 acres of potential suitable scrub habitat for the coastal California gnatcatcher within Area IV and NBZ (DOE 2017, DOE2018). Because the mean territory size for inland areas during the breeding season generally ranges from 12 to 27 acres per pair (Preston et al. 1998), we anticipate that the affected habitat could support up to 12 individuals (or 6 pairs) of coastal California gnatcatchers.

Consequently, we believe that 12 individuals (or 6 pairs) of coastal California gnatcatchers could be taken in the form of harm through the disturbance or loss of habitat within the action area. We expect that even with the implementation of the conservation measures proposed by the DOE, project related activities still have the potential to take up to 5 adults, subadults, nestlings, or eggs of coastal California gnatcatchers in the form of mortality if a nest is not detected during nesting bird or protocol coastal California gnatcatcher surveys.

Therefore, the Service anticipates five (5) coastal California gnatcatcher adults, subadults, or eggs could be taken as a result of the proposed action through death or injury. Project activities

that are likely to cause additional take should cease as the exemption provided pursuant to section 7(o)(2) may lapse and any further take could be a violation of section 4(d) or 9. We do not anticipate, nor do we exempt, take for any other activities not analyzed in this consultation.

California Red-legged Frog

We anticipate that some California red-legged frogs could be taken as a result of the proposed action. We expect the incidental take to be in the form of capture during relocation activities, and in the form of harm, injury, or death as a result of project activities if individuals are accidentally injured or killed during capture and relocation or are unable to be collected for relocation and remain in active project areas. Any California red-legged frogs that go undetected and remain in the action area could be killed by project activities. We expect this number to be low due to the avoidance and minimizations measures proposed by DOE and the status of the species in the action area. The probability of these risks may be increased if substantial rainfall (greater than 0.2 inch of rain in a 24-hour period) occurs and California red-legged frogs are dispersing through the area during work activities, though many activities would occur outside of the rainy season. California red-legged frogs could also be killed or wounded by predators if they abandon habitat within or adjacent to work areas and be subject to desiccation if they leave shelter sites.

We cannot quantify the precise number of California red-legged frogs that may be taken as a result of the DOE's proposed action because the species moves over time; for example, animals may enter or leave the action area over the duration of the project (up to 20 years) or after pre-activity surveys. California red-legged frogs may be difficult to detect due to their small body size and use of aquatic habitats, underground burrows, or dense cover. Animals injured or killed during capture efforts are likely to be observed; however, mortality from other sources, including the indirect effects of relocation (e.g. unable to find food in a new location) or displacement from the action area, would be difficult to observe. Finding a dead or injured California red-legged frog may also be unlikely due to their cryptic coloration and potential to be quickly scavenged. The protective measures proposed by DOE are likely to prevent mortality or injury of most individuals.

Consequently, we are unable to reasonably anticipate the actual number of California red-legged frogs that would be taken by the proposed Project; however, we must provide a level at which formal consultation would have to be reinitiated. The Environmental Baseline and Effects Analysis sections of this biological opinion indicate that adverse effects to the species would likely be low given the quality and quantity of available habitat, nature of the proposed activities, and conservation measures. Therefore, we anticipate that take of California red-legged frogs would also be low. We also recognize that for every California red-legged frog found dead or injured, other individuals may be killed or injured that are not detected, so when we determine an appropriate take level we are anticipating that the actual take would be higher and we set the number below that level.

Similarly, for estimating the number of California red-legged frogs that would be taken by capture, we cannot predict how many may be encountered for reasons stated earlier. While the

benefits of relocation (i.e. minimizing mortality) outweigh the risk of capture, we must provide a limit for take by capture at which consultation would be reinitiated because high rates of capture may indicate that some important information about the species in the action area was not apparent (i.e. it is much more abundant than previously believed). Conversely, because capture and relocation can be highly variable, depending upon the species and the timing of the activity, we do not anticipate a number so low that reinitiation would be triggered before the effects of the activity were greater than what we determined in the Effects Analysis.

Therefore, the Service anticipates two (2) adult or juvenile California red-legged frogs could be taken as a result of the proposed action through death or injury, or five (5) adult or juvenile California red-legged frogs could be taken as a result of the proposed action through capture and relocation. Also, if any other life stages of the California red-legged frog are identified within the action area that are completely dependent on water (i.e. egg masses or tadpoles), DOE must contact our office immediately. We do not expect egg masses or tadpoles to be present in the action area and are not exempting take for these life stages. Project activities that are likely to cause additional take should cease as the exemption provided pursuant to section 7(o)(2) may lapse and any further take could be a violation of section 4(d) or 9. We do not anticipate, nor do we exempt, take for any other activities not analyzed in this consultation.

Riverside Fairy Shrimp and Vernal Pool Fairy Shrimp

We anticipate that all Riverside fairy shrimp and/or vernal pool fairy shrimp cysts, adults, and juveniles within up to three pools within the action area could be taken as a result of the proposed action. We expect the incidental take to be in the form of being crushed, buried or displaced from any occupied habitat as a result of proposed project activities.

We cannot quantify the precise number of Riverside fairy shrimp and/or vernal pool fairy shrimp that may be taken within those three pools as a result of DOE's proposed action because Riverside fairy shrimp and/or vernal pool fairy shrimp are small and difficult to detect. Finding dead or injured Riverside fairy shrimp or vernal pool fairy shrimp is unlikely because they would be difficult to observe. The protective measures proposed by the DOE expected to prevent mortality or injury of most individuals.

Consequently, we are unable to reasonably anticipate the actual number of Riverside fairy shrimp and vernal pool fairy shrimp that would be taken by the proposed project. The Environmental Baseline and Effects Analysis sections of this biological opinion indicate that we expect few, if any, Riverside fairy shrimp and vernal pool fairy shrimp to be observed in the action area, and that adverse effects to the species would likely be low given the nature of the proposed activities. Therefore, we anticipate that take of Riverside fairy shrimp and vernal pool fairy shrimp would also be low. We also recognize that for every Riverside fairy shrimp or vernal pool fairy shrimp found dead or injured, other individuals may be killed or injured that are not detected, so when we determine an appropriate take level we are anticipating that the actual take would be higher and we set the number below that level.

Therefore, because of the difficulty in detecting incidental take of vernal pool species, we quantify take by measuring impacts to their habitat features. We anticipate three (3) vernal pools containing listed fairy shrimp may be impacted such that these features can no longer support fairy shrimp species. Project activities that are likely to cause additional take should cease as the exemption provided pursuant to section 7(o)(2) may lapse and any further take could be a violation of section 4(d) or 9. We do not anticipate, nor do we exempt, take for any other activities not analyzed in this consultation.

Braunton's Milkvetch

Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species; however, limited protection of listed plants is provided at section 9(a)(2) to the extent that the Act prohibits the removal and reduction to possession of federally listed plants from areas under Federal jurisdiction, the malicious damage or destruction of such plants on areas under Federal jurisdiction, and the destruction of listed plants on non-Federal areas in violation of State law or regulation or in the course of a violation of a State criminal trespass law.

EFFECT OF THE TAKE

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species or adverse modification of critical habitat.

REASONABLE AND PRUDENT MEASURES

The measures described below are non-discretionary, and must be undertaken by the DOE or made binding conditions of any grant or permit issued to the DOE, as appropriate, for the exemption in section 7(o)(2) to apply. The DOE has a continuing duty to regulate the activity covered by this incidental take statement. If the DOE (1) fails to assume and implement the terms and conditions or (2) fails to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the DOE 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 Service believes the following reasonable and prudent measures are necessary and appropriate to minimize the impacts of the incidental take of least Bell's vireo, coastal California gnatcatcher, California red-legged frog, Riverside fairy shrimp, and vernal pool fairy shrimp:

1. Biologists must be authorized by the Service before they survey for least Bell's vireo, coastal California gnatcatcher, California red-legged frog, Riverside fairy shrimp, or vernal pool fairy shrimp, and before they capture and move California red-legged frogs, Riverside fairy shrimp, or vernal pool fairy shrimp in the action area, as described in the terms and conditions below.

2. The DOE and authorized biologists must implement measures to reduce effects to and take of the least Bell's vireo, coastal California gnatcatcher, California red-legged frog, Riverside fairy shrimp, and vernal pool fairy shrimp in the action area as described in the Terms and Conditions below.

TERMS AND CONDITIONS

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

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

The DOE must request our approval of any biologists that conduct project activities (e.g. survey, capture, relocate) associated with the least Bell's vireo, coastal California gnatcatcher, California red-legged frog, Riverside fairy shrimp, or vernal pool fairy shrimp pursuant to this biological opinion in the action area. Such requests must be in writing, and be received by the Ventura Fish and Wildlife Office at least 30 days prior to any such activities being conducted. Information included in a request for authorization should include: (1) relevant education; (2) relevant training on species identification, survey techniques, handling individuals of different age classes, and handling of different life stages by a permitted biologist or recognized species expert authorized for such activities by the Service; (3) a summary of field experience conducting requested activities (to include project/research information); (4) a summary of biological opinions under which they were authorized to work with the listed species and at what level (such as construction monitoring versus handling), this should also include the names and qualifications of persons under which the work was supervised as well as the amount of work experience on the actual project; (5) any Federal Recovery Permits [10(a)1(A)] authorizing the individual to work with the species (to include permit #, authorized activities, and name of permit holder); and (6) any relevant professional references with contact information.

Please be advised that possession of a 10(a)(1)(A) permit for least Bell's vireo, coastal California gnatcatcher, California red-legged frog, Riverside fairy shrimp, or vernal pool fairy shrimp does not substitute for the implementation of this measure.

2. The following terms and conditions implement reasonable and prudent measure 2:
 - a. Prior to the onset of project-related activities in areas of suitable habitat for California red-legged frogs, Riverside fairy shrimps, or vernal pool fairy shrimps, a Service-approved biologist must identify appropriate relocation areas in the event these species are detected during the proposed action. These locations must be in proximity to the project site, contain suitable habitat for the respective species, not be affected

by project activities, and be free of exotic predatory species (e.g. bullfrogs, crayfish) to the best of the approved biologist's knowledge.

- b. If Riverside fairy shrimps, and/or vernal pool fairy shrimps are found within a habitat area that must be impacted by the action, every effort will be made to collect all cysts (cyst-bearing soil) from the entire work area of each impacted pool. The substrate will be removed in chunks and will be segregated separately for each pool. The cysts will be stored in labeled bags or boxes that are adequately ventilated. The cysts will be kept out of direct sunlight to prevent excessive heating of the soil. When excavation activities are complete, the inoculum will be returned to the corresponding pool or another suitable receptor site if the impacted pool no longer supports the appropriate conditions for fairy shrimp. Inoculum will be placed in a manner that preserved the orientation of the cysts within the surface layer of the soil. The inoculum will be shallowly distributed within the vernal pools so that the cysts have the potential to be brought into solution when inundated.
- c. Authorized biologists must have the authority to stop work if any least Bell's vireo, coastal California gnatcatcher, California red-legged frog, Riverside fairy shrimp, or vernal pool fairy shrimp are found in harm's way.
- d. In areas where there is no speed limit posted, all vehicles and equipment should not exceed 20-mile per hour speed limit, to minimize wildlife collisions.
- e. If project activities occur between November 1 and April 1, the authorized biologist or designated biological monitor must survey work areas following any precipitation events before construction activities resume, to ensure California red-legged frogs have not moved into a work area overnight.

REPORTING REQUIREMENTS

Pursuant to 50 CFR 402.14(i)(3), the DOE must report the progress of the action and its impact on the species to the Service as specified in this incidental take statement. The DOE must provide us a written annual report for each year that activities are conducted pursuant to this biological opinion. The timing of this annual report can be specified by DOE, to align with other reporting requirements; however, the Service must be informed of the proposed reporting schedule.

The report must state the number of least Bell's vireo, coastal California gnatcatcher, California red-legged frog, Riverside fairy shrimp, and vernal pool fairy shrimp killed or injured, describing the circumstances of the mortalities or injuries if known. The report must contain information on the following: (1) the type, location, and habitat characteristics of activities that occurred in the action area (e.g., construction activities, monitoring); (2) the results of any surveys conducted for any listed species and their habitats; (3) the number of California red-legged frog, Riverside fairy shrimp, or vernal pool fairy shrimp captured and relocated; (4) the locations from which

California red-legged frog, Riverside fairy shrimp, or vernal pool fairy shrimp were moved and where they were relocated to; (5) an analysis of the effectiveness of the avoidance and minimization measures and recommendations for future measures; and (6) any other pertinent information. This reporting is not in lieu of reporting required immediately upon the take of least Bell's vireo, coastal California gnatcatcher, California red-legged frog, Riverside fairy shrimp, or vernal pool fairy shrimp as described below.

DISPOSITION OF DEAD OR INJURED SPECIMENS

As part of this incidental take statement and pursuant to 50 CFR 402.14(i)(1)(v), upon locating a dead or injured least Bell's vireo, coastal California gnatcatcher, California red-legged frog, Riverside fairy shrimp, or vernal pool fairy shrimp, initial notification within 3 working days of its finding must be made by telephone and in writing to the Ventura Fish and Wildlife Office (805-644-1766). 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.

The DOE must take care in handling injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible state. The DOE must transport injured animals to a qualified veterinarian. Should any treated least Bell's vireo, coastal California gnatcatcher, California red-legged frog, Riverside fairy shrimp, or vernal pool fairy shrimp survive, the DOE must contact the Service regarding the final disposition of the animal(s). 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.

1. We recommend that the DOE create California red-legged frog habitat (aquatic breeding and aquatic non-breeding) following cleanup during the restoration activities, where feasible.
2. We recommend that the DOE 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.

3. We recommend that non-native predators of the California red-legged frog, such as bullfrogs, be removed permanently from the wild during project activities, if they can be captured and if such activities are in compliance with State laws.
4. To the extent possible, we recommend that DOE schedule project activities (especially those that would be conducted at night) such that they avoid rainy weather.
5. We recommend that native plants and seed be collected from the various species (sensitive and common) before the vegetation is removed, and that these plants and seeds be used for restoration efforts onsite to maintain genetic diversity of the local flora and to minimize long-term adverse effects. Creation of an onsite plant nursery could be helpful in maintaining these plants and seeds.
6. We recommend that the DOE work with local agencies and governments to implement recovery actions identified in the coastal California gnatcatcher Spotlight Species Action Plan.

The Service requests notification of the implementation of any conservation recommendations within the annual reports so we may be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats.

REINITIATION NOTICE

This concludes formal consultation on the action(s) outlined in the request. 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, the exemption issued pursuant to section 7(o)(2) may have lapsed and any further take could be a violation of section 4(d) or 9. Consequently, we recommend that any operations causing such take cease pending reinitiation.

If you have any questions about this biological opinion, please contact Jenny Marek of my staff at 805-677-3313, or by e-mail at jenny_marek@fws.gov.

Sincerely,



Stephen P. Henry
Field Supervisor

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Appendix A. Conservation Measures

The Biological Assessment (DOE 2018) incorporates a number of general and species-specific measures that DOE would implement to avoid, minimize, and/or compensate for adverse effects to federally listed species and designated critical habitat. The full text of these measures is presented in this appendix.

General Conservation Measures

Conservation Measure 1. *Biological Monitoring during Project Construction and Pre-Project Clearance Surveys.*

One or more qualified Project Biologist(s), approved by the Service, CDFW, and Corps would be retained by Boeing and DOE for the duration of construction activities. The Project Biologist will have experience with sensitive species that occur or have the potential to occur on the project site. The Project Biologist will be on site as needed during building demolition, and clearing and grubbing of vegetation in habitats that have the potential to support sensitive species, including federally or state-listed species. Given the scope of the project, level of potential impacts, and number of sensitive resources potentially affected by project activities, it is expected that a monitoring team may be required to adequately cover simultaneously-occurring project activities and provide the expertise needed to ensure protection of all environmental resources at the SSFL. The monitoring team will include a Project Biologist and staff members qualified to perform particular tasks under the direction of the Project Biologist.

a) The Project Biologist will identify work areas, monitor work activity, and provide “tailgate” sessions/education program (see Measure 3) for construction contractor personnel, and will oversee and execute the conservation protection measures pertaining to biological resources.

b) Prior to the ground disturbance associated with the initial phases of building demolition, soil remediation, and ground-disturbing aspects of ground water activities, the Project Biologist will conduct pre-project clearance surveys to ascertain the buildings are not being used by bats and native bird species, including owls and raptors. Vegetated areas will be surveyed for active bird nests (see Measure 5) and sensitive plant (see Measure 12) and wildlife species (see Measures 5, 13, 14, 15 and 16). Humane methods will be used to haze owls, raptors, native songbirds, and bats out of the structures prior to initial phases of construction. Effective methods of deterrence may include the use of exclusionary netting, reflective flagging and/or flight diverters, sonic bird control devices, or a falconry service program. Building demolition will be conducted outside the breeding seasons of birds protected by the Migratory Bird Treaty Act (MBTA) and bats unless the buildings can be completely confirmed for the absence of nesting birds or roosting bats.

Wildlife will be protected during work activities. Direct impacts to general wildlife species, such as snakes, other reptiles, and small mammals will be minimized during remediation.

- a) Prior to clearing and grubbing in a remediation area, the Project Biologist will walk through the area and attempt to locate and capture or otherwise humanely move out of harm's way sedentary species such as reptiles and amphibians, with special attention paid to species of conservation concern such as silvery legless lizards (*Anniella pulchra pulchra*) and coast horned lizards (*Phrynosoma blainvillii*).
- b) A Project Biologist will be on-site to monitor work zones for presence of wildlife periodically during work activities (such as vegetation removal or earth moving). Should an endangered, threatened, or sensitive animal species be observed in harm's way, the contractor will stop work until the Project Biologist can move the animal to a safe location, when work can resume.

Conservation Measure 2. Site Access Restrictions to Minimize Impacts to Sensitive Biological Resources.

- a) The project work areas will be accessed using existing roads to the extent possible. Parking, driving, lay-down, stockpiling, and vehicle and equipment storage will be limited to previously compacted and developed areas, or non-sensitive habitat areas (see Measure 8), and the designated staging areas as much as feasible.
- b) The demolition, remediation, and restoration contractors will stage equipment in areas that will create the greatest distance practical between demolition- and remediation-related noise sources and noise-sensitive receptors (e.g. sensitive habitat areas for endangered species or species of special concern) during all project demolition and remediation activities.
- c) Where access must be through native habitats, such as within the 2010 AOC (DTSC 2010a) proposed biological exemption areas (discussed in Section 4.2.2 and 4.2.3 below), the Project Biologist will be consulted to determine the least environmentally damaging and safe access route to the site. This access route will be clearly marked and will be considered part of the construction zone/action area.
- d) Limits of the action area will be clearly marked and delineated in the field by the biologist. No unauthorized personnel or equipment (including off-road vehicle access) will be allowed in native habitats outside the construction limits or designated access routes.
- e) Disturbance in the 2010 AOC proposed biological exemption areas, or similar areas identified in Boeing areas of responsibility, would be kept to a minimum, including consideration of using special methods such as the use of balloon-tired, all-terrain-vehicles to access sites and remove affected soil.
- f) Biologically sensitive areas (discussed in Section 4.2.2, below) will be clearly marked on plans and on site and avoided by personnel and equipment.

g) Before project initiation, the project boundary, including temporary features such as staging areas, will be clearly marked with flagging, fencing, or signposts. All project-related activities will occur within the designated construction boundary.

h) Boeing and DOE will cease all construction activities (e.g. confirmation sampling, vegetation removal, mapping, surveying, sample analysis, excavation and stockpiling) from sunset and to sunrise. If night work is required, the Responsible Party will implement the following minimization measures:

1. Exterior lighting will be of the lowest illumination allowed for human safety, selectively placed, shielded, and directed away from native habitat to the maximum extent practicable. The number of sites subject to night work at any given time and the total work area affected will be minimized to the maximum extent possible.

2. Project vehicle traffic will proceed at minimum speed to avoid impacts on nocturnal wildlife.

3. The on-site Project Biologist will inspect the surrounding area to ensure that illumination is limited to within 250 feet of the work area.

i) All trash will be disposed of properly. All food-related trash will be placed in sealed bins or removed from the site regularly. Following initial project construction, all equipment, waste, and construction debris will be removed from the site, and the soil will be re-contoured prior to habitat restoration.

Conservation Measure 3. *Environmental Education Program.*

All members of action related crews will participate in an Environmental Education Program to be administered by the Project Biologist. The Education Program will be conducted during all project phases for any new crew personnel brought to the site and will cover the potential presence of listed species; the requirements and boundaries of the project; the importance of complying with avoidance, minimization, and compensation measures; and problem reporting and resolution methods. Species-specific training will be administered to crews who will be performing activities within areas occupied, or presumed to be occupied, by listed species.

Conservation Measure 4. *Vehicle and Operation Restrictions to Prevent Unintentional Fire.*

To ensure fire does not commence due to project activities, trucks will carry water and shovels or fire extinguishers in the field. Shields, protective mats, or other fire prevention equipment will be used during grinding and welding, and wildfires will be prevented by exercising care when driving and by not parking vehicles in grass or other dry vegetation where catalytic converters can ignite it. Procedures for changing or halting operations when the fire hazard reaches a critical

level will be developed by the remediation contractor. No smoking or disposal of cigarette butts or other smoking materials will take place within vegetated areas.

Conservation Measure 5. *Conduct Vegetation Removal or Heavy Equipment Operation Adjacent to Vegetated Habitat Outside of Nesting Season for Those Species Protected by the Migratory Bird Treaty Act.*

a) Due to the presence of habitat for MBTA species within and adjacent to the project site and access routes, any grubbing, mowing, removal of surface vegetation, excavation, or other activity involving heavy equipment in or adjacent to vegetated areas will not be scheduled during the nesting season for song birds, between February 15 and August 31 to avoid potential impacts on nesting birds, whenever feasible. Nesting season for owls, hawks, and eagles may begin earlier than songbirds, as early as October. Areas within the project site where these birds roost or nest, including dead trees with snags and natural cavities, will be surveyed by qualified biologist prior to vegetation removal. If nesting birds are identified that may be affected by the proposed activities, then an appropriate work buffer will be established or work will be delayed until nesting activity has been completed to ensure that the nesting bird activity is not adversely impacted.

b) A qualified biologist, hired by the Responsible Party will perform a nesting bird survey and confirm that active nests would not be affected. The results of the survey would be submitted to the CDFW and the Service, as appropriate. See Conservation 700 Measures 15 and 16 for further measures to avoid effects on least Bell's vireo and coastal California gnatcatcher.

Habitat Protection and Restoration Measures

Conservation Measure 6. *Minimize the Potential for Establishment of Invasive Plant Species.*

Project activities will minimize the potential for invasive plant species (i.e. weeds) or soil pathogens to become established in disturbed areas and spread into restoration areas or natural areas. Weeds generally include those species listed by the California Invasive Plant Council and any species that can invade natural or restoration areas, and replace or preclude the establishment of native or other more desirable species. Equipment and/or vehicles used for remediation activities in off-road locations will utilize dry-truck cleaning measures (e.g. rumble strips, brushing) upon entering SSFL and/or the project site.

Conservation Measure 7. *Avoid, Minimize, and Mitigate for Disturbance to Corps Jurisdictional Wetlands and Waters of the U.S. and wetlands and waters under CDFW jurisdiction.*

This measure is included because proper functioning of drainages and wetland features is necessary to support overall ecosystem functioning, including the ability to support endangered,

threatened, and sensitive species onsite. Additionally, some of these features may have potential to provide habitat for threatened and endangered species.

- a) No dumping or fill will be placed in any Clean Water Act (CWA) Section 404 Waters of the U.S. except as authorized by a permit from the Corps in support of the CWA (33) *United States Code* (U.S.C.) 1251 - 1387 Section 404, 33 CFR 328.3, 40 CFR 122.2, the Soil and Water Conservation Act (16) U.S.C. 2001 - 2009, and MCO P5090.2A, 11201.3.
- b) Implement erosion BMPs for erosion and sediment control during soil remediation, building demolition, and any other ground disturbance activities in order to stop excess sediment flow into drainages, Waters of the U.S., and wetland features.
- c) When soil disturbance occurs during the rainy season (November 1 to May 1), erosion and sedimentation BMPs will be installed and maintained immediately downslope of work areas until work is completed and disturbed areas have been re-contoured and physically stabilized.
- d) Natural ephemeral drainages that are within the soil disturbance areas will be reconstructed as soon as possible to restore drainage patterns.
- e) Man-made drainage features that are impacted by project activities may not need to be restored to pre-disturbance condition, but may need to be replaced to restore the drainage patterns from the site. If drainage needs to be restored, it will be done in a manner that mimics the natural drainage on the site.
- f) In accordance with the Corps requirements, mitigation measures include a sequence of (1) seeking to avoid impacts, (2) minimizing impacts in space and/or time, and (3) providing compensation for impacts that are unavoidable. A SWPPP will be prepared and will incorporate BMPs, such as silt fences, silt basins, and gravel bags, or other measures to control erosion and prevent the release of sediment and contaminants that have the potential to move downstream or could be harmful to aquatic resources, such as vernal pools that may support listed species.

Conservation Measure 8. *Avoid and Minimize Disturbance to Sensitive Upland Vegetation.*

Disturbance to Venturan coastal sage scrub, dipslope grassland, sandstone outcrops (including vegetated sandstone outcrops), chaparral, southern California walnut woodland, coast live oak woodland, southern willow scrub, mulefat scrub, and coast live oak riparian woodland, will be avoided and minimized to the extent practicable. Avoiding or minimizing adverse impacts to these relatively undisturbed native habitats is emphasized because of the difficulty and time involved in restoring their function, once the soil has been removed. Although restoration has been done on some interim remediation sites within SSFL, these sites were restored using topsoil obtained from elsewhere on SSFL. Boeing has identified onsite borrow areas suitable for providing backfill for their remediation activities and the effects of using the onsite borrow areas

are addressed in this BA. For remediation to be performed pursuant to the AOC, DOE is required to use suitable backfill soil; however, offsite sources of soils to be used as backfill and in restoration by DOE have not been identified. Proper functioning of these habitats is necessary to support overall ecosystem functioning on SSFL including the site's ability to support endangered, threatened, and sensitive species and designated critical habitat.

- a) Design the final project to avoid or minimize impacts to sensitive native habitats by reducing disturbance footprints to the maximum extent practicable. Staging areas, laydown areas, and/or other temporary construction-related requirements will be located within already disturbed areas or non-sensitive habitat types.
- b) Restore sensitive habitats that are temporarily disturbed as a result of project implementation to pre-project conditions as soon as possible to prevent net loss of habitat. Areas that cannot be restored within a short period of time (long-term impact) or are permanently impacted by project activities may require additional measures to compensate for temporary or permanent loss of sensitive habitats.
- c) Topsoil below allowable chemical and radionuclide levels, if available, will be salvaged if practicable for eventual use in onsite habitat restoration.

Conservation Measure 9. *Develop a Revegetation and Habitat Restoration Plan.*

A qualified biologist will prepare a site-specific Revegetation and Habitat Restoration Plan (RHRP), in consultation with the Service and CDFW that includes a description of existing conditions in the action area, areas of impact, site preparation and revegetation methods, maintenance and monitoring criteria, performance standards, and adaptive management practices. Cover standards will be developed for each plant community target, and cover values will be established for each layer (i.e. herb, shrub, and/or tree layers).

The RHRP will be developed and approved by appropriate agencies prior to the initiation of ground disturbance or construction activities. The RHRP will address all revegetation efforts associated with the soil disturbances. It will include specific erosion control measures, irrigation requirements, species composition, seed mix origins and ratios for that particular habitat, weed control, water regimes, maintenance activities, success criteria, and monitoring requirements. The RHRP will, at a minimum, include the following:

- a) Specification of revegetation methods, including seeding and/or planting of container stock, salvaged plants, cuttings, or other propagules collected or propagated from onsite sources, including any sensitive plant species that would be impacted during soil disturbance or other construction activities.
- b) Establishment of an onsite nursery and use of onsite sources for growing medium (i.e. clean, weed-free soil) and propagules to avoid risk of introducing foreign pathogens, such as

water mold (*Phytophthora* spp.), and unwanted pests, such as Argentine ants (*Linepithema humile*), into restoration areas that may subsequently disperse and establish in undisturbed natural areas adjacent to restoration areas.

c) A schedule for seed and propagule collection for use in revegetation, as well as a schedule for construction and operation of the onsite propagation and growing facility. Propagule collection and propagation of plants in the growing facility will need to be initiated sufficiently in advance of remediation activities (a minimum of two growing seasons prior to the initial need for post-remediation revegetation) in order to generate adequate seed stock and container stock for use in revegetation.

d) Seed mixes will include only species native to the site and will be collected from onsite or nearby sources. The species mix to be used will contain species capable of providing self-sustaining native vegetation; for example, a suggested seed mix for Venturan coastal sage scrub could include the following species: California sagebrush, California buckwheat, coyote brush (*Baccharis pilularis*), black sage, purple sage (*S. leucophylla*), and deerweed (*Acmispon glaber*).

e) Topsoil below allowable chemical and radionuclide levels, if available, will be salvaged if practicable using two lifts: the first to salvage the seed bank and the second to salvage the soil biota in the root zone. The topsoil will be saved in two separate covered stockpiles close to the project site and replaced accordingly after final reconfiguration of disturbed areas.

f) Salvage uncontaminated and pest- or disease-free organic debris, including trees and shrubs downed during site clearing, for use as fill, mulch, compost, or habitat creation.

g) After completion of topsoil replacement and related grading and prior to initiation of restoration, graded areas will be inspected by a Project Biologist (or revegetation specialist) to determine whether any remedial measures are required prior to initiation of revegetation. Remedial measures may include re-grading, installation of erosion control methods, weed control, and installation of irrigation, if needed.

h) Revegetation of disturbed areas will be initiated the first fall after completion of final grading activities and before the winter rainfall season if feasible to minimize the need for watering and encourage early establishment of plants to reduce the potential for erosion associated with rain events. Supplemental watering may be required if reseeding/replanting must be conducted after the start of the rainy season.

i) Incorporate monitoring procedures, including periodic qualitative and quantitative assessments and minimum performance criteria, for revegetation and erosion control. The performance criteria and remedial actions need to consider the uncertainties of revegetation and restoration of sensitive habitats and sensitive plant species.

j) Appropriate remedial measures will be identified if the restoration is not progressing as expected. At a minimum, remedial measures may include invasive species control (e.g. hand removal, mechanical and herbicide control), reseeding/replanting, supplemental irrigation, and erosion control. The use of pesticides will be minimized through the use of green alternatives (for example, non-chemical solarizing technique) and an integrated pest management plan.

k) The monitoring and maintenance program duration and frequency will be specified to ensure the restoration sites are successful. RHRP Progress Reports will be submitted annually to all approval agencies. The progress reports will include an introduction, methods, results, and a summary of activities, findings, trends, and recommendations. There will be a period of monitoring, with no maintenance (including irrigation and weed control) to ensure the project site is self-sustaining and will not fail without maintenance (including supplemental water) or will not decline due to the presence of aggressive weedy species.

l) Minimize removal of existing vegetation during remediation.

Conservation Measure 10. *Develop a Tree Management and Preservation Plan.*

A Tree Management and Preservation Plan will be developed using a certified arborist. The goal of the plan is to offset tree impacts through a sustainable, customized plan that is suitable for the site's unique opportunities for tree preservation, enhancement, and establishment. The plan will identify trees protected by Ventura County, including coast live oak, sycamore, historical and heritage trees (protected trees), or special-status trees (e.g. southern California black walnut) that could be impacted within or adjacent to remediation areas, as well as those located outside of the project footprint that would be preserved. The plan will define direct and indirect impacts and include protection measures and options (such as tree relocation or replacement) within and outside of cleanup areas and the locations of mitigation areas within the project area boundary. Some flexibility will be required in applying protection measures to allow necessary contamination removal, and it is recognized that it is preferable to retain a tree rather than removing it even when contamination needs to be removed within its protective zone. The following protection measures may be used:

a) Fencing of oak and other protected trees adjacent to demolition and remediation activities areas.

b) Placement of fill, storage of equipment, and grading prohibited within the protective zone (minimum of 5 feet from the drip line or 15 feet from the trunk of the tree, whichever distance is greater) of a tree proposed for preservation.

c) Limit grade changes near the protective zones of trees.

- d) Temporary retaining walls may be built to protect trees proposed for preservation from surrounding cut and fill. Retaining walls may be placed outside of the protective zone of the tree to be preserved.

For trees impacted by project activities, where mitigation is required, the Tree Management and Preservation Plan, which may be separate from or incorporated into the RHRP (see Conservation Measure 9), will specify performance measures, maintenance and monitoring requirements, adaptive management, and regulatory authorities.

Conservation Measure 11. *Soil Stabilization.*

In conjunction with reseeded and when topsoil is unavailable, soil stabilization BMPs will be used, including soil binders, erosion mats, gabion walls (outside of stream channels), and erosion control check dams, where applicable. An updated SWPPP will guide erosion control measures for all activities (e.g. demolition and remediation activities). Dust control measures would be developed and implemented to minimize fugitive dust and limit soil losses due to wind. The SWPPP will require all structural and non-structural BMPs to be installed and implemented in accordance with approved plans and specifications prior to the beginning of demolition and remediation activities. The project plans specified above will incorporate the following specific measures when and if applicable:

- a) Use geotextile bags or nets to contain excavated sediment, facilitate sediment drying, and increased ease of sediment placement or transport, when appropriate.
- b) Utilize erosion control products such as silt fences, sand bags, straw wattles, basins, and fiber rolls to aid in capturing sediment runoff, particularly along the bases of slopes, runoff pathways, and drainage ditches.
- c) Provide contaminant control by using de-watering, runoff controls, tire washes, containment for chemical storage areas, demolition and remediation equipment decontamination, stockpile management, spill prevention and control measures, and protective sheeting or tarps on steep slopes prior to rain events.
- d) Restore and maintain surface water banks that mirror natural conditions.
- e) Install and maintain basins to capture sediment runoff along sloped areas and use excavated areas to serve as temporary retention basins; develop rain water retention basins or a collection system with barrels or cisterns to capture precipitation for potential onsite use. Retention basins should be designed in a way and appropriately treated to avoid creating mosquito breeding grounds.
- f) Install earthen berms that utilize onsite/local materials to manage run-on and/or runoff stormwater.

- g) Use gravel roads, porous pavement, and separated pervious surfaces rather than impermeable materials to maximize infiltration.
- h) Cover filled excavations with an appropriate erosion control fabric (preferably biodegradable) or mulch to stabilize soil (prevent erosion) and serve as a substrate for ecosystems.
- i) Use soil stabilization BMPs to help in reseeding success, including soil binders, erosion mats, and erosion control check dams.
- j) Use captured rainwater, uncontaminated wastewater, or treated water for building demolition and soil and groundwater remediation activities or site restoration activities when possible (e.g. for wash water, irrigation, dust control, constructed wetlands, or other uses).
- k) Establish protocols for proper storage and use of hazardous materials during the building demolition and soil and groundwater remediation phase.
- l) Establish spill response procedures.
- m) Use dust control measures to prevent soil erosion during the remediation phases.
- n) Provide for erosion control through planting and maintenance of native vegetation within the disturbed areas.

Include design features that replicate the natural site drainage patterns to the extent possible, with minimal constructed features to allow for long-term erosion control and successful revegetation.

Special Conservation Measures for Listed and Sensitive Plant and Wildlife Species

Conservation Measure 12. *Avoidance and Minimization of Impacts to Braunton's milkvetch, Santa Susana tarplant, other Sensitive Plant Species and Associated Critical Habitat.*

- a) Prior to access, excavation, demolition, remediation, installation of equipment, or any other activity associated with the proposed project, the Project Biologist will survey all proposed remediation, staging, and access areas, plus a buffer of 100 feet, for presence of federally and state-listed threatened or endangered plants, including Braunton's milkvetch and Santa Susana tarplant, and other sensitive plant species such as Malibu baccharis, Catalina mariposa lily (*Calochortus catalinae*), slender mariposa lily (*Calochortus clavatus* var. *gracilis*), Plummer's mariposa lily (*Calochortus plummerae*), or other mariposa lily (*Calochortus* spp.), California screw moss (*Tortula californica*), and any *Dudleya* species (other than chalk dudleya [*Dudleya pulverulenta*] or lance-leaved dudleya [*D. lanceolata*]).

Plants will be mapped and clearly marked, and numbers of individuals and their condition will be determined and recorded.

b) Remediation access routes will be adjusted as needed to maximize avoidance of impacts to individuals or populations of Braunton's milkvetch or any other sensitive plant species and associated critical habitat. The Project Biologist will be responsible for overseeing demolition and remediation to ensure compliance with the conservation measures for preventing unanticipated impacts to Braunton's milkvetch and any other sensitive plant species. The Project Biologist will be on site during access, vegetation removal, and any other remediation activities with the potential to impact sensitive plant species.

c) Dust migration in or adjacent to areas that support sensitive species will be minimized by lightly spraying areas of exposed soil with water during excavation activities when weather conditions require the use of dust control measures.

d) If any sensitive plants occur within 100 feet of a proposed demolition or remediation area, the Project Biologist will flag their locations and work with the project team to avoid or minimize impacts to the species.

e) Where impacts to Braunton's milkvetch or other sensitive plant species are unavoidable, a salvage, propagation, and replanting program will be developed and implemented as part of the RHRP. That plan will include the following aspects:

- Utilize both seed and salvaged (excavated) plants, constituting an ample and representative sample of each colony of the species that would be impacted. The program should consider perpetuating the genetic lines represented on the impacted sites by obtaining an adequate sample prior to construction, propagating them, and using them in the restoration of that site. The program should also consider that the salvage and transplant of listed species is experimental and often has low success.
- Incorporate provisions for recreating suitable habitat and measures for re-establishing self-sustaining colonies of Braunton's milkvetch and other sensitive plant species on the site.
- Include provisions for monitoring and performance assessment, including standards that will allow annual assessment of progress and provide for remedial action should the species fail to re-establish successfully.
- The program would require approval from the Service and CDFW prior to its implementation, and activities involving handling of sensitive plant species will require appropriate permits from CDFW.

Conservation Measure 13. *Avoidance of Vernal Pools and Vernal Rock Pools Potentially Occupied by Listed Vernal Pool Species including Riverside Fairy Shrimp and/or Vernal Pool Fairy Shrimp.*

- a) Prior to any work within 250 feet of vernal pools or vernal rock pools, and depressional features that support a hydroperiod sufficient to complete the fairy shrimp lifecycle, surveys should be conducted during the appropriate season(s) to determine the presence of federally listed Riverside and vernal pool fairy shrimp. Surveys must be conducted by a Service permitted fairy shrimp biologist. If listed fairy shrimp are identified, the Service would be notified by the permitted biologist within 10 working days of the discovery and work within 250 feet of occupied habitat (other than protective measures identified below) will not proceed until Responsible Party consultation with the Service on how to proceed has concluded.
- b) To avoid impacts to federally listed fairy shrimp, occupied vernal pools and vernal rock pools, and depressional features that support a hydroperiod sufficient to complete the fairy shrimp lifecycle, within 250 feet of the project boundary will be identified on project construction plans. Occupied fairy shrimp habitat (vernal pools and vernal rock pools) within 250 feet of the project footprint will be clearly identified in the field with flagging or exclusion fencing. Pools occupied by fairy shrimp and vernal pool features in the proposed AOC biological exemption areas, or similar locations identified in Boeing's areas of responsibility, will be monitored by the Project Biologist during construction; the Project Biologist will be responsible for ensuring compliance with conservation measures and preventing unanticipated impacts to vernal pools, rock pools and vernal pool species.
- c) Any demolition or remediation that could indirectly affect vernal pools or potential suitable habitat for federally listed fairy shrimp associated with vernal pools, rock pools, and vernal pool watersheds will occur outside of the rainy season (about November 1 to June 1) and in dry conditions only. Following the initial clearing of features, ongoing demolition and remediation activities can occur in the wet season by incorporating specific measures to protect surface water quality in vernal pools (e.g. use of jute netting into the SWPPP, geotextiles, wattling, and other materials), as determined by the Project Biologist, to avoid an increase or decrease of water quantity, sediment transport, and change in water quality runoff to pool basins. Sedimentation into basins will be prevented and soil-disturbing activities during the rainy season or when ground is wet (about November 1 to June 1) will be minimized.
- d) Fueling of equipment and vehicle washing will be allowed only in designated areas and will not occur within 100 feet of any vernal pool or vernal rock pool or other aquatic habitat, including intermittent drainages.

- e) Stockpiled soils will be placed on top of heavy-duty plastic sheeting on areas with an impervious surface. All stockpiles will be covered with material adequate to prevent soil transport by wind or rainwater. Covers will be maintained in good condition.

Conservation Measure 14. *Avoidance of California Red-legged Frog and associated Critical Habitat.*

To ensure that the unlikely event of the California red-legged frog migrating into the proposed work areas does not result in an impact to the species, a qualified biologist will conduct pre-demolition and pre-remediation surveys within work areas containing suitable habitat, as well as biological monitoring during demolition and remediation activities. the Service's (2005) guidance on habitat assessment and field surveys will be followed to determine presence/absence of the species and suitable habitat. If the California red-legged frog is discovered in work zones before or during demolition and remediation activities, the species will be avoided; demolition and remediation activities will be immediately halted; and consultation will be initiated with the Service to determine an appropriate response before demolition and remediation activities can begin/restart.

Conservation Measure 15. *Avoidance of Least Bell's Vireo.*

Any required clearing of woody riparian vegetation will take place outside of the breeding season for the least Bell's vireo (March 15 to August 31). When avoidance is not practicable, the following measures will be implemented:

- a) If activities cannot occur outside of the breeding season, then pre-activity surveys will be conducted by a qualified biologist for all individual active nests of listed species in all suitable habitats within 300 feet of the proposed activities.
- b) If an active nest occurs within 300 feet of the proposed activity, then project activities other than the use of existing roads will be delayed until after young fledge from the nest.
- c) A qualified biologist will monitor nest progress and activities in and adjacent to riparian habitats to ensure compliance.

Pre-project surveys, when applicable, will adhere to the Service's (2001) least Bell's vireo survey guidelines as a recognized method to determine presence or absence of the species and its habitat and be conducted during the April 10 to July 31 ideal survey window within one year in advance of construction activity.

Conservation Measure 16. *Avoidance of Coastal California Gnatcatcher.*

Prior to any clearing of vegetation or soil removal in Venturan coastal sage scrub or other suitable habitat for the coastal California gnatcatcher, the Service's presence/absence survey

protocol (Service 1997a) will be implemented. Suitable habitat for coastal California gnatcatcher includes sage scrub communities dominated by species of sagebrush (*Artemisia* spp.), sage (*Salvia* spp.), buckwheat (*Eriogonum* spp.), and bush sunflower as described in Section 4.2.1.1, of the final BA. Because surveys could be required years from now, the identification of suitable habitat to be surveyed will be made by individuals permitted to conduct coastal California gnatcatchers presence/absence surveys and will be based on conditions existing at the time of the survey. If surveys are conducted during the ideal survey window (March 15 to June 30) with a negative finding, they will be valid for a period of 1 year.

a) Pre-activity surveys in all suitable coastal California gnatcatcher habitats will be conducted by a qualified biologist. If an active nest occurs within 300 feet of the proposed activity, the biologist will immediately notify the Responsible Party, and the project activities in the vicinity of the nest other than the use of existing roads will be delayed until after young fledge from the nest. If active nests are observed, the biologist, in coordination with the Service, will determine adequate set-backs from nests to prevent nest disturbance.

b) A qualified biologist will monitor nest progress and activities in and adjacent to coastal California gnatcatcher habitat to ensure compliance.

Conservation Measure 17. *Environmental Mitigation Requirements and Monitoring Program.*

DOE and Boeing will be in consultation with oversight agencies including the Service, CDFW, Corps, CDTSC, and County of Ventura, as appropriate, and will be responsible for coordinating and implementing the conservation and protection measures and permit requirements. Each respective Responsible Party will consult with their project biologist and other qualified staff as appropriate.