UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

February 12, 2010

Ms. Diane Noda
U.S. Fish and Wildlife Service
2493 Portola Road, Suite B
Ventura, California 93003

Attn: Mr. Mark Elvin

Subj: Request to Initiate Formal Consultation under Section 7 of the U.S. Endangered Species Act for the Radiological Survey of the Santa Susana Field Laboratory Area IV and Northern Buffer Zone;
Santa Susana Field Laboratory; Ventura County, California

Dear Ms. Noda:

This letter requests initiation of formal consultation with U.S. Fish and Wildlife Service (FWS) under Section 7 of the Endangered Species Act (ESA) for the Environmental Protection Agency's (EPA) Radiological Survey of the Santa Susana Field Laboratory Area IV and Undeveloped North Buffer Zone (NBZ). The purpose of the consultation is to:

1. Protect species and their critical habitat listed in the Endangered Species Act, and Candidate Species/Sensitive Species of Concern identified by the FWS as having potential to occur within the Action area. The species include:

Listed Species

- Braunton's milk-vetch (*Astragalus brauntonii*)
- Lyon's pentachaeta (*Pentachaeta lyonii*)
- Spreading navarretia (*Navarretia fossalis*)
- Conejo dudleya (*Dudleya abramsii* ssp. *parva* [=> *Dudleya parva*])
- Santa Monica Mountains dudleya (*Dudleya cymosa* ssp. *ovatifolia* [inclusive of *Dudleya cymosa* ssp. *agourensis*])
- Marcescent dudleya (*Dudleya cymosa ssp. marcescens*)
- San Fernando Valley spineflower (*Chorizanthe parryi* var. *fernandina*)
- California Orcutt grass (*Orcuttia californica*)
- Coastal California gnatcatcher (*Polioptila californica californica*)
- Least Bell's vireo (*Vireo bellii pusillus*)
- California red-legged frog (*Rana aurora draytonii* [–> *Rana draytonii*])
- Quino checkerspot butterfly (*Euphydryas editha quino*)
- Riverside fairy shrimp (*Streptocephalus wootonii*)
- Vernal pool fairy shrimp (*Branchinecta lynchi*)
- California condor (*Gymnogyps californianus*)

Candidate/Sensitive Species

- San Fernando Valley spineflower (*Chorizanthe parryi* var. *fernandina*)
- Santa Susana tarplant (*Deinandra minthornii*)

2. Identify and agree to implement mitigation and/or minimization measures, which may be necessary to ensure compliance with the ESA, thereby allow the EPA to proceed with the Action.

Description of the proposed Action and Action Area

The proposed Action is the radiological characterization of a portion of Santa Susana Field Laboratory, consisting of administrative Area IV, and an adjacent undeveloped area to the north referred to as the Northern Buffer Zone, or NBZ. Area IV consists of 290 acres and the NBZ consists of 182 acres. Both Area IV and the NBZ are owned and operated by The Boeing Company ("Boeing"). The purpose and need for the Action is to determine the presence of potential radioactive contamination in surface and subsurface soils, groundwater, surface water, and sediment within SSFL Area IV and the NBZ. A detailed description of the components of the Action and the Action area are provided in the Biological Assessment that we have prepared and included within our submittal package.

Request for Formal Consultation under Section 7 of the ESA

The EPA would like to initiate formal consultation under Section 7 of the ESA for the proposed Action based on our determination that the Action would likely result in the following affects to listed and candidate species:

May Affect, Likely to Adversely Affect:

Braunton's milk-vetch (*Astragalus brauntonii*)
Braunton's milk-vetch Critical Habitat Unit 1d
Lyon's pentachaeta *(Pentachaeta lyonii)*
Coastal California gnatcatcher (*Poliopila californica californica*)
Spreading navarretia (*Navarretia fossalis*)
California Orcutt grass (*Orcuttia californica*)
Riverside fairy shrimp (*Streptocephalus wootton*i)
Vernal pool fairy shrimp (*Branchinecta lynchi*)
California red-legged frog (*Rana aurora draytonii*)
California red-legged frog Proposed Critical Habitat Unit VEN-3

California Orcutt grass has been included in this consultation request letter as it occurs within the same habitat and should be discussed in consultation along with the Riverside fairy shrimp. Based on a telephone conversation with Mark Elvin of the FWS on February 9, 2010, the species does not need to be discussed in the attached Biological Assessment because the findings and habitat information are consistent with Riverside fairy shrimp.

May Affect, Not Likely to Adversely Affect:

Least Bell's vireo (*Vireo bellii pusillus*)
Quino checkerspot butterfly (*Euphydryas editha quino*)
Conejo dudleya (*Dudleya abramsii* subsp. *parva* [=*D. parva*])
Santa Monica Mountains live-forever (*Dudleya cymosa* subsp. *ovatifolia* [inclusive of *D. cymosa* subsp. *agourensis*])
Marcescent dudleya (*Dudleya cymosa* subsp. *marcescens*)

No Effect:

California condor (*Gymnogyps californianus*)

These conclusions are based on an analysis of the status, biology, and baseline conditions for each species, and their anticipated response to the Action and associated avoidance and minimization measures discussed in the attached Biological Assessment.

EPA requests formal consultation with FWS and preparation of a biological opinion to ensure that any adverse affect (take) of these species associated with the Action is authorized. EPA will monitor the Action and will ensure that the Action adheres to any terms and conditions provided by FWS to minimize the impacts of any take.

We appreciate your attention to this matter and look forward to working with you. If you have any questions regarding this letter or attached Biological Assessment, please do not hesitate to contact me at (415) 947-4148.

Sincerely,

Craig Cooper

Craig Cooper
Project Manager
Superfund Federal Facilities and Site Cleanup Branch

Enclosure: Biological Assessment, Santa Susana Field Laboratory;
Area IV Radiological Study; Ventura County, California
dated February 12, 2010

cc: Stephie Jennings, Department of Energy
Mary Meyer, California Department of Fish and Game
Rick Brausch, California Department of Toxic Substances Control

BIOLOGICAL ASSESSMENT

SANTA SUSANA FIELD LABORATORY
AREA IV RADIOLOGICAL STUDY
VENTURA COUNTY, CALIFORNIA

EPA Contract Number: EP-S7-05-05
Task Order Number: 038

Prepared for:

U.S. Environmental Protection Agency Region 9
75 Hawthorne Street
San Francisco, CA 94105

Prepared by:

HydroGeoLogic, Inc.
6340 Glenwood; Suite 200
Building 7
Overland Park, KS 66202

Envicom Corporation
28328 Agoura Road
Agoura Hills, CA 91301

February 12, 2010

TABLE

FIGURES

APPENDIX

I. INTRODUCTION

The purpose of this initiation package is to review the U.S. Environmental Protection Agency's (EPA's) proposed Santa Susana Field Laboratory (SSFL) Area IV Radiological Study in sufficient detail to determine to what extent the proposed action may affect any of the threatened, endangered, proposed, or sensitive species and designated or proposed critical habitats listed below. In addition, the following information is provided to comply with statutory requirements to use the best scientific and commercial information available when assessing the risks posed to listed and/or proposed species and designated and/or proposed critical habitat by proposed federal actions. This initiation package is prepared in accordance with legal requirements set forth under regulations implementing Section 7 of the Endangered Species Act (ESA) (50 CFR 402; 16 U.S.C. 1536 (c)).

Threatened, Endangered, Proposed Threatened or Proposed Endangered Species

The following listed and proposed species that may be affected[1] by the proposed action are listed below with their species designation abbreviated as follows:

Braunton's milk-vetch (*Astragalus brauntonii*) **E (Endangered), CH (Critical Habitat)**
Lyon's pentachaeta (*Pentachaeta lyonii*) **E**
Spreading navarretia (*Navarretia fossalis*) **T (Threatened)**
Conejo dudleya (*Dudleya abramsii* ssp. *parva* [=> *Dudleya parva*]) **T**
Santa Monica Mountains dudleya (*Dudleya cymosa* ssp. *ovatifolia*
[inclusive of *Dudleya cymosa* ssp. *agourensis*]) **T**
Marcescent dudleya (*Dudleya cymosa* ssp. *marcescens*) **T**
Coastal California gnatcatcher (*Polioptila californica* ssp. *californica*) **T**
Least Bell's vireo (*Vireo bellii* ssp. *pusillus*) **E**
California red-legged frog (*Rana aurora* ssp. *draytonii* [=> *Rana draytonii*]) **T**
Quino checkerspot butterfly (*Euphydryas editha* ssp. *quino*) **E**
Riverside fairy shrimp (*Streptocephalus woottonii*) **E**
Vernal pool fairy shrimp (*Branchinecta lynchi*) **T**

This includes all of the species from the list obtained from the United States Fish and Wildlife Service (USFWS) in a letter dated October 5, 2009 from Chris Dellith, to Craig Cooper of the United States Environmental Protection Agency (EPA) Region 9, except the following:

California condor (*Gymnogyps californianus*) **E**

Though the USFWS letter listed the California condor, additional information obtained by Envicom indicates the SSFL is not within the condor's range. Data prepared by Blake Massey, a Biologist with the USFWS Hopper Mountain National Wildlife Reserve Complex, and transmitted to Jenny Marek (USFWS) on November 4, 2009 showing Condor GPS data accumulated since 2005 and the Condors' estimated historic range was obtained. Massey's data indicate that the SSFL "falls outside of the currently used area and [is] not within the historic range." Therefore, a **No Effect** determination for the California condor is appropriate, based on these data.

[1] This document will discuss making the "may affect" and subsequent determinations in later sections.

Candidate Species, Sensitive Species and Species of Concern (USFWS only)

The following candidate species, sensitive species, and species of concern that may be affected by the proposed action are listed below with their species designation as follows:

San Fernando Valley spineflower (*Chorizanthe parryi* var. *fernandina*) **C (Candidate)**
Santa Susana tarplant (*Deinandra minthornii*) **CR (California Rare)**

Critical Habitat

The action addressed within this document falls within Critical Habitat for Braunton's milk-vetch (*Astragalus brauntonii*) **E, CH.**

II. CONSULTATION TO DATE

An informal consultation meeting was held on September 16, 2009, with representatives of USFWS, EPA, United States Department of Energy (DOE), California Department of Fish and Game, Boeing, and consultants including CDM, SAIC, and HydroGeoLogic, Inc. (HGL). HGL is conducting the radiological study at Area IV under contract to EPA. The participants conducted a field visit of Area IV, and discussed whether a Section 7 Consultation would be required. USFWS indicated that a Section 7 Consultation would be required if gamma scanning or soil sampling will be conducted in the designated Critical Habitat for Braunton's milk-vetch, and/or in a manner that may adversely affect the milk-vetch. EPA's field techniques would need to minimize disturbance within Critical Habitat area for any listed species. Steps that would need to be completed as part of the Section 7 Consultation were discussed. USFWS indicated that a spring survey would need to be completed to more accurately identify the presence or absence of species that are not identifiable during fall or winter surveys. The minutes of the meeting are provided in **Appendix A**.

A second informal consultation meeting was held on November 4, 2009, at the Ventura Field Office of USFWS, with representatives of USFWS, EPA, DOE, and consultants including SAIC, HGL, and Envicom Corporation. Envicom has been subcontracted by HGL to prepare the Biological Assessment. The following topics were discussed:

- The history of the property ownership,
- Overall technical approach and regulatory framework,
- Project schedule and temporal timing constraints,
- Methods and results of Biological Surveys conducted by DOE in Fall 2009 (**Appendix B**),
- Need for follow-up surveys in winter, spring and summer, and
- Habitat considerations and potential for occurrence of least Bell's vireo, California gnatcatcher, Quino checkerspot, California red-legged frog, vernal pool plants and branchiopods, and threatened *Dudleya* spp.

DOE indicated that additional habitat suitability and presence absence surveys to be prepared by SAIC under contract with DOE will be completed in winter, spring and summer. The results of these surveys will be shared with EPA to facilitate the radiological survey process. The remainder of the meeting focused on scoping of the Biological Assessment, including description of "the project," discussion of the radiologic technology to be used, phasing of the scanning, distinguishing between adverse affect and take, potential impacts to Critical Habitat, development of avoidance and minimization measures, effects of physical actions such as mowing that will be necessary, scheduling, and action items to be addressed. The minutes of the meeting are provided in **Appendix A**.

EPA issued a biological assessment for this Action to USFWS on December 11, 2009. EPA and USFWS continued informal consultations in January 2010. Based on our informal consultations with USFWS in January 2010, EPA revised its biological assessment and resubmitted this document to USFWS requesting formal consultation under Section 7 of the Endangered Species Act.

III. DESCRIPTION OF THE PROPOSED ACTION

The Action Agency and Applicant proposing the action are the same, namely, EPA. The Action is to be administered by EPA pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). The EPA is undertaking the Action in accordance with federal legislative mandate, HR 2764, the Consolidated Appropriations Act of 2008. Funding for the proposed Action originates from the American Recovery and Reinvestment Act of 2009.

The proposed Action is the radiological characterization of a portion of Santa Susana Field Laboratory, consisting of administrative Area IV, and an adjacent undeveloped area to the north referred to as the Northern Buffer Zone, or NBZ. Area IV consists of 290 acres owned by The Boeing Company ("Boeing"), where upon USDOE and its contractors once operated several nuclear reactors and associated fuel facilities and laboratories. The NBZ consists of 182 acres, where industrial activities have never occurred, but a lawsuit settlement stipulated purchase of this area by Boeing from the adjoining American Jewish University's Brandeis-Bardin Campus.

The purpose and need for the Action is to determine the presence of potential radioactive contamination in surface soils, and subsurface soils, groundwater, surface water, and sediment within SSFL Area IV and the NBZ. It is reasonably foreseeable that future Actions will occur within the Action Area that have the potential to affect listed species or Critical Habitat. However, the scope and Action Agency for any future investigation(s) and remedial action are not known at this time. The need for consultation regarding the future Actions will be determined at which time their scope has been defined.

The Action Area

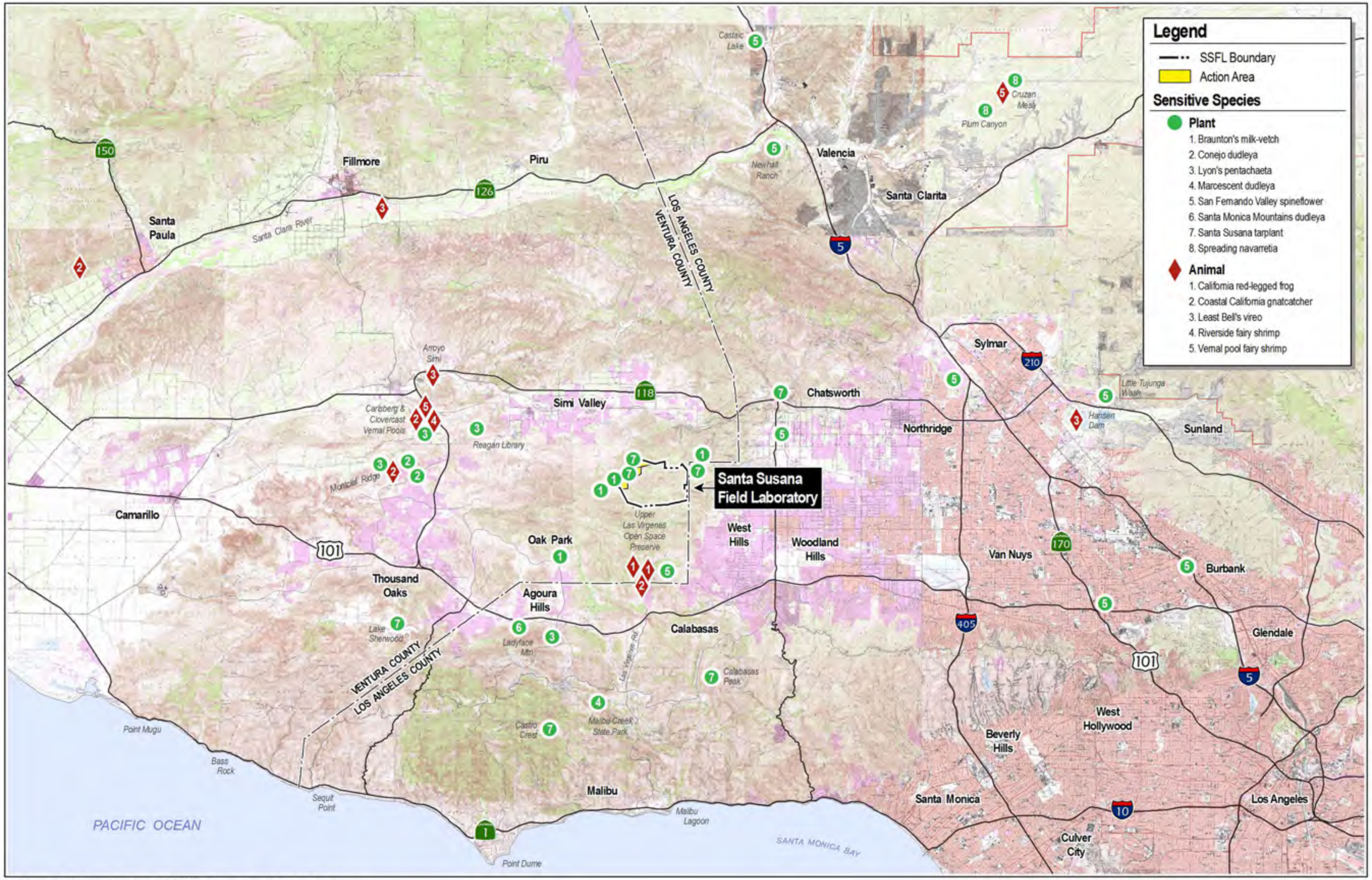
An area map, showing the location of the entire SSFL site, including the Action Area in relation to the surrounding areas is provided on **Figure 1**. Also included on Figure 1 are the locations of the regional sensitive species and the units referenced in subsequent discussions. The vicinity map shown on the United States Geologic Survey Calabasas 7.5-minute topographic quadrangle map is shown on **Figure 2**. The latter map more clearly identifies the Action Area in relation to the entire SSFL. **Figure 3** shows the map of the drainage patterns at SSFL.

The Proposed Action

General Description of Activities

The Action involves several activities that may affect listed species and Critical Habitat, and is proposed to initiate in January 2010 and be completed by September 2011. The separate components of the Action include Vegetation Cutting, Gamma Scanning, Geophysical Survey, Surface and Subsurface Soil Sampling, Groundwater Monitoring Well Sampling, Surface Water and Sediment Sampling, and Support Activities. A discussion of each component of the Action along with corresponding avoidance and minimization measures is provided below. Additionally, **Table 1** provided at the end of this section provides a summary of the effects associated with each of the components of the Action.

As discussed below and summarized in Table 3.1, each of the components of the Action has the potential to disturb listed species either via the activities themselves or in the process of gaining access to the activity locations. Therefore, prior to initiating any Action, a USFWS-approved biologist(s) will prepare habitat suitability surveys over the Action Area for each of the listed species. A discussion regarding the habitat suitability surveys for each species is provided as General Avoidance and Minimization Measures below. The habitat suitability surveys represent screening surveys that will identify and demarcate suitable and



Source: CNDDB (November 2009) and SAIC (2009). Base Source: USGS Quadrangle Mosiac.

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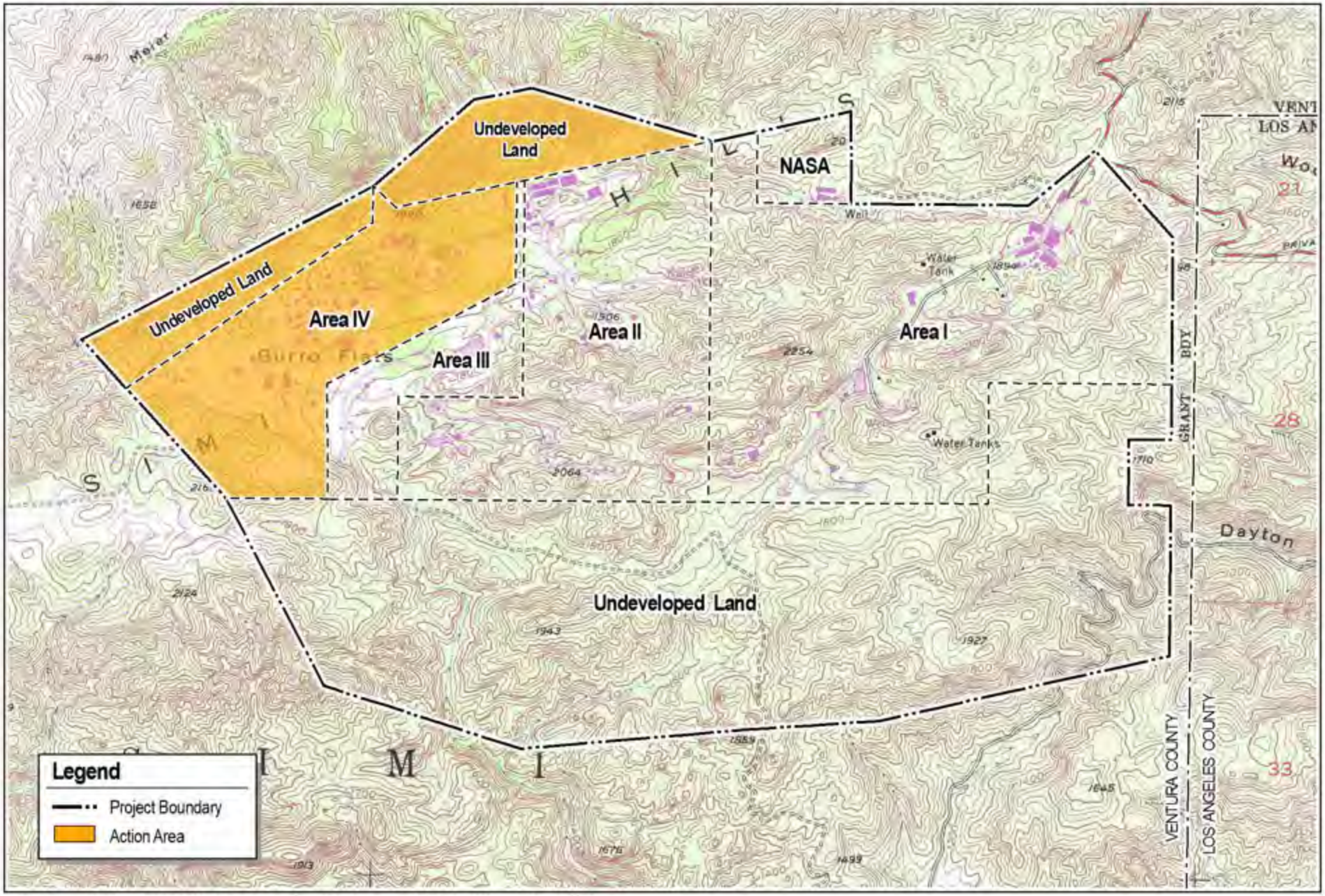
Area Map with Regional Sensitive Species (nearest records only)

0 2 4 Miles

FIGURE 1



Base Source: Calabasas, USGS 7.5 Minute Quadrangle. Project Boundary Source: Ventura County Assessor Parcels, 2007.

SANTA SUSANA FIELD LABORATORY AREA IV RADIOLOGICAL STUDY - BIOLOGICAL ASSESSMENT

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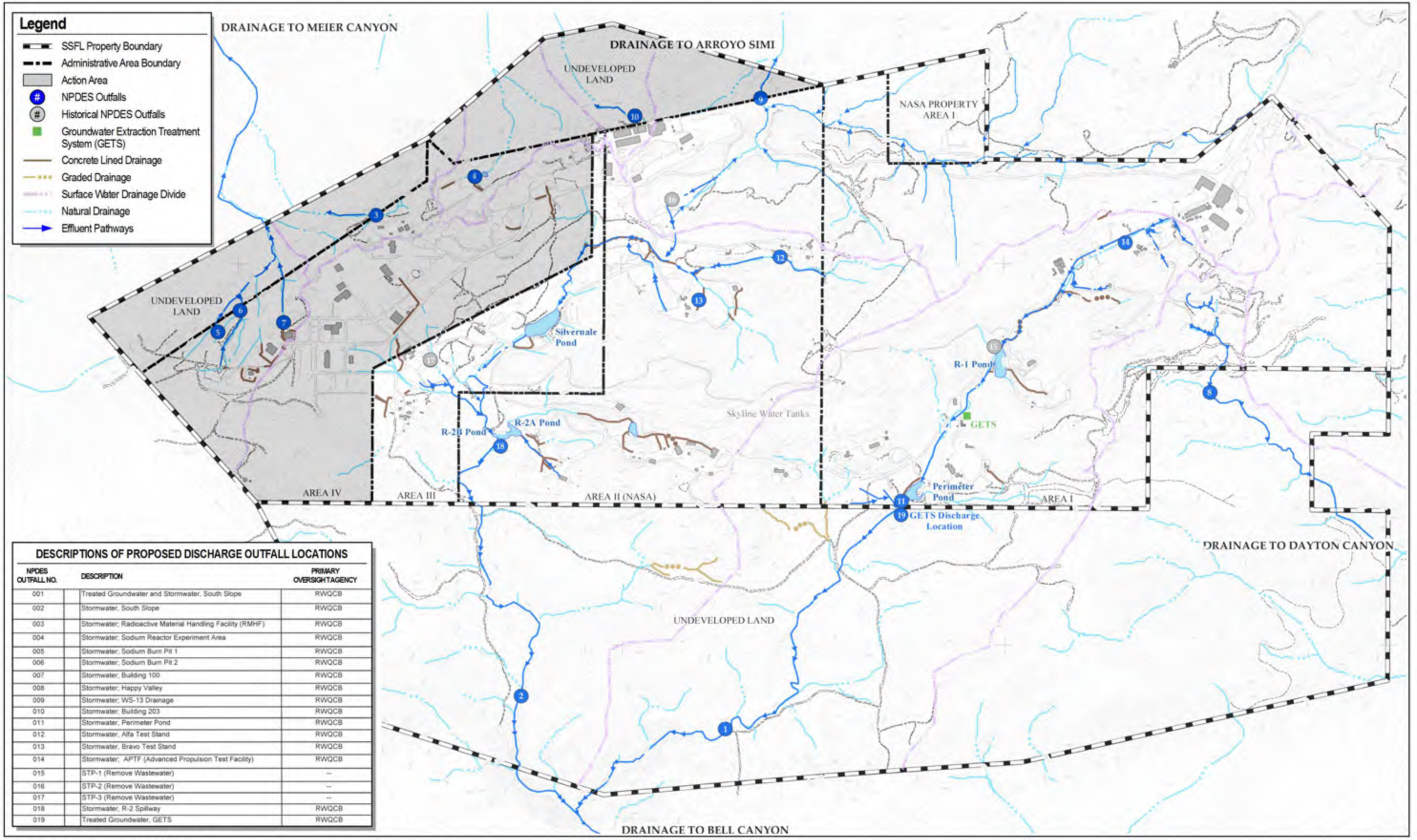
Vicinity Map

0 1,000 2,000 Feet

FIGURE 2



DESCRIPTIONS OF PROPOSED DISCHARGE OUTFALL LOCATIONS

NPDES OUTFALL NO.	DESCRIPTION	PRIMARY OVERSIGHT AGENCY
001	Treated Groundwater and Stormwater, South Slope	RWQCB
002	Stormwater, South Slope	RWQCB
003	Stormwater; Radioactive Material Handling Facility (RMHF)	RWQCB
004	Stormwater; Sodium Reactor Experiment Area	RWQCB
005	Stormwater; Sodium Burn Pit 1	RWQCB
006	Stormwater; Sodium Burn Pit 2	RWQCB
007	Stormwater; Building 100	RWQCB
008	Stormwater; Happy Valley	RWQCB
009	Stormwater; WS-13 Drainage	RWQCB
010	Stormwater; Building 203	RWQCB
011	Stormwater, Perimeter Pond	RWQCB
012	Stormwater, Alfa Test Stand	RWQCB
013	Stormwater, Bravo Test Stand	RWQCB
014	Stormwater; APTF (Advanced Propulsion Test Facility)	RWQCB
015	STP-1 (Remove Wastewater)	--
016	STP-2 (Remove Wastewater)	--
017	STP-3 (Remove Wastewater)	--
018	Stormwater, R-2 Spillway	RWQCB
019	Treated Groundwater, GETS	RWQCB

Source: NPDES and Watershed Map, MWH Global Inc., 2009.

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Drainage Map

0 600 1,200 Feet

FIGURE 3

occupied habitat versus areas that are unoccupied and lacking suitable habitat. Activities scheduled to occur within areas lacking suitable or occupied habitat, will proceed in accordance with the non-species specific general and activity related avoidance and minimization measures. Within areas of suitable or occupied habitat, scheduled activities will be carried out in accordance with the general and activity specific avoidance and minimization measures identified for the specific species below.

General Avoidance and Minimization measures that are appropriate for all species, as well as those specific to one or several species are provided below.

General Avoidance and Minimization Measures

The following measures have been identified to avoid and minimize the effects associated with all components of the Action.

GEN-1 Prior to conducting biological surveys or monitoring related to the Action and/or Avoidance and Minimization Measures identified herein, each biologist shall submit their qualifications to USFWS to be considered a USFWS-approved biologist.

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

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

<u>Braunton's milk-vetch</u>

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

<u>Lyon's pentachaeta, spreading navarretia and San Fernando Valley spineflower</u>

GEN-5 Before initiating the components of the proposed Action, a USFWS-approved biologist shall conduct surveys to identify areas exhibiting the PCEs or suitable habitat for Lyon's pentachaeta, spreading navarretia or San Fernando Valley spineflower. Potential suitable habitat areas shall be appropriately demarcated with flagging and/or fencing, and no Actions shall be undertaken in those areas until it has been determined whether or not they support the listed or candidate species. In areas identified as potentially suitable habitat for Lyon's pentachaeta, spreading navarretia or San Fernando Valley spineflower, a USFWS-approved

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

Quino checkerspot butterfly

GEN-6 Before initiating the components of the proposed Action, a USFWS-approved biologist shall survey the Action Area to identify and flag primary host plants for Quino checkerspot butterfly, or demarcate groups of primary host plants using appropriate flagging. Action related activities to be undertaken within said areas shall adhere to the avoidance and minimization measures identified for each component of the Action as discussed below.

Dudleya species

GEN-7 Prior to initiating the components of the proposed Action upon or immediately adjacent to rock outcrops, a USFWS-approved biologist shall conduct surveys to identify any *Dudleya* species possibly attributable to the listed taxa (other than chalk dudleya [*D. pulverulenta*]). Such occurrences will be appropriately flagged and/or fenced to alert field personnel to their presence and need for protection. *Dudleya* species encountered shall be treated as if they are a listed taxon, unless they can be determined otherwise by a USFWS-approved biologist.

Coastal California gnatcatcher

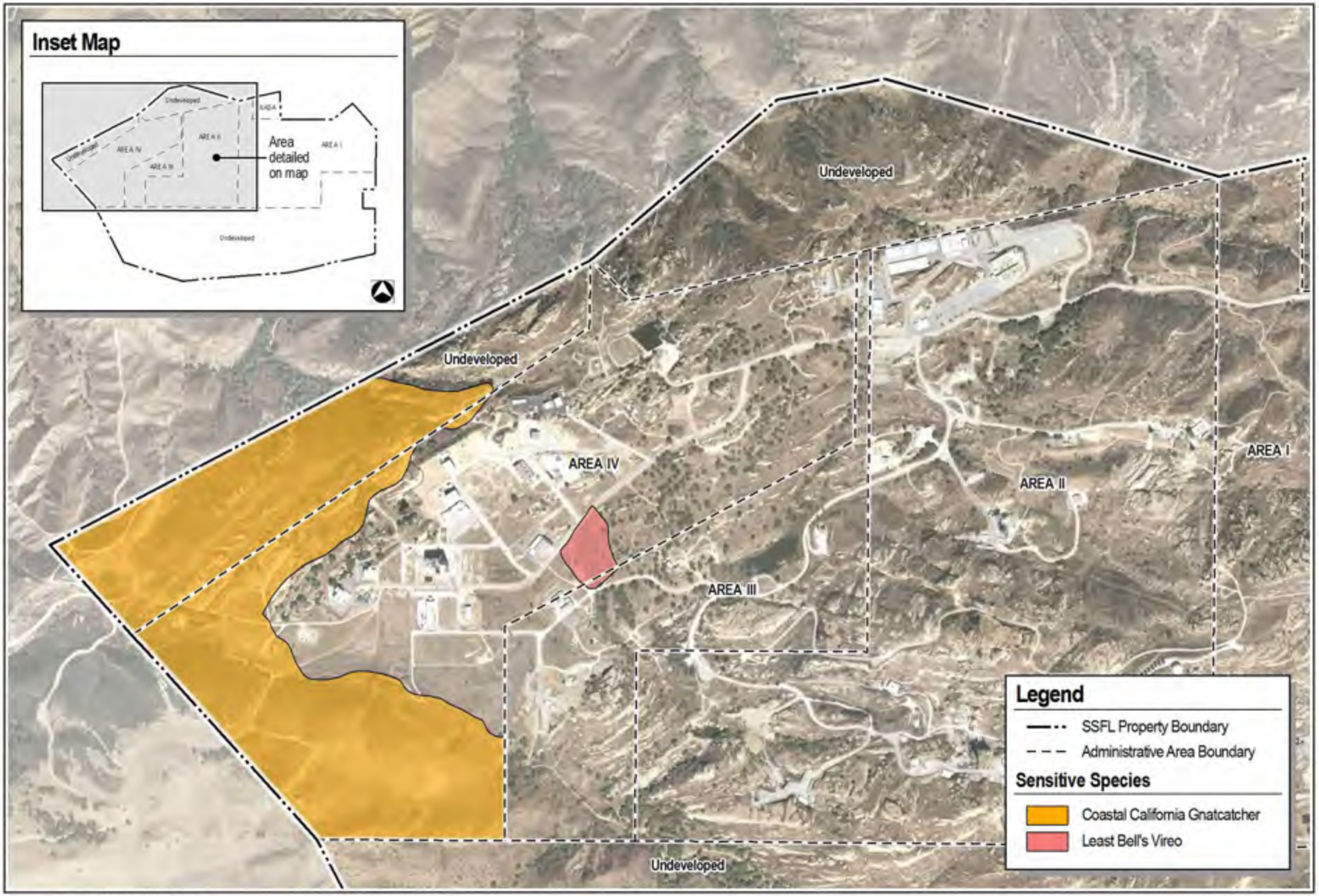
GEN-8 Before Action-related activities commence within areas identified as potential habitat for the coastal California gnatcatcher (as shown on **Figure 4**[2]), a Section 10(a)(1)(A) permitted biologist will conduct a survey of the potential habitat to determine the extent of suitable habitat present. For areas identified as suitable habitat, protocol surveys will be conducted between February 15 and August 30, according to Presence/Absence Survey Guidelines (USFWS, 1997b). If active nests are found, activities will be postponed or halted in the area until an appropriate setback can be established, based on the judgment of the Section 10(a)(1)(A) permitted biologist, and in consultation with the USFWS. No project activities will occur within the setback area, until the nest is vacated and juveniles have fledged, as determined by the Section 10(a)(1)(A) permitted biologist, and there is no evidence of a second attempt at nesting.

Least Bell's vireo

GEN-9 To the extent feasible, Action-related activities within areas identified as potential habitat for least Bell's vireo (as shown on Figure 4), will be conducted between October 1 and March 14. Before commencing work within potential habitat during this timeframe, preconstruction surveys will be conducted by a USFWS-approved biologist. However, protocol surveys to determine presence/absence are not required.

Before initiating Action-related activities between March 15 and September 30 within areas identified as potential habitat for least Bell's vireo, protocol surveys will be conducted by a Section 10(a)(1)(A) permitted biologist to determine presence/absence of the species. If

[2] The areas shown on Figure 4 were identified in consultation with staff of USFWS.



Source: SAIC & USFWS, 2010.

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

0 550 1,100 Feet

FIGURE 4

individuals are present, the nature of their activities will be determined, and consultation with the USFWS will be conducted to identify activities and/or avoidance and minimization measures that will not adversely affect the species.

Vernal pool branchiopods

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

Red-legged frog

GEN-11 Actions conducted within aquatic or riparian habitats, and upland habitats within 300 feet thereof, shall be supervised by a USFWS-approved biologist. Actions other than water sampling activities within intermittent aquatic habitats shall be conducted when the intermittent water body is dry.

Vegetation Cutting

To provide access for Action related vehicles/equipment and allow operation of gamma scanning equipment at optimum levels of sensitivity, vegetation within the Action Area will be cut or trimmed to a height of approximately six to 18 inches. Limited pruning of mature trees may occur to allow access under the canopy; mature trees will not be felled. Vegetation cutting will be conducted using a combination of mechanical equipment and hand tools. As discussed in the Avoidance and Minimization Measures below, cutting within areas occupied by listed species and/or Critical Habitat shall be limited to hand tools unless areas free of sensitive biological resources can be delineated by a USFWS-approved biologist. The vegetation cutting will be conducted in a manner that does not cause irreparable damage to the vegetation and candidate species of plants and animals. Likewise, cutting activities will be performed such that their Critical Habitat Areas are not likely to be adversely affected. Unless otherwise specified within the Vegetation Cutting Avoidance and Minimization Measures, cut materials will be collected into localized micro piles for light spreading of mulch within areas deemed appropriate by a USFWS-approved biologist. Cuttings of poison oak will be separated for off-site disposal.

Vegetation Cutting Avoidance and Minimization Measures

The following universal measures have been identified to avoid and minimize the effects associated with vegetation cutting activities:

VC-1 Within two weeks before initiation of vegetation cutting activities, a USFWS-approved biologist will survey the Action Area to delineate and flag the locations of individuals and/or habitat occupied by listed species or nesting migratory birds that will be avoided or protected from mechanical cutting and specific activities associated with the Action, i.e., the ERGS or subsurface soil sampling. Cutting within these areas will be performed under the supervision

of a USFWS-approved biologist pursuant to specific measures identified for each listed species below.

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

Braunton's milk-vetch

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

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

Spreading navarretia and vernal pool branchiopods

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

Red-legged frog

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

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

Quino checkerspot butterfly

VC-7 Before brush cutting and mowing, a USFWS-approved biologist will survey the Action Area to identify and flag primary host plants, or demarcate groups of primary host plants. If host plants are present, prior to cutting within areas occupied by host plants, a habitat suitability survey shall be conducted. If the habitat suitability survey concludes that the host plants within the Action Area represent suitable habitat, the host plants will be preserved in their

existing condition until a protocol survey can be conducted to determine the presence/absence of Quino checkerspot. If Quino checkerspot are found to be present, the host plants will not be cut and USFWS will be consulted regarding the preservation of adult nectar sources in the proximity of primary host plants prior to vegetation cutting. Hand tools will be used with extreme care to cut vegetation in the vicinity of primary host plants or plants containing Quino checkerspot larvae.

Lyon's pentachaeta, spreading navarretia and San Fernando Valley spineflower

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

Dudleya species

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

Santa Susana tarplant

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

Gamma Scanning

EPA will characterize surface soil for gamma activity over 100 percent of the accessible areas of Area IV and the NBZ to identify and characterize elevated areas of gamma radiation. Scanning will be conducted at a rate of one to three feet per second and will normally require only one pass over each area being scanned. Gamma scanning will be completed using a combination of hand-held, stroller-mounted, mule-mounted, and off-road, fork-lift mounted systems. The stroller-mounted, mule-mounted and fork-lift mounted systems will be custom-built systems that are capable of detecting low levels of gamma radiation. The potential impact that may result from the use of each scanning system is provided below:

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

Gamma Scanning Avoidance and Minimization Measures

The following measures have been identified to avoid and minimize the effects associated with gamma scanning activities:

GS-1 When conducting gamma scanning surveys within areas occupied by listed species, appropriate scanning equipment shall be selected that maximizes the sensitivity of the scanner and minimizes physical damage to species, their Primary Constituent Elements (PCEs) and habitats. Scanning undertaken within or adjacent to areas occupied, or presumed to be occupied by listed species, shall be performed with care by field-trained personnel and under the supervision of a USFWS-approved biologist.

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

Vernal pool branchiopods

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

Red-legged frog

GS-4 Gamma scanning surveys conducted within aquatic or riparian habitats, and upland habitats within 300 feet thereof, shall be supervised by a USFWS-approved biologist. Gamma scanning surveys of intermittent aquatic habitats shall only be conducted when the intermittent water body is dry.

Santa Susana tarplant

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

Geophysical Survey

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

equipment during the geophysical surveys (regardless of the type of equipment used) may impact nesting birds.

Geophysical Survey Avoidance and Minimization Measures

The following measures have been identified to avoid and minimize the effects associated with geophysical survey activities:

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

Vernal pool branchiopods

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

Red-legged frog

GP-3 Gamma scanning surveys conducted within aquatic or riparian habitats, and upland habitats within 300 feet thereof, shall be supervised by a USFWS-approved biologist. Gamma scanning surveys of intermittent aquatic habitats shall only be conducted when the intermittent water body is dry.

Soil Sampling

EPA will collect surface and subsurface soil samples to characterize the representative concentration of each radionuclide of concern in surface and subsurface soil within the Area IV Study Area. Biased and random sampling techniques will be used to identify surface and subsurface soil sampling locations. Should a sample location be identified within an area known to contain a threatened, endangered, or sensitive species and/or their habitat then that location will be relocated nearby so impacts will be minimized or totally avoided. EPA anticipates that up to approximately 3,500 surface and 3,500 subsurface soil samples will be initially collected. The surface and subsurface samples will be co-located; thus minimizing the surface disturbance during drilling. As explained below, from two to four closely spaced boreholes will be needed at each sample location to conduct the gamma logging, define the subsurface sample interval and collect the requisite soil volume for sample analysis.

Borehole gamma logging will be performed to identify depth intervals for subsurface soil samples. Boreholes will be made using a mechanized direct push technology (DPT) rig and 3.25 inch tooling. Each borehole will be advanced to a depth of approximately 10 feet deep below ground surface or until refusal is reached if less than 10 feet. Continuous cores will be collected in each borehole, the lithology will be logged, and the soil classification will be documented for each sample.

Downhole gamma logging will be completed after the lithologic logging effort or concurrently with the lithologic logging effort. A 2-inch inner diameter polyvinyl chloride (PVC) pipe will be inserted into the open borehole. A probe attached to a Ludlum 2221 ratemeter will be lowered down the PVC piping at 6-inch

intervals to document total gamma radiation counts. After the lithologic and gamma logging efforts have been completed at the borehole, the sample interval will be selected based on the previously described parameters.

Soil sample collection will then begin at a location offset by approximately 6 to 12 inches from the initial borehole. Surface soil samples will be collected from zero to six inches below the ground surface using stainless steel trowels, stainless steel shovels and/or spoons to collect enough soil to fill the appropriately sized sampling container (approximately one gallon). Subsurface soil sample intervals will be selected based on subsurface gamma scanning results and material noted during the lithologic logging effort. The DPT rig will then off-set to the surface sample location and advance the desired depth to collect the subsurface soil sample. Additional off-set boreholes may be necessary to meet sample volume requirements. Additional off-set boreholes, if needed, will also be 6 to 12 inches from the previous borehole. EPA does not anticipate more than four boreholes per location: one for lithologic and gamma logging and one to three for soil sample collection.

After the logging and sampling efforts are completed, each borehole will be backfilled with high solids bentonite.

The impact of each activity is listed below:

- Surface soil sampling – foot traffic, light vehicle traffic and vegetation alteration.
- Subsurface soil sampling – foot traffic, light vehicle traffic, heavy vehicle traffic, vegetation alteration, loud noises and produces heat.
- Subsurface gamma scanning – foot traffic, light vehicle traffic, heavy vehicle traffic and vegetation alteration.
- The presence of personnel and equipment during gamma scanning efforts (regardless of the type of equipment used) may impact nesting birds.

It is not anticipated that temporary access roads will need to be created for the DPT rig to access subsurface sample locations. The extent of access improvement is expected to be limited to vegetation removal.

Soil Sampling Avoidance and Minimization Measures

The following measures have been identified to avoid and minimize the effects associated with soil sampling activities:

SS-1 The locations of soil sampling surveys shall be selected to avoid listed species. Where listed species *not likely to be adversely affected* (as defined in Section VI. Effects of the Action) cannot be avoided, consultation with the USFWS will be conducted to identify activities and/or avoidance and minimization measures that will not adversely affect the species.

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

Monitoring Well Sampling

EPA will evaluate existing groundwater conditions at on- and off-site locations. Groundwater sampling will be conducted at existing on-site wells. Off-site sampling does not affect the evaluation of this BA and therefore will not be discussed. Approximately 10 existing on-site monitoring wells will be sampled on a quarterly basis. Low-flow purging and sampling methods will be implemented. Low-flow purging and sampling methods will use a bladder pump set in the monitoring well screen to purge the well at a rate of 100 to 1,000 milliliters per minute until water quality parameters are within established guidelines. Once the established purging criteria are met sample collection will proceed at a rate of 100 to 500 milliliters per minute. Typical low-flow monitoring well sampling efforts generate between 2 to 50 liters of purge water investigation derived waste per monitoring well. The impacts resulting from this sampling activity is expected to be foot traffic and light vehicle traffic.

Monitoring Well Sampling Avoidance and Minimization Measures

The following measures have been identified to avoid and minimize the effects associated with monitoring well sampling activities:

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

Surface Water and Sediment Sampling

EPA will collect surface water and sediment samples to determine radionuclide concentrations in on-site and off-site surface water and seeps. Sediment samples will be co-located with the surface water/seep sampling locations. The surface water sampling will be conducted in two phases. Phase 1 will focus on identifying the general extent of contamination and identification of key radionuclides. Phase 2 will involve conducting a detailed evaluation of the radionuclides that were detected during Phase 1. Phase 2 may include a more extensive sediment sampling effort in areas of sediment contamination identified during Phase 1, and a targeted radionuclide suite. The collection of surface water samples will be focused on drainage pathways with specific sample locations being determined during the site reconnaissance. Approximately 50 sample locations will be determined, with a surface water and sediment sample to be collected at each location. Surface water sampling will target major drainage ways downstream of potential source areas. Sediment sampling will target the fine-grained sediment located within the stream and associated stream bank. Environmental impacts are expected to consist of foot traffic and light vehicle traffic.

Surface Water and Sediment Sampling Avoidance and Minimization Measures

The following measures have been identified to avoid and minimize the effects associated with surface water and sediment sampling activities:

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

Support Activities

The support activities may consist of a variety of actions including mobilization/staging, equipment/Investigation Derived Waste (IDW) stock piling, IDW management, access/on-site travel, access improvement, vegetation alteration and vegetation/soil removal. The impacts of each of the aforementioned actions vary greatly and are summarized in Table 3.1.

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

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

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

Support Activities Avoidance and Minimization Measures

Avoidance and minimization measures for support activities are provided under the *General Avoidance and Minimization Measures*, above.

Table 1
Field Action Potential Impact Summary
Santa Susana Field Laboratory

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

IV. STATUS OF THE SPECIES AND CRITICAL HABITAT IN THE ACTION AREA

Braunton's milk-vetch (*Astragalus brauntonii*) **E, CH**

Braunton's milk-vetch is a robust, short-lived perennial in the pea family (Fabaceae), it is one of the tallest members of the genus, reaching a height of 1.5 m (5 ft). It is known to occur in substantial numbers at SSFL, in Area IV, in an area designated as Critical Habitat for the species (SAIC 2009). The extent of the distribution of Braunton's milk-vetch in the Action Area at SSFL are shown on **Figure 5**.

***Habitat*:** Associated with fire-dependent chaparral habitat dominated by chamise (*Adenostoma fasciculatum*) and yucca (*Yucca whipplei*) (USFWS 1997a). The species is primarily known to occur on outcrops and generally occurs along the tops of knolls ranging from 244-640 m (800-2,100 ft). Apparently restricted to carbonate and calcareous soils. The only locations which are non-calcareous are down-wash sites into which seeds have drifted (USFWS 1999). At the Action Area, Biologists of SWCA conducted an assessment of Braunton's milk-vetch in Critical Habitat Unit 1d in June, 2006 (MWH Global, Inc. 2009). They found that 76.4 percent of the occupied area was found on Gaviota Rocky Sandy Loam, 13.5 percent on Calleguas-Arnold Complex, and the remaining 10.1 percent was Los Osos Clay Loam and Zamora Loam. Also, they observed the population is distributed among several vegetation communities, including chamise-chaparral yucca series (61 percent), coast live oak woodland (29 percent), non-native grassland (6 percent), Mexican elderberry series (2 percent), and purple needlegrass grassland (2 percent). All of the communities in the Critical Habitat Unit 1d appear to have burned when the Topanga Fire swept through the area in October 2005. A substantial portion of the area within Critical Habitat Unit 1d was used in the past as a soil borrow pit. That area supports non-native grassland, and only a few plants (<10) occur therein.

***Range*:** Known from the San Gabriel Mountains near Monrovia, and an unvouchered record for Chino Hills. There are also records in Coal and Gypsum Canyons in the Santa Ana Mountains. Most records are from the core of the Santa Monica Mountains and Simi Hills (USFWS 1999).

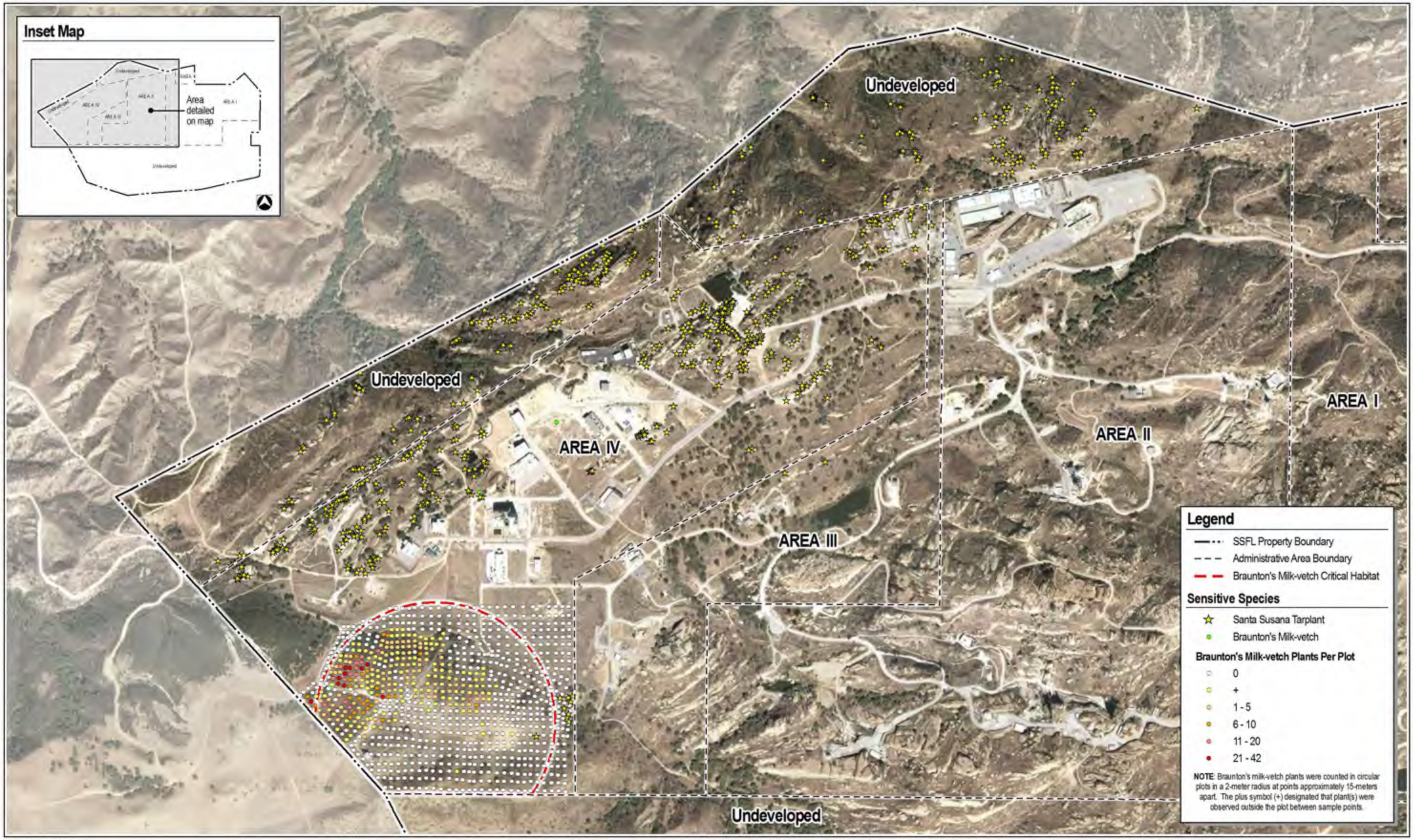
***Nearest Occurrences*:** SSFL, Area IV (SAIC 2009), Dayton Canyon, Upper Las Virgenes Canyon.

***Critical Habitat*:** Critical Habitat has been designated in Unit 1, The Northern Simi Hills, Subunit 1d: This subunit consists of 27 hectares (ha) (68 acres (ac)) of private land owned by Boeing and 1 ha (2 ac) of local agency lands (Santa Monica Mountains Conservancy) (USFWS 2006). This subunit contains at least two of the Primary Constituent Elements[3] (see below) [PCEs] (2 and 3); whether it contains PCE 1 is unknown. Several hundred plants were reported at this location after a fire in 2006 (USFWS 2006 *op cit.* [Lopez 2006]).

***Primary Constituent Elements*:** The PCEs for *Astragalus brauntonii* are: (1) Calcium carbonate soils derived from marine sediment; (2) Low proportion (<10%) 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.

***Life Cycle*:** A short-lived perennial. Seeds produced in the rear section of the pod are innately dormant and present in the soil year round. They have a thickened seed coat typical of many chaparral plants adapted to germinate after disturbance from fire or mechanical scarification. Dormancy allows seed to persist in the soil

[3] Primary Constituent Elements [PCEs] are defined as features that are ''essential to the conservation of the species.'' Critical habitat designations identify, to the extent known using the best scientific data available, habitat areas that provide essential life cycle needs of the species (i.e., areas on which are found the primary constituent elements, as defined at 50 CFR 424.12(b)).



Source: SAIC, 2009

ENVICOM CORPORATION

Distribution of Santa Susana Tarplant and Braunton's Milk-vetch in Action Area

0 375 750 Feet

FIGURE 5

for many years. Seed produced in the front part of the pod germinate readily (Fotheringham and Keeley 1998). A few sites are self-sustaining, with a complement of seedlings to mature individuals in the population. These are on steep slopes where mechanical abrasion probably scarifies a portion of the seed produced, and where local competition is reduced through maintenance of open habitat. Seed tests show viability is 95 percent. Recruitment of seedlings is stimulated by fire and other mechanisms promoting scarification of seeds. Numbers of individuals in any given year varies depending on the stage of the fire cycle and site disturbance. The natural fire interval in the habitat is unknown, but estimated from 20 to more than 100 years, with an average of 70 years (USFWS 1999). Pollinators are primarily native megachilid bees, and a native bumble bee. These species had low constancy, and also were pollinators of other common shrubs and herbs (USFWS 1999). At the Action Area, Biologists of SWCA conducted an assessment of Braunton's milk-vetch in Critical Habitat Unit 1d in June, 2006 (MWH Global, Inc. 2009). They observed "a total of ten species of pollinators in Critical Habitat Unit 1d, and although none were observed on milk-vetch blooms, two were regarded as potentially important pollinators, namely, short leafcutter bee (*Megachile brevis*), and California bumblebee (*Bombus californicus*).

***Threats*:** Urban development, fragmentation of habitat, reduction of necessary pollinators and their associated species, threats from fire suppression activities, and random, naturally occurring extinction due to disturbances in small population sizes (USFWS 1999). Browsing of the plants at SSFL by mule deer (*Odocoileus hemionus*) may be reducing the amount of seed produced there. Contrary to PCE 2, shrub cover >10% appears to offer some protection from browsing (Mark Elvin, pers. comm. November 4, 2009).

***Population Trends*:** No information on population trends is available. At the Action Area, Biologists of SWCA Environmental Consultants conducted an assessment of Braunton's milk-vetch in Critical Habitat Unit 1d in June, 2006 (MWH Global, Inc. 2009). They estimate that the milk-vetch population in and adjacent to Unit 1d occupies an area of approximately 16.55 ac [6.7 ha] within the SSFL property boundary, and their sampling intensity of 5.4% results in a population estimate of 33,500 individuals. More recently, SAIC (2009) conducted a survey in the Critical Habitat Area 1d within Area IV (a smaller area than SWCA survey). SAIC found "close correspondence between the area occupied in 2006 and that occupied in 2009, with the occupied area slightly expanded to the north in 2009, compared to 2006." They estimated "the areal extent of the main area of occurrence within the Critical Habitat [in Area IV] to be 71,000 sq m [17.5 ac; 7.1 ha]." By their methods, they estimate 18,500 individuals" [within a comparable area]. Comparison of these data indicate a decrease of approximately 45 percent (15,000 individuals) over a period of just over 3 years (40 months), encompassing three spring and summer growing periods. MWH (2009) also examined the size class data for these plants at SSFL. They found in 2006 that most (49.4 percent) of the plants were in the smallest size class (<10 cm), a considerable number (40.6 percent) were in the next size class (11-35 cm), few (9 percent) were in the next size class (36-70 cm), and fewer (1.4 percent) in the largest size class (>70 cm).

On November 19, 2009, Mr. Carl Wishner and Mr. Jim Anderson of Envicom Corporation examined the condition of the plants at Critical Habitat 1d within SSFL Area IV. It was noted that the majority of the plants are in the largest size class (>70cm). The population of Braunton's milk-vetch is fully mature at this time. No seedling recruitment of the stand from the previous spring season was observed. Most importantly, a majority of the plants (> 50 percent) appear 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. Further observation during the growing season would be necessary to confirm which individuals are dead. Although the survey by SAIC in October 2009 obtained an estimate of the number of standing plants, it did not account for their condition, whether living or dead. The conclusion from the most recent observation by Envicom is that the cycle of fire, growth, flowering and production of seed to replenish the seed bank at the site is nearly over after four years since the fire.

***Recovery Plan*:** USFWS (1999). The existing recovery plan for Braunton's milk-vetch does not include the population of the species at the SSFL and, therefore, no element of the plan has been implemented at the site.

***Period of Greatest Sensitivity to Proposed Action*:** During growth, flowering and seed production of the species, estimated as March-August in the first year following a fall season fire event, and continuing for 3 to 5 years, declining with each successive year.

Lyon's pentachaeta (*Pentachaeta lyonii*) **E**

Lyon's pentachaeta is a delicate annual in the sunflower family (Asteraceae). It reaches a height of 6 to 48 cm (2-19 in). It is not known to occur at SSFL; however, focused surveys for the species have not been conducted.

***Habitat*:** Occupies coastal habitats mostly below 150 m (500 ft) (Lane 1993), and pocket grassland sites that are ecotonal (transitional) to shrublands, occurring in openings in chaparral, coastal sage, and along edges of roads and trails. Undisturbed natural habitat is characterized by a low proportion of total vegetative cover and exposed soils with a microbiotic crust, which partially reduces competition with other species. Rodents and harvester ant colonies also manage the density of associated vegetation by reducing competition (USFWS 1999 *op cit.* [Thomas and Wishner 1988]).

***Range*:** Known from historic records around 1900 at San Pedro, Wilmington, Palos Verdes Peninsula, and Santa Catalina Island, but extirpated from those locations. All current records are from the Santa Monica Mountains, western terminus of the Simi Hills, and around the western edge of the Simi Hills to the western edge of the City of Simi Valley (USFWS 1999).

***Nearest Occurrences*:** Vicinity of Agoura Hills in the Santa Monica Mountains (not designated as Critical Habitat), and; vicinity Reagan Library, Carlsberg vernal pool and Clovercast vernal pool in the western Simi Hills (designated Critical Habitat).

***Critical Habitat*:** Critical Habitat has been designated in Unit 1: Simi Valley Unit; Unit 2: Montclef Ridge Unit; Unit 3: Thousand Oaks Unit; and Unit 4. Triunfo Canyon Unit; Unit 5: Mullholland Drive Unit; Unit 6: Cornell Road Unit, and; Unit 7: Malibu Lake Unit (USFWS 2006). None of these designated Units include SSFL.

***Primary Constituent Elements*:** PCEs for *Pentachaeta lyonii* are: (1) Clay soils of volcanic origin; (2) Exposed soils that exhibit a microbiotic crust which may inhibit invasion by other plant competitors; and (3) A mosaic of bare ground (>10%) patches in an area with less than 60 percent cover (USFWS 2006).

***Life Cycle*:** An annual, growing from seeds that readily germinate, without fire-related cues. Since *Pentachaeta lyonii* does not compete well with dense annual grasses or native shrubs, fire may play a role in opening up habitat and temporarily reducing spatial competition (USFWS 1999). Dispersal of seed appears to occur only over very short distances, due to fragility of the pappus. Thus, the plants exhibit a very contagious distribution, usually limited to small areas within otherwise suitable habitat. Seedling plants have been observed within weeks after fall rains occurring in November, or appearing late February when sufficient early winter rains fail to materialize. Contrary to accounts of flowering time of April-May (Munz and Keck 1973), the species frequently flowers into August and September, especially following summer rains, and on one occasion in late December (Wishner personal observation). Lyon's pentachaeta is dependent upon its pollinators for successful reproduction. In one study (Fotheringham and Keeley 1998), pollinators recorded

included a hoverfly, deerfly, andrenid bee, megachilid bee, digger bees, and bee flies. Pollinators were not constant, and pollen from numerous other common shrubs and herbs were found on the pollinators. Seeds produced in the rear section of the pod are innately dormant, and present in the soil year round. They have a thickened seed coat typical of many chaparral plants adapted to germinate after disturbance from fire or mechanical scarification. Dormancy allows seed to persist in the soil for many years. Seed produced in the front part of the pod germinate readily (Fotheringham and Keeley 1998). A few sites are self-sustaining, with a complement of seedling to mature individuals in the population. These are on steep slopes where mechanical abrasion probably scarifies a portion of the seed produced, and where local competition is reduced through maintenance of open habitat. Seed tests show viability is 95 percent. Recruitment of seedlings is stimulated by fire and other mechanisms promoting scarification of seeds. Numbers of individuals in any given year varies depending on the stage of the fire cycle and site disturbance. The natural fire interval in the habitat is unknown, but estimated from 20 to more than 100 years, with an average of 70 years (USFWS 1999).

***Threats*:** Direct loss of habitat and influence of development in close proximity to existing populations (fuel modification); introduction of competitive weeds, changes in local hydrology, intensive gopher activity altering soil integrity, and alteration of habitat structure from nearby development (USFWS 1999).

***Population Trends*:** No information on population trends is available.

***Recovery Plans*:** USFWS (1999). The existing recovery plan for Lyon's pentachaeta has not been implemented at the SSFL, as this species is not known to occur at the site.

***Period of Greatest Sensitivity to Proposed Action*:** During growth, flowering and seed production of the species; February through August. This annual species is mostly senescent after August.

Spreading navarretia (*Navarretia fossalis*) **T**

As the name implies, this is a spreading, but not prostrate annual member of the family Polemoniaceae, ranging in height from 1-15 cm (0.5-6 in) (Day 1993). It is not known to occur at SSFL; however focused surveys for the species have not been conducted.

***Habitat*:** Spreading navarretia is primarily associated with vernal pools, alkali playas, and alkali sinks. It sometimes is found in ditches and other artificial depressions, which occur in degraded vernal pool habitat, at elevations between sea level and 1,295 m (0-4,250 ft).

***Range*:** This plant is found in widely disjunct and restricted populations from the Santa Clarita region of Los Angeles County, east to Riverside County, and south through San Diego County and Baja California, Mexico. Historical records indicate that *Navarretia fossalis* is also known from two occurrences near Creston, in San Luis Obispo County.

***Nearest occurrences*:** Based on California Natural Diversity Database (CNDDB) (CDFG 2009) records, spreading navarretia are located in Los Angeles County within the Mint Canyon 7.5' USGS quadrangle at two vernal pool sites. One of the vernal pools is at Cruzan Mesa, ca 1.2 km (0.75 mi) south of Vasquez Canyon Road, between Bouquet Canyon Road and Sierra Highway. The other vernal pool is located just northeast of Plum Canyon Road about 3.25 km (2 mi) from the Sierra Highway and 3.25 km (2 mi) north of Solemint.

***Critical Habitat*:** In total, approximately 264 ha (652 ac) have been designated as critical habitat for spreading navarretia within Los Angeles 132 ha (326 ac) and San Diego 132 ha (326 ac) counties. Unit 1: Los Angeles Basin-Orange Management Area is located in northwestern Los Angeles County and consists of Sub-unit 1A Cruzan Mesa and Sub-unit 1B Plum Canyon. These units contain 119 ha (294 ac) of private land in total, and are the closest designated critical habitat to the Santa Susana Field Laboratory (USFWS 2005). There is currently a proposal to revise the critical habitat designation for this species, which would reduce the quality of designated critical habitat for the species, which would reduce the designated area of the Cruzan Mesa sub-unit by 67 ha (165 ac) (USFWS 2009).

***Primary Constituent Elements*:** (1) Vernal pool, alkali playa, or alkali sink habitats, at elevations between sea level and 1,300 m (0-4,250 ft), found on flat to gently sloping terrain; (2) Soils with a clay component or an impermeable surface or subsurface layer known to support vernal pool habitat including, but not limited to Cieneba-Pismo-Caperton in Los Angeles County, Domino, Traver, and Willows in Riverside County and Huerhuero, Placentia, Olivenhain, Stockpen, and Redding in San Diego. Clay soils serve to inhibit rapid infiltration of rainwater. These soils also act as a buffer to moderate the water chemistry and rate of loss of water to evaporation. Clay soils of this nature are known to support vernal pool, alkali playa, and alkali sink habitats; and, (3) Associated hydrology that provides water to fill the pools in the winter and spring months. A pool with functional hydrology includes a combination of surface and underground water flow, native upland vegetation, and intact soil substrate. An inundated phase occurring in the winter and spring months followed by a dry phase in the summer and fall months is necessary to maintain these specialized habitats.

***Life Cycle*:** The spreading navarretia is an annual species that grows from seed, and blooms from March to May.

***Threats*:** Most of the historical habitat of the spreading navarretia has been eliminated by agriculture and urban development. The species was proposed for listing as threatened on December 15, 1994 after the USFWS determined that *Navarretia fossalis* was declining as a result of habitat destruction and fragmentation from agricultural development, pipeline construction, alteration of wetland hydrology by draining or channelization, off-road vehicle activity, cattle and sheep grazing, weed abatement, fire suppression practices, and competition from nonnative plant species.

***Population Trends*:** Fewer than 30 populations of spreading navarretia remain in the United States, with nearly 60 percent of these concentrated in just three California locations: Otay Mesa in southern San Diego County, along the San Jacinto River in Riverside County, and near Hemet in Riverside County. The majority of the populations contain fewer than 1,000 individuals and occupy less than 0.4 ha (1 ac) of habitat. The USFWS estimates that the species is found on less than 121 ha (300 ac) of total habitat in the United States. In Mexico, it occurs in only about 10 populations.

***Recovery Plan*:** USFWS 1998. The existing recovery plan for spreading navarretia has not been implemented at the SSFL, as this species is not known to occur at the site.

***Period of Greatest Sensitivity to Proposed Action*:** During growth, flowering and seed production of the species, estimated as January-July.

Conejo dudleya (*Dudleya abramsii* ssp. *parva* [*Dudleya parva*]) **T**

Conejo dudleya is a perennial herb in the family Crassulaceae. It grows to a height of up to 18 cm (7 in), including the flowering stalk, and has vernal leaves (withering by early summer). It has not been found at SSFL; however focused surveys for the species have not been conducted.

***Habitat*:** Conejo dudleya "has unique habitat preference compared to all but one of the other local dudleyas." "Both *D. a*. ssp. *p*. and *D. blochmaniae* ssp. *b*. grow in shallow, rocky soils in grassland and coastal sage habitat. *Dudleya abramsii* ssp. *parva* is restricted to soils derived from Conejo volcanics, and usually grows at the base of small, scattered rock outcrops." (p. 23, USFWS 1999 [*Recovery Plan for Six Plants from the Mountains Surrounding the Los Angeles Basin*]), at elevations between 60 and 450 m (196-1,476 ft) (Bartel 1993).

***Range*:** All known occurrences of this subspecies, as reported by CNDDB (2009), and USFWS (1999, p. 22) are from the Santa Rosa Hills/Montclef Ridge (western terminus of the Simi Hills), and there are none from the Santa Monica Mountains, or Santa Susana Mountains. However, there is one anomalous record in the Consortium of California Herbaria http://ucjeps.berkeley.edu/cgi-bin/get_consort.pl: A record from "Orange Co., coastal plains and basins: south coastal plain region 8 km (5 mi) southeast of Laguna Beach, sea bluffs (Peirson 4674 31 May 1924, RSA84221). The validity of this record needs to be verified.

***Nearest Occurrences*:** In the vicinity of Montclef Ridge, western Simi Hills.

***Critical Habitat*:** No Critical Habitat has been designated.

***Primary Constituent Elements*:** No PCEs have been identified, See Habitat discussion above.

***Life Cycle*:** A perennial, succulent herb with little known about its life history (USFWS 1999).

***Threats*:** Urban development, fire management and suppression, establishment of equestrian facilities on occupied habitat, recreational activities that uproot plants, and removal by plant collectors (CNDDB 1998).

***Population Trends*:** No information is available.

***Recovery Plan*:** USFWS (1999). The existing recovery plan for Conejo dudleya has not been implemented at the SSFL, as this species is not known to occur at the site.

***Period of Greatest Sensitivity to Proposed Action*:** During growth, flowering and seed production of the species, estimated as January through July.

Santa Monica Mountains dudleya (*Dudleya cymosa* ssp. *ovatifolia* [inclusive of *Dudleya cymosa* ssp. *agourensis*]) **T**

Santa Monica Mountains dudleya is a perennial herb in the family Crassulaceae. It grows to a height of up to 15 cm (6 in), including the flowering stalk, and does not have vernal leaves. It has not been found at SSFL; however focused surveys for the species have not been conducted.

***Habitat*:** "The typical form is situated on shaded slopes and canyon bottoms on sedimentary comglomerate rock. The "*agourensis*" form occurs on a band of late Pleistocene dissected gravels that supports a sparser grassland habitat than the surrounding vegetation on the north slope of Ladyface [Mountain] (USFWS 1999). It occurs at elevations between 50 and 500 m (165-1,640 ft) (Bartel 1993).

***Range*:** All known occurrences of this subspecies, as reported by CNDDB (2009), the Consortium of California Herbaria http://ucjeps.berkeley.edu/cgi-bin/get_consort.pl, and USFWS (1999) are from the north-facing slopes of the Santa Monica Mountains near Westlake Village to Agoura Hills ("*agourensis*"), and in

deep canyon bottoms along lower Malibu Creek and Topanga Creek in the Santa Monica Mountains. In the Santa Ana Mountains there are populations in Modjeska Canyon and Modjeska Peak (USFWS 1999). There are no records of this subspecies from the Santa Rosa Hills, Simi Hills, or Santa Susana Mountains.

***Nearest Occurrences*:** In the vicinity of Ladyface [Mountain], in the Santa Monica Mountains, Agoura Hills ("*agourensis*"). Topanga Canyon (typical form).

***Critical Habitat*:** No Critical Habitat has been designated.

***Primary Constituent Elements*:** No PCEs have been identified, but see Habitat discussion above.

***Life Cycle*:** A perennial, succulent herb with little known about its life history, other than that hummingbirds and bees pollinate the flowers, and abundant, small seed is produced (USFWS 1999).

***Threats*:** "Bulldozing on private land, commercial and residential development, roadside "weed abatement" in the City of Agoura Hills (USFWS 1999).

***Population Trends*:** No information on population trends is available.

***Recovery Plan*:** USFWS (1999). The existing recovery plan for Santa Monica Mountains dudleya has not been implemented at the SSFL, as this species is not known to occur at the site.

***Period of Greatest Sensitivity to Proposed Action*:** During growth, flowering and seed production of the species, estimated as January through July.

Marcescent dudleya (*Dudleya cymosa* ssp. *marcescens*) **T**

Marcescent dudleya is a perennial herb in the family Crassulaceae. It grows to a height of up to 4 inches, including the flowering stalk, and has vernal leaves (withering by early summer). It has not been found at SSFL; however focused surveys for the species have not been conducted.

***Habitat*:** "The microhabitat requirements of the plant and limited distribution of the plant's potential habitat limit the possibility that any additional large populations will be found." (USFWS 1999). "*Dudleya cymosa* ssp. *marcescens* typically occurs on the lower reaches of sheer volcanic rock surfaces and canyon walls adjacent to perennial streams in a coastal live oak woodland often with California bay (*Umbellularia californica*). In most locations, the topographic relief has prevented deep soil formation; therefore, this dudleya may be the only flowering plant occurring in a microhabitat that is otherwise dominated by mosses, lichens, and ferns (*Pellaea andromedifolia*, and *Polypodium californicum*) (NDDB 1998)." (USFWS 1999). It occurs at elevations between 150 and 500 m (492-1,640 ft) (Bartel 1993).

***Range*:** All known occurrences of this subspecies, as reported by CNDDB (2009), the Consortium of California Herbaria http://ucjeps.berkeley.edu/cgi-bin/get_consort.pl, and USFWS (1999) are from the Santa Monica Mountains, and there are none from the Santa Rosa Hills, Simi Hills, or Santa Susana Mountains.

***Nearest Occurrences*:** In the vicinity of Malibu Creek State Park, in the Santa Monica Mountains.

***Critical Habitat*:** No Critical Habitat has been designated.

***Primary Constituent Elements*:** No PCEs have been identified, but see Habitat discussion above.

***Life Cycle*:** A perennial, succulent herb with little known about its life history, other than that hummingbirds and bees pollinate the flowers, and abundant, small seed is produced (USFWS 1999).

***Threats*:** Recreational use, particularly rockclimbing, collection, fire, and clearing or modification of native landscape vegetation (USFWS 1999).

***Population Trends*:** No information is available.

***Recovery Plan*:** USFWS (1999). The existing recovery plan for marcescent dudleya has not been implemented at the SSFL, as this species is not known to occur at the site.

***Period of Greatest Sensitivity to Proposed Action*:** During growth, flowering and seed production of the species, estimated as January-July.

San Fernando Valley spineflower (*Chorizanthe parryi* var. *fernandina*) **C**

San Fernando Valley spineflower is a low-growing herbaceous annual plant in the family Polygonaceae, growing to a height of 30 cm (12 in). It is not known to occur at SSFL; however focused surveys for the species have not been conducted.

***Habitat*:** According to Glen Lukos Associates (2000): "SFVS is clearly a plant of open habitats, free of shade and competing plants. A small fraction of the plants are known to grow among tall annual grasses or shrubs, and all significant clusters of plants are on open-soils. These areas are not only in full sunlight, but strikingly free of dense exotic grasses." Furthermore, the plant exhibits a "wide range of tolerance to soil types, chemistry, and compaction; prefers acidic, fine-sand colluvium that is low in nitrogen, and possibly permeated with mycorrhizal mycelium; is shade and competition intolerant, and is a hardy plant which exploits disturbance by natural bioturbation and anthropogenic processes." It occurs at elevations between 200 and 350 m (656-1,148 ft) (Hickman 1993).

***Range*:** Extant in northeastern Santa Susana Mountains (Newhall Ranch) and southeastern Simi Hills (Upper Las Virgenes Open Space Preserve (formerly Ahmanson Ranch). Historical occurrences in Liebre Mountains (Castaic, Lake Elizabeth), San Gabriel Mountains (Little Tujunga Wash), Los Angeles Basin (Hollywood), and in the San Fernando Valley (Chatsworth, San Fernando Wash) (Consortium of California Herbaria search November 16, 2009).

***Critical Habitat*:** No Critical Habitat has been designated.

***Primary Constituent Elements*:** No PCEs have been identified.

***Life Cycle*:** Germination occurs following the onset of late-fall and winter rains and typically represents different cohorts from the seed bank. Flowering occurs in the spring, generally between April and June. It grows up to 30 cm in height and 5 to 40 cm across (USFWS 2009). Pollination occurs by a variety of aerial visitors, as well as autogamy (a facultative-selfer, showing about 25% selfing), which appears to contribute significantly to fruit/seed set. There was a significant correlation between the numerous different floral visitors and the invertebrate fauna in the immediately surrounding coastal sage scrub community indicating that this taxon is visited by a substantial variety of potential pollinators and is probably not pollinator-limited.

Although there were many potential pollinators, only six species, including three species of ants, made up the vast majority of visits to the flowers at the two study sites. Many of the invertebrate visitors to the flowers of the SFVS exhibited a high rate of constancy. An overall generalist strategy is suggested. Seed set was high and a germination rate of over 70% occurred without pre-treatment (Jones et al. 2009).

***Threats*:** The threats to this plant are high in magnitude since *Chorizanthe parryi* var. *fernandina* is particularly vulnerable to extinction due to its concentration in two isolated areas. The existence of only two areas of occurrence, and a relatively small range, makes the variety highly susceptible to extinction or extirpation from a significant portion of its range due to random events such as fire, drought, or erosion. The primary threat from habitat destruction by development is non-imminent due to the ongoing development of a Candidate Conservation Agreement (CCA). USFWS retained a listing priority number of six (6) for *Chorizanthe parryi* var. *fernandina* due to a high magnitude of non-imminent threats (USFWS 2009).

***Population Trends*:** Formerly considered extinct, now known from two metapopulations in Los Angeles and Ventura counties.

***Recovery Plan*:** None. No recovery plan has been implemented at the SSFL for the San Fernando Valley spineflower, as no recovery plan currently exists for this species and it is not known to occur at the site.

***Period of Greatest Sensitivity to Proposed Action*:** During growth, flowering and seed production of the species, estimated as January through July.

Santa Susana tarplant (*Deinandra minthornii* [<= *Hemizonia m.*]) **CR (California Rare)**

A perennial subshrub in the sunflower family (Asteraceae). It grows up to 1m (3.3 ft) high, < 30 cm (12 in) in diameter (Keil 1993), with up to 500 stiff, woody ascending stems from the base (Munz and Keck 1973). It is known to occur in substantial numbers at SSFL in Area IV and NBZ. The extent of the distribution of Santa Susana tarplant in the Action Area at SSFL are shown on Figure 5. Surveys performed in 2009 recorded 679 GPS locations, many of which are represented by multiple plants, with the total estimated at roughly 850 individuals (SAIC 2009).

Habitat: Grows in crevices in sandstone bluffs and outcrops in chaparral and coastal scrub, 280-760m (919-2,493 ft) elevation (CDFG 1991, 2009). Also occurs at one location in Santa Monica Mountains, north of Lake Sherwood on west-facing cliffs on Conejo volcanic breccia; the only occurrence not associated with sandstone (Wishner 1989). It typically grows directly upon and within sandstone rock crevices, or in soil in very close proximity to rocks. Mulroy (pers. comm. Nov 4, 2009) indicates it grows in cracks in asphalt and concrete at one remediated site at SSFL.

***Range*:** Restricted to the Simi Hills, Santa Susana Mountains, and Santa Monica Mountains of Los Angeles and Ventura counties (Consortium of California Herbaria: search result for *Deinandra minthornii*, Nov 16, 2009).

***Nearest Occurrences*:** SSFL in Area IV and the NBZ.

***Critical Habitat*:** No Critical Habitat has been designated for this species.

***Primary Constituent Elements*:** No PCE's have been identified for this species.

***Life Cycle*:** Very little is known about the life cycle. The plants bloom from July-October (Munz and Keck 1973), and reproduces from seed. During the survey conducted by Envicom in November 2009, the tarplant was observed to be re-sprouting from the base following fire.

***Threats*:** Residential development, road and maintenance activities (CDFG 1991).

***Population Trends*:** No information is available. SAIC (2009) conducted a survey of tarplants at Area IV and the NBZ in October 2009. They recorded 679 GPS locations, many with multiple plants, and estimate there are "roughly 850 individuals."

***Recovery Plan*:** None. A habitat conservation plan is needed and research on its reproductive biology, germination and growth and habitat requirements will be necessary in formulating a conservation strategy (Center for Plant Conservation, 2007). No recovery plan for this species has been developed, and therefore no recovery plan has been implemented at the SSFL.

***Period of Greatest Sensitivity to Proposed Action*:** At all times of the year.

Coastal California gnatcatcher (*Polioptila californica* ssp. *californica*) **T**

Coastal California gnatcatcher is a small, non-migratory songbird in the family Sylviidae. Robert McMorran [USFWS Ventura Field Office] (pers. comm. January 21, 2010) reports having heard two vocalizations of this species on December 2, 2009, at a location of unburned chaparral and coastal scrub at the western boundary of Area IV. The status of their activity is not known; whether or not they are resident in established territories, or dispersing individuals. Focused surveys for the species have not been conducted. Areas classified as Venturan Coastal Scrub amounting to 1.3 ha (3.1 ac) occur in Area IV (SAIC 2009).

***Habitat*:** Coastal California gnatcatchers are found exclusively in coastal sage scrub habitat. Coastal sage scrub is composed of low-growing, drought-deciduous, and succulent plant species such as coastal sagebrush, California buckwheat, prickly pear, cholla, and various species of sage.

***Range*:** Generally found at elevations below 914 m (3,000 ft), the gnatcatcher ranges from California's Ventura County south through Los Angeles, Orange, Riverside, San Bernardino, and San Diego counties, extending into Baja California, Mexico. The coastal California gnatcatcher is not known to occur at the Santa Susana Field Laboratory site. The species was heard vocalizing at the north end of Las Virgenes Road in Los Angeles County, which is probably the closest known occurrence of the species to the project site. There are many CNDDB records for the coastal California gnatcatcher in Los Angeles County and a few records for Ventura County. For example, in Ventura County the gnatcatcher has been observed northwest of Hwy 23 and Tierra Rejada Road in Moorpark, at Montclef Ridge between Santa Rosa Road and W. Olsen Road, and 4 km (2.5 mi) west of Santa Paula.

***Critical Habitat*:** Designated critical habitat includes coastal California gnatcatcher habitat throughout the species' range in the U.S. (i.e., Ventura, Los Angeles, Orange, San Bernardino, and San Diego Counties, California) in a variety of climatic zones and vegetation types to preserve the genetic and behavioral diversity that currently exists within the species. Unit 13 is the closest to the Santa Susana Field Laboratory, and contains 23,365 ha (57,737 ac) of designated critical habitat on federal, state, local, and private lands in western Los Angeles County and Ventura County. Unit 13 is located along the southern and eastern slopes of the Santa Susana Mountains and a portion of the interior foothills of the San Gabriel Mountains.

***Primary Constituent Elements*:** (1) Dynamic and successional sage scrub habitats: Venturan coastal sage scrub, Diegan coastal sage scrub, Riversidean sage scrub, maritime succulent scrub, Riversidean alluvial fan scrub, southern coastal bluff scrub, and coastal sage-chaparral scrub in Ventura, Los Angeles, Orange, Riverside, San Bernardino, and San Diego Counties that provide space for individual and population growth, normal behavior, breeding, reproduction, nesting, dispersal and foraging; and (2) Non-sage scrub habitats such as chaparral, grassland, riparian areas, in proximity to sage scrub habitats as described for PCE 1 above that provide space for dispersal, foraging, and nesting.

***Life Cycle*:** Altricial, chicks are blind and uncoordinated at hatching, yet after just two weeks, fledging occurs. They disperse from their natal territory three to four weeks after fledging and have typically paired up for their own mating by October. They are mature enough to breed by the following spring.

***Breeding*:** The breeding season for monogamous pairs of coastal California gnatcatchers lasts from late February through August. Low-lying, open-cup nests are built by both parents in areas with a less-than-40-percent slope gradient. Average clutch sizes number four aquamarine-colored eggs, and incubation lasts two weeks. Both parents incubate the eggs, taking half-hour shifts, alternating between incubating the eggs and foraging for food. In a study of fire effects in San Diegan coastal scrub habitats, Wirtz et al. (1995) reported breeding range densities from 2 pairs/ha in unburned habitats to 0.2 pairs/ha in burned habitats, with the smallest breeding patch size estimated at 0.2 ha (ac). The mean number of fledglings per territory, over five breeding seasons was 1.83 on unburned sites, and 1.87 on burned sites, suggesting that although fire initially decreases the number of gnatcatcher pairs and the reproductive success of surviving pairs, there may be a rapid postfire increase in density and productivity in only a few years *if* there is adequate vegetation to support foraging and breeding activities. The coastal California gnatcatcher defends breeding territories ranging in size from 1 to 6 ha (2 to 14 ac). Reported home ranges vary in size from 5 to 15 ha (13 to 39 ac) for this species (Mock and Jones 1990 op cit USFWS 2003).

***Feeding*:** California gnatcatchers are ground and shrub-foraging insectivores. They feed on arthropods, beetles, spiders, leafhoppers, and other small insects. Most of their water intake is obtained through their diet.

***Migration*:** Coastal California gnatcatchers are non-migratory. The longest-documented adult dispersal is less than 8 km (5 mi).

***Threats*:** Threats to the coastal California gnatcatcher include habitat loss, fragmentation, and degradation, urban and agricultural development, livestock grazing, invasion by exotic grasses, off-road vehicles, pesticides, and military training activities all contribute to the destruction of gnatcatcher habitat.

***Population Trends*:** Once locally common, coastal California gnatcatchers have experienced widespread habitat destruction and have been driven from most of their former range. By 1997, no more than 2,900 pairs remained in the United States. Only small patches of coastal sage scrub remain, and the majority is privately owned, making species recovery a difficult task.

***Recovery Plan*:** None. No recovery plan has been implemented at the SSFL for the coastal California gnatcatcher, as no recovery plan currently exists for this species and it is not known to occur at the site.

***Period of Greatest Sensitivity to Proposed Action*:** During the breeding season for this species; February through August.

Least Bell's vireo (*Vireo bellii* ssp. *pusillus*) **E**

Least Bell's vireo is a small, migratory songbird in the family Vireonidae. It is not known to occur at SSFL; however focused surveys for the species have not been conducted. Seasonal drainages characterized as "disturbed riparian" habitat amounting to 0.1 ha (0.2 ac) are located in the eastern portion of the NBZ. "Formerly Disturbed areas dominated by Mulefat" (*Baccharis salicifolia*) amounting to 0.1 ha (0.2 ac) occur in Area IV (SAIC 2009).

***Habitat*:** A riparian species, least Bell's vireos depend on dense, low-growing thickets of willows, mulefat, mugwort, and California wild rose. Vireos inhabit areas where an overstory of taller willows, cottonwoods, and sycamores is also present. During the winter, they are known to occur in mesquite scrub vegetation. Foraging sometimes takes place in adjacent chaparral and coastal sage scrub (USFWS 1998).

***Range*:** The least Bell's vireo was once widespread with a summer range from northern California all the way to Baja California, Mexico, extending as far east as Death Valley. The vireo can today be found in a handful of locations from Santa Barbara to San Diego counties. The least Bell's vireo is not known from the SSFL site or the surrounding area. Based on CNDDB (2009) records, the species has been observed at several locations within Ventura County and a few locations in Los Angeles County. For example, the least Bell's vireo has been observed at the Santa Clara River and Arroyo Simi in Ventura County and at Hansen Dam in Los Angeles County (USFWS 1998).

***Critical Habitat*:** A total of about 14,569 ha (36,000 ac) is designated critical habitat for the least Bell's vireo at ten localities in portions of 6 counties in southern California. The nearest designated critical habitat to the Santa Susana Field Laboratory is along the Santa Clara River generally between Piru and Castaic Junction within Ventura and Los Angeles Counties (USFWS 1994).

***Primary Constituent Elements*:** Riparian woodland vegetation that generally contains both canopy and shrub layers, and includes some associated upland habitats (USFWS 1994).

***Life Cycle*:** Least Bell's vireos have a lifespan of about seven years (USFWS 1998).

***Breeding*:** Males arrive in breeding areas ahead of females and use their song to establish territories up to 0.3 ha (0.75 ac) in size. After a mate is selected and a low-lying, open-cup nest is constructed by the pair, egg laying begins within a couple of days. Typically, three or four eggs are laid. Both parents share in the two-week incubation and care for the chicks until fledging. Breeding lasts from mid-March until late September (USFWS 1998).

***Feeding*:** Least Bell's vireos prey on bugs, beetles, grasshoppers, moths, spiders, and caterpillars. They glean insects from leaves, twigs, and branches by hovering and picking prey off these stationary objects. They also utilize aerial pursuit, or flycatching (USFWS 1998).

***Migration*:** The least Bell's vireo is a neotropical migrant, traveling ca 3,200 km (2,000 mi) annually between breeding and wintering grounds (USFWS 1998).

***Threats*:** The least Bell's vireo has suffered habitat loss due to urbanization, agricultural development, the damming and canalization of rivers and streams, invasion of nonnative plants, pesticides, road construction, and sand and gravel mining. Brood parasitism by the brown-headed cowbird is another serious threat (USFWS 1998).

***Population Trends*:** Once described as one of the most abundant birds in the state of California, the least Bell's vireo suffered precipitous declines between 1930 and 1985. By 1986, only an estimated 300 pairs remained. After the species was listed as endangered, the population increased to 1,300 pairs by 1996 and 2,500 pairs in 2004. Robert McMorran (pers. comm. January 21, 2010) has indicated that least Bell's vireos are expanding their range in this area, and sometimes they are utilizing suboptimal habitats such as disturbed riparian areas and mulefat scrub found over portions of the NBZ.

***Recovery Plan*:** Draft USFWS (1998). The existing recovery plan for least Bell's vireo has not been implemented at the SSFL, as this species is not known to occur at the site.

***Period of Greatest Sensitivity to Proposed Action*:** During the breeding season for this species; March through September.

California red-legged frog (*Rana aurora* ssp. *draytonii* [=> *Rana draytonii*]) **T**

California red-legged frog in the family Ranidae. It is not known to occur at SSFL; however focused surveys for the species have not been conducted. Two man-made ponds are known to occur. Seasonal drainages characterized as "disturbed riparian" habitat amounting to 0.1 ha (0.2 ha) are located in the eastern portion of the NBZ (SAIC 2009).

***Habitat*:** This frog prefers aquatic habitat such as ponds, marshes and creeks with still water for breeding. It needs riparian and upland areas with dense vegetation and open areas for cover, aestivation food and basking. Frogs in cooler areas may hibernate in burrows for the winter.

***Range*:** California red-legged frogs were once common throughout California's Central Valley, from Point Reyes National Seashore down to northwestern Baja California. Today they occupy Sonoma and Butte counties in the north to Riverside County in the south, mostly in the western counties. They reside in about 238 streams or drainages in 23 counties, with Monterey, San Luis Obispo, and Santa Barbara counties supporting the most frogs. They now exist in about 30 percent of their historic range.

***Nearest Occurrence*:** In pools of East Las Virgenes Creek, a tributary of Malibu Creek, on state-owned land of the Upper Las Virgenes Open Space Preserve in the Simi Hills.

***Critical Habitat*:** The Service has recently reopened the comment period on the proposed revision of critical habitat (USFWS 2009), whereby, they propose to revise designated critical habitat from the previous final rule designating 182,225 ha (450,288 ac) to approximately 730,403 ha (1,804,865 ac) in 28 California counties, an increase of approximately 548,178 ha (1,354,577 ac) (USFWS 2008). The closest proposed Critical Habitat areas to SSFL are: VEN–1, San Antonio Creek; VEN–2, Piru Creek; VEN–3, Upper Las Virgenes Canyon, and; LOS–1, San Francisquito Creek (USFWS 2008).

***Primary Constituent Elements*:** According to USFWS (2008) the PCEs are: (1) *Aquatic Breeding* Habitat: Standing bodies of fresh water, including: natural and manmade stock ponds, slow-moving streams or pools within streams, and other ephemeral or permanent water bodies that typically become inundated during winter rains and hold water for a minimum of 20 weeks in all but the driest of years. (2) *Non-Breeding Aquatic Habitat*. Freshwater and wetted riparian habitats that may not hold water long enough for the subspecies to hatch and complete its aquatic life cycle but that do provide for shelter, foraging, predator avoidance, and aquatic dispersal for juvenile and adult California red-legged frogs. Other wetland habitats that would be considered to meet these elements include, but are not limited to: plunge pools within intermittent creeks;

seeps; quiet water refugia during high water flows; and springs of sufficient flow to withstand the summer dry period. (3) *Upland Habitat*. Upland areas adjacent to or surrounding breeding and non-breeding aquatic and riparian habitat up to a distance of 1.6 km (1 mi) in most cases and comprised of various vegetation such as grasslands, woodlands, wetland, or riparian plant species that provides shelter, forage, and predator avoidance. Upland features are also essential in that they are needed to maintain the hydrologic, geographic, topographic, ecological, and edaphic features that support and surround the wetland or riparian habitat. These upland features contribute to the filling and drying of the wetland or riparian habitat and are responsible for maintaining suitable periods of pool inundation for larval frogs and their food sources, and provide breeding, non-breeding, feeding, and sheltering habitat for juvenile and adult frogs (e.g., shelter, shade, moisture, cooler temperatures, a prey base, foraging opportunities, and areas for predator avoidance). Upland habitat should include structural features such as boulders, rocks and organic debris (e.g., downed trees, logs), as well as small mammal burrows and moist leaf litter. (4) *Dispersal Habitat*. Accessible upland or riparian dispersal habitat within designated units and between occupied locations within a minimum of 1.6 km (1 mi) of each other and that allows for movement between such sites. Dispersal habitat includes various natural habitats and altered habitats such as agricultural fields, which do not contain barriers (e.g., heavily traveled road without bridges or culverts) to dispersal. Dispersal habitat does not include moderate- to high-density urban or industrial developments with large expanses of asphalt or concrete, nor does it include large reservoirs over 20 ha (50 ac) in size, or other areas that do not contain those features identified in PCE 1, 2, or 3 as essential to the conservation of the subspecies.

***Life Cycle*:** Tadpoles hatch within two weeks, then take up to half a year to develop into frogs. Young frogs become sexually mature in the third year after metamorphosis.

***Feeding*:** Hunting largely at night, adult frogs use their sticky tongues to draw prey into their mouths. They commonly chow on insects, but about half their food consists of Pacific tree frogs and California mice. Tadpoles and young frogs hunt invertebrates both day and night, adding to their vulnerability to predators.

***Breeding*:** California red-legged frogs breed from November through April, during or after rainfall. Males appear at breeding sites before females and usually call in small groups. A frog pair clasped in the breeding position with the male riding piggyback on the female, called amplexus, moves to a site where eggs are laid.

***Migration*:** Frogs may make overland excursions of up to 1.6 km (1 mi) through upland habitats in wet weather and can disperse up to 3.2 km (2 mi) from breeding ponds.

***Threats*:** Habitat loss to urban development, agriculture, logging and wetland draining, impacts of dams and water diversions, competition and predation by introduced species, pesticides, cattle grazing, and global warming are driving frog populations down.

***Population Trend*:** Population has declined by at least 90 percent; the frog is gone from 70 percent of its former range. The only large breeding populations left are on the coast from San Mateo to San Luis Obispo counties. The species is extinct in the Central Valley and almost completely extirpated from the Sierra Nevada.

***Recovery Plan*:** USFWS (2002). The existing recovery plan for the red-legged frog has not been implemented at the SSFL, as this species is not known to occur at the site.

***Period of Greatest Sensitivity to Proposed Action*:** During breeding from November through April.

Quino checkerspot butterfly (*Euphydryas editha* ssp. *quino*) **E**

Quino checkerspot is a medium-sized butterfly of the family Nymphalidae, with a wingspan of about 3 cm (1 in). The wings are a patchwork of brown, red and yellow spots. It is not know to occur at SSFL; however focused surveys for the species have not been conducted.

***Habitat*:** The Quino checkerspot may occupy a variety of habitat types including grasslands, coastal sage scrub, chamise chaparral, red shank chaparral, juniper woodland, and semi-desert scrub that support native species of plantain, the butterfly's primary larval host plant. This checkerspot can also be found at the lower edge of the chaparral, in desert canyons, and in canyon washes.

***Critical Habitat*:** Approximately 25,141 ha (62,125 ac) of critical habitat is designated for the Quino checkerspot butterfly within 9 units. All designated critical habitat is located in Riverside and San Diego Counties.

***Primary Constituent Elements*:** (1) Open areas within scrublands at least 2 sq m (21.5 sq ft) in size that: (A) Contain no woody canopy cover; and (B) Contain one or more of the host plants *Plantago erecta, Plantago patagonica*, *Antirrhinum coulterianum*, or *Collinsia concolor* used for Quino checkerspot butterfly growth, reproduction, and feeding; or (C) Contain one or more of the host plants *Cordylanthus rigidus* or *Castilleja exserta* that are within 100 m (328 ft) of the host plants listed in (B) above; or (D) Contain flowering plants with a corolla tube less than or equal to 11 mm (0.43 in) used for Quino checkerspot butterfly feeding; (2) Open scrubland areas and vegetation within 200 m (656 ft) of the open canopy areas (PCE 1) used for movement and basking; and (3) Hilltops or ridges within scrublands that contain an open, woody-canopy area at least 2 sq m (21.5 sq ft) in size used for Quino checkerspot butterfly mating (hilltopping behavior) and are contiguous with (but not otherwise included in) open areas and natural vegetation described in PCEs 1 and 2 above.

Range: Historically, this butterfly was distributed throughout the coastal slopes of southern California, from Los Angeles, Orange, Riverside, San Diego, and San Bernardino counties southward to El Rosario in northern Baja California, Mexico. Its historic distribution included the westernmost slopes of the Santa Monica Mountains, the Los Angeles plain, and the Transverse Ranges to the edge of the upper Anza-Borrego desert. The Quino checkerspot is not known to occur at the Santa Susana Field Laboratory property. All CNDDB records for this species are within San Diego and Riverside County.

***Life Cycle*:** When host plants become desiccated, larvae seek shelter among leaf litter until the following winter. Fall and winter rains spark the germination of the host plant, which in turn causes the larvae to come out of dormancy. These butterflies may spend several years in a dormant period, briefly breaking and reentering dormancy over and over before reaching maturity, depending largely on rain patterns. Quino checkerspot butterfly larvae may undergo as many as seven molts prior to pupation. The periods between molts (shedding skin) are called instars.

During the first two instars, prediapause larvae cannot move more than a few centimeters and are usually restricted to the plant on which eggs were laid (the primary host plant species). Prediapause larvae spin a web and feed in groups. Webs are fairly conspicuous and associated with visible feeding damage to the plant. During the third instar (about 10 days after hatching), larvae are able to move to new individual host plants. Third instar larvae usually wander independently in search of food, and may switch from feeding on the plant on which they hatched to another plant of the same species (primary host plant), or another host plant species (secondary host plant). During larval development, the host plants age, eventually drying out and becoming

inedible (senescence). At the time of host plant senescence, if larvae are old enough and have accumulated sufficient reserves, they are able to enter diapause. There is typically one generation of adults per year, with a 4 to 6 week flight period beginning from late January to early March and continuing as late as early May, depending on weather conditions. If sufficient rain falls in late summer or early fall, a rare second generation of reduced numbers may occur. Females are usually mated on the day they emerge from pupae, and lay one or two egg clusters per day for most of their adult life. Adults live from 10 to 14 days; however, adult emergence from pupae is staggered, resulting in a 1 to 2 month flight season. From the perspective of judging whether a population has been extirpated, it is important to know that a normally robust population may generate no adults at all in a given year if poor environmental conditions preclude an adult flight period.

***Breeding*:** Mating and peak adult activity generally occur in March and April, when the female lays her eggs at the base of the host plant.

***Feeding*:** Most Quino checkerspot butterfly ovipositing has been documented on *Plantago erecta* (dwarf plantain). Another apparently important, but only recently documented, primary host plant is *Antirrhinum coulterianum* (white snapdragon). All Quino checkerspot butterfly egg and larval clusters found during the 2001 season in the Silverado Occurrence Complex, Riverside County were on this plant species. Another species of *Plantago* that was recently documented as a primary host plant for the Quino checkerspot butterfly is *Plantago patagonica* (woolly plantain. *Plantago patagonica* is the only species of *Plantago* found in the Silverado Occurrence Complex, and numerous egg and larval clusters were documented on this plant species during the 2000 season. *Cordylanthus rigidus* (thread-leaved bird's beak), a partially parasitic plant often found at high densities in disturbed areas, is perhaps the most widely distributed of all the primary host plants. Other possible primary host plants include *Castilleja exserta* (owl's-clover) and other native *Plantago* species. Adults feed on plant nectar. *Euphydryas editha* butterflies use a much wider range of plant species for adult nectar feeding than for larval foliage feeding. *Euphydryas editha* has a short tongue and cannot feed on flowers that have deep corolla tubes or flowers that have evolved to be opened by bees. *Euphydryas editha* prefers flowers with a platform-like surface on which they can remain upright while feeding. The butterflies frequently take nectar from *Lomatium* spp. (lomatium), *Muilla* spp. (goldenstar), *Achillea millefolium* (milfoil or yarrow), *Amsinckia* spp. (fiddleneck), *Lasthenia* spp. (goldfields), *Plagiobothrys* and *Cryptantha* spp. (popcornflower), *Gilia* spp. (gilia), *Eriogonum fasciculatum* (California buckwheat), *Allium* spp. (onion), *Eriodictyon* spp. (yerba santa), *Salvia columbariae* (chia), and *Dichelostemma capitatum* (blue dicks).

***Migration*:** The Quino checkerspot does not migrate.

***Threats*:** The Quino checkerspot is threatened by elimination, fragmentation, and degradation of habitat caused by urban and suburban development, increased fire frequency, pesticide spraying, unauthorized trash dumping, exotic plants, off-road vehicles, and collecting. On national forest lands the species is threatened by displacement of larval host plants and adult nectar sources, the spread of invasive plants, livestock grazing, predation by exotic invertebrates, off-road vehicle activity, and fire-management practices.

***Population Trends*:** Formerly one of the most common butterflies in southern California, the Quino checkerspot now inhabits only eight areas in southwestern Riverside and southern San Diego counties and four in Baja. Of these, all but three populations contained fewer than five individual butterflies in 2000. Currently, the butterfly is known from high, inland elevations such as Dictionary Hill, Otay Lakes, and San Miguel Mountain in San Diego County, as well as the Gavilan Hills in Riverside County. It has not been seen in Orange County, Los Angeles County, or coastal San Diego County for nearly 30 years and is extirpated from San Bernardino County as well. Wildfires in Southern California in 2003 burned 19 percent of the Quino checkerspot's critical habitat and eliminated 27 percent of its known occurrences. The prolonged

drought in California in the 1980's is credited as being largely responsible for near-extirpation of the Quino checkerspot butterfly. Historical accounts and precipitation records also suggest that a severe flood was at least partially responsible for extirpation of lower elevation Quino checkerspot butterfly populations in Orange County.

***Recovery Plan*:** USFWS (2003). The existing recovery plan for the Quino checkerspot butterfly has not been implemented at the SSFL, as this species is not known to occur at the site.

***Period of Greatest Sensitivity to Proposed Action*:** During growth of the larval host plants, as well as the peak of adult egg-laying activity, estimated February through May.

Riverside fairy shrimp (*Streptocephalus woottonii*) **E**

The Riverside fairy shrimp is a small freshwater crustacean in the Family Streptocephalidae of the Order Anostraca. The species was first collected in 1979 by C.H. Erickson and was identified as a new species in 1985. The Riverside fairy shrimp was listed as endangered on August 3, 1993 (USFWS). Riverside fairy shrimp (and vernal pools) are not known to occur at SSFL; however focused surveys for the species have not been conducted. No vernal pools have been identified at the site. Two man-made ponds are known to occur. Seasonal drainages characterized as "disturbed riparian" habitat amounting to 0.1 ha (0.2 ha) are located in the eastern portion of the NBZ (SAIC 2009). The location and extent of potentially suitable road ruts and ditches has not been determined.

***Habitat*:** The Riverside fairy shrimp is restricted to deep vernal pools and ponds with chemistry and temperature conditions specific to non-marine and non-riverine waters. The species has also been found in depressions that support suitable habitat, such as road ruts and ditches. The vernal pools that Riverside fairy shrimp are found in typically have water with a relatively neutral pH (approximately 7), low to moderate salinity, and low to moderate levels of total dissolved solids. Generally, in vernal pools where Riverside fairy shrimp occur, the external ion concentrations ($Na+$) averaged 0.73 mmol/l^3. All known vernal pool habitat lies within annual grasslands, which may be interspersed with chaparral or coastal sage scrub vegetation. Vernal pools form when winter rains fall on relatively flat lands whose soils are underlain by naturally impervious layers, usually dense clay layers. Because the water can't easily percolate down into the ground, above ground pools form in the vernal months of late winter and early spring, evaporating in late spring. A suite of uniquely adapted plants and animals like the Riverside fairy shrimp depend on these seasonal pools for life.

***Range*:** Known from California's Ventura County, Los Angeles County, Riverside County, Orange County, and San Diego County, the shrimp has also been found at two locations Valle de las Palmas and south of El Rosario in Baja California, Mexico.

***Nearest Occurrences*:** According to CNDDB records, nearest to the Santa Susana Field Laboratory is the Carlsberg vernal pool, located in Ventura County within the USGS 7.5' Simi quadrangle. The Carlsberg pool is located to the north of the intersection of Tierra Rejada Drive and Moorpark Road, just west of the 23 Freeway.

***Critical Habitat*:** There is approximately 124 ha (306 ac) of designated critical habitat for the Riverside fairy shrimp within Ventura, Orange and San Diego counties. Of this area, 94 ha (232 ac) are within Ventura County. Designated critical habitat in Ventura County consists of two sub-units. Sub-unit 1A is in the City of

Moorpark Greenbelt, north of Tierra Rejada valley, and contains the above-mentioned Carlsberg vernal pool. Sub-unit 1B is located on the east side of the 23 Freeway and south of Tierra Rejada Road.

***Primary Constituent Elements*:** Three main primary constituent elements have been identified for the Riverside fairy shrimp, with the first two considered to be the most significant: (1) small to large pools or pool complexes, with the appropriate size and volume, local climate, topography, water temperature, water chemistry, soil conditions, and length of time of inundation with water necessary for Riverside fairy shrimp incubation and reproduction, as well as dry periods necessary to provide the conditions to maintain a dormant and viable cyst bank; (2) geographic, topographic, and edaphic features that support aggregations or systems of hydrologically interconnected pools, swales, and other ephemeral wetlands and depressions within a matrix of immediately surrounding upslope areas that together form hydrologically and ecologically functional units called vernal pool complexes. These features contribute to the filling and drying of the vernal pool, maintain suitable periods of pool inundation, and maintain water and nutrient quality and soil moisture to enable the Riverside fairy shrimp to carry out their lifecycle; and (3) soils in the summit, rim and basin geomorphic positions, must have a clay component and/or an impermeable surface or subsurface layer, and must provide a unique assemblage of available nutrients and redox conditions known to support vernal pool habitat. The biogeochemical environment strongly influences hydrologic properties and play a critical role in nutrient cycling in vernal pool ecosystems.

***Feeding*:** Nearly all species of fairy shrimp feed on algae, bacteria, protozoa, rotifers, and various bits of organic matter.

***Breeding*:** Riverside fairy shrimp deposit eggs or cysts (organisms in a resting stage) in their pool's soil to wait out dry periods. The hatching of the cysts usually occurs from January to March within seven to 21 days after the pool refills, depending on water temperature. "Resting" or "summer" cysts are capable of withstanding temperature extremes and prolonged drying; thus, the soil may contain egg banks that are the result of several years of breeding.

***Migration*:** Fairy shrimp are non-migratory and have limited movement. Any dispersal of the species is likely caused by animal vectors wading or walking through wet or dry pools inhabited by fairy shrimp adults or eggs. Because of the long distances between the few remaining pools, natural gene flow is greatly, if not completely reduced.

***Threats*:** This shrimp is imperiled by a huge variety of threats, including urban sprawl, agribusiness, off-road vehicles, livestock grazing, wetland draining, pollution, invasion of non-native plants, fire, and fire-suppression activities. The species has a U.S. Fish and Wildlife Service recovery priority of SC, indicating that it is a species facing a high degree of threat and having a low potential for recovery. The "C" indicates that the species may be in conflict with construction or development projects.

***Population Trends*:** The Riverside fairy shrimp has the most limited range of any endemic California fairy shrimp. Unfortunately, the species' population numbers are dwindling primarily because the vernal pools it needs to survive are being destroyed at an alarming rate in southern California. Sometimes Riverside fairy shrimp are overlooked during vernal pool surveys because they hatch out and swim later in the season than many other fairy shrimp, and if they aren't detected, the pool is often plowed up. Vernal pools occur on relatively flat land that is highly desirable for agriculture and housing development. Now, with the looming threat of global climate change, vernal pools may very well be threatened with extinction due to decreased rainfall predicted in southern California. Not only the Riverside fairy shrimp, but a suite of rare species dependent on vernal pools for reproduction could slip closer to extinction.

***Recovery Plan*:** USFWS (1998). The existing recovery plan for the Riverside fairy shrimp has not been implemented at the SSFL, as this species is not known to occur at the site.

***Period of Greatest Sensitivity to Proposed Action*:** During periods of hatching of the eggs and cysts from January to March, and continuing until pools are dry.

Vernal pool fairy shrimp (*Branchinecta lynchi*) **T**

Vernal pool fairy shrimp is a species of freshwater crustacean in the family Branchinectidae. It is not known to occur at SSFL; however focused surveys for the species have not been conducted. No vernal pools have been identified at the site. Two man-made ponds are known to occur. Seasonal drainages characterized as "disturbed riparian" habitat amounting to 0.1 ha (0.2 ha) are located in the eastern portion of the NBZ (SAIC 2009).

***Habitat*:** Vernal pool fairy shrimp are usually found in vernal pools, although they are sometimes found in a range of natural and artificially created ephemeral habitats such as alkali pools, seasonal drainages, stock ponds, vernal swales, and rock outcrops. Individuals have never been found in riverine, marine, or other permanent bodies of water. Vernal pool habitats form in depressions above an impervious soil layer or duripan. Due to local topography and geology, the depressions are part of an undulating landscape, where soil mounds are interspersed with basins, swales, and drainages. Water movement within complexes allows vernal pool fairy shrimp to move between individual pools. These movement patterns, as well as genetic evidence, indicate that vernal pool fairy shrimp populations exist within and are defined by entire vernal pool complexes, rather than individual vernal pools.

The vernal pool fairy shrimp occupies a variety of different vernal pool habitats, from small, clear, sandstone rock pools to large, turbid, alkaline, grassland valley floor pools. Although the vernal pool fairy shrimp has been collected from large vernal pools, including one exceeding 10 ha (25 ac) in area, it tends to occur primarily in smaller pools, and is most frequently found in pools measuring less than 0.02 ha (0.05 ac) in area. The vernal pool fairy shrimp typically occurs at elevations from 10 m (33 ft) to 1,220 m (4,003 ft), although the two sites in the Los Padres National Forest have been found to contain the species at an elevation of 1,700 m (5,600 ft) in atypical habitats consisting of vernal pools under a *Pinus jeffreyi* (Jeffrey pine) canopy without a grass understory. The vernal pool fairy shrimp has been collected at water temperatures as low as 4.5 degrees Celsius (40 degrees Fahrenheit), and has not been found in water temperatures above about 23 degrees C (73 degrees F). The species is typically found in pools with low to moderate amounts of salinity or total dissolved solids. Although there are many observations of the environmental conditions where vernal pool fairy shrimp have been found, there have been no experimental studies investigating the specific habitat requirements of this species.

***Range*:** The vernal pool fairy shrimp is currently found in 28 counties across the Central Valley and coast ranges of California, and in Jackson County of southern Oregon. The species occupies a variety of vernal pool habitats, and occurs in 11 of the 17 vernal pool regions identified in California. It is generally uncommon throughout its range, and rarely abundant where it does occur.

***Nearest Occurrences*:** The vernal pool fairy shrimp is not known to occur at the Santa Susana Field Laboratory property. Occurrences with Los Angeles County include the Cruzan Mesa vernal pools. Occurrences in Ventura County include the Carlsberg vernal pools and two locations within the Los Padres National Forest.

***Critical Habitat*:** Unit 22A, the Ventura County Unit is within northern Ventura County and contains 18,830 ha (46,531 ac) of critical habitat for the vernal pool fairy shrimp, of which 790 ha (1,951 ac) is privately owned, and the remainder is within the Los Padres National Forest. Unit 22A is within USGS Alamo Mountain, Lion Canyon, Lockwood Valley, San Guillermo, and Topatopa Mountains quadrangles.

***Primary Constituent Elements*:** (1) Topographic features characterized by mounds and swales and depressions within a matrix of surrounding uplands that result in complexes of continuously, or intermittently, flowing surface water in the swales connecting the pools described below, providing for dispersal and promoting hydroperiods of adequate length in the pools; (2) Depressional features including isolated vernal pools with underlying restrictive soil layers that become inundated during winter rains and that continuously hold water for a minimum of 18 days, in all but the driest years; thereby providing adequate water for incubation, maturation, and reproduction. As these features are inundated on a seasonal basis, they do not promote the development of obligate wetland vegetation habitats typical of permanently flooded emergent wetlands; (3) Sources of food, expected to be detritus occurring in the pools, contributed by overland flow from the pools' watershed, or the results of biological processes within the pools themselves, such as single-celled bacteria, algae, and dead organic matter, to provide for feeding; and (4) Structure within the pools described above, consisting of organic and inorganic materials, such as living and dead plants from plant species adapted to seasonally inundated environments, rocks, and other inorganic debris that may be washed, blown, or otherwise transported into the pools, that provide shelter.

***Life Cycle/Feeding*:** Vernal pool fairy shrimp feed on algae, bacteria, protozoa, rotifers, and bits of detritus.

***Breeding*:** Vernal pool fairy shrimp eggs, or cysts, remain dormant in the soil when their vernal pool habitats are dry. The species has a relatively short life span, allowing it to hatch, mature to adulthood, and reproduce during the short time period when vernal pools contain water. The vernal pool fairy shrimp can reach sexual maturity in as few as 18 days at optimal conditions of 20 degrees C (68 degrees F), and can complete its life cycle in as little as 9 weeks. However, maturation and reproduction rates of vernal pool crustaceans are controlled by water temperature and can vary greatly. Vernal pool fairy shrimp have been observed to not reach maturity until 41 days at water temperatures of 15 degrees C (59 degrees F). In larger pools that hold water for longer durations, vernal pool fairy shrimp are capable of hatching multiple times if water temperatures drop to below 10 degrees C (50 degrees F), a necessary environmental cue for vernal pool fairy shrimp cyst hatching. Vernal pool fairy shrimp have been observed to live for as long as 147 days.

***Threats*:** The vernal pool fairy shrimp is threatened by development and agricultural conversion, military activities, flood control projects, road construction, recreational use, and non-native species introduction, as well as other factors.

***Population Trends*:** The population of the species has declined significantly from its historical distribution. It is likely the historical distribution of this species coincided with the historical distribution of vernal pools in California's Central Valley and southern Oregon. For example, it is estimated that roughly 1,618,700 ha (4,000,000 ac) of vernal pool habitat existed in the Central Valley prior to the widespread agricultural development that began in the mid-1800s. Although the current and historical distribution of vernal pools is similar, vernal pools are now far more fragmented and isolated from each other than during historical times and currently occupy only about 25 percent of their former land area.

***Recovery Plan*:** USFWS (2005, 2006). No existing recovery plan for the vernal pool fairy shrimp has been implemented at the SSFL, as this species is not known to occur at the site.

***Period of Greatest Sensitivity to Proposed Action*:** During periods of hatching of the eggs and cysts from January to March, and continuing until pools are dry (for small pools such as those which could occur at SSFL; expect a longer period for larger pools).

V. ENVIRONMENTAL BASELINE AND CUMULATIVE EFFECTS

Environmental Baseline

Physical and Biological Conditions

Area IV of the SSFL was developed within Burro Flat, a plateau near the crest of the Simi Hills between approximately 550 meters in elevation. Structures, facilities, and roads are concentrated within the relatively flat area of the site. The surrounding undeveloped area of Area IV consists of naturally vegetated flat terrain, hills and rock outcrops. The NBZ is adjacent to the northern boundaries of Areas II, III and IV. The NBZ is undeveloped and distinguished by very steep north-facing slopes and numerous large sandstone rock outcrops.

The climate of the region is semi-arid. Water is scarce and consequently development of riparian and wetland vegetation is localized to intermittent drainages and small man-made impoundments. Several drainages lead north from Area IV into the NBZ and southeast into Areas II and III. Engineered collection and treatment systems, developed to address National Pollutant Discharge Elimination System stormwater discharge requirements, control flows northward from Area IV. These systems are primarily used during the winter rain season (November through April), as there are no perennial streams or naturally occurring permanent water bodies within the study area.

The Chatsworth and Santa Susana Geologic Formations underlie Area IV. The Chatsworth formation is a thick sequence of steeply dipping sandstone beds interbedded with siltstone. This formation also contains conglomerate of metavolcanic and granitic detritus in a hard sandstone matrix, as well as clay shale. The Santa Susana Formation consists of layers of sandstone, claystone and siltstone, as well as conglomerates and sandstone containing shell-beds and calcareous concretions (Dibblee, Jr., T.W., 1992). Soils at the SSFL consist of unconsolidated sand, silt and clay materials. Several geologic faults traverse the site (DOE, 2003).

Science Applications International Corporation (SAIC) identified nine vegetation types within the entire study area, which encompassed Area IV and the NBZ, as described in their *Fall Biological Survey Report for Santa Susana Field Laboratory Area IV and Northern Undeveloped Areas* (November 2009). Vegetation types were based upon the classification of terrestrial natural communities of California in Holland (1986). Vegetation types represented include northern mixed chaparral, Venturan coastal scrub, coast live oak woodland/savanna, California walnut woodland, steep dipslope grassland, non-native annual grassland, formerly disturbed, disturbed riparian, and unvegetated disturbed/developed. Areas that have been mechanically disturbed tend to be dominated by introduced species, with generally poor representation of native species.

The most abundant habitat is northern mixed chaparral, which generally occurs on steeply sloping hillsides. It is particularly well developed in the NBZ and two hills in the southwestern portion of Area IV. Dominant species vary, but most sites include chamise (*Adenostoma fasciculatum*), laural sumac (*Malosma laurina*), sugar bush (*Rhus ovata*), and ceanothus (*Ceanothus crassifolius; Ceanothus oliganthus*).

Venturan Coastal Scrub occurs around the base of a hill at the northwest corner of Area IV, and includes dominant plant species of black sage (*Salvia mellifera*), purple sage (*Salvia leucophylla*) and giant wild rye (*Leymus condensatus*).

Coast live oak woodland is dominated by coast live oak (*Quercus agrifolia*) with a variable understory. Coast live oaks tend to occur in more sheltered areas and on north-facing slopes at the site. They also co-dominate with California black walnut (*Juglans californica*) on the north slope of the two hills in the southwestern portion of Area IV.

Riparian areas are nearly absent on the site. There are very limited areas occupied by willows in the NBZ where intermittent runoff concentrates. Mule fat (*Baccharis salicifolia*) is prevalent on the sandy soils in many formerly disturbed sites within Area IV.

The vegetation of the site is in the process of recovering from a wildland fire that burned through most of the SSFL in September 2005. The fire burned different portions of the site with variable intensity, resulting in a mosaic of vegetation burned at different degrees of severity. Some areas were not burned, such as some areas protected by large rock outcrops.

For more detailed information on vegetation and wildlife habitat within Area IV and the NBZ, as well as site surveys for sensitive species, see the above mentioned survey report by SAIC (November 2009), and the *Biological Report on Braunton's Milk-vetch Habitat* by MWH Global, Inc. (October 2009).

Actions and Activities at Area IV and the NBZ

Radiological Activities

Several nuclear reactors and associated fuel facilities and laboratories were operated within Area IV. From the mid-1950s until 1964, activities primarily focused on developing a sodium-cooled nuclear power plant, and developing space power systems with sodium and sodium potassium coolants. Beginning in the mid-1960s, the focus of operations was the development of liquid metal heat transfer systems in support of the Liquid Metal Fast Breeder Reactor Program. Nuclear operations included 10 nuclear research reactors, seven criticality facilities, burn pits, a hot laboratory, a nuclear materials development facility (plutonium fuel fabrication facility), a Radioactive Materials Handling Facility, and various test and nuclear material storage areas. Nuclear reactors at the SSFL lacked containment structures.

During peak operation, there were 272 numbered structures within Area IV. Most of these structures were demolished once their mission was achieved. Many facilities were decontaminated, decommissioned and demolished after 1996. In 2009, 23 structures remain at the site.

Radiological and Chemical Contamination

Historical operations at Area IV have resulted in the release of radionuclides and other contaminants to the environment. A measurable release occurred at the site in July 1959, when localized melting of a reactor core caused gas to build up within the reactor and gasses containing radionuclides were released to the atmosphere. A burn pit used from 1966 to the late 1970s for the disposal of metallic sodium and sodium-potassium mixtures, solvents, and radioactively contaminated equipment released radiological contaminants to the environment. The Hot Lab suffered a number of fires involving radioactive materials. A report produced by CDM Inc., submitted on June 1, 2008, lists incidents that may have released various radionuclides, which include several radiological contaminants of concern.

In 1989, the United States Department of Energy found widespread chemical and radioactive contamination at the site. Large amounts of toxic chemicals have been released into the soil, air and groundwater and surface water. Detected chemicals to date include perchlorate, heavy metals, PCBs, dioxins, volatile organic, and

semivolatile organic compounds, as well as radioactivity. The possibility exists that releases of radioactive materials and toxic chemicals may have contaminated natural habitats within Area IV or the NBZ, and have adversely impacted sensitive plants and/or wildlife. There are no known studies of the effects of known or potentially occurring contaminants on the biota at the site.

Other Disturbance

Considerable excavation and relocation of earth materials has occurred within Area IV, which has resulted in substantial modification of portions of the site. Over time roads have been constructed, and buildings and other facilities have been erected and removed. Many areas have been previously disturbed, presumably for a variety of purposes, particularly within the more developed portions of the site. These areas are now dominated by non-native species. Unpaved and paved roads, as well as a large water tank, have been constructed within Critical Habitat Unit 1D in the southwestern portion of Area IV. A large amount of soil was excavated from a "borrow pit" in the eastern portion of Unit ID. The possibility exists that relocation of earth materials may have resulted in contamination of natural habitats within Area IV, including Critical Habitat Unit ID, or the NBZ. Also, the possibility exists that past construction of facilities may have impacted sensitive species in these same areas, but this information is not available.

The NBZ is essentially in natural condition, except for a few unpaved roads and disturbed areas, and the presence of non-native species. Industrial activities have never occurred within the NBZ. The natural hydrological function of the larger drainages within the NBZ is altered by the capture and monitoring of water prior to its discharge downstream, as required by National Pollutant Discharge Elimination System (NPDES) permit.

Ongoing Activities

Ongoing activities at Area IV and the NBZ include general maintenance of facilities, decontamination and removal of structures, and NPDES monitoring. As mentioned previously, the Energy Technology Engineering Center (ETEC), as of 2009, has 23 structures at the site. Some structures contain hazardous materials. It is unknown whether ETEC continues to conduct operations other than hazardous waste storage/clean-up and activities necessary to decommission the site.

Future Activities

The objective of the radiological study at Area IV and the NBZ is to identify radionuclides of concern in soil and other media to support remediation of the site, as necessary to decommission the site. No future industrial use of the site is planned. Following successful remediation of the area, it is anticipated that ownership will be transferred to the State of California for permanent protection and, possibly, light recreational use.

Surrounding Land Use

The SSFL is surrounded by natural open space. There are residential developments located to the north, south and east, although these developments range from roughly 0.6 to 1.6 miles from developed areas at the SSFL. To the west of Area IV and the NBZ are large areas of undeveloped open space of the Simi Hills.

Cumulative Effects

Cumulative effects are not anticipated beyond the direct and indirect impacts associated with the proposed action. Any future remediation of Area IV and the NBZ, as well as gamma radiation surveys and remediation

of additional areas outside of Area IV and the NBZ will be subject to a separate consultation process under the Federal Endangered Species Act, and therefore do not need to be discussed in this Biological Assessment. No known Federal, State or local agency activities, or private entity actions are anticipated at the site, or in the surrounding area, which when combined with the Action would have a cumulative adverse impact to biological resources.

VI. EFFECTS OF THE ACTION

DIRECT AND INDIRECT EFFECTS OF THE ACTION

Braunton's milk-vetch and Critical Habitat Unit 1d

The subject species would be exposed to the following *Stressors* resulting from the proposed Action:

1) Mowing and brush cutting of the occupied area to a height of approximately six to 18 inches. This could result in direct damage to living plants that could result in premature mortality or reduced seed production;
2) Reduction in numbers and diversity of pollinating insects. Associated plant species with shared pollinator insects would also be mowed or cut, and their flowers producing pollen and nectar for these insects would not be available to attract them to the affected area;
3) Operation of Action-related vehicles and/or equipment in the occupied area and Critical Habitat could cause mechanical injury to living plants including foot traffic and grazing by the mule carrying the gamma scanner, resulting in premature mortality, reduced seed production, or physical damage to seeds and soil structure;
4) Physically accessing occupied habitat areas by hand crews and equipment may stimulate mechanical germination from the dormant seed bank, resulting in an adverse affect if subsequent growing conditions are unsuitable.
5) Spread of invasive weeds. Operation of Action-related vehicles and/or equipment, could serve to transport invasive weeds, especially, but not limited to yellow star-thistle (*Centauria solstitialis*) to the occupied areas and Critical Habitat from known infested locations elsewhere within the Action Area.

Exposure to the stressors would occur over the entire Action Area that is occupied by Braunton's milk-vetch. This amounts to approximately 83 percent, or 22.8 ha (56.3 ac) of the entirety of the designated 27 ha (68 ac) Critical Habitat Unit 1d, of which approximately 7.1 ha (17.5 ac) are actually occupied by Braunton's milk-vetch (MWH Global 2009; SAIC 2009). Exposure to stressors would occur for a period of approximately four months, and would occur one time only. An estimated 18,500 standing living and dead individuals (as of 2009), and an undetermined number of seeds would be exposed. Those individuals and seeds represent the majority of the population occurring in Critical Habitat Unit 1d. The life stage of the exposure would be after senescence and death of approximately half or more of the standing individuals, and during resumption of growth, flowering, and seed production for the remainder of standing individuals. Also, dormant seed in the soil seed bank would be exposed, and possibly, seeds whose dormancy may be broken by natural factors, or as a result of the Action itself.

The above Stressors resulting from the Action are not expected to affect the three PCEs of the Critical Habitat Unit. The carbonate nature of the soils would remain unchanged. Rather, the Action may result in *Subsidies* of the other two PCEs as follows: 1) disturbance to the chaparral community causing a low proportion of competing vegetative cover, and; 2) mechanical scarification of seed in the soil seed bank that are stimulated to break their dormancy.

The *Responses* of the exposed individuals and Critical Habitat to the Stressors and Subsidies are: 1) potential mortality of standing live individuals, 2) reduction of seed set in fruits of standing live individuals 3) mechanical damage resulting in mortality of some seed, and; 4) stimulation of germination of some seed by mechanical abrasion.

Finding for Braunton's milk-vetch listed species: **May Affect, Likely to Adversely Affect.** Some standing live individuals may be cut, or damaged during the brush cutting, moving of cut brush, stockpiling, or scanning phase. In this process, some seed could be damaged, while other could be stimulated to germinate. Standing dead individuals will be allowed to be cut; however, the cut plants including any senescent inflorescences that may contain seeds will remain on site at their original location, or relocated to other suitable habitat for the species. The Work Plan for the Action restricts the use of the large, fork-lift mounted scanning equipment (ERGS) to flatter areas. Coincidentally, these areas are either not occupied by Braunton's milk-vetch, or with only a few plants which are judged to be dead at the present time (Wishner and Anderson, personal observation). In contrast to the ERGS, the use of mule-mounted gamma scanning equipment (MMGS), wheel-mounted gamma scanning equipment (WMGS), and hand-held gamma scanning equipment (HHGS) in occupied habitat will be easier to control, and substantially less damaging to the standing live individuals.

Approximately 50%, or more of the estimated 18,500 standing individuals (2009) are judged to be dead, based on examination in November 2009 by Envicom representatives Wishner and Anderson. The population is now entering the fifth annual growth period of this short-lived perennial which typically persists for only three to five years following a fire event. No seedling recruitment of the species occurred in the fourth year, and none is expected to occur during the fifth year- the action year. Rather, the population can be expected to expire its above-ground growth phase and enter a period of dormancy within the next one- to two-years, persisting as seed in the soil seed bank until the next fire event. Thus, the stressors of potential mechanical damage to living plants, and indirect effects on pollinators will be affecting a declining and decadent stand with very limited near-term productivity. Avoidance and minimization measures involving flagging of live individuals, and preventing damage to them by careful manual cutting of brush and use of scanning devices serve to substantially retain the remaining productivity of the stand. The numbers of living individuals potentially adversely affected is estimated at 5 percent of the estimated 2009 standing live individuals, or approximately 462 individuals.

Finally, subsidies resulting from careful brush cutting will result in a low proportion of shrub cover around the plants, a reduction of competition, and could simulate a "periodic disturbance" that may stimulate seed germination by scarification and reduction of vegetative cover; factors identified as PCEs.

Finding for Braunton's milk-vetch Critical Habitat: **May Affect, Likely to Adversely Affect.** Although the proposed Action is not anticipated to adversely affect the PCEs for Braunton's milk-vetch, several activities including vegetation cutting, gamma scanning, geophysical surveys, and soil sampling would occur within the Critical Habitat Unit 1d. The use of Action-related equipment and presence of crews within the Critical Habitat may have an adverse affect on the Critical Habitat. The areal extent and disturbance associated with each activity is not known at this time; however, one of the four methods of gamma scanning will occur over all 68 acres of Critical Habitat within the Action Area. The type of gamma scanning, and locations for vegetation cutting and geophysical surveys and soil sampling will be selected to minimize the affect of the Action on the Critical Habitat and PCEs. Additionally, avoidance and minimization measures identified in Section III are expected to reduce the affects of the proposed Action.

Lyon's pentachaeta

Lyon's pentachaeta is not known to occur within the Action Area. The nearest known locations are in the Tierra Rejada Hills and Montclef Ridge areas of the western Simi Hills and Santa Rosa Hills (ca 12.6 km [6.8 mi]), and in the vicinity of Ladyface [Mountain] in the City of Agoura Hills (ca 18.5 km [10 mi]), on the northern slope of the Santa Monica Mountains. Nonetheless, surveys for this species have not been

conducted on site at the appropriate time of the year for detection. Therefore, for purposes of this Biological Assessment, and for identifying appropriate avoidance and minimization measures, Lyon's pentachaeta is presumed to be present.
The subject species would be exposed to the following *Stressors* resulting from the proposed Action:

1) Mowing and brush cutting of the occupied area to a height of approximately six to 18 inches. This could result in direct damage to living plants that could result in premature mortality or reduced seed production;
2) Reduction in numbers and diversity of pollinating insects. Associated plant species with shared pollinator insects would also be mowed or cut, and their flowers producing pollen and nectar for these insects would not be available to attract them to the affected area;
3) Operation of Action-related vehicles and/or equipment in any occupied area could cause mechanical injury to living plants. This could cause premature mortality of seedlings or growing or mature plants, reduced seed production, or physical damage to seeds and soil structure, including the integrity of microbiotic crusts; and
4) Spread of invasive weeds. Operation of Action-related vehicles and/or equipment could serve to transport invasive weeds, especially, but not limited to yellow star-thistle (*Centauria solstitialis*) to occupied areas from known infested locations elsewhere within the Action Area.

Exposure to the stressors would occur over any portion of the Action Area that that may actually be occupied by Lyon's pentachaeta. No occurrences or areal extent of this species have been identified. Exposure to stressors would occur for a period of approximately up to eleven months, and would occur one time only. The numbers of individuals and number of seeds that would be exposed is unknown at this time. The life stage of the exposure would be while dormant seed are in the soil seed bank, continuing during germination, growth, flowering, maturation, seed production and senescence of this annual plant.

No Critical Habitat for Lyon's pentachaeta has been designated within the Action Area. Nonetheless, the above stressors resulting from the Action are not expected to affect the first of three PCEs of the Critical Habitat Unit. Namely, the clay nature of the soils would remain unchanged. Microbiotic crusts that inhibit invasion by other plant competitors and bare ground (>10%) patches in areas with less than 60% cover are unlikely to be disturbed by mowing or scanning equipment.

No Subsidies have been identified. The *Responses* of exposed individuals to the Stressors are: 1) potential mortality of live individuals; 2) reduction of seed production, and; 3) mechanical damage to soil structure, especially microbiotic crusts.

Finding for Lyon's pentachaeta listed species: **May Affect, Likely to Adversely Affect.** The numbers of individuals and areal extent of their occurrence is not known at this time. However, if Lyon's pentachaeta is present within the Action Area, it is estimated the population could include approximately 5,000 to 10,000 individuals. If present, live individuals may be cut, or damaged during the brush cutting, moving of cut brush, stockpiling, or scanning. Some seed could be damaged, and soil structure, especially microbiotic crust could be disturbed. In areas with Lyon's pentachaeta where no brush occurs, no brush cutting will be necessary, and mowing of herbaceous material is also unlikely to be required. Lyon's pentachaeta does not normally occur in dense herbaceous vegetation such as oat and brome grasses, and mustard where the soil surface is not substantially bare. Lyon's pentachaeta is normally of short stature from 6-48 cm (2-19 in), and is a very flexible annual that would be resilient and undamaged by passing a scanning device over it at a height of 15 cm (6 in).

Measures incorporated as part of the Action would serve effectively to reduce and avoid damage to plants during their above-ground living stages, and minimize other direct and indirect damage to the habitat, including introduction of invasive weeds, and disturbance to soil structure, especially microbiotic crust that promotes low competition and therefore, persistence of this species.

Spreading navarretia

This species has not been observed within the Action Area. The nearest known occurrences of this species to the Action Area are at two vernal pools within the Mint Canyon 7.5' USGS quadrangle in Los Angeles County. A habitat assessment has not been completed to determine if suitable habitat for Speading navarretia within the Action Area. Therefore, for the purposes of this Biological Assessment and identifying appropriate avoidance and minimization measures, spreading navarretia is presumed to be present. If suitable habitat is found at the site, and conditions do not permit a definitive determination of presence versus absence of the species, measures to avoid and minimize impacts to the habitat shall be implemented.

The subject species would be exposed to the following *Stressors* resulting from the proposed Action:

1) Mowing and brush cutting of the occupied area to a height of approximately six to 18 inches.

   a) The potential for direct damage to the species from mowing and brush cutting is substantially reduced because of its small stature, as the species ranges in height from 1-15 cm (0.5-6 in). Most likely, the species would be associated only with other low growing plant species in vernal pool habitats, and mowing or brush cutting would not be necessary. Nevertheless, the activity has the potential to result in direct damage to living plants, which could cause premature mortality or reduced seed production. Direct damage could be caused by accidental cutting or by foot trampling as personnel cut or mow vegetation;

   b) Mowing and brush cutting of large portions of the Action Area could change the quantity and pattern of runoff, which could potentially result in an indirect impact to the species by altering the quantity of water flowing to vernal pools or other suitable habitat soil habitats (but not affecting depressions in rock outcrops). If spreading navarretia habitats receive insufficient input of surface water from runoff, the species may not be able to carry out its life cycle;

2) Reduction in numbers and diversity of pollinating insects. Associated plant species with shared pollinator insects would also be mowed or cut, and their flowers producing pollen and nectar for these insects would not be available to attract them to the affected area;
3) Operation of Action-related vehicles and/or equipment in any occupied area could cause mechanical injury to living plants, resulting in premature mortality or reduced seed production, or physical damage to seeds and soil structure; and
4) Operation of Action-related vehicles and/or equipment could serve to transport invasive weeds, especially, but not limited to yellow star-thistle (*Centauria solstitialis*) to the occupied areas from known infested locations elsewhere within the Action Area.

Exposure to the stressors would occur over the entire Action Area that may be occupied by spreading navarretia, or over its habitat, if the species or habitat is present. If the species is discovered at the site, a count or an estimation of population size would be necessary to determine the number of individuals potentially impacted by the project. The life stage of the exposure would depend upon the timing of the project activities and the species life cycle.

Stressors 1a, 2, 3 and 4 resulting from the Action are not expected to affect the three PCEs of critical habitat for the species. The landforms and soil type would remain unchanged. Stressor 1b, a potential result of the Action, may affect PCE 3, i.e., the functional hydrology that provides surface water that fills the vernal pools in the winter and spring months. However, the Action on the other hand may result in a *Subsidy* of PCE 3 by improving habitat conditions at vernal pools, or other suitable habitat for the species. Whether or not the project would result in Stressors or Subsidies (or both or neither) related to PCE 3 would depend upon any relevant changes in runoff patterns and the effects on the quality of habitat for the species.

The *Responses* of the exposed individuals and habitat to the stressors and subsidies are: 1) potential mortality of live individuals; 2) reduction of seed set in fruits; 3) mechanical damage resulting in mortality of some seed; 4) loss of habitat and consequential loss of individuals, sub-populations, or population; 5) reduction in habitat quality weakening population viability, and; 6) improvement in habitat quality for the species.

Finding for Spreading Navarretia listed species: **May Affect, Likely to Adversely Affect.** The numbers of individuals and areal extent of their occurrence, if present, is not known at this time. The number of individuals of *N. fossalis* at a given population site varies annually in response to the timing and amount of rainfall and temperature (USFWS 2005). The four core habitat areas where this species occurs are large, both in number of occupied areas and in terms of the occurrence size (greater than 3,000 plants) (USFWS 2009). Therefore, if spreading navarretia is found to be present, it is estimated that approximately 3,000 individuals could be present. If present, standing live individuals may be damaged during the brush cutting, moving of cut brush, or stockpiling phase, or damaged during the scanning phase, and some seed could be damaged. Proposed avoidance and minimization measures should be sufficient such that the size of the impact should never reach the scale where take would occur.

Finding for Spreading Navarretia Critical Habitat: Spreading navarretia Critical Habitat has not been designated in the Action Area.

Conejo Dudleya, Santa Monica Mountains Dudleya, and Marcescent Dudleya

The analysis of for these three species has been combined here because they share high degree of similarity in habitat preference, the assessment of effects of the Action, and appropriate avoidance and minimization measures. None of the above three listed *Dudleya* species are known to occur within the Action Area. Surveys have been conducted within the Action Area and undetermined *Dudleya* species have been detected. However, those studies were not conducted at the appropriate time of the year for precise determination. Therefore, for purposes of this Biological Assessment and identifying appropriate avoidance and minimization measures, all of the listed dudleyas are presumed to be present.

The subject species would be exposed to the following *Stressors* resulting from the proposed Action:

1) Mowing and brush cutting of the occupied area to a height of approximately six to 18 inches. All of the species are intimately associated with rocks, typically associated with fissures or local accumulations of soil and organic detritus in depressions on the rocks, usually on the shaded faces of these rocks. In large degree, mowing and brush cutting will not be required on the rock surfaces in order to facilitate scanning. However, attendant brush adjacent to these shaded rock faces will need to be cut, and accidental damage, injury or dislodgement of the *Dudleya* plants could occur. This could result in direct damage to living plants that could result in premature mortality or reduced seed production;

2) Reduction in numbers and diversity of pollinating insects. Associated plant species with shared pollinator insects would also be mowed or cut, and their flowers producing pollen and nectar for these insects would not be available to attract them to the affected area; and
3) Operation of Action-related vehicles and/or equipment in any occupied area could cause mechanical injury to living plants, resulting in premature mortality or reduced seed production, or physical damage to seeds and soil structure. The rockland habitats where Santa Susana tarplant occur may preclude the use of some equipment being operated thereon.

Exposure to the stressors would occur over any portion of the Action Area that that may actually be occupied by any of the listed *Dudleya* species. No occurrences or areal extent of this species have been identified. Exposure to stressors would occur for a period of up to 11 months, and would occur one time only. The numbers of individuals that would be exposed is unknown at this time. The life stage of the exposure would be while dormant seed are in the crevices, fissures, soil seed bank, continuing during germination, growth, flowering, maturation, seed production and yearly senescence of these perennial plants.

No Critical Habitat for any of these listed *Dudleya* species has been designated within the Action Area, or anywhere else. For this reason, no PCEs have been identified. Nonetheless, one habitat characteristic is clearly required, namely, suitable rocks with fissures and/or local pockets of soil for trapping seeds, and their subsequent establishment and growth. The fundamental nature of the rocks and included microsites are unlikely to be disturbed by or changed by mowing, brushing, or the use of scanning equipment.

No Subsidies are identified. The *Responses* of the exposed individuals to the Stressors are: 1) potential mortality of live individuals, and; 2) reduction of seed production

Finding for listed Dudleya species: **May Affect, but is Not Likely to Adversely Affect – *Insignificant effects.*** Accidental or inadvertent damage to, or dislodgement of live individuals could occur during the brush cutting, moving of cut brush, stockpiling, or scanning. Seed is unlikely to be damaged, and the fundamental nature of the rockland habitat is unlikely to be changed or altered. All these *Dudleya* species are normally of short stature, including their inflorescences, reaching maximum heights of 15-18 cm (6-7 in), are very flexible above, and would be resilient and undamaged by passing a scanning device over them at a height of 15 cm (6 in).

Avoidance and minimization measures incorporated as part of the Action would effectively serve to completely avoid damage to plants at all life stages. Impacts associated with the proposed Action should never reach the scale where take would occur.

San Fernando Valley spineflower

San Fernando Valley spineflower is not known to occur within the Action Area. The nearest known *extant* location of San Fernando Valley spineflower is on Laskey Mesa, in the Upper Las Virgenes Open Space Preserve in the eastern Simi Hills ca 1.85 km (1.0 mi) south-southeast of the Action Area. Surveys have not been conducted at the appropriate time of the year for detection of this species. Therefore, for purposes of this Biological Assessment, and for identifying appropriate avoidance and minimization measures, San Fernando Valley spineflower is presumed to be present.

The subject species would be exposed to the following *Stressors* resulting from the proposed Action:

1) Mowing and/or brush cutting of the occupied area to a height of approximately 6 to 18 inches could damage or injure these plants, and result premature mortality or reduced seed production;
2) Reduction in numbers and diversity of pollinating insects. Associated plant species with shared pollinator insects would also be mowed or cut, and their flowers producing pollen and nectar for these insects would not be available to attract them to the affected area;
3) Operation of Action-related vehicles and/or equipment in any occupied area could result in physical damage to these annual plants; and
4) Operation of Action-related vehicles and/or equipment could serve to transport invasive weeds, especially, but not limited to yellow star-thistle (*Centauria solstitialis*) to the occupied areas from known infested locations elsewhere within the Action Area.

Exposure to the stressors would occur over any portion of the Action Area that that may actually be occupied by San Fernando Valley spineflower. No occurrences or areal extent of this species have been identified. Exposure to stressors would occur for a period of up to 11 months, and would occur one time only. The numbers of individuals that would be exposed is unknown at this time. The life stage of the exposure would be while dormant seed are in the soil seed bank, continuing during germination, growth, flowering, maturation, seed production and senescence of this annual plant.

No Critical Habitat for San Fernando Valley spineflower has been designated in the Action Area, or anywhere else. For this reason, no PCEs have been identified. However, habitat characteristics that are likely required include "open habitats," "strikingly free of dense exotic grasses," "on a wide range of soil types, chemistry, and compaction, acidic, fine-sand colluvium low in nitrogen, possibly permeated with mycorrhizal mycelium." The fundamental nature of the soils are unlikely to be disturbed or changed by mowing, brushing, or the use of any of the types of scanning equipment.

No Subsidies are identified. The *Responses* of the exposed individuals to the Stressors are: 1) potential mortality of live individuals, and; 2) reduction of seed production.

Finding for San Fernando Valley Spineflower Candidate Species: **Not Likely to Jeopardize the Continued Existence**. Some live individuals may be cut, or damaged during the brush cutting, moving of cut brush, stockpiling, or scanning. Some seed could be damaged, and soil structure, especially microbiotic crust could be disturbed. In areas with San Fernando Valley spineflower where no brush occurs, brush cutting, and and also mowing of herbaceous material is unlikely to be required. San Fernando Valley spineflower does not normally occur in dense herbaceous vegetation such as oat and brome grasses, and mustard where the soil surface is not substantially bare. San Fernando Valley spineflower is "clearly a plant of open habitats, free of shade and competing plants" (Glen Lukos Associates 2000). "Only a small fraction of the plants grow among tall grasses or shrubs, and all significant clusters of plants are on open soils." Furthermore, "it is a hardy plant which exploits disturbance by natural bioturbation and anthropogenic processes." San Fernando Valley spineflower is normally of short stature up to 30 cm (12 in), and is a very flexible annual that would be resilient and undamaged by passing a scanning device over it at a height of 15 cm (6 in).

Avoidance and minimization measures incorporated as part of the Action effectively would serve to completely avoid damage to plants during their above-ground living stages, and minimize other direct and indirect damage to the habitat, including introduction of invasive weeds, and disturbance to soil structure,

especially microbiotic crust, that promotes low competition and therefore, persistence of this species. Impacts associated with the proposed action should never reach the scale where take would occur.

Finding for San Fernando Valley Spineflower Critical Habitat: San Fernando Valley spineflower Critical Habitat has not been designated in the Action Area, or anywhere else.

Santa Susana tarplant

Santa Susana Tarplant occurs extensively in the Action Area, nearly exclusively associated with cracks and fissures on the sandstone outcrops, but also occurring on some hard-packed remediated soils.

The subject species would be exposed to the following *Stressors* resulting from the proposed Action:

1) Mowing and brush cutting of the occupied area to a height of approximately six to 18 inches. This species is intimately associated with rocks, typically associated with cracks and fissures, but also occurring sparingly in cracks in asphalt and concrete, and on some hard-packed remediated soils. In large degree, mowing and brush cutting will not be required on the rock surfaces in order to facilitate scanning. However, attendant brush adjacent to these rock faces will need to be cut, and accidental damage to these plants could occur. This could result in direct damage to living plants that could result in premature mortality or reduced seed production;
2) Reduction in numbers and diversity of pollinating insects. Associated plant species with shared pollinator insects would also be mowed or cut, and their flowers producing pollen and nectar for these insects would not be available to attract them to the affected area; and
3) Operation of Action-related vehicles and/or equipment in any occupied area could cause mechanical injury to living plants, resulting in premature mortality or reduced seed production, or physical damage to seeds and soil structure. The rockland habitats where Santa Susana tarplant occur may preclude the use of some equipment being operated thereon.

Exposure to the stressors would occur over those portions of the Action Area occupied by Santa Susana tarplant. Exposure to stressors would occur for a period of up to 11 months, and would occur one time only. The numbers of individuals that would be exposed is estimated to be roughly 850 individuals at 679 distinct dGPS locations. The life stage of the exposure would be while dormant seed are in the crevices, fissures, soil seed bank, continuing during germination, growth, flowering, maturation, seed production and yearly senescence of these perennial plants.

No Critical Habitat for Santa Susana tarplant has been designated in the Action Area, or anywhere else, since it is not a federally-listed species. Also for this reason, no Primary Constituent Elements (PCEs) have been identified. Nonetheless, one habitat characteristic is clearly required, namely, suitable rocks with fissures for trapping seeds, and their subsequent establishment and growth. The fundamental nature of the rocks and included microsites are unlikely to be disturbed by or changed by mowing, brushing, or the use of scanning equipment.

No Subsidies are identified. The *Responses* of the exposed individuals to the Stressors are: 1) potential damage or mortality of live individuals, and; 2) reduction of seed production.

Finding for State-Listed Rare Santa Susana Tarplant: This is not a federally listed, proposed or candidate species. Therefore, a specific finding under the ESA is not technically required. Nonetheless, the same criteria and concepts can still be applied. By this, the finding is: **May Affect, Likely to Adversely Affect.**

Accidental or inadvertent damage to, or dislodgement of individuals could occur during the brush cutting, moving of cut brush, stockpiling, or scanning. Seed is unlikely to be damaged, and the fundamental nature of the rockland habitat is unlikely to be changed or altered. Santa Susana tarplant grows to a height of 1 m (3.3 ft), but most are considerably shorter. The many branches arising near the base of the plants are rather flexible, as determined in a field test of this characteristic conducted in November 2009. They are judged to be substantially resilient and relatively undamaged by using one's hands to press them close to the substrate, allowing passage of a scanning device over them at a height of 15 cm (6 in).

The number of individuals that would be adversely affected is estimated at approximately 10 percent, or 85 of the approximately 850 plants occurring in the Action Area. The majority of adverse affects are anticipated to occur to individuals growing within previously disturbed areas such as the area around the Sodium Reactor Experiment. Avoidance and minimization measures incorporated as part of the Action would effectively serve to substantially lessen the magnitude of damage to plants at all life stages.

Finding for Santa Susana Tarplant Critical Habitat: Santa Susana Tarplant is not a federally listed species, and therefore Critical Habitat has not been established.

Coastal California Gnatcatcher

This species is reported to occur in the Action Area, based on two vocalizations heard on December 2, 2009, in an area of unburned chaparral and coastal scrub at the western boundary of Area IV (Robert McMorran pers. comm. January 21, 2010). The nature of their presence; whether resident on established territories or dispersing individuals is unknown. Protocol surveys have not been conducted. For purposes of this Biological Assessment and identifying appropriate avoidance and minimization measures, the coastal California gnatcatcher is presumed to present in a limited portion of the Action Area, utilizing coastal sage scrub, and possibly other habitats adjacent to coastal sage scrub within the Action Area for cover, foraging, and nesting.

The subject species would be exposed to the following *Stressor* resulting from the proposed Action:

1) Brush cutting of coastal sage scrub vegetation to a height of approximately six to 18 inches. This could result in disturbance or direct harm to nesting coastal California gnatcatchers, including mortality of eggs and young birds, and reduce the value of the habitat for cover and foraging.

Exposure to the stressor would occur wherever occupied suitable habitat occurs within the entire Action Area, i.e., coastal sage scrub habitats such as Venturan coastal sage scrub and coastal sage-chaparral scrub, and non-sage scrub habitats such as chaparral, grassland, riparian areas in proximity to coastal sage scrub habitats. There is 1.3 ha (3.1 ac) of Venturan coastal sage scrub at the base of a hill at the northwest corner of Area IV (SAIC 2009). This area is transitional between mixed chaparral and California walnut woodland with a shrub and herbaceous understory. These adjacent habitats may be used by the species for foraging or nesting. Exposure would occur during mowing and brush cutting activities. Various life stage effects may include temporary loss of habitat for cover, forage and reproduction, which could cause individuals to disperse to other suitable habitat. Additionally, the stressor could potentially affect the nesting period, including eggs and young birds that have not fledged, if project activities are conducted during the nesting season. Breeding for coastal California gnatcatchers lasts from late February through late August. Impacts of mowing and brush cutting outside of the nesting season would be insignificant, as adult birds are expected to disperse to other areas containing suitable habitat. If the species is identified during additional surveys or monitoring of the proposed project, a count or an estimation of population size would be necessary to determine the number of individuals potentially impacted by the project.

The above Stressor resulting from the Action would affect the PCE, by cutting the entire Venturan coastal sage scrub habitat and adjacent habitats within the Action Area. The Action would not result in a *Subsidy* of the PCE.

The *Responses* of the exposed individuals to the Stressor are: 1) disturbance of nesting behavior resulting in unsuccessful breeding and nest formation, or abandonment of an active nest by adult birds; 2) direct mortality of eggs or live young birds within the nest; and 3) temporary dispersal of adults to other suitable habitat.

Finding for coastal California gnatcatcher listed species: **May Affect, Likely to Adversely Affect.** Significant direct effects may include temporary loss of habitat for cover, forage and reproduction, which would cause individuals to disperse to other suitable habitat. Based upon approximately 61ha (151 ac) of potential breeding territory within the Action Area, an estimated range between 12 and 122 breading pairs could be displaced[4]. Although this estimate of numbers of breeding pairs would likely relocate to nearby suitable habitat, direct mortality of these birds, and direct disturbance to nesting will be avoided by the Avoidance and Minimization measures specified. Protocol surveys for coastal California gnatcatchers will be conducted, commencing on or after March 15, and prior to all activities that would directly impact or disturb suitable occupied habitat. If protocol surveys indicate resident territorial use of the Action Area, then all activities therein within suitable habitat will be postponed until breeding activity has ended, based upon continuing observations, or after August 30. This is expected to result in a substantial reduction in the magnitude of the adverse impact.

Least Bell's vireo

This species has not been observed within the Action Area, and is not expected to nest within the Action Area due to the absence of well-developed riparian woodlands. There is a low probability that the species may nest or be present temporarily during migration within a small, disturbed riparian woodland associated with an intermittent stream in the NBZ, within disturbed areas containing stands of mulefat in Area IV, or potentially within additional undocumented areas containing riparian vegetation, if present. However, neither an assessment of the suitability of the habitats nor protocol surveys have been conducted. Therefore, for purposes of this Biological Assessment and for identifying appropriate avoidance and minimization measures, the least Bell's vireo is presumed to nest in riparian woodlands at the site, or utilize riparian habitats at the site on a temporary basis.

The subject species would be exposed to the following *Stressors* resulting from the proposed Action:

1) Mowing and brush cutting of understory riparian vegetation within riparian woodlands to a height of approximately six to 18 inches. This could result in disturbance or direct harm to nesting least Bell's vireos, including mortality of eggs and young birds, and reduce the value of suitable habitat for cover and foraging.

Exposure to the stressor would occur wherever suitable occupied habitat, as identified by the PCEs, occurs within the Action Area, i.e. within riparian woodlands that contain both canopy and shrub layers, and include some associated upland habitats. This amounts to approximately 0.1 ha (0.2 ac) of disturbed riparian woodland at the eastern end of the NBZ (SAIC 2009). Exposure would occur during mowing and brush cutting activities, and would occur once, based on the current project plan. The life stage that would be affected by the stressor would be the nesting period, including eggs and young birds that have not fledged, if

4 Wirtz et al (1995) data for burned and unburned suitable habitat in San Diego County.

project activities are conducted during the nesting season. Breeding for the species lasts from mid-March through late September. Impacts of mowing and brush cutting outside of the nesting season would be insignificant, as adult birds are expected to disperse to other riparian areas containing suitable habitat. If the species is identified during additional surveys or monitoring of the proposed project, a count or an estimation of population size would be necessary to determine the number of individuals potentially impacted by the project. However, based on the amount of riparian habitat at the site, the number of potentially affected individuals would most likely be limited to eggs or young within a single nest. A single nest typically contains three or four eggs.

The above Stressor resulting from the Action would affect the PCE, by mowing or cutting the entire understory of any riparian woodland located within the Action Area. The Action would not result in a *Subsidy* of the PCE.

The *Responses* of the exposed individuals to the Stressor include: 1) disturbance of nesting behavior resulting in unsuccessful breeding and nest formation, or abandonment of an active nest by adult birds; 2) direct mortality of eggs or live young birds within the nest; and 3) temporary dispersal of adults to other suitable habitat.

Finding for least Bell's vireo listed species: **May Affect, but is Not Likely to Adversely Affect – *Insignificant effects.*** Provided that Action related activities take place during the non-breeding season (after September 30 and before March 15), adverse effects to the species are not likely to occur. Additionally, if active nests are present during the nesting season, Action-related activities may have some insignificant effects, but are not likely to result in an adverse effect through compliance with setback and avoidance requirements identified in Avoidance and Minimization Measure GEN-9. Insignificant effects may include temporary loss of habitat for cover, forage and reproduction, which would cause individuals to seek alternative suitable habitat. Therefore, the Action and incorporation of the proposed avoidance measure should be sufficient to prevent adverse impacts to the species, if present.

California Red-legged frog

This species has not been observed within the Action Area. The nearest known occurrence of the species is at East Las Virgenes Creek, a tributary of Malibu Creek, on state-owned land of the Upper Las Virgenes Open Space Preserve in the Simi Hills. However, neither an assessment of the suitability of the habitats nor protocol surveys have been conducted. Therefore, for the purposes of this Biological Assessment and for identifying appropriate avoidance and minimization measures, the red-legged frog is presumed to occur within permanent or intermittent aquatic or riparian habitats and to temporarily occupy upland habitats within the Action Area.

The subject species would be exposed to the following *Stressors* resulting from the proposed Action:

1) Operation of Action-related vehicles and/or equipment, as well as foot traffic, within aquatic habitats or riparian habitats, or upland habitats within 300 feet thereof, and;
2) Mowing and brush cutting of large portions of the Action Area could change the quantity and pattern of runoff, which could potentially result in an indirect impact to the species by altering the quantity of water flowing to suitable aquatic or wetted habitats.

Exposure to the stressors would occur over those portions of the Action Area that may be occupied by the California red-legged frog and its habitat, if the species is present. Known potentially suitable habitat for the

California red-legged frog includes two man-made ponds within Area IV, and a seasonal drainage characterized as "disturbed riparian" habitat amounting to 0.1 ha (0.2 ha), located in the eastern portion of the NBZ. If the species is discovered at the site, a count or an estimation of population size would be necessary to determine the number of individuals potentially impacted by the project. Only the adult life stage would be exposed to the stressor within upland or non-aquatic riparian habitats. Within aquatic habitats, potentially all life stages could be affected, depending on the timing of project activities and the species life cycle.

The above Stressors resulting from the Action would affect, or may potentially affect, all four PCEs for the red-legged frog. It is also possible that any change in runoff quantity or patterns that may potentially result from cutting and mowing large amounts of vegetation could create a *Subsidy* to the PCEs, improving habitat conditions for the species.

The *Responses* of the exposed individuals and habitat to the Stressors and Subsidies are: 1) potential injury or mortality of individuals, 2) loss of suitable habitat, 3) loss or reduction in value of suitable habitat, 4) an increase in habitat or an improvement in suitable habitat values.

Finding for California red-legged frog listed species: **May Affect, Likely to Adversely Affect.** The status of California red-legged frog in the Action Area, and within 1.6 km (1 mi) is unknown. Thomas Mulroy of SAIC indicates that Aquatic Breeding Habitat (Primary Constituent Element 1) for this species is absent (pers. comm. January 23, 2010). However, he notes that water bodies outside the Action Area in Area II and Area III, namely R-2A Pond, R-2B Pond and Silvernale Pond (see Figure 3 herein) are within 0.15 km (500 ft) to 0.43 km (1400 ft) of Area IV. The possibility of occurrence of California red-legged frog at these locations cannot be discounted at the present time, as surveys have not been conducted. For this reason, there is some remote possibility that these frogs could occur in areas within 1.6 km (1 mi) from these ponds exhibiting PCE 2 (Non-breeding aquatic habitat, PCE 3 (Upland Habitat), and PCE 4 (Dispersal Habitat). The number of individuals potentially adversely affected is estimated at 10 to 20, given the distance to the ponds, and the extreme dryness of the intervening terrain. Avoidance and minimization measures incorporated would serve to substantially reduce the magnitude of direct impacts to California red-legged frog.

Finding for California red-legged frog Critical Habitat: California red-legged frog Critical Habitat has not been designated in the Action Area.

Quino Checkerspot Butterfly

This species is not known to occur within the Action Area. Although the species is not expected in the Action Area, and is believed to be extirpated from the region, its historical range probably included the Simi Hills. Larval host plants and adult nectar sources for the species have been observed within the Action Area. However, neither an assessment of habitat suitability nor protocol surveys have been conducted for this species. Therefore, for purposes of this Biological Assessment and identifying appropriate avoidance and minimization measures, the Quino checkerspot is presumed present within the Action Area.

The subject species would be exposed to the following *Stressors* resulting from the proposed Action:

1) Mowing and brush cutting of primary host plant species and adult nectar sources to a height of approximately six to 18 inches. Larval host plants include *Plantago erecta, Plantago patagonica*, *Antirrhinum coulterianum*, *Collinsia concolor*, *Cordylanthus rigidus* and *Castilleja exserta*. Adult nectar sources are flowering plants with a corolla tube less than or equal to 0.43 in (11 mm);

2) Operation of Action related vehicles and/or equipment in occupied areas may cause direct mortality to all life stages of the species, as well as injury to or mortality of primary host plants; and
3) Operation of Action related vehicles and/or equipment could serve to transport invasive weeds, especially, but not limited to yellow star-thistle (*Centauria solstitialis*) to areas supporting host plant species. Invasive plant species may over time outcompete primary host plants within the Action Area, resulting in habitat loss and indirect impacts to the species.

Exposure to the stressors could occur over the entire Action Area wherever the Quino checkerspot or the plant species on which it depends are found. *Antirrhinum coulterianum* and *Cordylanthus rigidus* are reported to occur within the Action Area (MWH Global 2009; SAIC 2009), and Envicom Corporation found *Cordylanthus rigidus* in open shrubland on a hill in the southwestern portion of Area IV. Other primary host plants may occur at the site, particularly *Plantago erecta*. Several potential nectar sources for adult butterflies have been reported as occurring within the Action Area, and can probably be found throughout the site (MWH Global 2009; SAIC 2009). Exposure to stressors would continue for the duration of cutting and mowing, gamma radiation surveying, and other sampling activities, and would occur one time only based on the current project plan. If the species is identified during surveys or monitoring, additional surveys to estimate population size would be necessary to determine the number of individuals potentially impacted by the project. The feeding larval life stage would be most vulnerable to the stressors. Adult stages are mobile and more likely to avoid harm. Larvae typically enter diapause in the soil or leaf litter, or construct silken webs in vegetation a few centimeters above the ground. Larvae are known to enter diapause on plant species other than primary host plants, such as *Eriogonum fasciculatum* (Pratt and Emmet, 2009). Pupae or larvae within soil or leaf litter may also potentially be affected by trampling, trucks, mules or other equipment during brush cutting and mowing, gamma radiation surveying, and other project activities. Females deposit eggs at the base of host plants. The low position of eggs on host plants may reduce the exposure of this life stage to stressors. The capability of the species to enter into long periods of diapause in larvae and pupae form, such as during periods of drought stress, may improve survival rates despite temporary losses or a reduction in food sources.

The above Stressors resulting from the Action would affect the three PCEs that define critical habitat for the species, by changing the quantity and structure of vegetation and temporarily reducing the quality of the habitat for growth, reproduction, and feeding. The Action would not result in *Subsidies* of the PCEs.

The *Responses* of the exposed individuals to the Stressors include direct or indirect mortality to all life stages of the species. Direct mortality may result from cutting and mowing of vegetation, foot trampling, vehicles and surveying equipment. Indirect mortality could result from permanent or temporary loss or reduction in foraging habitat.

Finding for Quino checkerspot listed species: **May Affect, but is Not Likely to Adversely Affect – *Insignificant effects.*** Provided that plants containing the Quino checkerspot and primary host plants are not impacted, and a sufficient amount of adult nectar sources are available to support individuals found on-site, only insignificant effects to the species would occur. Therefore, the Action and incorporation of the proposed avoidance and minimization measures should be sufficient to prevent adverse impacts to the species, if present.

Vernal Pool Branchiopods – Riverside Fairy Shrimp and Vernal Pool Fairy Shrimp

The analysis of these two species has been combined, because they share a high degree of similarity in their life cycles, habitat preference, and Primary Constituent Elements (PCEs). No vernal pools have been

identified within the Action Area. However, two man-made ponds are known to occur. A seasonal drainage characterized as "disturbed riparian" habitat amounting to 0.1 ha (0.2 ha) is located in the eastern portion of the NBZ (SAIC 2009). The location and extent of potentially suitable road ruts and ditches has not been determined, and a habitat assessment to determine if suitable habitat for the Riverside fairy shrimp and vernal pool fairy shrimp exist within the Action Area has not been completed. Therefore, for purposes of this Biological Assessment and identifying appropriate avoidance and minimization measures, the Riverside fairy shrimp and the vernal pool fairy shrimp are presumed present within the Action Area.

The subject species would be exposed to the following *Stressors* resulting from the proposed Action:

1) Operation of Action-related vehicles and/or equipment, as well as foot traffic during the inundation period, in an occupied area could cause injury to the species, and;
2) Mowing and brush cutting of large portions of the Action Area could change the quantity and pattern of runoff, which could potentially result in an indirect impact to the species by altering the quantity of water flowing to vernal pools or other suitable soil habitats (but not affecting depressions in rock outcrops). If Riverside fairy shrimp or vernal pool fairy shrimp habitats receive insufficient input of surface water from runoff, the species may not be able to carry out its life cycle.

Exposure to the stressors would occur over those portions of the Action Area that may be occupied by the Riverside fairy shrimp or vernal pool fairy shrimp, or its habitat, if the species is present. If the species is discovered at the site, a count or an estimation of population size would be necessary to determine the number of individuals potentially impacted by the project. The life stage of the exposure would depend upon the timing of the project activities and the species life cycle.

Stressor 1 resulting from the Action could result in direct mortality, but is not expected to affect the Primary Constituent Elements (PCEs) for either of the species. Stressor 2, a potential result of the Action, may affect Primary Constituent Elements of the Riverside fairy shrimp and the vernal pool fairy shrimp, by potentially reducing or augmenting overland flows that contribute to the inundation and transport of detritus and other matter to vernal pools. However, the Action may result in a *Subsidy* by improving habitat conditions at vernal pools, or other suitable habitat for the species. Whether or not the project would result in Stressors or Subsidies (or both or neither) would depend upon any relevant changes in runoff patterns and the affects, if any, on the quality of habitat for the species.

The *Responses* of the exposed individuals and habitat to the stressors and subsidies include: 1) potential mortality of live individuals, and; 2) loss of habitat and consequential loss of individuals; 3) reduction in habitat quality weakening population viability, and; 4) improvement in habitat quality for the species.

Finding for Riverside fairy shrimp and vernal pool fairy shrimp listed species: **May Affect, Likely to Adversely Affect.** The numbers of individuals and areal extent of their occurrence is currently not known. If present, however, these numbers may be substantial. For Riverside fairy shrimp, USFWS (2005 *op cit*. Belk 1998) indicates that "by the time the pool dries out, the numbers of dormant cysts within each pool basin can reach tens of thousands to millions, depending on pool size, volume, and depth." The nearby Carlsberg Ranch vernal pool in Tierra Rajada Valley has been surveyed numerous times, and is characterized as excellent, with 5–10,000 Riverside fairy shrimp recorded within (CNDDB 2009). No corresponding data for vernal pool fairy shrimp could be found. Therefore, if present, it is estimated approximately 5,000 to 10,000 Riverside fairy shrimp could be present and adversely affected. Implementation of the avoidance and minimization measures would serve to reduce or minimize damage to both species and their habitat,

Finding for Riverside fairy shrimp and vernal pool fairy shrimp Critical Habitat: Riverside fairy shrimp and vernal pool fairy shrimp Critical Habitat has not been designated in the Action Area.

DIRECT AND INDIRECT EFFECTS OF INTERRELATED OR INTERDEPENDENT ACTIONS

EPA is not aware of any interrelated or interdependent actions at SSFL that have the potential to effect federally listed species. The land at SSFL is owned by NASA (about 20%) and Boeing (about 80%). Most, if not all, of the Braunton's milk-vetch Critical Habitat Unit 1d is located in the portion owned by Boeing. The scope and timing of future site remediation is not known at this time. NASA currently has no active activities other than some periodic soil testing and water testing on their property. Boeing recently conducted a soil removal action at the direction of the Regional Water Board and conducts some soil and water testing periodically. Boeing also periodically dismantles a building outside of Area IV.

Interrelated and interdependent actions that need to be included are only those actions that are not subject to Section 7 consultation, and have potential to affect the listed species. Any future DOE remediation would be subject to its own Environmental Impact Statement (EIS) process, which may include a separate Section 7 consultation. Therefore, actions under any potential DOE remediation do not need to be discussed in this Biological Assessment.

CUMULATIVE EFFECTS OF THE ACTION AND INTERRELATED OR INTERDEPENDENT ACTIONS

Interrelated and interdependent actions are not anticipated within the Action Area. Therefore, cumulative effects would be consistent with the Effects of the Action, described above.

VII. OTHER RELEVANT INFORMATION

We are unaware of other relevant information that has not already been incorporated into this assessment.

VIII. CONCLUSION

The conclusion for the listed species, California Condor is **No Effect**.

The conclusion for the following listed species is **May Affect, Likely to Adversely Affect:**

Braunton's milk-vetch (*Astragalus brauntonii*)
Braunton's milk-vetch Critical Habitat Unit 1d
Lyon's pentachaeta (*Pentachaeta lyonii*)
Coastal California gnatcatcher (*Polioptila californica californica*)
Spreading navarretia (*Navarretia fossalis*)
California Orcutt grass *(Orcuttia californica*)
Riverside fairy shrimp (*Streptocephalus woottoni*)
Vernal pool fairy shrimp (*Branchinecta lynchi)*
California red-legged frog (*Rana aurora draytonii*)
California red-legged frog Proposed Critical Habitat Unit VEN-3

The conclusion for the remaining 11 listed species addressed in this Biological Assessment is **May Affect, but is Not Likely to Adversely Affect – Insignificant effects**.
The species addressed are:

Least Bell's vireo (*Vireo bellii pusillus*)
Quino checkerspot butterfly (*Euphydryas editha quino*)
Conejo dudleya (*Dudleya abramsii* subsp. *parva* [=D. *parva*])
Santa Monica Mountains live-forever (*Dudleya cymosa* subsp. *ovatifolia* [inclusive of *D. cymosa* subsp. *agourensis*])
Marcescent dudleya (*Dudleya cymosa* subsp. *marcescens*)

The conclusion for the Candidate species San Fernando Valley spineflower is **Not Likely to Jeopardize the Continued Existence.**

These conclusions are based on analysis of the status, biology, and baseline conditions for each species, and their anticipated response to the Action and associated avoidance and minimization measures provided. Support for the conclusions is discussed in detail in Section VI Effects of the Action.

IX. LIST OF DOCUMENTS

MWH Global, Inc. 2009 (October 2). Biological Report on Braunton's Milk-Vetch Habitat. Arcadia, California. Prepared for The Boeing Company. MWH Global, Inc., Arcadia, California.

Palladino Company, and HydroGeoLogic, Inc. 2009 (October). Draft Gamma Radiation Scanning and Analysis Plan, Area IV Radiological Study, Santa Susana Field Laboratory, Ventura County, California. Prepared For UEPA Region 7 and Region 9. Palladino Co, San Francisco, California, and HydroGeoLogic, Inc., Lenexa, Kansas.

SAIC. 2009 (September 25). Draft Study Plan: Fall Biological Surveys of Area IV and the Northern Undeveloped Land, Santa Susana Field Laboratory. . SAIC, Carpenteria, CA. 9 pp.

SAIC. 2009 (November 13). Fall Biological Survey Report for Santa Susana Field Laboratory Area IV and Northern Undeveloped Areas. Prepared for CDM and USDOE. SAIC, Carpinteria, CA.

X. LITERATURE CITED

Bartel, Jim A. 1993. *Dudleya*. Pp. 525-530 *In*: *The Jepson Manual: Higher Plants of California* (Hickman, J.C. [ed.]), Univ. California Press, Berkeley, California.

California Department of Fish and Game. 1991. *Annual Report on the Status of California State Listed Threatened and Endangered Animals and Plants*. CDFG, Sacramento, California.

California Department of Fish and Game. 2009 (November 14). California Natural Diversity Database, Rarefind 3 application report on element occurrences. CDFG, Sacramento, California.

Center for Plant Conservation. 2007. National Collection Plant Profile. On-line at:

http://www.centerforplantconservation.org/ASP/CPC_ViewProfile.asp?CPCNum=2215

Day, Alva G. 1993. *Navarretia*. Pp. 844-849 *In*: *The Jepson Manual: Higher Plants of California* (Hickman, J.C. [ed.]), Univ. California Press, Berkeley, California.

Dibblee, T.W., and Ehrenspeck, H.E., ed., 1992, Geologic map of the Calabasas quadrangle, Los Angeles and Ventura Counties,California: Dibblee Geological Foundation, Map DF-37, scale 1:24000.

Fotheringham, C., and Jon Keeley. 1998. Draft report, ecology and distribution of Braunton's milk-vetch (*Astragalus brauntonii*) and Lyon's pentachaeta (*Pentachaeta lyonii*). Prepared for California Dept of Fish and Game, USFWS Section 6 Contract No. FG5636-R5. 55 pp.

Hickman, J.C. 1993. *Chorizanthe*. Pp. 856-861 *In*: *The Jepson Manual: Higher Plants of California* (Hickman, J.C. [ed.]), Univ. California Press, Berkeley, California.

Holland, Robert F. 1986. Preliminary Descriptions of the Terrestrial Communities of California. California Department of Fish and Game, Sacramento, CA. 156 p.

Jones, Eugene, Frances M. Shropshire, Laura L. Taylor-Taft, Sean E. Walker, Leo C. Song Jr., Youssef C. Atallah, Robert L. Allen, Darren R. Sandquist, Jim Luttrell, and Jack H. Burk. 2009. Reproductive Biology of the San Fernando Valley Spineflower, *Chorizanthe parryi* var. *fernandina* (Polygonaceae). Madroño 56(1):23-42. 2009.

Glen Lukos Associates, Inc, 2000. Revised Report: Biology of the San Fernando Valley Spineflower, Ahmanson Ranch, Ventura County, California.

Keil, D. 1993. *Hemizonia*, Tarplant, Tarweed. Pp. 280-284 *In*: *The Jepson Manual: Higher Plants of California* (Hickman, J.C. [ed.]), Univ. California Press, Berkeley, California.

Keeley, Jon E. 1995 (16 June). Final Report: Seed Germination and Dormancy of *Pentachaeta lyonii* Emergency Drought Relief Project. Contract No. CA HER 011994 California Department of Fish and Game, Sacramento, CA.

Lane, Meredith. 1993. *Pentachaeta*. Pp. 322-323 *In*: *The Jepson Manual: Higher Plants of California* (Hickman, J.C. [ed.]), Univ. California Press, Berkeley, California.

Mock, P.J., B.L. Jones, M. Grishaver, J. Konecny, and D. King. 1990. Home range size and habitat preferences of the California gnatcatcher in San Diego County. Unpublished abstract, American Ornithologists Union Annual Meeting, Los Angeles, CA.

Munz, P.A., and D.D. Keck. 1973. *A California Flora and Supplement*. Univ. California Press, Berkeley, California.

Science Applications International Corp. (SAIC). 2009 (September 25). Draft Study Plan: Fall Biological Surveys of Area IV and the Northern Undeveloped Land, Santa Susana Field Laboratory. 9 pp.

Sclafani, Christie J. 2006. *Astragalus brauntonii*. *In*: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/ [2009, November 11].

Thomas, Timothy W., and Carl Wishner. 1988. *Pentachaeta lyonii*: rarity, threats, and recovery plans. *In*: Third Biennial Conference of Research in California's National Parks, program abstracts, 13-15 Sept. 1988. Univ. Calif. Davis.

U.S. Fish and Wildlife Service. (USFWS) 1994. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Least Bell's Vireo. Final rule. Federal Register, Vol. 59, No. 22**,** Wednesday. February 2. 1994. Pp. 4845-4867.

USFWS. 1996 (April 19). Interim Survey Guidelines to Permittees for Recovery Permits under Section 10(a)(1)(A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods.

USFWS. 1997a. Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for Two plants and Threatened Status for Four Plants From Southern California. Federal Register, Vol. 62, No. 19, Wednesday, January 29, 1997. Pp. 4172-4183. [Re: *Astragalus brauntonii, Pentachaeta lyonii, Dudleya abramsii* ssp*. parva, D. cymosa ssp. marcescens, D. cymosa* ssp*. ovatifolia, D. verityi*]

USFWS. 1997b (February 27), Coastal California Gnatcatcher (*Polioptila californica californica*) Presence/Absence Survey Guidelines.

USFWS. 1998. Draft Recovery Plan for the least Bell's Vireo. Portland, Oregon. 139 pp.

USFWS. 1998. Vernal Pools of Southern California Recovery Plan. Portland, Oregon. 113+ pp. [*Navarretia fossalis, Streptocephalus woottonii*]

USFWS. 1999. Recovery Plan for Six Plants from the Mountains Surrounding the Los Angeles Basin. Portland, Oregon. 62 pp. [Re: *Astragalus brauntonii, Pentachaeta lyonii, Dudleya abramsii* ssp*. parva, D. cymosa ssp. marcescens, D. cymosa* ssp*. ovatifolia, D. verityi*]

USFWS. 2002. Recovery Plan for the California Red-legged Frog (*Rana aurora draytonii*). U.S. Fish and Wildlife Service, Portland, Oregon. viii + 173 pp.

USFWS. 2003. Recovery Plan for the Quino Checkerspot Butterfly (*Euphydryas editha quino*). Portland, Oregon. x + 179 pp.

USFWS. 2003. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Coastal California Gnatcatcher (*Polioptila californica californica*) and Determination of Distinct Vertebrate Population Segment for the California Gnatcatcher (*Polioptila californica*); Proposed Rule Federal Register, Vol. 68, No. 79, Thursday, April 24, 2003. Pp. 20228-20312.

USFWS. 2005. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Riverside Fairy Shrimp (*Streptocephalus woottoni*); Final Rule. Federal Register, Vol. 70, No. 69, Tuesday, April 12, 2005. Pp. 19153-19204.

USFWS. 2005. Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon. Portland, Oregon. xxvi + 606 pages. [Re: Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)]

USFWS. 2005 Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for Four Vernal Pool Crustaceans and Eleven Vernal Pool Plants in California and Southern Oregon; Evaluation of Economic Exclusions From August 2003 Final Rule. Federal Register Vol. 70, No. 154, Thursday, August 11, 2005. Pp. 46924-46999. [Re: vernal pool fairy shrimp]

USFWS. 2005. Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for *Navarretia fossalis* (Spreading Navarretia) Final Rule. Federal Register Vol. 70, No. 200 Tuesday, October 18, 2005. Pp. 60657-60694.

USFWS. 2006. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for Four Vernal Pool Crustaceans and Eleven Vernal Pool Plants. Final rule; administrative revisions. Federal Register Vol. 71, No. 28, Friday, February 10, 2006, pp. 7117-7166. [Re: vernal pool fairy shrimp]

USFWS. 2006. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the California Red-Legged Frog, and Special Rule Exemption Associated With Final Listing for Existing

Routine Ranching Activities: Final rule. Federal Register Vol. 71, No. 71, Thursday April 13, 2006, pp. 19244-19292.

USFWS. 2006. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for *Astragalus brauntonii* and *Pentachaeta lyonii*; Final Rule Federal Register / Vol. 71, No. 219 / Tuesday, November 14, 2006. Pp. 66374-66423.

USFWS. 2007. Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for Coastal California Gnatcatcher (*Polioptila californica californica*) Final Rule. Federal Register Vol. 72, No. 243 Wednesday, December 19, 2007. Pp. 72009-72213.

USFWS. 2008. Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the California Red-Legged Frog (*Rana aurora draytonii*) Proposed rule. Federal Register Vol. 73, No. 180 Tuesday, September 16, 2008. Pp. 53492-53679.

USFWS. 2009. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for *Astragalus brauntonii* and *Pentachaeta lyonii*. Proposed rule; reopening of comment period and notice of availability of draft economic analyses. Federal Register Vol. 71, No. 140 Friday, July 21, 2009. Pp. 41410-41414.

USFWS. 2009. Endangered and Threatened Wildlife and Plants; Proposed Revised Designation of Critical Habitat for *Navarretia fossalis* (Spreading Navarretia) Proposed Rule. Federal Register Vol. 74, No. 110, Wednesday, June 10, 2009. Pp. 27588-27640.

USFWS. 2009. Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for the California Red-Legged Frog (*Rana aurora draytonii*) Proposed Rule; reopening of comment period, availability of revised draft economic analysis, and amended required determinations. Federal Register Vol. 74, No. 194, Thursday, October 8, 2009. Pp. 51825-51829. USFWS. 2009. Endangered and Threatened Wildlife and Plants; Review of Native Species That Are Candidates for Listing as Endangered or Threatened; Annual Notice of Findings on Resubmitted Petitions; Annual Description of Progress on Listing Actions, Notice of Review, Proposed Rules. Federal Register: Monday, November 9, 2009, Vol. 74, No. 215. Pp. 57803-57878 [Re: San Fernando Valley Spineflower (*Chorizanthe parryi* ssp. *fernandina*)]

Wirtz, William O. II, Audrey L. Mayer, Mary M. Raney, and Jan L. Beyers. 1995. Effects of fire on the ecology of the California gnatcatcher, *Polioptila californica*, in California coastal sage scrub communities. Proc. Fire Effects on Rare and Endangered Species and Habitats Conference, Coeur d'Alene Idaho, Nov. 13-16, 1995.

Wishner, Carl. 1989. Field Survey Data Form for *Hemizonia minthornii*, element occurrence 34 in California Natural Diversity Database, CDFG 2009.

XI. LIST OF CONTACTS/CONTRIBUTORS/PREPARERS

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Appendix A

Minutes of Informal Consultation Meetings

SSFL AREA IV AND THE NORTHERN UNDEVELOPED LAND BIOLOGICAL SURVEY MEETING
MEETING MINUTES
September 16, 2009

Attendees:

Craig Cooper	USEPA – Region IX	cooper.craig@epa.gov	415-947-4148
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MEETING MINUTES:

1. After introductions, Bob Mako (Boeing) provided a safety briefing. During the briefing, Bob provided an overview of the primary physical and biological hazards at the SSFL, and he provided safety instructions for the site visit that was conducted later in the day.
2. Thomas Johnson provided an overview of the EIS that will be prepared by the Department of Energy (DOE). The EIS is required by court order. Cultural and natural resources surveys will be conducted as one component of the EIS. Thomas Johnson and Craig Cooper also provided an overview of the overall regulatory framework at the SSFL. The DTSC is the lead regulatory agency at the site. EPA received a congressional mandate to conduct a radiological background study for soil and to characterize radiological contamination within Area IV. The congressional mandate dictates that this work be conducted in accordance with CERCLA.
3. Stephanie Jennings stated that the purpose of the meeting was to discuss natural resources. Cultural resources will be discussed at a later meeting.
4. Craig Cooper provided an overview of EPA's characterization study. The Area IV characterization study will consist of a gamma radiation scanning survey and groundwater, surface water, sediment, seep, and soil sampling. The work would be completed by dividing the site into manageable work units. The characterization study needs to be completed by September 30, 2011. Craig stated that the EPA was committed to complying with the Federal Endangered Species Act and the California Endangered Species Act.
5. Gregg Dempsey provided an overview of the gamma scanning survey that would be completed as part of the project. This will be the first work activity that will be conducted at the site. Gregg stated the goal of the gamma survey was to scan 100% of the accessible area within Area IV and the Northern Undeveloped Lands (e.g., Northern Buffer Zone). Gregg indicated that steep cliffs may not be considered "accessible". This determination will be made during the project planning phase.
6. Gregg discussed the various gamma scanning technologies that might be used at the SSFL. These include 1) a large gamma scanning system that will be transported using an off-road forklift; 2) a mule-mounted system; 3)

a stroller-mounted system; and 4) a hand-held gamma scanning system. Gregg pointed out that the sensitivity of the systems decreased with the decreasing size of the system.

7. One of the major concerns of the group was that the full scope of the project must be disclosed and analyzed to eliminate the concern of project segmentation.
8. Mary Meyer indicated that CEQA mandates that the long-term impacts of all proposed actions at a site be considered. Consequently, the impact of conducting gamma scanning surveys at the other three areas within the SSFL should be considered.
9. The meeting attendees discussed whether a CEQA EIR would be required as part of the EPA characterization study. Craig Cooper indicated that EPA would not be completing NEPA or CEQA documents. The substantive requirements of NEPA are met through the CERCLA process. Craig indicated that an EIR would likely be required by the DTSC at the end of the remediation process.
10. Mary Meyer indicated that a Stream Alteration Permit would likely be required if work activities within drainages would impact the stream banks. This includes driving vehicles across the streams.
11. Craig Cooper indicated that a draft gamma scanning work plan is currently being prepared by HGL. This work plan will include a section on regulatory compliance. Craig also stated that EPA plans to conduct biological monitoring throughout the project.
12. The participants discussed who would be the "action agency" if a FWS consultation was required. Craig Cooper indicated that EPA would be the action agency for the EPA scope of work (characterization).
13. The participants conducted a field visit of Area IV. During this field visit, the participants viewed several areas characterized by distinctly different vegetation. Areas containing the Santa Susana Tar Plant and the Braunton's Milk Vetch were visited.
14. After concluding the site visit, the meeting was reconvened in the SHEA conference room.
15. The meeting participants discussed whether a Section 7 Fish and Wildlife Service Consultation would be required. Jenny Marek and Mark Elvin (FWS) indicated that a Section 7 Consultation would be required if gamma scanning or soil sampling will be conducted in the designated critical habitat for the Braunton's Milk Vetch and/or in a manner that may adversely impact the milk vetch. Furthermore, EPA's field techniques would need to be employed to minimize disturbances within this critical habitat area and to any listed plant and animal species. For example, soil sampling within the critical habitat zone may need to be conducted using hand augering. Operation of gamma scanning devices would need to be conducted in a manner to limit impacts to less than significant.
16. A question was raised regarding whether a portion of the project could be initiated in areas outside the critical habitat area. FWS staff indicated that the field project could not likely be initiated prior to completing the Section 7 Consultation. It was determined that the "project" would include all of the gamma scanning and soil sampling work in Area IV.
17. Mark Elvin discussed the steps that would need to be completed as part of the Section 7 Consultation. These include: a) initiate an informal consultation (ongoing); b) define the project; c) FWS would provide a list of federally listed species; d) complete biological survey; e) complete a biological assessment; f) request a formal consultation; and g) FWS will complete a biological opinion. Mark Elvin and Jenny Marek agreed to provide an amended list of federally protected species that may be present at the SSFL. The FWS will provide a consultation that considers the entire study area.
18. Mark Elvin and Jenny Marek indicated that a spring biological survey would be required. However, it is likely that this could be built into the project work plans in order to initiate the project prior to completing this survey. To date, only a fall survey has been planned.
19. There was some discussion that a vernal pool survey may be required.
20. The need to consider bird nesting areas was addressed. Mitigation measures would need to be employed to protect nesting birds during the nesting season (approximately February 15 through August 15). Craig Cooper suggested that the project team should strive to complete Section 7 consultation in a timely manner so initial vegetation cutting could commence prior to bird nesting season.

21. Mary Meyer indicated that a formal consultation was not required by the California Department of Fish and Game (CDFG). However, the CDFG will work with the project team to establish practices that minimize disturbances to natural resources (e.g., the Santa Susana Tar Plant).
22. Craig Cooper asked whether the FWS would be willing to present the Section 7 Consultation process to the project stakeholders. Mark Elvin and Jenny Marek indicated that they would be willing to do this.

Action Items:

1. Revise Biological Survey Plan per EPA comments (done)
2. DOE/EPA to jointly request revised species list from FWS (done)
3. DOE commence biological survey field work (would like to start first week of October)
4. DOE to provide report (probably mid November)
5. Need to discuss fall survey results with group (November?)
6. Need to discuss with the community technical group (December?)
7. EPA starts the Biological Assessment process and finishes BA upon DOE issuance of the fall biological survey report
8. EPA submits BA to the FWS

SSFL AREA IV AND THE NORTHERN UNDEVELOPED LAND BIOLOGICAL SURVEY MEETING
MEETING MINUTES
November 4, 2009

Attendees:

Craig Cooper	USEPA – Region IX	cooper.craig@epa.gov	415-947-4148
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MEETING MINUTES:

Introductions

23. After introductions, Stephie Jennings provided a history of the property ownership, remediation activities, the Department of Energy's EIS process, the relationship between DOE and the Environmental Protection Agency (EPA), and CDM and SAIC's involvement.
24. Craig Cooper provided an overview of the overall regulatory framework at the SSFL. The DTSC is the lead regulatory agency at the site. EPA received a congressional mandate to conduct a radiological background study for soil and to characterize radiological contamination within Area IV. The congressional mandate dictates that this work be conducted in accordance with CERCLA. Craig also indicated that the radiological survey is funded under the American Recovery and Investment Act, therefore the study and reports must be completed by September 30, 2011. Further, the EPA was committed to complying with the Federal Endangered Species Act and the California Endangered Species Act.

Fall 2009 Bio Survey Results

25. Tom Mulroy of SAIC presented the findings of the Fall 2009 Surveys, which focused on identifying species detectable during the fall season. The results focused on the distribution of Braunton's Milk-vetch (BMV) and Santa Susana tarplant (SSTP) within SSFL Area IV and the undeveloped buffer area to the north. The maps were revised versions of similar maps previously distributed. The following is a summary of Tom's presentation:
    - The survey for BMV included walking transects 30 feet apart and counting the number of individuals within a quadrant. The number of individuals within a quadrant is represented on the map by a color-coded circle. The actual location of each BMV individual was not documented.
    - The occurrence of BMV is concentrated in the southwest portion of Area IV, primarily within the area that has been defined as critical habitat.
    - There are a couple of outliers as identified on the maps presented.
    - Within the critical habitat area, there is an area that was previously disturbed by Boeing that was used as a borrow site. The borrow site is more flat than the surrounding area and contains fewer occurrences of BMV than undisturbed habitat adjacent to the northwest.
    - Tom noted that after the fire on 2005, Boeing commissioned a BMV survey, but the results were not presented.
    - With regard to SSTP, each individual and/or cluster of individuals was GPS located.

- Approximately 650 gps points were taken, which represent approximately 1,000 SSTP individuals.
- 90% of SSTP are located on sandstone outcrops. However, at a remediated site near the sodium burn pit, some were found growing within cracks in concrete and asphalt.
- Locations of Southern California black walnut (SCBW) were also documented in the western portions of both Area IV and the western undeveloped buffer area, as well as the northern portion of the eastern buffer area. This is a CNPS list 4 species.
- SCBW were primary found within the bottoms of gullies or north facing slopes.
- Generally, the SCBW on-site were shrubby, tattered and multi-trunked due to prior fire damage.
- Follow-up surveys will be conducted in winter, spring and summer to document the presence/absence of other sensitive species, which are only apparent during specific times of year.
- Informally, SAIC concluded that the subject property does not contain riparian habitat suitable for least Bell's vireo (LBV). Additionally, conditions to support vernal pools were not observed. The only wetted area on-site was a storm water outfall.
- No known host plants for Quinoo checkerspot were observed. However, *Antirrhinum* multiflorum is abundant, and may serve as a host plant. A habitat suitability survey to confirm this finding will be prepared in January/February 2010.
- California Red-legged frog could be located outside of the study area within ponds on Areas II and III, and could therefore wander into Area IV if present within Areas II and III.
- Some puddling occurred after the rains within one of the formerly remediated sites.
- Dudleya observed needs to be verified as lance-leaf, and not one of the Threatened cymosa subspecies.
- The potential for California gnatcatcher is not known at this time. A habitat assessment will be conducted in January/February. Artemesia on-site appears to be successive to chaparral, but no legitimate coastal sage scrub was found within the survey area.

26. Next steps for SAIC include:
    - Additional botanical surveys during appropriate seasons.
    - Follow-up habitat suitability surveys to determine the need for protocol surveys.
    - Create a schedule for habitat assessments and work with USFWS to obtain approval to move forward by early December.
27. USFWS requested that SAIC move up their schedule of habitat assessments as early as feasible to assist with EPA's schedule.
28. DOE indicated the need to revise their work plan to include the habitat suitability assessments.

Scoping EPA's Biological Assessment

29. EPA, USFWS, HGL and Envicom Corporation participated in a discussion regarding the contents of the Biological Assessment (BA) to be submitted to USFWS to support their Biological Opinion regarding the proposed project.
30. The "Project" was defined by EPA to included: 1) a radiological study, 2) an independent review of DOEs activities and literature, 3) interviews of former employees and individuals with information about the site, and 4) a review of historic aerial photography.
31. Field work associated with the project will include:
    - Gamma scanning survey,
    - Surface soil sampling,
    - Sub-surface sampling from track or wheeled vehicles,
    - Magnetometer,
    - Groundwater testing,

- Surface water testing, and
- Stream water sampling and testing.

32. Four different Gamma scanning technologies will be used to try to scan 100% of the survey area. Gamma scanning technologies include:
    - Enhanced Radiological Scanning System (ERGS) – Four-wheel drive or track mounted. (Most sensitive scanner, requires flat terrain, and causes most disturbance)
    - Mule-Carried Scanning System – (Moderately sensitive scanner, able to operate in rough terrain, with potential for some disturbance)
    - Wheeled or "Buggy" Gamma Scanner – (Low to moderately sensitive scanner, able to operate in moderately rough terrain with little to no disturbance)
    - Hand-held scanner – (Least sensitive scanner, used in rough or sensitive terrain, with no disturbance)
33. EPA is looking to start testing the gamma scanning equipment in February/March 2010.
34. Water sampling will start during the winter months.
35. Gamma scanning will initiate in the Burro Flats area and then the remainder of Area IV prior to scanning the undeveloped buffer areas.
36. USFWS requested that drainage maps for the site be included in the BA.
37. The BA should differentiate between adverse affect and take.
38. If the project will result in no affect to federally protected species, then no formal consultation with USFWS is required.
39. If the project is not likely to adversely affect federally protected species and avoidance and mitigation will reduce impacts to a less than significant impact, informal consultation will only be required.
40. If the project is likely to affect or take federally protected species, formal consultation is required.
41. From the submittal of the BA, the USFWS has 135 days to issue their Biological Opinion.
42. Due to funding from the American Recovery and Reinvestment Act, USFWS will prioritize the review of the BA and preparation of the Biological Opinion.
43. Critical habitat areas carry the same level of protection as the actual plant species. The BA needs to determine the affects to critical habitat areas through the primary constituent elements.
44. Avoidance and Minimization Measures
    - Biologist required to be on-site during study activities.
    - Demarcating location of sensitive areas through roping other or other signage.
    - Selective mowing within BMV habitat to avoid individuals and densely populated areas.
    - Cut materials should be collected in piles and redistributed over the cut areas.
    - Minimal cutting of BMV within critical habitat will be permitted.
    - The ERGS could be used within the borrow site area of the critical habitat.
    - Create a map of the site with two categories which shows the portions of the site where the ERGS can go (fuzzy line), and areas where all other scanning applications can be used based on conditions encountered in the field.
    - USFWS will think about how to define a threshold between adverse impact and take related to cutting of BMV in critical habitat.
    - Crushing or laying down of plants is better than mowing.
    - Mowing, crushing or laying down of plants shall not remove plant roots.
    - Mule droppings shall be picked up and discarded offsite.
    - Proceed at the discretion of the on-site biologist
    - When proceeding within the nesting season:
        i. Establish buffers to work around nesting birds.

ii. Identify procedures for nesting bird surveys/monitoring during and outside of the nesting season.

45. Describe the cutting, mowing and scanning procedures.
46. The BA needs to speak to all of the species included on the USFWS species list. In order to proceed without waiting to study for species during the appropriate seasons, where conditions on the site support suitable habitat for a species, EPA has to agree to assume the species is present.

Schedule

47. Mary Aycock to send out Draft Gamma Scan Work Plan by November 20, 2009.
48. HGL and Envicom to attend meeting in the field with Mary Aycock and Gamma Scanning Team the week of November 16, 2009, with date to be determined.
49. Radiation stakeholders meeting December 8, 2009.
50. EPA to Draft BA for submittal to USFWS by December 1, 2009
51. One of the major concerns of the group was that the full scope of the project must be disclosed and analyzed to eliminate the concern of project segmentation.

Action Items:

9. EPA to provide USFWS with ownership of property to the west.
10. EPA to provide HGL and Envicom with watershed data for Area IV.
11. USFWS to provide BA format and guidelines.
12. HGL and Envicom to Draft BA
13. EPA submits BA to the FWS
14. SAIC to provide copies of Boeing's post 2005 fire survey report.

Appendix B

Fall Biological Survey Report for Santa Susana Field Laboratory Area IV and Northern Undeveloped Areas November 13, 2009

Appendix B

Fall Biological Survey Report for Santa Susana Field Laboratory Area IV and Northern Undeveloped Areas November 13, 2009

Fall Biological Survey Report for Santa Susana Field Laboratory Area IV and Northern Undeveloped Areas

November 13, 2009

Prepared for:

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and

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1 Introduction

Science Applications International Corporation (SAIC) scientists conducted rare plant surveys at the Santa Susana Field Laboratory (SSFL) Area IV and Northern Undeveloped Areas. The purpose of the surveys was to determine the presence of Braunton's milk-vetch (*Astragulus brauntonii*) and Santa Susana tar plant (*Deinandra minthornii*) and other special status plant species detectable at the time of the surveys within the Area IV and undeveloped areas. As part of this effort, a floristic inventory of the area was initiated, focusing on species identifiable at the time of the surveys, and a vegetation map was prepared. An initial wildlife assessment of the site was conducted, focusing on habitat and seasonally identifiable features. It is planned that these efforts will be supplemented by additional surveys to be conducted during the late fall/early winter, spring, and late spring early summer to identify species during the season(s) when they are evident.

2 Methods

Data Review. The California Native Diversity Database (CNDDB) was accessed to obtain the list and locational information of all species with special status that are known to occur in the SSFL area. Special status species include those listed as threatened or endangered under the Endangered Species Act (federally listed species), under the California Endangered Species Act (state listed species), and as other regionally declining, rare, or sensitive species tracked by CNDDB. Per Ventura County guidelines, a 9-USGS quadrangle area was reviewed to get a sense of the species that occupy the vicinity. The only known listed and sensitive species recorded in the CNDDB as occurring in the SSFL were plant species. Prior reports produced for the site owner were reviewed as they became available. These include MWH 2009, MWH, 1998 and a supplement produced in 2005.

Survey Method. Surveys were conducted on 5 October through 9 October and on 21 October and 22 October 2009. A supplemental visit was made on November 10, 2009 to field check the mapped vegetation categories within the previously developed portions of the site. The biological survey routes and coverage were determined with the aid of high resolution aerial photographs. Surveys were conducted by biologists walking parallel transects over a defined area where permitted by the habitat conditions (e.g., in grassland and low scrub) and terrain with some meandering back and forth over the centerline of each transect to more closely inspect features of interest. In general, transect spacing was about 15 meters (~49 feet). In steeper terrain and dense vegetation, especially in the northern undeveloped areas, additional departures from the centerline were required to negotiate the terrain and vegetation. Binoculars and spotting scopes were used from suitable vantage points to supplement the walking transects and to scan inaccessible portions of the site, such as steep rock outcrops. Photographs were taken to document habitat types, sensitive species, and important features.

Locations and boundaries of sensitive species occurrences and other noteworthy features were delineated using differential global positioning system (dGPS) equipment (Trimble® GeoXT™) capable of sub-meter accuracy (i.e., repeat measurements would fall less than 1 meter from the actual location).

Braunton's Milk-vetch Critical Habitat. In the critical habitat in the southwestern portion of Area IV, individuals of Braunton's milk-vetch were counted in circular plots with a 2 meter radius approximately 15 meters apart. If no Braunton's milk-vetch plants were observed in the sample plot, but Braunton's milk-vetch plant(s) were observed outside but within 7.5 meters from the center of the sampling plot (the midpoint between plots) the data for the sampling plot was recorded as a "+" instead of a zero. Sampling plot locations were determined with the aid of dGPS. Although the focus was delineating the areas occupied by Braunton's milk-vetch at different densities, the data were also used to approximate the population size within the survey area.

Santa Susana tarplant. For Santa Susana tarplant, the location of each occurrence was identified using dGPS. For clusters of plants occurring within a few meters of other plants, the location was recorded with dGPS and the number of plants were counted. For inaccessible areas the locations of the Santa Susana tarplants were recorded

using high-resolution aerial photography. A TruPulse® Laser Rangefinder was used in conjunction with the dGPS on the October 21 and 22 survey to document the locations of inaccessible plants.

Other plant species. The locations of California walnut trees *(Juglans californica)* were recorded with dGPS supplemented with use of high resolution aerial photographs or use of a TruPulse® Laser Rangefinder coupled with dGPS in relatively inaccessible areas. Locations of other biological features of interest were also recorded for future reference with dGPS or mapping on aerial photographs.

Vegetation Mapping. All surveys within the Area IV and northern undeveloped areas boundaries were conducted with the aid hard copies of high resolution aerial photos, which were used to supplement the dGPS in locating and delineating areas of interest. Maps of the vegetation within the survey area were created by delineating polygons of different vegetation types using the GIS and a digital version of the same high resolution aerial photographs as a base. Vegetation categories are consistent with *Preliminary Descriptions of Terrestrial Natural Communities of California* (Holland 1986), except where no suitable categories exist. For example, there is no suitable category for weed-dominated areas and so a category was developed to identify this type. This vegetation categorization and discussion, including information on herbaceous plant species, will be adjusted following future rare plant surveys and data analysis planned for spring 2010.

In addition to vegetation mapping, SAIC biologists identified and recorded a preliminary list of identifiable plant species observed during surveys. A list of these species is included in Attachment B. Scientific plant names follow *The Jepson Manual* (Hickman 1993). This preliminary list will be refined and augmented with the results of planned future seasonal surveys.

Wildlife Habitat Assessment. SAIC wildlife biologists conducted a site walkover October 5-8 focusing on characterizing habitat with the aid of high resolution aerial photographs. Incidental wildlife observations were recorded but additional seasonal surveys would be required for resident birds and seasonally active species including most amphibians and reptiles and sensitive invertebrates. Buildings and fenced sites were not entered as part of this survey.

3 Results

3.1 Sensitive Plant Species Surveys

Braunton's milk-vetch, Santa Susana tarplant, and California black walnut were identified from the site and their locations mapped. Figure 1 provides an overview of the locations of Braunton's milk-vetch and Santa Susana Tarplant for the entire study area. Braunton's milk-vetch are concentrated within and near the designated critical habitat in the southwestern part of the site. Santa Susana tarplants are closely associated with sandstone outcrops where they are typically found growing in fissures in the rock. Some occurrences are in cracks in pavement or remediated sites near sandstone outcrops populated by tarplants, which act as a seed source. Because of their occurrence in contrasting geologic/soil conditions, Braunton's milk-vetch and Santa Susana tarplants were found in proximity to one another only in a couple of exceptional occurrences.

Figure 2 shows an expanded view of the northwestern part of Area IV and the adjacent northern undeveloped area with locations of Braunton's milk-vetch and Santa Susana tarplant. Note that there are two occurrences of Braunton's milk-vetch shown in Figure 2 that are within the previously developed area north of the main population and the designated critical habitat. Each of these isolated occurrences is a single individual. Figure 3 shows an expanded view of the northern portion of Area IV and the adjacent northern undeveloped area. The close association of Santa Susana tarplant with sandstone outcrops is clearly visible in Figures 2 and 3.

Figure 4 shows the locations of California black walnut identified from the study area. California black walnuts were primarily associated with lower portions of north-facing slopes.


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AREA II
AREA II
AREA I
Undeveloped

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AREA IV
Underwood Road
SAIC
2

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Undeveloped
AREA IV
3

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Undeveloped
AREA II
AREA III
AREA IV
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Figure 5 shows an expanded view of the southwestern portion of Area IV including the boundaries of the designated Braunton's milk-vetch critical habitat. The colored circles indicate where the numbers of Braunton's milk-vetch are highest. The white line indicates the limit of Braunton's milk-vetch occurrences documented during surveys in spring 2006, conducted following the September 2005 Topanga fire that had burned through the site and stimulated the germination and establishment of the Braunton's milk-vetch. There is a close correspondence between the area occupied in 2006 and that occupied in 2009, with the occupied area slightly expanded to the north in 2009, compared to 2006.

Numbers of Braunton's milk-vetch. Although the surveys were conducted primarily to determine locations of Braunton's milk-vetch and where the highest concentrations of Braunton's milk-vetch individuals were located, the data were used to provide a rough estimate of Braunton's milk-vetch numbers. The area occupied by Braunton's milk-vetch was estimated based on the contiguous plus or positive counts for the sample plots in the sampling area. The areal extent of the main area of occurrence within the critical habitat includes some zero values which were surrounded by positive and plus counts. The areal extent of the main area of occurrence within the critical habitat was estimated to be 71,000 square meters, which included 299 sample plots. There were on average 3.27 plants per plot for the 299 plots. Each plot size is 12.57 square meters. The plant density was estimated by dividing the average count by the plot size resulting in 0.26 plants per square meter. The population was estimated by multiplying the plant density by the area of occurrence (71,000 square meters), resulting in an estimate of 18,500 individuals of Braunton's milk-vetch. There were six isolated Braunton's milk-vetch plants outside of the main area of occurrence in the critical habitat.

*Number of Santa Susana tarplant*s. There were 679 locations of Santa Susana tarplant recorded on the dGPS, many of which represented multiple plants. Based on preliminary analysis of the data recorded, the total number of Santa Susana tarplant in Area IV and the Northern Undeveloped Areas observed is roughly 850 individuals.

3.2 Vegetation

Figure 6 is a vegetation map of the study area. The map contains nine vegetation types, two with three subtypes each for a total of thirteen subtypes. These categories are described in detail below. Table 1 details the acreage of each type within the overall survey area at the proposed project site. Tables 2, 3, and 4 provide a breakdown of the acreages within Area IV, western portion of the Northern Undeveloped Area, and the eastern portion of the Northern Undeveloped area, respectively.

Topography at the Santa Susan Field Laboratory is variable. In the majority of Area IV, land is relatively flat with a few large sandstone outcrops in scattered locations, mainly in the northern part of the site. The southwestern portion of Area IV contains portions of two hills that continue of the site to the west and south. The northern undeveloped Area is distinguished by very steep north-facing slopes and massive sandstone outcrops.

Table 1. Areas of Vegetation Types Identified within the Overall Study Area

Type	*Acres*	*Hectares*
Northern Mixed Chaparral – Burned (C-B)	216.6	87.7
Northern Mixed Chaparral – Sandstone Outcrops (C-S)	40.5	16.4
Northern Mixed Chaparral – Unburned (C-UB)	8.8	3.6
Formerly Disturbed – Mulefat – dominated (MF)	3.0	1.2
Formerly Disturbed – Revegetated (RV)	13.5	5.5
Formerly Disturbed – Weed-Dominated (WD)	51.8	20.9
Coast Live Oak Woodland/ Savanna (CLO)	62.9	25.5
Unvegetated Disturbed/Developed (UDD)	46.2	18.7
California Walnut Woodland (CWW)	8.7	3.5
Non-native Annual Grassland (AG)	8.6	3.5
Steep Dipslope Grassland (SDG)	7.7	3.1
Venturan Coastal Scrub (VCS)	3.1	1.3
Disturbed Riparian (DR)	0.2	0.1
Total	**471.6**	**191.0**

Table 2. Areas of Vegetation Types Identified within Area IV

Type	*Acres*	*Hectares*
Northern Mixed Chaparral – Burned (C-B)	97.3	39.4
Northern Mixed Chaparral – Sandstone Outcrops (C-S)	10.9	4.4
Northern Mixed Chaparral – Unburned (C-UB)	5.0	2.0
Formerly Disturbed – Mulefat-dominated (MF)	3.0	1.2
Formerly Disturbed – Revegetated (RV)	12.6	5.1
Formerly Disturbed – Weed-dominated (WD)	52.6	21.3
California Live Oak Woodland and Savanna (CLO)	50.6	20.5
Unvegetated Disturbed/Developed (UDD)	43.9	17.8
California Walnut Woodland (CWW)	7.3	3.0
Non-native Annual Grassland (AG)	3.6	1.4
Venturan Coastal Scrub	3.1	1.3
Total	**289.9**	**117.4**

Table 3. Areas of Vegetation Types Identified within the western portion of the Northern Undeveloped Area

Type	*Acres*	*Hectares*
Northern Mixed Chaparral – Burned (C-B)	53.2	21.5
Northern Mixed Chaparral –Sandstone Outcrop (C-S)	13.2	5.3
Northern Mixed Chaparral –Unburned (C-UB)	2.5	1.0
Coast Live Oak Woodland and Savanna (CLO)	4.9	2.0
Non-native Annual Grassland (AG)	3.3	1.3
Unvegetated Disturbed/Developed (UDD)	1.5	0.6
California Walnut Woodland (CWW)	0.4	0.2
Steep Dipslope Grassland (SDG)	0.4	0.2
Total	**79.4**	**32.1**

Table 4. Areas of Vegetation Types Identified within the eastern portion of the Northern Undeveloped Area

Type	*Acres*	*Hectares*
Northern Mixed Chaparral – Burned (C-B)	66.2	26.8
Northern Mixed Chaparral – Sandstone Outcrops (C-S)	16.4	6.6
Northern Mixed Chaparral – Unburned (C-UB)	1.3	0.5
Coast Live oak Woodland and Savanna (CLO)	7.4	3.0
Steep Dipslope Grassland (SDG)	7.3	3.0
Non-native Grassland (AG)	1.8	0.7
California Walnut Woodland (CWW)	1.0	0.4
Unvegetated Disturbed/Developed (UDD)	0.9	0.4
Disturbed Riparian ((DR)	0.2	0.1
Total	**102.5**	**41.5**

DRAFT
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DRAFT
Undeveloped
AREA II
AREA II
AREA III
Undeveloped
6

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3.2.1 Description of Vegetation Types Identified on Area IV and the Northern Undeveloped areas.

3.2.1.1 Steep Dipslope Grassland

Steep dipslope grassland occurs on steep north-facing slopes in the northern undeveloped area. In particular, these sites have sandstone bedrock which follows the slope angle over lain by a thin (one to several inches) layer of soil. This type is dominated by non-native annual grasses and herbs including wild oats (*Avena* sp.), ripgut brome (*Bromus diandrus*), and tocalote (*Centaurea melitensis*). Sizable areas that support annual and perennial native herbs and wildflowers (e.g. Bigelow's spike-moss [*Selaginella bigelovii],* shooting stars [*Dodecatheon clevelandii*] wild onion [*Allium* sp.] common goldenstar [*Bloomeria crocea*.], blue dicks [*Dichelostemma pulchellum*], chalk dudleya [*Dudleya pulverulenta*] and mariposa lily [*Calochortus* spp.]) are also present within this type.

3.2.1.2 Northern Mixed Chaparral

Northern mixed chaparral is the most abundant habitat type in areas that have not been mechanically disturbed in the past. It generally occurs on steeply sloping hillsides. It is particularly well-developed in the northern undeveloped area and two hills in the western portion of Area IV. Due to different appearance and functionality of the habitat, three subtypes are mapped and described below: burned, unburned, and sandstone outcrops.

Burned Northern Mixed Chaparral

Large portions of the Field Laboratory site burned in 2005. The fire burned different portions of the site with variable intensity, resulting in a mosaic of degree of burning, with some areas not burned at all (see below). Burned northern mixed chaparral occupies one hill in the western portion of Area IV and most of the northern undeveloped area. Dominant species vary in different portions of the site, but most sites include resprouting and seedlings of woody chaparral species such as chamise (*Adenostoma fasciculatum*), laurel sumac (*Malosma laurina*), sugar bush (*Rhus ovata*), and ceanothus (*Ceanothus crassifolius, oliganthus*, and *megacarpus*). Dense stands of shrubs, subshrubs and perennials have established in some areas including poison oak (*Toxicodendron diversilobum*) coastal deerweed (*Lotus scoparius*), thickleaf yerba santa (*Eriodictyon crassifolium*), and sticky snapdragon (*Antirrhinum multiflorum*). Species typical of sage scrub including black sage (*Salvia mellifera*), purple sage (*Salvia leucophylla*), and coastal sagebrush (*Artemisia californica*) are abundant in places among the resprouting chaparral dominants.

Braunton's milkvetch (*Astragalus brauntonii*), discussed above, is one of the dominant plants in localized portions of burned northern mixed chaparral.

Unburned Northern Mixed Chaparral

Unburned chaparral occurs on the hilltop at the northwestern corner of Area IV. Vegetation on this hilltop is dominated by mature chaparral species including chamise, Our Lord's Candle (*Yucca whipplei*), holly leaf redberry (*Rhamnus ilicifolia*), hoary leaf ceanothus (*Ceanothus crassifolius*), and bigberry manzanita (*Arctostaphylos glauca*). Shrubs are about four feet in height and, in most places, the vegetation is thick and impenetrable. Occasional disturbed paths and clearings in the chaparral support stands of non-native grasses and forbs including wild oats, ripgut brome, Mediterranean mustard (*Hirschfeldia incana*), and tocalote.

In addition to the hilltop described above, small pockets of Northern Mixed Chaparral that were missed by the fire due to protection by rock outcrops or chance are included in this category. These areas support tall chaparral shrubs, similar in species composition as described for burned Northern Mixed Chaparral. Although uncommon, where unburned areas occur along ridgelines, they are dominated by chamise and

species of manzanita (*Arctostaphylos* sp). In most cases, unburned areas are restricted to low lying swales dominated by Ceanothus and laurel sumac.

Sandstone Outcrops Northern Mixed Chaparral

Very large sandstone outcrops dominate portions of the habitat in the survey area. Some outcrops are at or near the soil level and others are 40 or more feet above the soil level. Due to size and frequency of the outcrops, the habitat function of the chaparral is very different in these areas. Sandstone outcrops Northern Mixed Chaparral is located in the northern undeveloped areas where there are large outcrops that dominate 80 precent or more of the ground surface. In general, these occur as wide, linear features, as the outcrops form in natural rows. Chaparral, similar to as described above, occurs around the edges and the interspaces between outcrops. However, the outcrops support limited cover by shrubby species. Plants frequently observed on outcrops include the Santa Susana tarplant (*Deinandra minthornii*), listed under the California Endangered Species Act (CESA) as Rare and discussed above.

3.2.1.3 Venturan Coastal Scrub

Venturan Coastal Scrub occurs around the base of a hill at the northwest corner of Area IV. This location is transitional between unburned Northern Mixed Chaparral and California Walnut Woodland. Dominant plant species in this vegetation type at the Field Laboratory include giant wild rye (*Leymus condensatus*), black sage (*Salvia mellifera*), and purple sage (*Salvia leucophylla*).

3.2.1.4 Coast Live Oak Woodland and Savanna

Coast live oak woodland is dominated by coast live oak trees (*Quercus agrifolia*) with a variable understory, depending on surrounding habitat. In the northern part of Area IV, it generally occurs in with an understory of annual grasses and forbs such as ripgut brome, wild oats, and tocalote with scattered large sandstone outcrops. In the northern undeveloped area, it occurs at margins with Northern Mixed Chaparral and chaparral species are intermixed.

3.2.1.5 California Walnut Woodland

California walnut woodland is defined by the presence of California black walnut trees (*Juglans californica*). In Area IV, California Walnut Woodland occurs in at the base of two hills at the western edge. They are on north or east-facing slopes in the transition between chaparral / coastal scrub and grassland. In these areas, coast live oaks are also dominant and the understory is characterized by shrubs and subshrubs, including poison oak and purple sage.

3.2.1.6 Formerly Disturbed Sites

Formerly disturbed sites support a variety of native and non-native plants. For that reason, this category is divided into three subcatgories: mulefat, weed-dominated, and revegetated. These subcategories are described below.

Mulefat-Dominated Formerly Disturbed Sites

Mulefat-dominated formerly disturbed sites are dominated heavily by mulefat (*Baccharis salicifolia*), a species chiefly known to occur along sandy floodplains of streamcourses. Understory is minimal and this habitat may be transitional to other naturally-occurring habitats, such as chaparral. Its dominance on the some of the sandy previously disturbed habitats may be related to the coincidence of freshly disturbed sandy soil following restoration of these sites and ample rainfall coinciding with the release of the short-lived wind dispersed seeds during the fall. Mulefat-dominated areas occur in two locations in the northern portion of Area IV.

Weed-dominated Formerly Disturbed Sites

Weed-dominated formerly disturbed sites support extensive stands of invasive non-native species such as Italian thistle (*Carduus pycnocephalus*), milk thistle (*Silybum marianum*), Russian thistle (*Salsola tragus*) and Mediterranean mustard. This category only applies to large scale weed infestations. Localized infestations of non-native invasive species are identified separately.

Revegetated Formerly Disturbed Sites

Revegetated formerly disturbed sites occur in various locations where buildings and pads have been removed and plants with a mix of native species. These areas are typically somewhat open shrub-dominated areas with annual grasses in the space between shrubs. Many of these sites support stands of mule fat or coyote brush (*Baccharis pilularis*). Coast goldenbush (*Isocoma menziesii*), coastal bush sunflower (*Encelia californica*), and deerweed (*Lotus scoparius*) may be present or prevalent on these sites. On a few sites good stands of native perennial bunchgrass (*Nassella* sp.) are present.

3.2.1.7 Unvegetated Disturbed/ Developed

This mapping category is applied to areas with existing pads, buildings, or roads. Small dirt tracks (e.g. "two tracks") are not included in this category, but rather that of the surrounding vegetation. Most areas in this designation are located in Area IV.

3.2.1.8 Non-native Grassland

This mapping category is applied to areas dominated by annual species, particularly annual grasses such as rip-gut brome and wild oats. Cover is typically dense and soils are relatively deep. This type occurs in scattered locations in Area IV and the northern undeveloped area.

3.2.1.9 Disturbed Riparian

Disturbed riparian habitat is present along one drainage feature at the eastern end of the northern undeveloped area. It is characterized by scattered riparian trees, such as willows (*Salix* spp.) and one western sycamore (*Platanus racemosa*). Other trees that are that can occur in riparian habitats and uplands are present as well including coast live oak and California bay laurel (*Umbellularia californica*). The channel bottom is bedrock and, at the time of the October 2009 field visit following heavy rainfall in the preceding week, contained some pools. Plants typical of shady slopes were noted in nearby including California wild rose (*Rosa californica*), California blackberry (*Rubus ursinus*), and coastal wood fern (*Dryopteris arguta*).

3.3 Wildlife

The fall surveys focused on habitat for native wildlife species. Coast live oak (*Quercus agrifolia*) communities, especially those having connectivity to other undisturbed and/or healthy habitats, even if offsite, are considered most valuable to wildlife. Oak woodlands are thought to have the richest wildlife species abundance of any habitat in California and support up to 331 species to varying degrees (Verner 1980; Barrett 1980; Block and Morrison 1998 - all cited in PIF 2002). The high wildlife value of oaks is due both to acorn production and the cavity-nesting sites afforded by large oak trees in the landscape. Birds utilize all canopy levels for nest placement in association with oaks from the highest branches to mid-canopy cavities to the grasses on the ground underneath. Bird species that utilize oak woodlands include jays, woodpeckers, nuthatches, oak titmouse, and wintering ruby-crowned kinglets and yellow-rumped warbler (PIF 2002; SAIC personal observations).

Riparian areas, normally providing very important wildlife habitat, are nearly absent on the site due to the site's location at the top of the watershed. There are very limited areas occupied by willows where

intermittent runoff concentrates, though these areas are too small to support an abundance or variety of species. During the survey, SAIC biologists did not observe avian species normally associated with riparian zones within these small areas – and these areas were far too removed from permanent water and undeveloped to support sensitive amphibian species. Mule fat, normally a plant characteristic of sandy stream channels, is prevalent on the sandy soils in many formerly disturbed sites and is frequented by common songbirds.

Dense stands of mixed chaparral were also considered high value for their cover and nesting potential for bird species. Birds that use chaparral include spotted towhee, California thrasher, gray vireo, wrentit, blue-gray gnatcatcher, California towhee, lesser goldfinch, western scrub jay, and California quail (PIF 2004; SAIC personal observations).

Species that nest and roost within sandstone rock outcrops include white-throated swift, barn owl, cliff and barn swallows, canyon wren, raven, turkey vulture, golden eagle, honey bees, woodrat, and bats. Some of the oak woodland species utilize rock cavities to cache acorns and other food items.

Formerly developed areas and areas occupied by existing structures and pavement are for the most part sparsely vegetated and exhibit limited value for most wildlife species due to the sparseness or absence of plant cover (for food, nesting, and cover). These areas do support common songbirds such as mourning dove, house finch, and American crow, which forage on the bare ground for seeds and invertebrates. Stands of flowering tree tobacco support Anna's hummingbirds and areas that are currently revegetating provide foraging opportunities for flocks of migratory and wintering songbirds. Additionally, overhead power and communication lines stretching from existing structures are frequent perching sites for avian species such as western kingbird, mourning dove, western scrub jay, black phoebe, and western meadowlark. Existing buildings also provide space for roosting or nesting barn and cliff swallows, owls, and bats.

4 Summary and Conclusions

These surveys documents the locations of Braunton's milk-vetch and Santa Susana tarplant and relatively extensive areas of native vegetation and wildlife habitat, especially on the Northern Undeveloped Areas and the western and southwestern portions of the site. Most of the woody vegetation onsite is recovering from a wildland fire that burned most of the site in September of 2005. The fire skipped over localized areas including patches of oaks and chaparral in the northern undeveloped areas and chaparral in the western corner of the site. Much of the more or less flat previously developed portion of the site is in some stage of vegetation recovery following removal of structures and remediation of the individual building sites at various times over the years. The vegetative cover of these areas varies dramatically from site to site related to a variety of factors including the year and seasonal timing of remediation, type of restoration activities, and characteristics of adjacent sites. Vegetative cover of these sites varies considerably from site to site with some sites supporting high abundance of invasive exotic species and other sites supporting a prevalence of native species.

5 References

Hickman, J.C. (ed.). 1993. *The Jepson Manual: Higher Plants of California*. Berkeley: University of California Press.

Holland, Robert F. 1986. Preliminar Descriptions of the Terrestrial Natural Communities of California. State of California Department of Fish and Game.

USDA, NRCS. 2009. The PLANTS Database (http://plants.usda.gov). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

Attachment A

Representative Photographs

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Steep Dipslope Grassland. This steep slope has a thin layer of soil over standstone bedrock. This site supports several annual grass species as well as spike-moss. Many areas mapped as Steep Dipslope Grassland support a variety of bulbs and other wildflowers in the spring. 5 October 2009.

Burned Northern Mixed Chaparral. Many resprouting mature chaparral shrubs are visible in this photograph including chamise and laurel sumac. Perennials and subshrubs that are "fire followers" are also apparent, including sticky snapdragon. 6 October 2009.

Burned Northern Mixed Chaparral. This photograph is taken in the western part of Area IV on a hilltop. Dominant plants in this view are black sage and chamise. 21 October 2009.

Northern Mixed Chaparral Sandstone Outcrops. Sandstone out crops are common in the Northern Mixed Chaparral, especially in the northern undeveloped area. Most of the habitat is relatively unvegetated. The Santa Susana tarplant is commonly found in this habitat. 6 October 2009.

Venturan Coastal Scrub. Venturan Coastal Scrub occurs near the base of a slope in the western part of Area VI. Common species in this habitat include black sage, purple sage, and giant wild rye. 21 October 2009.

Coast live Oak Woodland/ Savanna. Coast Live Oak Woodland and Savnana occur in portions of Area VI. Canopy cover is highly variable and many areas have a grassy understory. 6 October 2009.

California Walnut Woodland and Weed-Dominated Formerly Disturbed Areas. This photograph was taken below a hill in the western part of Area IV. It shows Weed-Dominated Formerly Disturbed Areas on the left and California Walnut Woodland on the right. Invasive exotic species on the left include Mediterranean mustard and Italian thistle. The California walnut woodland consists of resprouting walnut trees and coast live oaks in a matrix of snowberry and poison oak.

Need Photo

Mulefat-dominated formerly disturbed sites

Non-native Grassland and Coast Live Oak Woodland/ Savana. The photographs was taken in the eastern part of the northern undeveloped area and shows Non-native Grassland on the right and Coast Live Oak Woodland and Savana on the left. The grassland is dominated by species of annual grasses that were senescent when the photograph was taken. 6 October 2009.

Disturbed Riparian. This type is present along a drainage feature in the eastern part of the northern undeveloped area. Coast live oaks and willows are present along a bedrock-lined channel. 20 October 2009.

Attachment B

Plant Species Observed During Vegetation Surveys

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Plant Species Identified During Surveys

Scientific Name[1]	*Common Name*[2]	*Native (Y/N)*
Anacardiaceae		
Malosma laurina	Laurel sumac	Y
Toxicodendron diversilobum	Poison oak	Y
Apiaceae		
Lomatium sp.	Desert parsley	Y
Asclepiadaceae		
Asclepias fascicularis	Narrow-leaf milkweed	Y
Asteraceae		
Acourtia microcephala	Sacapellote	Y
Artemisia californica	California sagebrush	Y
Baccharis pilularis	Coyote Brush	Y
Baccharis salicifolia	Mulefat	Y
Brickellia sp.	Brickellbush	Y
Centaurea calcitrapa	Purple starthistle	N
Centaurea melitensis	Tocalote	N
Centaurea solstitialis	Yellow starthistle	N
Carduus pycnocephala	Italian thistle	N
Deinandra minthornii	Santa Susana tarplant	Y
Encelia californica	California brittlebush	Y
Eriophyllum confertiflorum	Golden yarrow	Y
Lactuca sp.	Lettuce	N
Lessingia filaginifolia	California-aster	Y
Stephanomeria sp.	Wire lettuce	Y
Silybum marianum	Milk thistle	N
Venegasia carpesioides	Canyon sunflower	Y
Boraginaceae		
Amsinckia sp.	Fiddleneck	Y
Brassicaceae		
Hirschfeldia incana	Mediterranean mustard	N
Raphanus sativus	Wild radish	N
Caprifoliaceae		
Sambucus mexicana	Elderberry	Y
Symphoricarpos mollis	Snowberry	Y
Caryophyllaceae		
Silene sp.	Catchfly	N/A
Cistaceae		
Helianthemum scoparium	Rush rose	Y
Crassulaceae		
Dudleya lanceolata	Lanceleaf liveforever	Y
Dudleya puverulenta	Chalk dudleya	Y
Ericaceae		
Arctostaphylos glauca	Bigberry manzanita	Y
Euphorbiaceae		
Eremocarpus setigerus	Turkey mullein	Y
Fabaceae		
Astragalus brauntonii	Braunton's milk vetch	Y
Lotus scoparius	Coastal deer weed	Y
Lotus sp.	Lotus	Y
Lupinus hirsutissimus	Stinging lupine	Y
Fagaceae		
Quercus agrifolia	Coast live oak	Y
Geraniaceae		
Erodium sp.	Stork's bill	N
Hydrophyllaceae		
*Emmenanthe penduliflora**	Whispering bells	Y
Eriodictyon crassifolium	Thickleaf yerba santa	Y
Phacelia ramosissima	Branching phacelia	Y
Juglandaceae		
Juglans californica	California black walnut	Y
Lamiaceae		
Marrubium vulgare	Horehound	N

Plant Species Identified During Surveys

Scientific Name[1]	*Common Name*[2]	*Native (Y/N)*
Salvia columbariae	Chia	Y
Salvia leucophylla	Purple sage	Y
Salvia mellifera	Black sage	Y
Trichostemma lanata	Wooly blue curls	Y
Lauraceae		
Umbellularia californica	California bay laurel	Y
Liliaceae		
Allium sp.*	Wild onion	Y
*Bloomeria crocea**	Golden stars	Y
*Dichelostemma pulchellum**	Blue dicks	Y
Calochortus sp.*	Mariposa lily	
Yucca whipplei	Our Lord's candle	Y
Malvaceae		
Malacothamnus fasciculatus	Bush mallow	Y
Onagraceae		
Clarkia sp.*	Farewell to spring	Y
Epilobium canum	California fuchsia	Y
Paeoniaceae		
Paeonia californica	Peony	Y
Plantanaceae		
Platanus racemosa	California sycamore	Y
Poaceae		
Avena sp.	Wild oats	N
Bromus diandrus	Ripgut brome	N
Bromus hordeaceus	Soft chess	N
Bromus madritensis ssp. *rubens*	Red brome	N
Melica imperfecta	Coast Range melic	Y
Leymus condensatus	Giant wild rye	Y
Pennisetum setaceum	Fountain grass	N
Polygonaceae		
Eriogonum elongatum	Longstem buckwheat	Y
Primulaceae		
Dodecatheon clevelandii	Shooting star	Y
Rhamnaceae		
Ceanothus crassifolius	Hoary leaf ceanothus	Y
Ceanothus cuneatus	Buckbrush	Y
Rhamnus ilicifolia	Holly-leaf redberry	Y
Rosaceae		
Adenostoma fasciculatum	Chamise	Y
Cercocarpus betuloides	Mountain mahogany	Y
Heteromeles arbutifolia	Toyon	Y
Prunus ilicifolia	Holly-leaved cherry	Y
Rosa californica	California wild rose	Y
Salicaceae		
Salix spp.	Willow	Y
Simaroubaceae		
Ailanthus altissima	Tree of heaven	N
Scrophulariaceae		
Antirrhinum couterianum	Coulter's snapdragon	
Mimulus aurantiacus	Bush monkey flower	Y
Solanaceae		
Nicotiana glauca	Tree tobacco	N
Zygophyllaceae		
Tribulus terrestris	Puncture vine	N

Notes:

1. Scientific plant names follow the Jespon Mnaual (Hickman 1993)
2. Common plant names follow the Jepson manual or the Plants database (USDA 2009)
3. Plants designated with a * are preliminary identifications based on dried portions visible in the fall and need to be verified in the spring

Partners in Flight (PIF). 2002. The Oak Woodland Bird Conservation Plan: A Strategy for Protecting and Managing Oak Woodland Habitats and Associated Birds in California. Version 2.0. Point Reyes Bird Observatory (PRBO), Stinson Beach, CA. Located on Web at http://www.prbo.org/calpif/plans.html.

_____. 2004. The Coastal Scrub and Chaparral Bird Conservation Plan: A Strategy for Protecting and Managing Coastal Scrub and Chaparral Habitats and Associated Birds in California. Version 2.0. PRBO Conservation Science, Stinson Beach, CA. Located on Web at http://www.prbo.org/calpif/plans.html.