



Environmental Functional Area

Environmental Stewardship Planning & Monitoring

LLNL-TR-648102

Lawrence Livermore National Laboratory

Experimental Test Site, Site 300

Biological Review

January 1, 2009 through December 31, 2012

January 2014

Lisa Paterson

Jim Woollett

**This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore
National Laboratory under Contract DE-AC52-07NA27344.**

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1.0 Introduction

The Lawrence Livermore National Laboratory's (LLNL's) Environmental Restoration Department (ERD) is required to conduct an ecological review at least every five years to ensure that biological and contaminant conditions in areas undergoing remediation have not changed such that existing conditions pose an ecological hazard (Dibley et al. 2009a). This biological review is being prepared by the Natural Resources Team within LLNL's Environmental Functional Area (EFA) to support the 2013 five-year ecological review.

The previous biological review was conducted on data collected between 1999 and 2008. These were the years since ERD's Site 300 Site-Wide Feasibility Study was completed (Ferry et al. 1999). The 1999 - 2008 biological review was conducted by the LLNL Natural Resources Management Team, and an unpublished report was prepared (Paterson et al. 2009). The results of the 1999 - 2008 biological review were used in the 2008 five-year ecological review, reported on in the 2008 Annual Compliance Monitoring Report (Dibley et al. 2009b), and used in the development of the 2009 Compliance Monitoring Plan/Contingency Plan (CMP/CP) (Dibley et al. 2009a). The current biological review includes only four years of data to ensure that the end of the biological review period coincides with the end of the contaminant review period used in the 2013 five-year ecological review. A limited number of incidental observations made in 2013 are included in this biological review to aid in the interpretation of the biological data.

LLNL's Experimental Test Site, Site 300, in Alameda and San Joaquin Counties, is located approximately 15 miles east of the City of Livermore on the eastern slope of the Coast Ranges and has an area of 28.3 km² (10.9 mi²). Only 5% of the approximately 7000-acre site has been developed for use as high-explosive test facilities and administrative buildings (DOE/NNSA 2005).

The effectiveness of ERD's remediation activities at Site 300 is evaluated in the following eight Operable Units (OUs), which are covered by the 2009 CMP/CP (**Figure 1**):

- General Services Area (GSA) (OU 1) including the Central and Eastern GSA
- Building 834 (OU 2)
- Pit 6 Landfill (OU 3)
- High Explosives (HE) Process Area (OU 4) including the Building 829-HE Burn Pit
- Building 850/Pit 7 Complex (OU 5)
- Building 854 (OU 6)
- Building 832 Canyon (OU 7)
- Site-wide (OU 8) including Buildings 801, 833, 845, and 851 and the Pit 2, 8, 9 Landfills

The Building 812 OU (OU 9), and the Building 865 area (within OU 8) are currently undergoing characterization by ERD, and are not covered by the 2009 CMP/CP. Once characterization is complete and a final remediation strategy selected, these areas will be incorporated into the CMP/CP, and subject to the five-year ecological reviews. However, for completeness, relevant biological data for these areas

are included in this biological review, and identified as occurring in areas not covered by the 2009 CMP/CP.

To evaluate potential changes in biological conditions in OUs 1 through 8, available biological survey data for Site 300 obtained over the biological evaluation period (January 1, 2009 to December 31, 2012) were reviewed. This included:

1. Evaluating available biological survey data (pre-construction survey data, biological monitoring data, surveys conducted for various regulatory reports),
2. Evaluating available biological survey data for changes in the presence and abundance of species over time, and
3. Determining the locations and OUs in which newly identified species are likely to reside, as well as those species in which changes in presence or abundance has been observed.

The biological evaluation focused on special-status species, defined as:

- Plant or animal species classified as candidate, threatened or endangered under the federal or California Endangered Species Acts (ESA);
- California Fully Protected Species;
- U.S. Fish and Wildlife Service (USFWS) Bird Species of Conservation Concern (USFWS 2008);
- California Species of Special Concern (CDFW 2013); and
- Rare plants with a California Rare Plant Rank (CRPR) of 1 or 2 (CNPS 2013).

Five species that are listed under the federal ESA are known to occur at Site 300—the California tiger salamander (*Ambystoma californiense*), California red-legged frog (*Rana draytonii*), Alameda whipsnake (*Masticophis lateralis euryxanthus*), valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), and the large-flowered fiddleneck (*Amsinckia grandiflora*). The golden eagle (*Aquila chrysaetos*) is federally protected under the Bald and Golden Eagle Protection Act. Although there are no recorded observations of the federally endangered San Joaquin kit fox (*Vulpes macrotis mutica*) at Site 300, this species is known to have historically occurred in the adjacent Carnegie and Tracy Hills areas (USFWS 1998). Because of the proximity of known observations of San Joaquin kit fox to Site 300, it is necessary to consider potential impacts to San Joaquin kit fox during activities at Site 300. California threatened Swainson's Hawks (*Buteo swainsoni*) and California Endangered willow flycatchers (*Empidonax traillii*) have also been observed at Site 300. The willow flycatcher is not known to nest at Site 300. Current and historic observations of the five listed species, a California Fully Protected Species (white-tailed kite [*Elanus leucurus*]), and two avian California Species of Special Concern (western burrowing owl [*Athene cunicularia*] and tricolored blackbird [*Agelaius tricolor*]) at Site 300 are shown in **Figures 2 and 3**.

A complete list of special-status vertebrate and invertebrate species known to occur at Site 300, including state and federally listed species and other species of special concern are listed in **Table 1**. The USFWS list of Bird Species of Conservation Concern was first published in 2008. This category of special-status species was not included in the 1999 – 2008 biological review. Bird Species of Conservation

Concern includes species that without conservation actions are likely to become candidates for listing under the federal ESA. Ten Site 300 species are considered federal Bird Species of Conservation Concern (**Table 1**); five of these ten species are not included in other special-status categories (California Species of Special Concern, California or federal threatened or endangered, or California Fully Protected Species). California Department of Fish and Wildlife Taxa to Watch are also included in **Table 1**. The Taxa to Watch list includes avian species that did not meet the criteria for inclusion on the current list of California Bird Species of Special Concern (Shuford et al. 2008) but were included on previous (1) California Bird Species of Special Concern lists (Remsen 1978 and CDFG 1992), (2) were previously state or federal threaten or endangered species that have been delisted, or (3) species that are California Fully Protected Species. These species are not considered special-status species; instead this list is considered a watch list of uncommon species. Six species are known to occur at Site 300 that are considered California Department of Fish and Wildlife Taxa to Watch and do not have any other regulatory status (**Table 1**).

Including the federally endangered large-flowered fiddleneck, five rare plant species and three uncommon plant species are known to occur at Site 300. Four of these rare plant species—the large-flowered fiddleneck, the big tarplant (*Blepharizonia plumosa*), the round-leaved filaree (*California macrophylla*), and the diamond-petaled California poppy (*Eschscholzia rhombipetala*)—were known to occur at Site 300 during the 1999 - 2008 review period. A fifth species, adobe navarretia (*Navarretia nigelliformis* ssp. *radians*) was found to occur at Site 300 during the current biological review period. All five species have a CRPR of 1B (CNPS 2013). These species are considered rare and endangered throughout their range. The location of these five rare plant species at Site 300 is shown in **Figure 4**.

The three uncommon plant species, California androsace (*Androsace elongata* subsp. *acuta*), stinkbells (*Fritillaria agrestis*), and hogwallow starfish (*Hesperervax caulescens*), occur in isolated locations at Site 300. These plants have a CRPR of 4 (CNPS 2013). CRPR 4 includes plants of limited distribution that are not considered rare or endangered. The gypsum-loving larkspur (*Delphinium gypsophilum* ssp. *gypsophilum*), a spring flowering perennial that also occurs in isolated areas throughout Site 300, was previously included on List 4. In 2012, the gypsum-loving larkspur was removed from List 4 because it is now considered too common for inclusion on this list (CNPS 2013).

Changes in the presence of special-status species were evaluated. If sufficient data were available, potential changes in the relative abundance were analyzed. This analysis included both special-status species and more common species when information was available. The analysis focused on those special-status species that are expected to occur or breed in OUs 1 through 8.

Habitats and species that were present or species expected to occur or breed (e.g., suitable habitat present) in OUs 1 through 8 at the completion of the 2008 Five-Year Ecological Review were considered the baseline. Data used to develop this baseline came from the 1994 Site-Wide Remedial Investigation (SWRI) (Webster-Scholten et al. 1994), the 1999 Site-Wide Feasibility Study (SWFS) (Ferry et al. 1999), studies conducted in 2002 for the Final Site-Wide Environmental Impact Statement (SWEIS) (DOE/NNSA 2005), as well as an internal review of biological data collected from 1999 through 2008 conducted in

support of the 2008 Five-Year Ecological Review (Paterson et al. 2009). The 2008 biological review included an evaluation of data presented in the above-mentioned documents, as well as data and observations collected by LLNL wildlife biologists that had not yet been reported.

The most recent site-wide inventories of special-status species at Site 300 were conducted in preparation for the 2005 SWEIS (DOE/NNSA 2005) in 1997 through 2002. Since 2005, monitoring surveys and project specific surveys have been conducted, but no site-wide inventories have been conducted to determine the distribution or abundance of rare species throughout Site 300. A list of vertebrate species known to occur at Site 300 was developed based on the inventories completed for the 2005 SWEIS. This list is published in the Site Annual Environmental Reports (LLNL 2010a, 2011a, 2012 and 2013). Incidental observations of newly observed species have been periodically added to this list. The status and taxonomy of species included on the list was reviewed in January of 2013. **Table 1** shows all special-status species included in the Site 300 wildlife species list published in the 2012 Site Annual Environmental Report (LLNL 2013).

Routine resource monitoring as reported in the Site Annual Environmental Reports (LLNL 2010a, 2011a, 2012 and 2013), rare plant management and monitoring reports (Carlsen et al. 2012; Carlsen and Paterson 2013), and surveys conducted for ground-disturbing programmatic activities are described in this biological review. In addition, significant taxonomic and regulatory changes are summarized.

General information on the distribution, abundance, habitat requirements of species, or the distribution of species or habitats prior to 2009 is not included in this report except when necessary to explain the significance of current survey results. General and historic information on biological resources at Site 300 is available in the 2005 SWEIS (DOE/NNSA 2005) and summarized in the 2008 Annual Compliance Monitoring Report (Dibley et al. 2009b).

2.0 Community Level Monitoring and Changes in Management

Although no site-wide vegetation mapping or vegetation studies have been conducted within the current biological review period, three project specific wetland delineations were conducted between 2009 and 2012, and remediation efforts, local wildfires, and changes in the Site 300 prescribed burn regime occurred during the review period that may have impacts of vegetation communities and species distribution.

2.1 Building 850 Remediation

On November 17, 2008, the U.S. Department of Energy/National Nuclear Security Administration (DOE/NNSA) requested consultation with the USFWS to amend the Biological Opinion for Routine Maintenance and Operations Projects at Site 300. The proposed amendment described the environmental remediation activities for the Building 850 area involving removal of polychlorinated biphenyl (PCB-), dioxin-, and furan-contaminated soil from the hillsides surrounding the former explosives test facility. The resulting Opinion addressed impacts of the remediation operation on 17.8 acres of California tiger salamander and California red-legged frog upland habitat, and issued a

conference opinion on the then proposed California red-legged frog critical habitat within the action area. This project is within OU 5 (Building 850).

No California red-legged frogs or California tiger salamanders were discovered at the Building 850 project site during the pre-construction, developmental, or post-construction activities. No special-status species were observed in the project area during the duration of the project. To ensure wildlife did not enter the work area, perimeter exclusionary fencing surrounding the entire construction site was maintained between April 2009 and December 2009. Although no rare species were observed to be directly impacted by this project, impacts to upland habitat for the California tiger salamander and the California red-legged frog occurred during soil removal within the remediation area. While upland habitat was impacted by the remediation efforts, one of the primary objectives of this soil removal project was to mitigate hazards to ecological receptors, including the California tiger salamander and the California red-legged frog, associated with potential exposure to the PCB-, dioxin- and furan-contaminated soil.

The Biological Opinion for the Building 850 project requires that potential adverse impacts to the California red-legged frog and California tiger salamander that occurred as part of the Building 850 remediation to be mitigated by the enhancement of an existing seasonal pool and the protection of 48.5 acres surrounding the breeding pool. Two potential mitigation areas were identified in the Building 850 Biological Opinion: Pool M3 in the southeast quadrant of Site 300 (within OU 1) and an area just downstream (north) of Pool A (known as the Pool A overflow) in the northwest quadrant of the site (**Figure 2**). Preliminary hydrological investigations were conducted in preparation for the required habitat enhancement project. During the course of these investigations, it was determined that the Pool A overflow was not suitable for a habitat enhancement project, therefore Pool M3 was chosen as the mitigation site for Building 850 mitigation.

The Pool M3 habitat enhancement project includes the removal of accumulated sediment from the existing pool, installation of an upstream sediment basin, and revegetation of the pool with native species. This habitat enhancement project is scheduled for 2014.

Branchiopod surveys conducted in preparation for the habitat enhancement project at the two proposed mitigation sites are described in Section 4.1. In addition, a wetland delineation conducted at the chosen mitigation site, Pool M3, is described in Section 2.2.

2.2 Wetlands

The first wetland delineation of Site 300 was conducted in 1991 using the 1989 wetland delineation manual (Federal Interagency Committee for Wetland Delineation 1989) in preparation for the 1992 site-wide Environmental Impact Statement/Environmental Impact Report (EIS/EIR; LLNL 1992). The 1991 wetland delineation identified 6.76 acres of wetlands throughout the site. In 2002, a second wetland delineation (Jones & Stokes 2002a) was completed for the entire Site 300 in preparation for the 2005 SWEIS (DOE/NNSA 2005). In 2002, wetlands were delineated using the routine onsite determination procedure described in the Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory

1987). During the 2002 study, 46 wetlands were identified, with a total area of 8.605 acres (wetlands appearing to meet the criteria for federal jurisdiction total 4.388 acres).

Although no site-wide wetlands surveys have been completed during the current biological review period, Preliminary Jurisdictional Determinations have been completed for three small project sites at Site 300 as part of the permitting process for Section 404/401 of the Clean Water Act. During the review period, wetland delineations were completed for habitat restoration projects at Pool HC1 and Pool M3, and within the Building 812 Canyon (OU 9).

Building 812 Canyon

A wetland delineation was conducted in a small ravine (approximately 1.7 acres) located southwest of Building 812 in preparation for characterization studies. This location is within the Building 812 OU (OU 9), which is not currently covered under the 2009 CMP/CP. The canyon is adjacent to the Building 812 firing table in an area where current characterization activities are occurring (**Figure 5**). This ravine contains a small ephemeral tributary to Elk Ravine, which is tributary to Corral Hollow Creek. A perennial seep is present along the sides of the ravine at the northern end of the study area included in this preliminary wetland delineation. Stormwater also flows through a small ephemeral channel at the bottom of the ravine. Two wetland communities found at this location (stinging nettle [*Urtica dioica*] dominated habitat and seep monkey flower [*Mimulus guttatus*] dominated habitat) were considered jurisdiction wetlands. These two wetland communities include 0.12 acres (LLNL 2011b). An additional 0.04 acres downstream of these wetland communities is considered non-wetland jurisdictional areas (Other Waters). The Building 812 canyon was not studied as part of the 1992 or 2002 wetland delineations. Although employees of LLNL were aware of this small wetland, it had not been previously described in any documentation including the 2008 biological review. This wetland is likely to have been present during the 1999 - 2008 review period although it was not recorded in previous wetland delineations. The Building 812 Canyon provides seasonal aquatic (non-breeding) habitat for California red-legged frogs.

Pool HC1

The Pool HC1 (previously known as Round Valley) site includes a small seasonal pool within an ephemeral drainage located near the western perimeter of the Site 300 (**Figure 5**). This site is not located within any of the OUs and is considered a part of the Draney Canyon watershed. A culvertized fire trail crosses Draney Canyon at the project site, forming Pool HC1. A habitat enhancement project was conducted at Pool HC1 in 2006. At that time, the fire trail had washed out at the Draney Canyon crossing, and the pool and gradient was filled with sediment. The purpose of the 2006 project was to repair the fire trail and reduce erosion, while enhancing the habitat value of the pool as a breeding site for California red-legged frogs and California tiger salamanders through the installation of clay on the pool bottom. Several subsequent below average annual rainfall years contributed to this site losing the integrity of the pool bottom.

A wetland delineation of Pool HC1 was completed in 2011 in preparation for a 2012 habitat enhancement project at this site to further improve the habitat value of the pool (and reduce water

infiltration through the pool bottom) as a breeding site for California red-legged frogs and California tiger salamanders. In 2011, 0.16 acres of potential jurisdictional wetlands and 0.07 acres of Other Waters were identified at this site (LLNL 2011c). In 2002, 0.20 acres of potential wetlands were identified at this site. The decrease in wetland acreage at this location in 2011 compared to 2002 is most likely the result of different study methodologies used in 2002 and 2011. The 2011 wetland delineation included recording and analyzing specific characteristics of the soil, vegetation, and hydrology at the Pool HC1 wetland. While wetlands were mapped at Pool HC1 in 2002 based on the similarity of these areas to other Site 300 wetlands, no data were collected on the soils, vegetation or hydrology of the Pool HC1 area in 2002.

Pool M3

As discussed in Section 2.1, Pool M3 was selected for enhancement as mitigation for potential impacts to the California red-legged frog and California tiger salamander as a result of the Building 850 remediation project. The site consists of a small impoundment formed by a fire trail crossing of an intermittent drainage channel. Pool M3 (previously known as the Burn Cage Pool) occurs at the northern boundary of OU 1 near the southeastern boundary of Site 300 (**Figure 5**). This pool typically only holds water until April on average rainfall years. Sediment deposition over time has filled the site with roughly 8 - 10 feet of sandy-loam and reduced the ponded area to a shallow pool. Although no jurisdictional wetlands were identified at the project's site, results of this survey identified jurisdictional waters (Waters of the U.S.) on the project site. The jurisdictional area is commensurate with the ordinary high water (OHW) mark of the impoundment and low-lying areas within the drainage channel upstream of the pond and downstream of the road crossing. It was determined that a total of 0.17 acres of non-wetland jurisdictional waters exist within the project boundary (LLNL 2010b). As with the Building 812 wetland, this area was not studied as part of the 1992 or 2002 site-wide wetland delineations. Although employees of LLNL were aware of this small wetland, it had not been previously described in any documentation including the 2008 biological review.

2.3 Prescribed Burns and Wildfires

Prescribed burns are conducted annually at Site 300, typically in early June, to protect programmatic areas from uncontrolled wildfires. Prescribed burns and wildfires appear to have a significant effect on the composition of vegetation communities and wildlife species' distribution occurring at Site 300. Areas of perennial grasslands are most common where prescribed burns occur annually, and coastal scrub habitat does not typically occur where fires are too frequent (DOE/NNSA 2005), although this habitat type is adapted to periodic fires.

During the 2009 - 2012 review period, two wildfires occurred in the eastern half of the site. The location of these burns is shown in **Figure 6**. In June of 2009, a wildfire occurred in approximately 570 acres near Building 812 and the eastern perimeter of Site 300. An area within the boundary of the 2009 wildfire was burned again in June of 2010. The 2010 wildfire included approximately 120 acres. These fires did not include any area within OU 1 through 8, but did include areas southwest and east of Building 812 (OU 9). This burn impacted wetlands within Elk Ravine, upland habitat for California red-legged frog, Valley elderberry longhorn beetle habitat, and big tarplant habitat.

In June 2012, a non-routine prescribed burn was conducted in the area east of Building 801 (known as the Building 801 bowl) to improve the success of big tarplant in this area. This area is not typically burned as part of the annual programmatic prescribed burns. This burn area is outlined on **Figure 6**. The success of the big tarplant in response to this prescribed burn will be measured in 2013 and following years.

2.4 Misting Tower Vegetation Surveys

Misting towers are used by ERD in several OUs to discharge treated ground water in the form of aerosolized mist. In 2012, the distribution and abundance of plant species surrounding Building 854 misting towers (OU 6), the Building 830 misting towers (OU 7), and the GSA misting towers (OU 1) was recorded to determine if the addition of water (in the form of mist) to these vegetation communities from the misting towers is supporting the growth of hydrophytic vegetation surrounding the towers. For each species observed, the wetland indicator category from *the National Wetland Plant List* (ACOE 2012) was determined. The wetland indicator categories for the Army Corps of Engineers' Arid West Region (shown below) were used.

Although hydrophytic vegetation is present at the misting tower locations described below, these areas do not meet the regulatory definition of wetlands under Section 404 of the Clean Water Act because this hydrophytic vegetation has developed as a result of an artificial water source. The changes in vegetation and hydrology surrounding the misting towers have potential ecological and regulatory significance because the wetter, more densely vegetated areas surrounding the misting towers may attract amphibians, including special-status species, from nearby wetlands and provide a refuge for these species. No surveys for special-status amphibians have been conducted within the three misting tower areas described below.

Indicator categories (from the 2012 National Wetland Plant List compiled by the US Army Corps of Engineers)

Indicator Code	Indicator Status	Comment
OBL	Obligate Wetland	Almost always is a hydrophyte, rarely in uplands
FACW	Facultative Wetland	Usually is a hydrophyte but occasionally found in uplands
FAC	Facultative	Commonly occurs as either a hydrophyte or non-hydrophyte
FACU	Facultative Upland	Occasionally is a hydrophyte but usually occurs in uplands
UPL	Obligate Upland	Rarely is a hydrophyte, almost always in uplands
*Not Listed	Not Listed	These species are not included in the national wetland plant list. In most cases, these are upland species.

Building 854 Misting Towers

A survey of the vegetation at the Building 854 misting towers was conducted on November 2, 2012. The vegetation surrounding the area influenced by the Building 854 misting towers is dominated by a mosaic of annual grassland and coastal scrub vegetation. There are four misting towers grouped closely together at this location. In a ring approximately 10 feet in radius surrounding the misting towers, the vegetation is dominated by *Polypogon monspeliensis* (rabbit's foot grass, FACW). This species represents approximately 95% cover within the area closest to the misting towers.

A ring of ruderal species occurs surrounding the towers beyond the *Polypogon* dominated vegetation. *Carduus* sp. (Italian thistle, both Site 300 *Carduus* species are Not Listed), *Hirschfeldia incana* (Mediterranean mustard, UPL), *Sonchus asper* (spiny sowthistle, FAC), *Silybum marianum* (milk thistle, Not Listed) are the dominant species in this area.

Beyond these ruderal species the vegetation is dominated by coastal scrub species including *Artemisia californica* (California sage) and *Grindellia camporum* (gum plant).

Building 830 Misting Towers

A survey of the vegetation at the Building 830 misting towers was conducted on November 2, 2012. Annual grassland vegetation dominated by *Avena fatua* (wild oats) and *Bromus madritensis* (red brome) occurs surrounding the area influenced by the misting towers. There are three misting towers on the hillside above and to the east of Building 830. These towers are each approximately 200 feet apart. The central misting tower at this location did not appear to be operational during the site visit. At the misting tower located furthest to the north at this location, the vegetation surrounding the tower was dominated by *Polypogon monspeliensis* (40% cover, FACW) and *Carduus* sp. (40% cover, Not Listed). At

the tower furthest to the south, the vegetation was dominated by a combination of annual grasses and ruderal forbs. Many of the grasses in this location were not flowering at the time of the site visit, thus it was not possible to determine the dominant species. At the time of the site visit it was possible to identify the following species at this location:

<u>Scientific Name</u>	<u>Common Name</u>	<u>Wetland Indicator Status*</u>	<u>Percent Cover</u>
Unknown grass			30% cover
<i>Polypogon monspeliensis</i>	rabbit's foot grass	FACW	5% cover
<i>Bromus madritensis</i>	red brome	UPL	15% cover
<i>Hirschfeldia incana</i>	Mediterranean mustard	UPL	25% cover
<i>Avena fatua</i>	wild oats	Not Listed	5% cover
<i>Sonchus asper</i>	spiny sowthistle	FAC	15% cover

The presence of the upland grasses, *Bromus madritensis* and *Avena fatua*, indicate that this area may not be as wet as the area surrounding the towers at Building 854.

GSA Misting Towers

The vegetation surrounding the GSA misting towers was described during a site visit on May 22, 2012. Plant species present surrounding the GSA misting towers were recorded, but the distribution or abundance of these species was not recorded.

Plant species present on May 22, 2012 in the area surrounding the GSA misting towers include:

<u>Scientific Name</u>	<u>Common Name</u>	<u>Wetland Indicator Status*</u>
<i>Carduus pycnocephalus</i>	Italian thistle	Not Listed
<i>Brassica nigra</i>	black mustard	Not Listed
<i>Avena fatua</i>	wild oats	Not Listed
<i>Bromus hordeaceus</i>	soft brome	FACU
<i>Polypogon monspeliensis</i>	rabbit's foot grass	FACW
<i>Baccharis salicifolia</i>	mule fat	FAC
<i>Urtica dioica</i>	stinging nettle	FAC
<i>Sonchus asper</i>	spiny sowthistle	FAC
<i>Bromus madritensis</i>	red brome	UPL
<i>Cirsium vulgare</i>	bull thistle	FACU
<i>Heliotropium curassavicum</i>	seaside heliotrope	FACU
<i>Lepidium latifolium</i>	perennial pepperweed	FAC

Mule fat is a common wetland shrub at Site 300 and in the surrounding areas. In this area, mule fat is found in wetlands and creek beds. The presence of this large perennial wetland plant indicates that the area has been wet over a relatively long period of time (over a year).

3.0 Special-status Plants

Annual monitoring of the abundance and distribution of the four rare plant species with a CRPR of 1B that were known to occur at Site 300 during the review period were conducted each year between 2009 and 2012. The results of these surveys are analyzed in detail in the rare plant monitoring and restoration report for 2007 through 2011 (Carlsen et al. 2012) and the data summary and appendix for rare plant monitoring and restoration work conducted in 2012 (Carlsen and Paterson 2013). The following section summarizes monitoring conducted between 2009 and 2012.

3.1 Diamond-petaled California Poppy (*Eschscholzia rhombipetala*)

Although the diamond-petaled California poppy is not listed under the federal or California ESAs, the diamond-petaled California poppy is extremely rare and is currently known to occur only at Site 300 and in one location in San Luis Obispo County. Until recently, only three isolated populations of this species were known to occur at Site 300 (**Figure 4**). In 2012, a fourth population was discovered near the northern perimeter of Site 300. All four populations occur in undeveloped areas near the western perimeter of Site 300 and do not occur within any OU. Like other annual plants, the number of diamond-petaled California poppy plants present in these populations is expected to vary considerably from year to year, depending on environmental conditions.

A spring census (typically conducted in April through early May) of the known populations has been conducted annually since 1998. During this time, the largest diamond-petaled California poppy populations were observed in the April 2012 census. A total of between 20,000 and 45,000 diamond-petaled California poppies were observed at Site 300 in 2012. In contrast, the number of diamond-petaled California poppies observed in 2011 was the lowest seen since surveys began (a total of only 46 plants). The relatively large numbers of diamond-petaled California poppies in 2012 is likely attributable to the low annual grass cover in 2012, which was much less than average as a result of low rainfall that year.

3.2 Big Tarplant (*Blepharizonia plumosa*)

The distribution of big tarplant was mapped at Site 300 using a handheld global positioning system (GPS) in September through November of 2009, 2010, 2011, and 2012. While this species is extremely rare throughout its range, it can be abundant at Site 300, especially in or near areas where prescribed burns are routinely conducted and where wildfires have occurred. As with the diamond-petaled California poppy and other annual plant species, the abundance of big tarplant varies greatly between years depending on environmental conditions. For example in 2009, the Site 300 big tarplant population was estimated to contain no more than 22,000 individual plants while up to 225,500 big tarplants were found at Site 300 in 2010. It is estimated that between 6,702 and 28,974 individual big tarplants occurred at Site 300 in 2011, and between 100,008 and 161,155 individual big tarplants occurred at Site 300 in 2012. The distribution of big tarplant between 2009 and 2012 is similar to what was observed prior to 2009 (**Figure 4**). Big tarplant is abundant surrounding Building 851 (OU 8), within and surrounding the Building 834 Complex (OU 2), in the Building 832 Canyon (OU 7), and surrounding Building 801 (OU 8).

3.3 Large-flowered Fiddleneck (*Amsinckia grandiflora*)

This species is currently known to exist naturally in only two locations—at the Site 300 Drop Tower and on nearby conservation property owned by the Contra Costa Water District. The Drop Tower site is located within the boundary of the Building 854 OU (OU 6) adjacent to Building 858, outside of the immediate Building 854 area. A third population occurs in Draney Canyon at Site 300 (a canyon in the southwestern portion of Site 300 outside any OU), but no large-flowered fiddleneck have been observed at this location since a landslide that occurred at the population site in 1997. The Drop Tower native population has contained no large-flowered fiddleneck plants since 2008. This population has been in decline since 1997. During the previous review period, 9 plants were observed in 1999. The population declined to 0 plants in 2005, but slightly rebounded after a wildfire in 2005, when 4 plants were observed in 2006 and 1 plant in 2007. LLNL established an experimental population of the large-flowered fiddleneck at Site 300 in the early 1990s. LLNL maintains the experimental population by periodically planting large-flowered fiddleneck seeds in established plots within the population. The size of the experimental population fluctuates as a result of these seed bank enhancement efforts. In December of 2011, 100 large-flowered fiddleneck seeds were planted in each of 18 plots in the experimental population, and the experimental population contained 553 large-flowered fiddleneck plants at flowering in April of 2012. These plants are a result of seeds produced from plants present in the population in 2011 and previous years and the 2011 seed bank enhancement efforts.

3.4 Round-leaved Filaree (*California macrophylla*)

Six populations of round-leaved filaree are known to occur at Site 300 (**Figure 4**). All populations occur in the northwest portion of the site. This species thrives in the disturbed soils of the annually graded fire trails at Site 300, but also occurs in grasslands. Of the six known Site 300 populations, four occur on fire trails and two occur in grasslands. None of the six populations occur within an OU.

During the spring of 2009, 2010, 2011, and 2012, the extent of the six populations was mapped using a handheld GPS, and the size of each population was estimated. As is typical with annual plant species, the abundance of round-leaved filaree varies greatly between years depending on environmental conditions. The six populations combined were estimated to contain approximately 5,300 round-leaved filaree plants in 2009, 7,000 plants in 2010, 5,000 plants in 2011, and 360 in 2012.

3.5 Adobe Navarretia (*Navarretia nigelliformis* ssp. *radians*)

A herbarium specimen collected at Site 300 in 1986 was recently re-identified as the rare species, adobe navarretia (*Navarretia nigelliformis* ssp. *radians*). As a result, the Site 300 population of navarretia was entered into the CNDDDB as adobe navarretia, and this re-identification was discovered while reviewing the CNDDDB as part of this biological review. Adobe navarretia is a spring flowering annual plant with a CRPR of 1B. A more common subspecies of *Navarretia nigelliformis* (ssp. *nigelliformis*) was previously thought to occur at Site 300. Based on recorded observations of the Site 300 navarretia species (now considered to be the rare subspecies) in 1986 (BioSystems 1986) and 2002 (Jones and Stokes 2002b), adobe navarretia is expected to occur in one location in the northwest corner of Site 300, outside of any OU (**Figure 4**).

4.0 Invertebrates

4.1 Branchiopods

LLNL was directed by the USFWS to conduct protocol-level branchiopod surveys to determine whether listed brachiopod species were present within the two pools, Pool M3 and the Pool A overflow, proposed as mitigation areas for impacts to California tiger salamander and California red-legged frog habitat that occurred during the Building 850 remediation project (see Section 2.1).

Surveys for listed branchiopods were performed in the 2009 - 2010 wet season to determine the presence of federally listed branchiopods in the two pools (at the Pool A overflow and at Pool M3, **(Figure 2)**). Surveys were conducted according to the methods described in the USFWS Guidelines (USFWS 1996).

Wet season surveys began on February 4, 2010, within two weeks of the pools filling to a depth greater than 3 cm (1 in). Sampling occurred every two weeks thereafter until May 14, 2010 when both pools were dry. The surveys performed in the interim were conducted on the dates listed in **Table 2**. Samples were taken at the surface, throughout the water column, and along the margins and bottom of each pool. Identification of specimens was performed in the field using a 16X hand lens. Living specimens were identified and returned to their collection location. All amphibian eggs and larvae found in samples were released at the point of capture after being identified to species. A dry season sampling effort followed the wet season surveys in the summer of 2010. No listed branchiopod species were discovered at either potential mitigation site. California linderiella (*Linderiella occidentalis*) was the only branchiopod observed, and it was only observed in the Pool A overflow. All individuals observed were dead, likely due to high water temperatures prior to the survey in which they were detected. This species numbered less than 200 individuals in this pool. Other invertebrates found in Pool A overflow included ostracods, chaobitids, cladocerans, culicids, zygoptera, notonectids, corixids, and chironomids. No branchiopods were observed in Pool M3. Other invertebrates found in this pool included ostracods, cladocerans, notonectids, corixids, and chironomids. (Dexter 2010)

4.2 Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*)

On October 2, 2012, the valley elderberry longhorn beetle was proposed for delisting (77 FR 60238-60275). At the time of listing in 1980, the valley elderberry longhorn beetle was known from ten occurrences within three counties. At the time of the 2012 delisting proposal, 201 occurrences were known from 26 locations. In addition, significant progress has been made in the protection and restoration of valley elderberry longhorn beetle habitat since the initial listing (USFWS 2012). On January 23, 2013, the review period for the delisting of the valley Elderberry Longhorn Beetle was extended (78 FR 4812-4813). A final rule delisting the beetle has not been issued.

No valley elderberry longhorn beetle surveys have been conducted within the current review period. Riparian habitat including elderberries that provide habitat for the beetle within Elk Ravine and the canyon north of Elk Ravine and east of Building 812 in an area known as Gooseberry Canyon was impacted by the 2009 and 2010 wildfires. No studies were conducted to determine valley elderberry

longhorn beetle presence since these fires, but the elderberry trees (*Sambucus nigra* ssp. *caerulea*) within the burn area are recovering.

5.0 Amphibians

Surveys for amphibians were performed less intensively site-wide between January 2009 and December 2012 than those performed during the prior 1999 - 2008 biological review period. Overall, annual rainfall patterns were less prolific onsite and many pools that previously supported amphibian breeding were not able to support annual recruitment. Additionally, feral pig wallowing and grubbing activities adversely affected several pools. Common amphibian species were observed incidental to surveying for branchiopods conducted in 2010. Observations at the Pool A overflow included one adult and ten egg masses of Sierran treefrog (*Pseudacris sierra*) and many California toad (*Bufo boreas halophilus*) tadpoles. Common amphibians were also observed in Pool M3. Sierran treefrog tadpoles were found in this pool during branchiopod surveys (Dexter 2010). Observations of special-status amphibians are described in detail below. Relevant regulatory changes are also described in the following sections. Similarly, no surveys for the coast range newt (*Taricha torosa*) were conducted during the review period, although this species is described briefly below because it was not included in the 2008 biological review.

5.1 California Red-legged Frog (*Rana draytonii*)

Ongoing California red-legged frog monitoring surveys were performed at Pools M1a and b during the review period (**Figure 2**). These pools occur in the Building 812 OU (OU 9), outside of the OUs covered by the 2009 CMP/CP. Breeding surveys in March and April found successful reproduction efforts at Pools M1a and b --laying and hatching of red-legged frog eggs and subsequent metamorphosis of juveniles in the fall for each year (2009 through 2012). Red-legged frog adults were observed at the pools year-round. Western toad and sierra treefrog also successfully reproduced at Pools M1a and b.

During the 2009 - 2012 period, the Pools M1a and b suffered heavy in-flow of sediment, at least in part from the two wildfires previously noted, and will require future dredging to ensure adequate habitat quality for the breeding populations. Additionally, willow growth and nettle colonization has begun to limit the open water environment and a dredging action will remove this factor also.

Two pools have been newly identified as breeding pools for California red-legged frog, Pool CR (upstream of Pool M1a and b) and Pool CP (south of the HE Process Area). Both sites are shallow water, spring-fed pools, with adequate cover to recruit a small percentage of metamorphs into the local population, and both sites are newly developed since the 1999 - 2008 review period.

Pool CR is located within the channel of Elk Ravine within the Building 812 OU (OU 9). This pool occurs below a drop in the channel elevation and was developed from erosion at this drop.

Pool CP is located west of OU 4 (HE Process Area). This pool is recently developed at an existing spring. Pool CP is located 520 feet west of OU 4 (HE Process Area). Although the pool itself is not within OU 4, it is possible for California red-legged frogs that utilize this pool to use portions of OU 4 as upland habitat.

Several Site 300 pools that formerly supported breeding populations of red-legged frogs failed to support breeding between 2009 and 2012 for a variety of reasons (**Table 3**). Pool SG has largely dried-up, possibly, in part to changes in run-off near the Pit 7 complex to the west. Pool O and Pool J supported California red-legged frog breeding between 1999 and 2008, but did not support breeding in the current review period largely due to loss of the pool depth (e.g., sedimentation and pig grubbing). Feral pig wallowing and grubbing activities also caused the clay installed at the base of two restored pools, Pools HC1 and M2, to be exposed and lose integrity. Pool S typically requires an above-average annual rainfall year to fill. Pool OS is in a heavily developed area with anthropogenic disturbance regiments. Pool D and Pool H continue to be too small or shallow to support California red-legged frog breeding. It is unknown if Pool M3 supported California red-legged frog breeding in 2009 through 2012. The pool has filled with sediment, greatly reducing the depth of the pool and making it less likely that the pool retained water long enough for red-legged frog tadpole to survive long enough to metamorphosis.

California Red-legged Frog 2010 Critical Habitat Designation

Critical habitat for the California red-legged frog was originally designated in March of 2001. This designation included most of Site 300. The 2001 designation was later rescinded, and in April 2006 a new final critical habitat rule was issued for the California red-legged frog that no longer included any portion of the site (USFWS 2006: 71 FR 19244-19346). The 2006 designation was the current critical habitat designation for the California red-legged frog at the time that the 1999 - 2008 biological review was prepared. In the 2006 critical habitat designation for the California red-legged frog, the USFWS denoted upland habitat for red-legged frogs as natural areas within 200 feet (60 meters) of the edge of the riparian vegetation or dripline and recognized that a distance of 0.7 mi (1.1 km) from water features should be used for defining dispersal habitat when considering red-legged frogs upland movements (USFWS 2006).

The critical habitat designation for the California red-legged frog was revised again in 2010 (USFWS 2010: 75 FR 12816-12959). The 2010 designation not only includes a greater area than the 2006 designation but also modifies the definitions of the primary constituent element (PCE's) that define the critical habitat. The 2006 designation defined California red-legged frog upland habitat as areas up to 200 feet from a water feature. Based on new biological information, the 2010 designation states that the extent of upland habitat surrounding water features should be defined on a case by case basis and limited to 1 mile (1.6 km) from a water feature representing a much greater area of upland habitat than was described in the 2006 designation. The 2010 critical habitat designation describes dispersal habitat as areas within 1.0 mile (1.6 km) from water features, which also represents an increased area compared to 2006 (USFWS 2010).

In the current (2010) critical habitat description for the California red-legged frog, all of Site 300 is included within the critical habitat designation, and all of Site 300 is considered potential upland or dispersal habitat for the species.

5.2 California Tiger Salamander (*Ambystoma californiense*)

Surveys for California tiger salamanders were infrequent during the review period. Pool D, noted as a breeding site in the 2008 biological review, was largely dry during this period, except during 2010. Pools A and H were noted to have breeding tiger salamanders in February of 2010. It is unknown if tiger salamander larvae were able to reach maturity at Pool H during the review period, but the duration of inundation at Pool A was long enough in 2010 and 2011 for tiger salamander larvae to successfully mature. Pool M2 supported a breeding population in 2010 and 2011 before pig disturbance breached the earlier installed clay liner in 2012.

Similar drying and/or disturbance events as noted for the California red-legged frog adversely affected ponds with breeding tiger salamanders: Pool SG, OS, and M3. Although California tiger salamander larvae were observed in Pool M3 during the branchiopod survey, it is unknown if those larvae reached adulthood.

The 2005 critical habitat designation for the central population of the California tiger salamander (70 FR 49380 – 49458) was current at the time of the 1999 - 2008 biological review. The 2005 critical habitat is still in place. This critical habitat designation does not include any portion of Site 300.

5.3 Western Spadefoot (*Spea hammondi*)

No site-wide surveys for western spadefoot (a California Species of Special Concern) were conducted during the review period. Western spadefoot were observed in Pool M3, located with the General Services Area OU (OU 1, **Figure 2**), during branchiopods surveys conducted in 2010 (**Table 2**). In 2010, eggs were observed in February, tadpoles were observed in March, and metamorphs were observed in May. No surveys for spadefoot breeding were conducted at Pool M3 in 2009, 2011 or 2012.

5.4 Coast Range Newt (*Taricha torosa*)

No specific surveys for the Coast range newt (a California Species of Special Concern) were conducted at Site 300 during the review period, and no incidental observations were recorded. Incidental observations of this species by LLNL wildlife biologists during the previous review period are not discussed in 2008 biological review. Coast range newts were not known to occur at Site 300 when the 2005 SWEIS was prepared. Coast range newts were collected near Building 817 in 2005/2006 rainy season, within the HE Process Area OU (OU 4), during pitfall trapping that was conducted after closure of the HE ponds. Trapping served as a conservation measure for protection of California tiger salamanders that may have still been using upland habitat in the area and needed to be relocated (no California tiger salamanders were collected). Coast range newts at Site 300 show a tendency to inhabit areas within 1 km of Corral Hollow Creek and near oak woodland habitat. This species is known to migrate over 2 km during the breeding season to aquatic habitats. The coast range newt is most likely to be found in the southern half of Site 300 because deep canyons are found in this portion of the site in proximity to Corral Hollow Creek.

6.0 Reptiles

Surveys for reptiles at Site 300 during the review period were very limited. Incidental observations of coast horned lizards, and the 2009 survey result for the Alameda whipsnake burn study are discussed below. No surveys for other special-status reptiles including the San Joaquin coachwhip (*Masticophis flagellum ruddocki*), California legless lizard (*Anniella pulchra pulchra*), pacific pond turtle (*Actinemys marmorata*) were conducted during the review period. The pacific pond turtle is described briefly below because this species was not described in the 2008 biological review.

6.1 Alameda Whipsnake (*Masticophis lateralis euryxanthus*)

From 2002 through 2009, LLNL participated in a study, in cooperation with the USFWS and four other local land management entities, to determine the effects of prescribed burns on the Alameda whipsnake. The USFWS issued a Biological Opinion for this study that outlined the general conditions for conducting prescribed burns and gathering information about potential impacts to Alameda whipsnakes. Participation in this study allowed LLNL to obtain USFWS approval to conduct prescribed burns necessary for Site 300 operations in areas that potentially support Alameda whipsnakes.

LLNL implemented the study in two adjacent areas (a burn site and a control site) of coastal scrub vegetation at Site 300. The Alameda whipsnake study area overlaps with the western perimeter of OU 6 (Building 854). A prescribed burn was conducted at the burn site in the summer of 2003, and the post-burn monitoring was conducted starting in the fall of 2003 through the spring 2009. Both the burn and control sites were impacted by a wildfire in 2005. Although no whipsnake fatalities were documented during post-burn surveys, both trapping areas were burned severely and little remnant vegetation was left in the shrubland.

No whipsnakes were captured during the spring 2009 trapping period. 2009 was the final year of trapping at Site 300 conducted as part of this study; no trapping was conducted in 2010. Although the effects of the prescribed burn and subsequent impacts of the wildfire on the whipsnake are not yet determined, both the whipsnake and its habitat are adapted to periodic fire events, and both the snake population and vegetation are expected to recover from the fire in subsequent years.

The 150-meter buffer on shrub habitat highlighted in **Figure 3** shows the distribution of Alameda whipsnake habitat at Site 300. The 2006 Alameda whipsnake critical habitat designation is also shown in **Figure 3**. Alameda whipsnake critical habitat occurs within OUs 3 (Pit 6), 5 (Building 850), 6 (Building 854) and 8 (Building 851). The HE Burn Pit (OU 4) occurs within the 150-meter buffer area around coastal shrub habitat that occurs outside of the area designated as critical habitat. The distribution and abundance of Alameda whipsnakes at this time is expected to be similar to what was expected in 2008.

6.2 Coast Horned Lizards (*Phrynosoma blainvillii*)

No site-wide surveys for coast horned lizards (a California Species of Special Concern) were conducted during the review period. Spring rare plant surveys (typically conducted during the last week in March and the first three weeks in April) coincide with the spring activity period of the coast horned lizard. The locations of coast horned lizards observed during spring rare plant surveys were recorded using a handheld GPS unit (**Figure 7**). The locations of the coast horned lizard observations were northwest of

OU 5 (Pit 7 Complex) but were not within the boundaries of any OUs. Spring rare plant surveys are restricted to the spring flowering rare plant populations shown in **Figure 4**. Additional incidental coast horned lizard observations recorded between 2009 and 2012 during fire trail and other routine surveys have not yet been mapped or reported, but will be reported in future compliance monitoring reports.

6.3 Pacific Pond Turtle (*Actinemys marmorata*)

The pacific pond turtle (a California Species of Special Concern) was observed at one location at Site 300, Pool O (**Figure 2**), during the previous review period. This pool is located in the southwestern portion of Site 300 outside of the boundaries of any OUs. No incidental observations of this species were made during the current review period. This species is found in a variety of aquatic habitats throughout its range including pools, lakes, artificial water bodies, and rivers.

7.0 Mammals

No surveys for mammals were conducted during the review period at Site 300. No significant incidental observations were recorded.

8.0 Birds

Although no site-wide nesting bird or other avian surveys were conducted during the review period, incidental observations of raptor nesting were recorded, and annual surveys were conducted to determine the success of the tricolored blackbird colony within Elk Ravine. Incidental observations of red-tailed hawk nests in 2012 are shown in **Figure 8**. The red-tailed hawk nests were observed in the Building 854 OU (OU 6) and the Building 812 OU (OU 9). Incidental observations of nesting by special-status avian species during the review period are described below. In addition, habitat modifications conducted for the benefit of avian species are also described.

8.1 Power Pole Modifications for Migratory Bird Protection

To minimize potential adverse impacts to migratory birds, Site 300 implemented an avian protection policy to support avian-friendly transmission lines, insulators, power poles and other features that are designed to minimize collision and electrocution fatalities of birds of prey. Multiple perch deterrents and gray PVC triangles designed to fully discourage perching birds of prey on the crossarm arrays (and withstand the ambient UV rays) were installed on five existing power poles. Additionally, to allow alternative, safe perch sites for birds, non-energized poles (standalone) with cross arm arrays in multiple directions were placed within roughly 25 feet of each of the five poles where perch deterrents were installed. The poles installed as alternative safe perch sites lacked chemical treatments and were at least 6 feet taller in stature than the original pole (to support the viewshed perspective of the birds). Two of the modified power poles are located within Building 850/Pit 7 Complex OU (OU 5) and one is within GSA OU (OU 1).

8.2 Burrowing Owl (*Athene cunicularia*)

The burrowing owl is a California Species of Special Concern and a USFWS Bird Species of Conservation Concern. No site-wide burrowing owl surveys were conducted within the review period. Incidental

burrowing owl observations and nesting activity was recorded between 2009 and 2012 that has not yet been mapped or reported. The 2009 - 2012 data should be available to be included in the 2014 Compliance Monitoring Report. Historic observations of burrowing owls recorded from 1999 through 2009 and observations from 2013 are shown on **Figure 3**. The distribution and abundance of burrowing owls at Site 300 is expected to be slightly diminished from what was reported in 2008. The burrowing owl appears to be declining within their central and southern coast breeding areas and experiencing a modest breeding range retraction statewide (CDFG 2012 and Gervais et al. 2008). Burrowing owls are frequently observed throughout the Pit 7 and Building 850 OU (OU 5), and have been observed in the Building 854 OU (OU 6) and near the Building 851, Building 845, Building 801 and Pit 2 areas of OU 8.

8.3 White-tailed Kite (*Elanus leucurus*)

The white-tailed kite, a California Fully Protected Species, established a nest during 2011 in the western portion of the General Services Area that is part of the HE Process Area OU (OU 4) (**Figure 8**). Nest protection measures were put into place between May and June of 2011. Three fledgling kites were observed learning to fly in June (Woollett pers. comm. 2013).

8.4 Swainson's Hawk (*Buteo swainsoni*)

In 2009, a nesting attempt by a state threatened species, the Swainson's hawk, occurred in the southern part of Paper Canyon (**Figure 8**). California Department of Fish and Wildlife (CDFW) maintains that to avoid impacts to active Swainson's hawk nest sites, a 1/2-mile buffer from "intensive new disturbances" is to be implemented between March 1 and September 15 (CDFG 1994) to reduce project impacts to less than significant levels. This nest site is not within an OU, and is located in an area southwest of the High Explosives Burn Pit (OU 4) and northeast of Pit 6 (OU 3). The timing of the nesting attempt overlapped with the performance of Site 300's annual prescription burn regime designed to reduce grassland fuels around key facilities and protect infrastructure from dry season wildfire incidents. As a result, the Paper Canyon burn, serving as the western flank of fire protection to the HE Process Area, was not burned in 2009. Despite these protective measures, by late June the Swainson's hawk nest attempt was observed to have failed (no recorded eggs laid) and the nest site soon abandoned by the raptors (Woollett pers. comm. 2013).

There were no known Swainson's hawk nesting attempts at Site 300 in 2010, 2011 or 2012.

8.5 Tricolored Blackbird (*Agelaius tricolor*)

The tricolored blackbird is a California Species of Special Concern and a USFWS Bird Species of Conservation Concern. Annual surveys were conducted during the review period to determine the nesting success of the tricolored blackbird in the known nesting colony in Elk Ravine (**Figure 3**). This nesting colony is located just southwest of Building 812, within OU 9. Tricolored blackbirds were observed to successfully nest at the Elk Ravine colony in 2009, 2010 and 2011 (Woollett pers. comm. 2013).

9.0 Summary

Two wildlife species not described in the 2008 biological review are included in this report: the pacific pond turtle and the coast range newt. Incidental observations of these species occurred during the 1999 – 2008 review period, but these survey results were not available at the time of the preparation of the 2008 biological review. No species-specific surveys for these species were conducted during the current review period. The pacific pond turtle was observed during the previous review period in Pool O, outside of the boundaries of any of the designated OUs. The coast range newt as observed during the previous review period south of Building 817 within the HE Process Area OU (OU 4).

The rare plant, adobe navarretia, was newly identified as occurring at Site 300 from a recently re-classified herbarium specimen collected from Site 300 in 1986. This reclassification was discovered as part of the records review conducted as part of this biological review. The adobe navarretia is expected to occur in the northwestern corner of the site outside of all OUs.

The breeding success of special-status amphibians at Site 300 in 2009 through 2012 was impacted by lower than average rainfall during the 2008/2009 and 2011/2012 rainy seasons, pool sedimentation, and impacts to pool habitat caused by feral pigs. Despite this, California red-legged frogs, California tiger salamanders, and spadefoot toads were able to successfully breed at the locations that are able to sustain the longest period of inundation. This includes Pool M1a and b (located within the Building 812 OU [OU 9]), and Pool SVRA (located offsite but adjacent to Pit 6 [OU 3]) for California red-legged frogs and Pool A for California tiger salamanders. In 2010, western spadefoot were observed to successfully breed in Pool M3 (located within the GSA OU [OU 1]), despite sedimentation in this pool, possibly as a result of the higher than average rainfall at Site 300 during the 2009/2010 rainy season that followed the lower than average rainfall season in 2008/2009.

Two pools, Pool CP and Pool CR, were newly utilized by California red-legged frogs as breeding pools during the review period. Pool CR is located within Elk Ravine in the Building 812 OU (OU 9), and Pool CP is located southeast of the HE Burn Pit (OU 4) and west of the HE Process Area (OU 4). The location of breeding habitat adjacent to OU 4 increases the probably that red-legged frogs will utilize upland habitat within that OU.

Regulatory changes that occurred during the review period also changed our understanding of the California red-legged frog's use of Site 300. In 2010, the critical habitat designation for the California red-legged frog was revised. This new critical habitat designation includes all of Site 300 compared to the previous (2006) critical habitat designation (which did not include any portion of Site 300). Research reported in the 2010 critical habitat designation indicates that California red-legged frogs utilize upland and dispersal habitat farther from aquatic habitats than was previously known. As a result, the USFWS revised their definition of California red-legged frog upland and dispersal habitat in the 2010 critical habitat designation. All of Site 300 is considered upland or dispersal habitat for the California red-legged frog based on these revised definitions. During the previous review period, the northeastern portion of Site 300 was not considered California red-legged frog upland or dispersal habitat (based on the 2006 definitions).

Two significant breeding attempts were made by special-status raptors during the review period. White-tailed kites nested within OU 4 (HE Process Area) near the General Services Area of Site 300 in 2011. Three white-tailed kites fledged from this nest. A pair of Swainson's hawks made a nesting attempt near Paper Canyon in 2009. This attempted nest site is located in an area southwest of the High Explosives Burn Pit (OU 4) and northeast of Pit 6 (OU 3). The nesting attempt failed, and no young were produced.

Stands of the valley elderberry longhorn beetle's food plant, the blue elderberry, are known to occur in isolated areas at Site 300 including within Elk Ravine and Gooseberry Canyon within the Building 812 OU (OU 9). These stands of blue elderberry were impacted by wildfires that occurred in 2009 and 2010. No surveys for valley elderberry longhorn beetles have been conducted during the biological review period, therefore the distribution of valley elderberry longhorn beetles since these wildfires is unknown. The valley elderberry longhorn beetle is also currently proposed for delisting by the USFWS.

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Figures

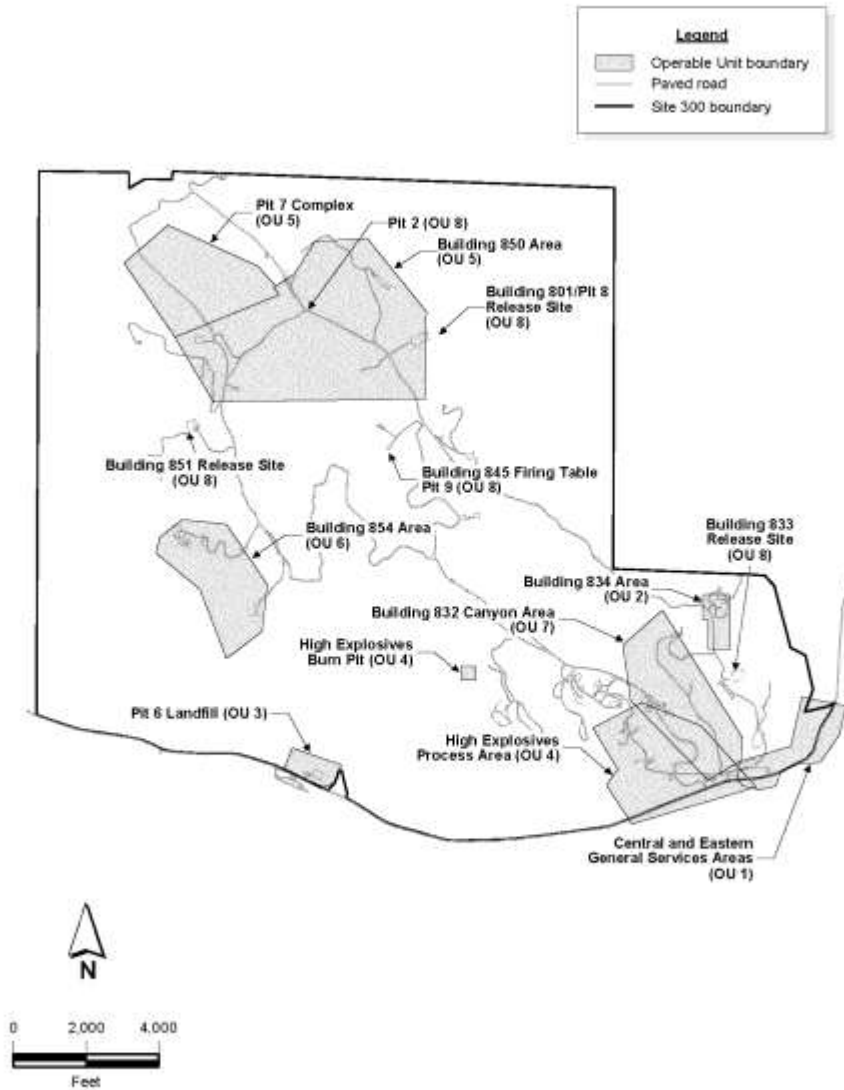
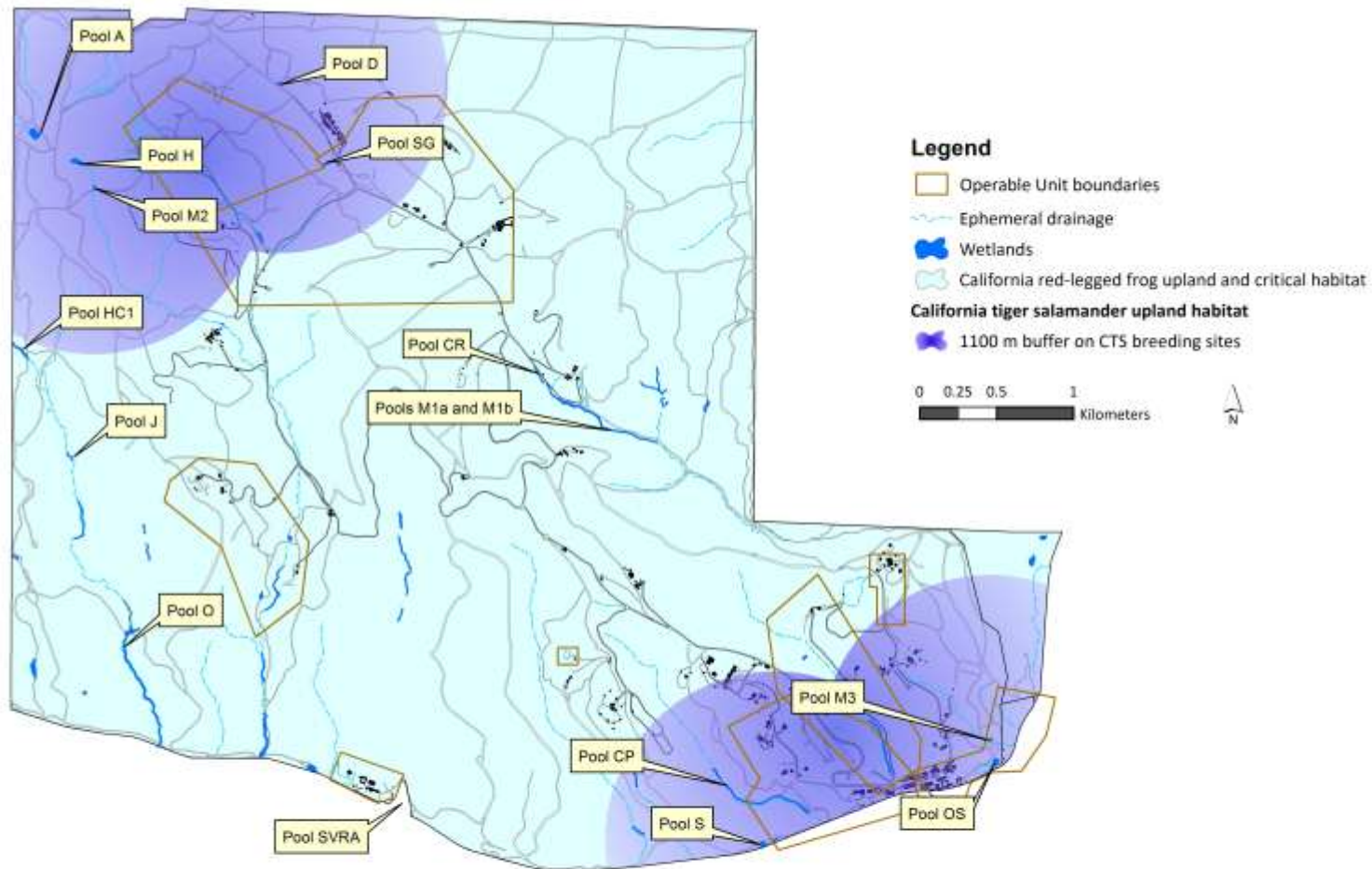


Figure 1. Site 300 map showing Operable Unit (OU) locations covered by the 2009 CMP/CP (Dibley et al. 2009).



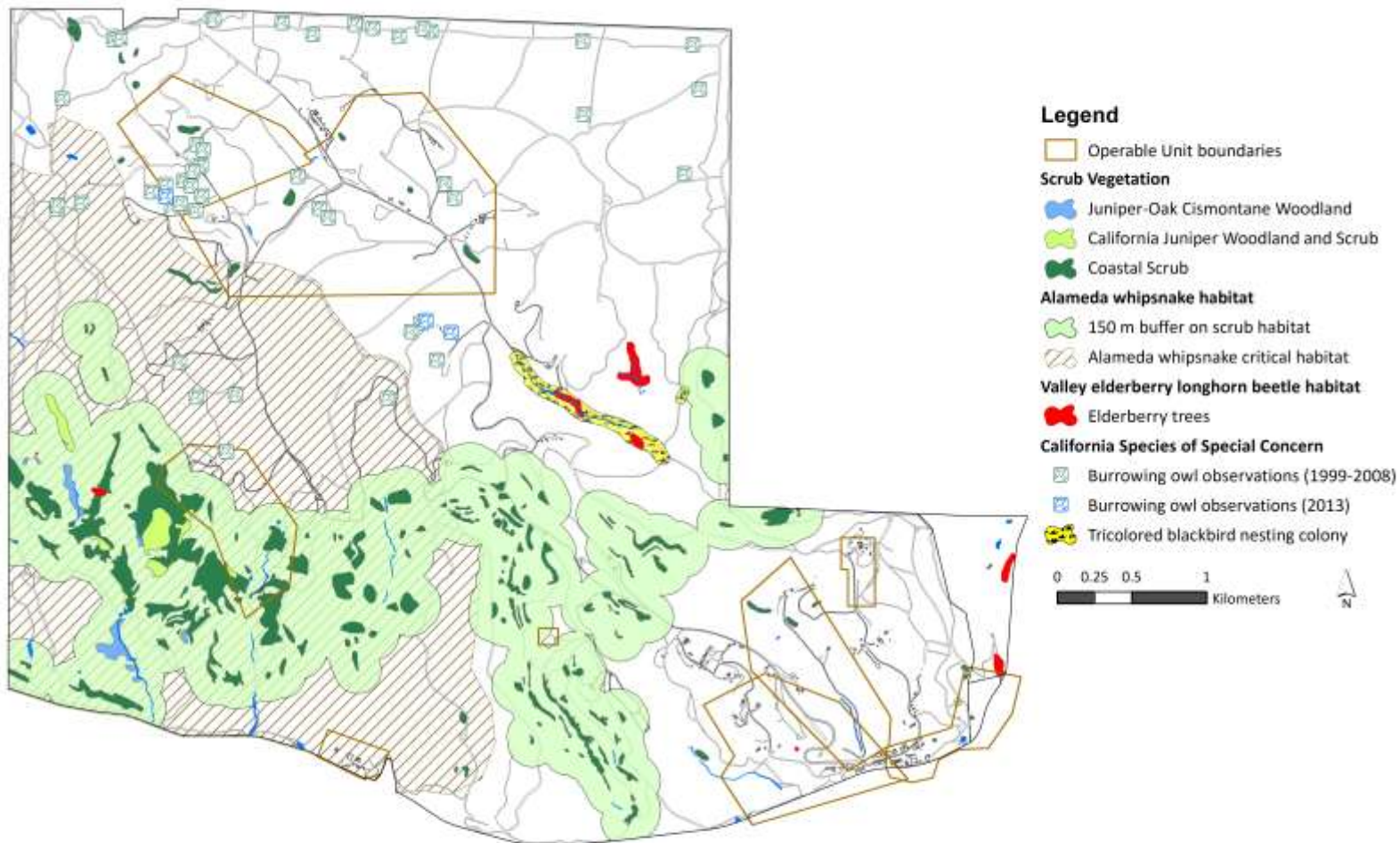


Figure 3. Distribution of Alameda whipsnake habitat and critical habitat, and valley elderberry longhorn beetle habitat at Site 300. Tricolored blackbird nesting colony locations and historic burrowing owl observations are also shown. This map does not include all California Species of Special Concern known to occur at Site 300.

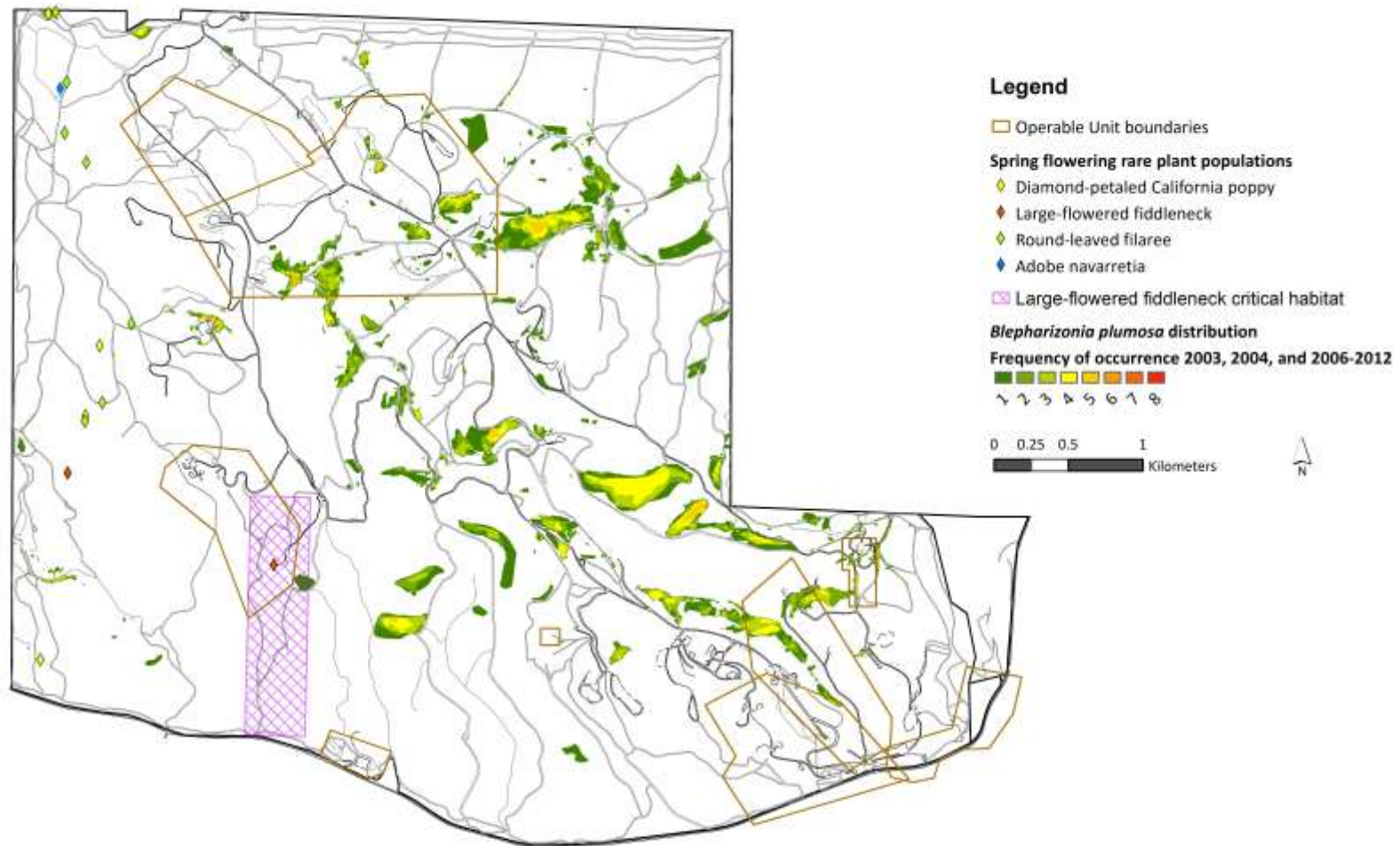


Figure 4. Distribution of rare plant species at Site 300.

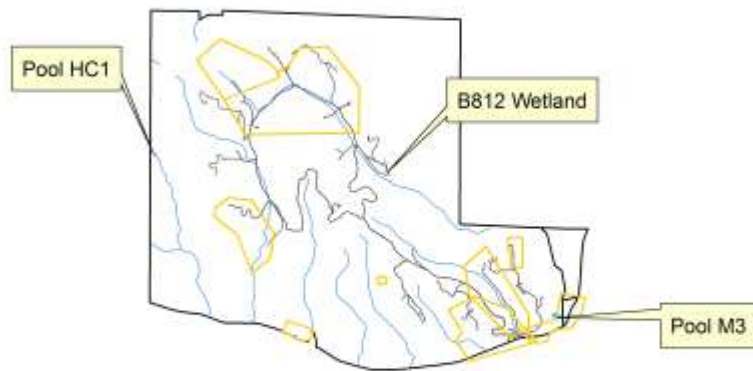
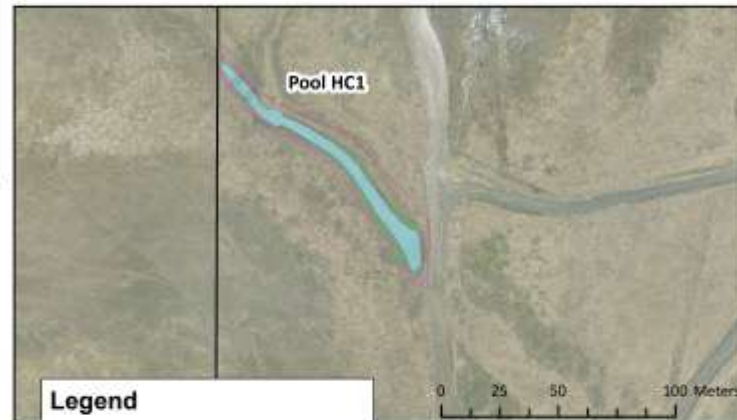


Figure 5. 2009 through 2012 wetland delineation results.

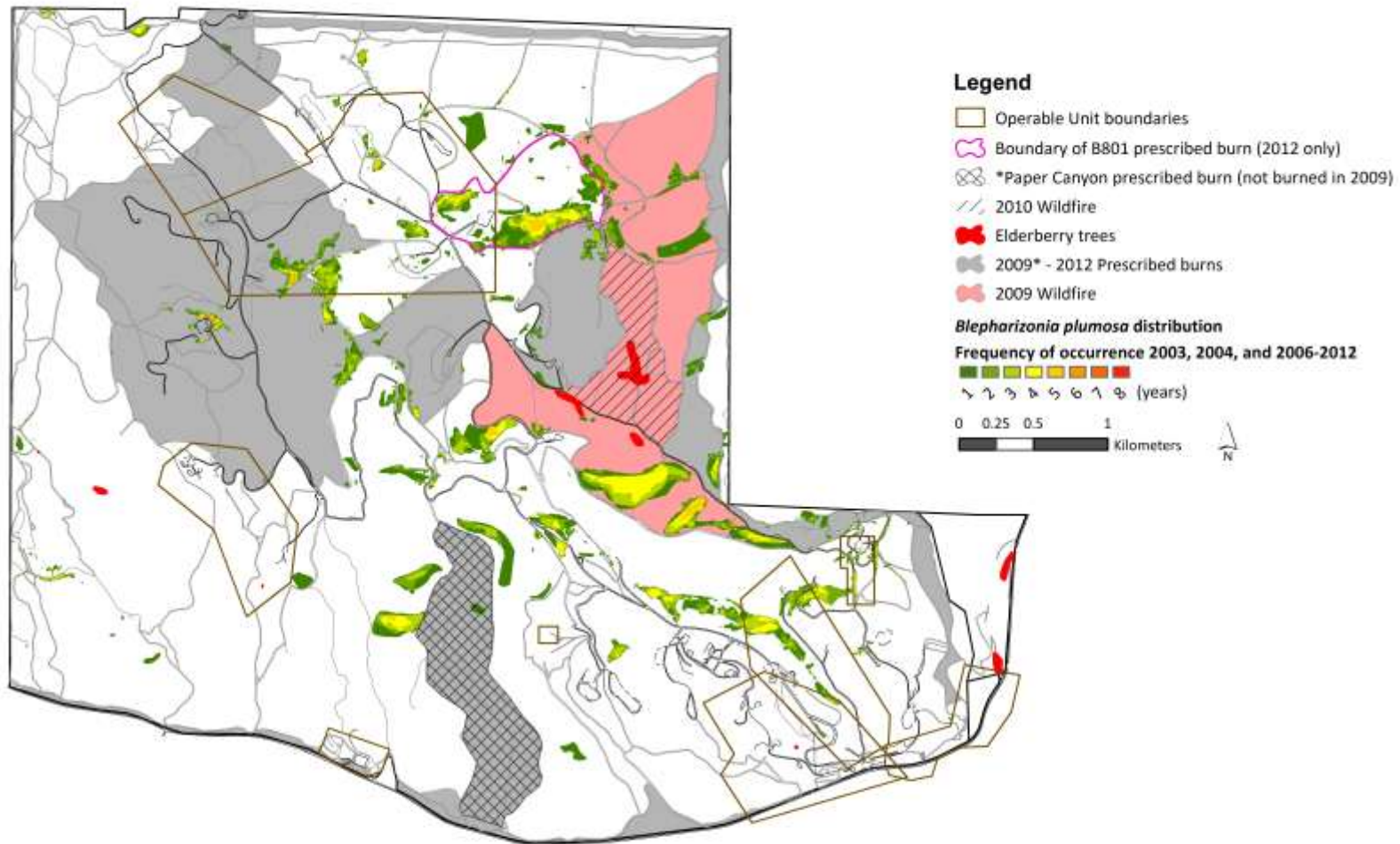
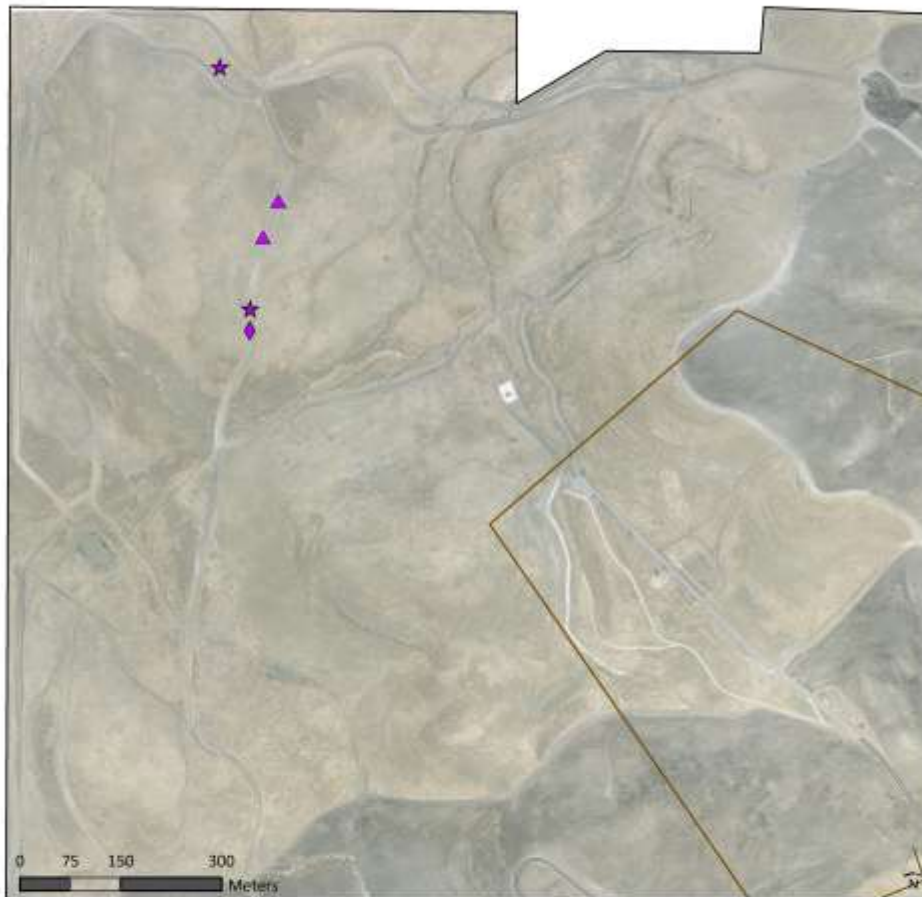
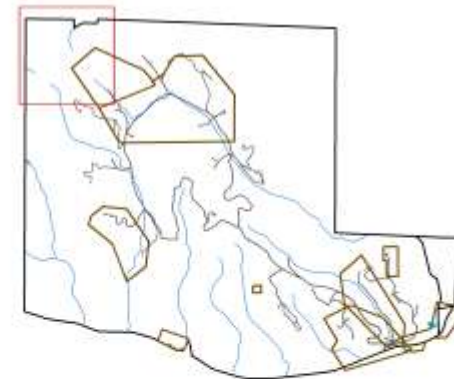


Figure 6. Map of Site 300 2009 through 2012 prescribed burns and wildfires with big tarplant and valley elderberry longhorn beetle distribution.



Legend

- Operable Unit boundaries
- ◆ 2009 incidental coast horned lizard observation
- ▲ 2010 incidental coast horned lizard observation
- ★ 2012 incidental coast horned lizard observation



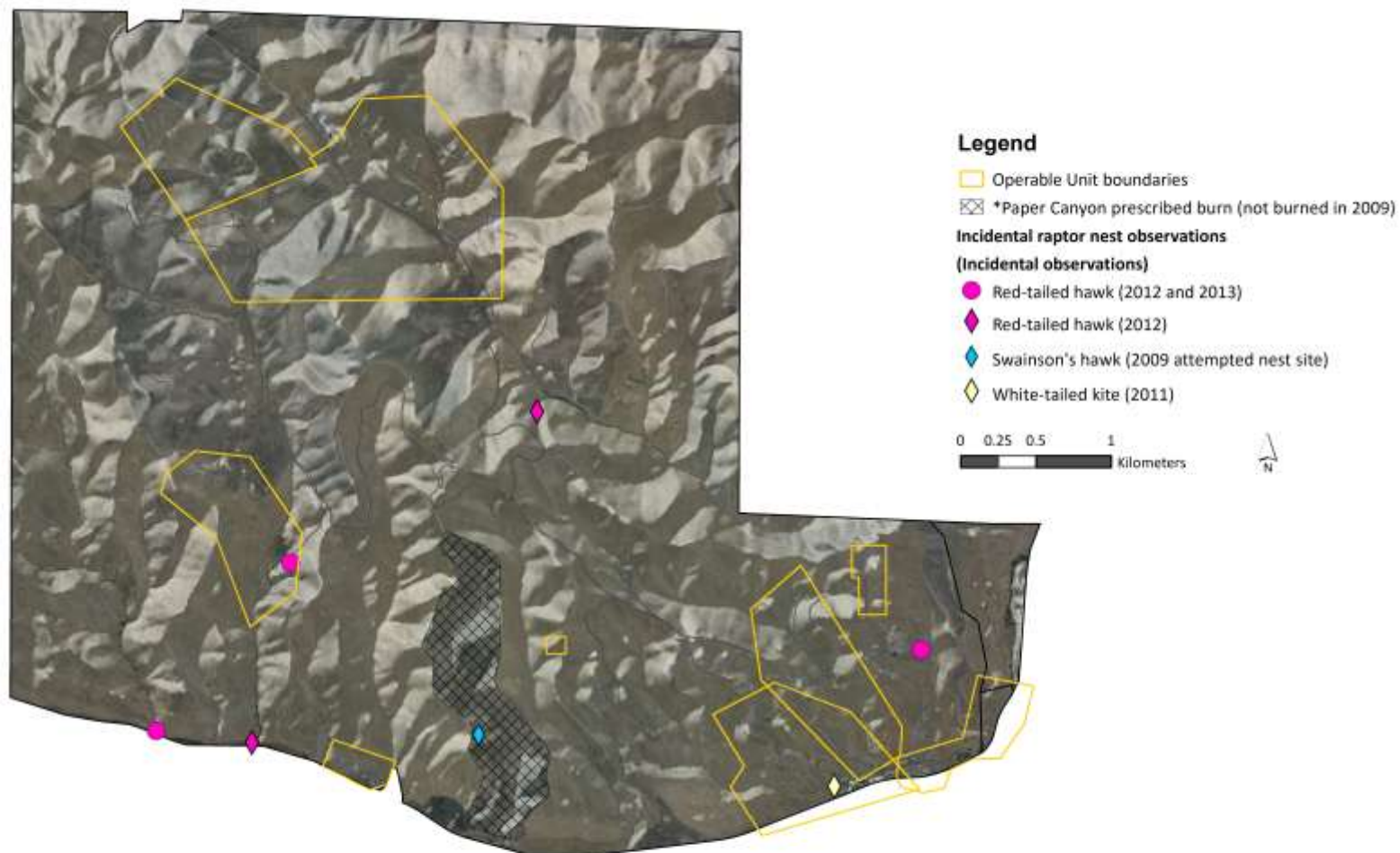


Figure 8. Incidental red-tailed hawk nesting observations for 2012 and 2013; Location of the 2009 Swainson's hawk nesting attempted; and the 2011 white-tailed kite nesting location. (Note: No site wide raptor nest surveys were conducted in 2009 through 2012.)

Tables

Table 1 (Page 1 of 3). Special-status wildlife and invertebrate species known to occur at Site 300.

Taxa	Common Name	Scientific Name 2013	Regulatory Status 2008	Regulatory Status^(a) 2013	Source
Invertebrates	Valley elderberry longhorn beetle	<i>Desmocerus californicus dimorphus</i>	FT	FT	Arnold 2002
Amphibians	California tiger salamander	<i>Ambystoma californiense</i>	FT, CASSC	FT, ST, CASSC	LLNL 2002
	Coast Range newt	<i>Taricha torosa torosa</i>	CASSC	CASSC	Woollett 2005
	California red-legged frog	<i>Rana draytonii</i>	FT, CASSC	FT, CASSC	LLNL 2002
	Western spadefoot toad	<i>Spea hammondi</i>	CASSC	CASSC	LLNL 2002
Reptiles	Pacific pond turtle	<i>Actinemys marmorata</i>	CASSC*	CASSC	Woollett 2005
	Alameda whipsnake	<i>Masticophis lateralis euryxanthus</i>	FT, ST	FT, ST	Swaim 2002
	San Joaquin coachwhip	<i>Masticophis flagellum ruddocki</i>	CASSC	CASSC	LLNL 2002
	Coast horned lizard	<i>Phrynosoma blainvillii</i>	CASSC	CASSC	LLNL 2002
	Silvery legless lizard	<i>Anniella pulchra pulchra</i>	CASSC	CASSC	Swaim 2002
Birds	Double-crested Cormorant	<i>Phalacrocorax auritus</i>	No special-status	DFWWL	LLNL 2003
	Osprey	<i>Pandion haliaetus</i>	No special-status	DFWWL	LLNL 2003
	Golden Eagle	<i>Aquila chrysaetos</i>	BGEPA, CAFPS	BGEPA, CAFPS	LLNL 2003
	Ferruginous Hawk	<i>Buteo regalis</i>	No special-status	DFWWL	LLNL 2003
	Swainson's Hawk	<i>Buteo swainsoni</i>	ST	ST	LLNL 2003
	White-tailed Kite	<i>Elanus leucurus</i>	CAFPS	CAFPS	LLNL 2003
	Cooper's Hawk	<i>Accipiter cooperii</i>	No special-status	DFWWL	LLNL 2003
	Sharp-shinned Hawk	<i>Accipiter striatus</i>	No special-status	DFWWL	LLNL 2003

Table 1. (Page 2 of 3)

Taxa	Common Name	Scientific Name	Regulatory Status 2008	Regulatory Status 2008	Source
	Northern Harrier	<i>Circus cyaneus</i>	CASSC	CASSC	LLNL 2003
	Prairie Falcon	<i>Falco mexicanus</i>	No special-status	DFWWL	LLNL 2003
	Short-eared Owl	<i>Asio flammeus</i>	CASSC	CASSC	LLNL 2003
	Burrowing Owl	<i>Athene cunicularia</i>	CASSC	BCC, CASSC	LLNL 2003
	Allen's Hummingbird	<i>Selasphorus sasin</i>	No special-status	BCC	LLNL 1992
	Rufous Hummingbird	<i>Selasphorus rufus</i>	No special-status	BCC	LLNL 2003
	Costa's Hummingbird	<i>Calypte costae</i>	No special-status	BCC	LLNL 2003
	Nuttal's Woodpecker	<i>Picoides nuttallii</i>	No special-status	BCC	LLNL 2003
	Willow Flycatcher	<i>Empidonax traillii</i>	SE	BCC, SE	van Hatterm 2005
	Loggerhead Shrike	<i>Lanius ludovicianus</i>	CASSC	BCC, CASSC	LLNL 2003
	Oak Titmouse	<i>Baeolophus inornatus</i>	No special-status	BCC	LLNL 2003
	Yellow Warbler	<i>Dendroica petechia brewsteri</i>	CASSC	BCC, CASSC	LLNL 2003
	Grasshopper Sparrow	<i>Ammodramus savannarum</i>	CASSC	CASSC	LLNL 2003
	Tricolored Blackbird	<i>Agelaius tricolor</i>	CASSC	BCC, CASSC	LLNL 2003
Mammals	Pallid bat	<i>Antrozous pallidus</i>	CASSC	CASSC	Rainey 2004
	Western red bat	<i>Lasiurus blossevillii</i>	CASSC	CASSC	Rainey 2004
	American badger	<i>Taxidea taxus</i>	CASSC	CASSC	LLNL 2002; Clark et al. 2002

Notes on following page.

Table 1. (Page 3 of 3)

Notes:

- FT = Threatened under the Federal Endangered Species Act
- BCC = U.S. Fish and Wildlife Service Birds of Conservation Concern (US Fish and Wildlife Service 2008)
- BGEPA = Bald and Golden Eagle Protection Act
- SE = Endangered under the State Endangered Species Act
- ST = Threatened under the State Endangered Species Act
- CAFPS = California Department of Fish and Wildlife Fully Protected Species (CA Fish and Game Code Section 3511)
- CASSC = California Species of Special Concern (CA Dept. of Fish and Wildlife, Special Animals List, January 2011)
- DFWWL = California Department of Fish and Wildlife Taxa to Watch

Table 2. 2010 Branchiopod Survey Summary (Dexter 2010).

Pool #	Survey Date	Special-status Species Observed	Non-special-status Species Observed
Pool A Overflow	02/04/10	none	None
Pool M3	02/04/10	none	Ost, Cor, Chi
Pool A Overflow	02/19/10	none	LIOC (dead), Ost
Pool M3	02/19/10	WSF eggs	Ost, Cor, Not
Pool A Overflow	03/05/10	none	Ost, Cor, Chi
Pool M3	03/05/10	WSF tadpoles	Ost, Cor, Chi
Pool A Overflow	03/19/10	none	Cla, Ost, Cor
Pool M3	03/19/10	WSF tadpoles	Ost, Cor, Chi
Pool A Overflow	04/02/10	none	Chi, Cha
Pool M3	04/02/10	WSF tadpoles, 3 CTS larvae	Cla, Ost, Cor, Not
Pool A Overflow	04/16/10	none	PSSI male and 10 egg masses, Ost, Cor, Cul, Chi, Cha
Pool M3	04/16/10	7 WSF tadpoles, 1 CTS larvae	Ost, Cor, Not
Pool A Overflow	04/30/10	none	CAT tadpoles
Pool M3	04/30/10	100+ WSF tadpoles, 3 CTS larvae	WSF tadpoles, Cor, Not
Pool A Overflow	05/14/10	none	none
Pool M3	05/14/10	WSF metamorphs	none

Notes:

Amphibians:

WSF – Western spadefoot (*Spea hammondi*)

CTS – California tiger salamander (*Ambystoma californiense*)

CAT – Western toad (*Bufo boreas halophilus*)

STR – Sierran treefrog (*Pseudocris sierra*)

Invertebrates

LIOC=California linderiella (*Linderiella occidentalis*)

Cha=Chaobatidae

Chi=Chironomid

Cla=Cladocera

Cor=Corixid

Cul=Culicidae

Not=Notonectid

Ost=Ostracods

Zyg=Zygoptera

Table 3. Summary of amphibian survey results for 1999-2008 biological review period compared to the 2009-2012 review period. CTS, CRLF, or WSF in the breeding success column indicates that those species were observed to reproduce and offspring were able to successfully complete metamorphosis at least once during the review period. At locations where CTS, CRLF, or WSF are not listed in the breeding success columns, unsuccessful breeding attempts may have been made.

Name used in the 2013 Biological Review (Figure 2)	Name used in 2008 Biological Review	1999-2008 WSF/CTS/CRLF Breeding Success	2009-2012 WSF/CTS/CRLF Breeding Success
Pool D	Danger Pools	CTS	Unknown
*	Elk Ravine at B865	CRLF	Water release terminated in 2006
Pool SG	Sharp Pool	CRLF CTS	Unknown
Pool CR	**	Unknown	CRLF
Pool M1a and 1b	Mid Elk Ravine	CRLF	CRLF
Pool M3	Burn Cage Pool	WSF CRLF CTS	WSF CTS/CRLF unknown
Pool OS	Overflow Pond	CRLF CTS	Unknown
Pool A	Ambrosino Pool	CRLF CTS	CRLF CTS
Pool H	Harrier Pool	CTS	Unknown
Pool M2	CTS mitigation pool	CTS	CTS
Pool HC1	Round Valley	CTS	Unknown
Pool J	Upper and Lower Juniper Slide Pool	CRLF	Unknown
Pool O	Pool O (2008 Review - Oasis)	CRLF	Unknown
Pool SVRA	CDFG Residence	CRLF	CRLF
Pool CP	**		CRLF
Pool S	Song Pool	CRLF	Unknown

Notes: *The Elk Ravine Pool at B865 is no longer present

**Pool CR and Pool CP were not known during the 1999-2008 Review Period

WSF – Western spadefoot (*Spea hammondi*)

CTS – California tiger salamander (*Ambystoma californiense*)

CRLF – California red-legged frog (*Rana draytonii*)

Blue – Elk Ravine watershed

Yellow – Patterson Pass watershed

Purple - Draney Canyon watershed

Green – Directly tributary to Corral Hollow

White – Pool OS is part of the sewage treatment system and is not tributary to any watershed.