

FORA ESCA REMEDIATION PROGRAM

2011 Annual Natural Resource Monitoring, Mitigation, and Management Report

Covering Activities Conducted from October 16, 2010
through October 15, 2011

Environmental Services Cooperative Agreement
Remediation Program Munitions Response Areas

Former Fort Ord
Monterey County, California

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920 2nd Avenue, Suite A

Marina, California 93933



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ACRONYMS AND ABBREVIATIONS

AOC	Administrative Order on Consent
Army	U.S. Department of the Army
BO	Biological Opinion
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CSUMB	California State University Monterey Bay
CTS	California tiger salamander
DBH	diameter at breast height
DGM	digital geophysical mapping
DTSC	Department of Toxic Substances Control
EPA	U.S. Environmental Protection Agency
ESCA	Environmental Services Cooperative Agreement
ESCA RP	Environmental Services Cooperative Agreement Remediation Program
FFA	Federal Facility Agreement
FORA	Fort Ord Reuse Authority
GIS	Geographic Information System
HMP	Habitat Management Plan
MEC	munitions and explosives of concern
MRA	Munitions Response Area
msl	mean sea level
NCA	Non-Completed Area
NRIM	Natural Resource Impact Mitigation
NRMA	Natural Resources Management Area (The area that is being managed by the Bureau of Land Management, within the central portion of former Fort Ord.)
QB	Qualified Biologist
RWQCB	Regional Water Quality Control Board
SCA	Special Case Area
SQB	Senior Qualified Biologist
USACE	U.S. Army Corps of Engineers

USFWS U.S. Fish and Wildlife Service

GLOSSARY

2011 Reporting Period

October 16, 2010 through October 15, 2011 (i.e., the period covered by this report).

Limb Up

Pruning of lower branches back to the main trunk or to major branches, usually to provide munitions and explosives of concern (MEC) clearance personnel access underneath large trees. The purpose of this procedure is to enable MEC clearance while allowing larger trees (generally trees that are 6 inches in diameter at breast height) to remain viable and in place.

Past Activities

Past activity (activities) refers to activities that occurred prior to the initiation of ESCA RP fieldwork at former Fort Ord. This phrase typically is used to characterize what appear to be anthropogenic disturbances in habitat parcels that were not caused by ESCA RP activities.

Seral

Stages (e.g., initial, early, intermediate, mature, sub-climax, climax, etc.) of a plant community demonstrated or presumed to be associated with succession (see also succession).

Succession

A natural temporal progression of plant community development from a disturbed to a “climax” state. Modern understanding of the climax state is that of a dynamic steady-state condition (see also seral, trajectory). (Note: The term succession as applied in plant ecology is associated with certain precursor-dependent processes that facilitate transition from one seral stage to the next. The development of central maritime chaparral at former Fort Ord following disturbance appears to involve a simpler sequence of opportunistic recruitment, stand maturation and competitive exclusion; therefore, maritime chaparral development in the area should be referred to as “stand maturation” rather than succession.)

Trajectory

The trend of temporal progression of a habitat from a disturbed (typically a restored or created habitat) to a “climax” (or predicted) condition. Although similar to “succession,” this term is more often employed in ecological restoration projects when physical features of the habitat (in addition to plant communities) are altered by the disturbance and which also exhibit progression to some equilibrium condition (see also succession).

Vegetation clearance

Vegetation clearance in this report refers to: 1) a prescribed burn or 2) manual and/or mechanical removal to a maximum 6-inch height except for large trees, which are pruned to a height that allows human access below the tree canopies (see “limb up”). Vegetation clearance is performed for the purpose of providing accessibility to the local ground surface for MEC clearance activities.

1.0 INTRODUCTION

1.1 Purpose and Scope

This Annual Natural Resource Monitoring, Mitigation, and Management Report summarizes natural resource-related activities performed by the Fort Ord Reuse Authority (FORA) Environmental Services Cooperative Agreement Remediation Program (ESCA RP) Team during the period from October 16, 2010 through October 15, 2011. The information presented in this report was obtained to meet requirements that are relevant to ESCA RP activities as described in relevant Biological Opinions (BOs) issued by U.S. Fish and Wildlife Service (USFWS) and the Habitat Management Plan (HMP; USACE 1997 [see Chapter 3, pp. 3-16 through 3-25]). These requirements are described in detail in Section 2 of this report.

Implementation of the requirements by the ESCA RP Team was conducted in coordination with the U.S. Department of the Army (Army). ARCADIS U.S., Inc. (ARCADIS) has prepared this document on behalf of FORA in accordance with industry standards and consistent with the requirements of the Remediation Services Agreement dated March 30, 2007, by and between ARCADIS and FORA, including any applicable governing documents and applicable laws and regulations.

This report is the fourth in a series of Annual Natural Resource Monitoring, Mitigation, and Management Reports produced for the ESCA RP. The three previous reports covered the 2008, 2009 and 2010 reporting periods (ESCA RP Team 2009, 2010a, 2011).

1.2 Environmental Services Cooperative Agreement

The former Fort Ord was placed on the National Priorities List in 1990, primarily because of chemical contamination in soil and groundwater that resulted from past Army operations. To oversee the cleanup of the base, the Army, the Department of Toxic Substances Control (DTSC), the Central Coast Regional Water Quality Control Board (RWQCB), and the U.S. Environmental Protection Agency (EPA) entered into a Federal Facility Agreement (FFA). One of the purposes of the FFA was to ensure that the environmental impacts associated with past and present activities at the former Fort Ord were thoroughly investigated and appropriate remedial action taken as necessary to protect public health and the environment. In accordance with the FFA, the Army was designated as the lead agency under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) for conducting environmental investigations, making cleanup decisions, and taking cleanup actions at the former Fort Ord. The EPA was designated as the lead regulatory agency for the cleanup, while the DTSC and RWQCB are supporting agencies.

On March 31, 2007, the Army and FORA entered into an ESCA with the Army for munitions and explosives of concern (MEC) remediation services, thereby allowing the Army to transfer approximately 3,380 acres of property to FORA as an Economic Development Conveyance under a Finding of Suitability for Early Transfer. In accordance with the ESCA, FORA is responsible for addressing MEC response actions for the ESCA property except for those responsibilities retained by the Army. To accomplish this effort, FORA entered into an agreement with ARCADIS (formerly LFR Inc.), teamed with Weston Solutions, Inc., and Westcliffe Engineers, Inc. (collectively “the ESCA RP Team”), to assist in the completion of

the MEC remediation activities on the 3,380 acres in accordance with the ESCA and an Administrative Order on Consent (AOC).

The AOC was entered into voluntarily by FORA, the EPA, the DTSC, and the U.S. Department of Justice Environment and Natural Resources Division on December 20, 2006 (U.S. EPA Region 9 CERCLA Docket No. R9-2007-03). The AOC was issued under the authority vested in the President of the United States by Sections 104, 106, and 122 of the CERCLA, as amended, 42 United States Code §§ 9604, 9606, and 9622.

FORA, through the ESCA RP Team, will complete the Army's MEC response actions, in a program hereinafter identified as the ESCA RP.

1.3 Site Location and Description

ESCA RP Munitions Response Areas (MRAs) are depicted on Figure 1 (yellow polygons). Since the inception of the ESCA RP, natural resource monitoring, mitigation, and management activities associated with natural resources requirements have been performed in the five MRAs that include habitat reserve or habitat corridor parcels: County North, Del Rey Oaks/Monterey, Future East Garrison, Interim Action Ranges, and Parker Flats (ESCA RP Team 2009, 2010a, 2011; Figure 2). During the period covered by this report, ESCA RP MEC investigation and remedial activities and related non-biological field activities were performed in three MRAs that include habitat parcels: Future East Garrison, Interim Action Ranges, and Parker Flats.

The following sections provide summaries of surroundings, terrain, soil, vegetation, and past activities (i.e., activities that occurred prior to initiation of ESCA RP activities) for each of these MRAs.

The line where development parcels abut the Natural Resources Management Area (NRMA) is referred to as the "borderland boundary" or "borderland interface" in the HMP. A number of management requirements are associated with development parcels where they adjoin the NRMA. These requirements are referred to as the "borderland boundary condition" and are described on pages 1-6, 4-3, and 4-57 of the HMP. This boundary was depicted on Figure 4-1 of the HMP; however, its location has changed owing to changes in the future uses of some parcels. The current borderland boundary (Army 2009b) is shown on Figure 1 and Figure 2. Borderland boundary condition requirements that are relevant to the ESCA RP include erosion control (see Section 4.6) and weed management (see Section 4.7).

1.3.1 Future East Garrison MRA

The Future East Garrison MRA (formerly known as the East Garrison MRA) is located in the northeastern portion of the former Fort Ord (Figures 2 and 3), and is wholly contained within the jurisdictional boundaries of Monterey County. This MRA encompasses approximately 244 acres and contains the following four U.S. Army Corps of Engineers (USACE) parcels: E11b.6.1, E11b.7.1.1, E11b.8, and L20.19 1.1. Of the 244 acres within this MRA, 170 are designated as habitat reserve. The line where development parcels abut the habitat reserve

parcels is referred to as the borderland interface and is subject to the requirements identified as borderland boundary condition.

The terrain of the Future East Garrison MRA varies from gently sloping in the south and west to steep canyon-like walls in the north and east. The elevation ranges from approximately 170 to approximately 480 feet mean sea level (msl). Three ravines exist within the MRA: one ravine extends to the east in the southern portion of the MRA, and two converging ravines extend to the northeast in the northern portion of the MRA. The slope of the terrain in the MRA ranges from relatively flat (3 to 5 percent) within an area formerly used as an Ammunition Supply Point, to steep (up to 50 percent) along the ravines. The MRA is underlain by several hundred feet of eolian deposits (Aromas Eolian Facies) consisting mostly of weathered dune sand. Surface soil conditions in the Future East Garrison MRA are predominantly weathered dune sand.

The Future East Garrison MRA primarily consists of maritime chaparral with small areas of oak woodland and grassland (USACE/Jones & Stokes 1992). Vegetation varies from sparsely vegetated areas to dense areas of overgrowth. The western portion of the MRA is designated as critical habitat for Monterey spineflower (Figure 9).

1.3.2 Interim Action Ranges MRA

The Interim Action Ranges MRA is located in the central portion of the former Fort Ord, within the boundary of the former impact area. The Interim Action Ranges MRA is bordered by the Parker Flats MRA to the north, the Seaside MRA to the east, and the former impact area to the southeast, south, and southwest (Figures 2 and 4). The Interim Action Ranges MRA is contained within the jurisdictional boundaries of Monterey County and a small portion in the City of Seaside. The Interim Action Ranges MRA encompasses approximately 231 acres and fully contains the following five USACE parcels: E38, E39, E40, E41, and E42. Of the 231 acres within this MRA, 206 acres are designated as habitat reserve. The line where development parcels in the north portion of the MRA abut the NRMA is referred to as the borderland interface and is subject to the requirements identified as borderland boundary condition.

The terrain of the Interim Action Ranges MRA is relatively flat. The elevation ranges from approximately 370 to approximately 530 feet msl with 2 to 15 percent slopes. The surface soils are characterized as eolian (sand dune) and terrace (river deposits), which consist of unconsolidated materials of the Aromas and Old Dune Sand formations. The primary soil type present in the Interim Action Ranges MRA is Arnold-Santa Ynez Complex with Baywood Sand in the northwestern portion of the MRA. Soil conditions at the MRA consist predominantly of weathered dune sand.

Vegetation in the Interim Action Ranges MRA consists primarily of maritime chaparral (USACE/Jones & Stokes 1992). Prior to 2003, much of the Interim Action Ranges MRA was inhabited by dense maritime chaparral with stands of varying maturity (or seral stage) ranging from very young to mature, the latter with shrub canopy up to 15 feet tall. The MRA was subjected to a prescribed burn in 2003. In early 2008, prior to initiation of ESCA RP vegetation monitoring activities in the MRA, ESCA RP biologists observed that the majority

of vegetation was about 4 feet tall and less dense than it had been prior to 2003. Patches of annual grassland habitats existed in 2008 along the western and southern boundaries of the MRA. Poison oak is present in the MRA. Except for a small parcel on the northern edge of the area, most of the MRA is designated as critical habitat for Monterey spineflower (Figure 9).

1.3.3 Parker Flats MRA

The Parker Flats MRA is located in the central portion of the former Fort Ord, bordered by the California State University Monterey Bay (CSUMB) Off-Campus MRA and the County North MRA to the north, the Interim Action Ranges MRA to the south, CSUMB campus property to the west, and additional former Fort Ord property to the east and southeast (Figures 2 and 5). The Parker Flats MRA is contained within the jurisdictional boundaries of the City of Seaside and Monterey County. The Parker Flats MRA (Phase I and Phase II areas) encompasses approximately 1,180 acres and fully contains USACE parcels E18.1.1, E18.1.2, E18.1.3, E18.4, E19a.1, E19a.2, E19a.5, E20c.2, E21b.3, L20.18, L23.2, and L32.1, and portions of USACE parcels E19a.3 and E19a.4. The remaining portions of USACE parcels E19a.3 and E19a.4 are contained in the County North MRA. The area completed under the Phase I activities was approximately 698 acres; the remaining approximately 482 acres were included under the Phase II activities. Of the 698 acres within the Phase I portion of this MRA, 143.8 acres are designated as habitat reserve. Of the 482 acres within the Phase II portion of this MRA, 167.2 acres are designated as habitat reserve. The line where the development parcel abuts the NRMA in the middle of the Phase II portion of the Parker Flats MRA is referred to as the borderland interface and is subject to the requirements referred to as borderland boundary condition.

ESCA RP fieldwork in the Parker Flats MRA is primarily associated with the Phase II area where additional MEC investigation and remedial activities is needed.

The terrain of the Parker Flats MRA is primarily rolling hills with moderate to steep slopes. The elevation ranges from approximately 280 to approximately 490 feet msl with 2 to 15 percent slopes. The surface soils are characterized as eolian (sand dune) and terrace (river deposits), which consist of unconsolidated materials of the Aromas and Old Dune Sand formations. The primary soil type present in the Parker Flats MRA is Oceano Loamy Sand with smaller areas of Arnold-Santa Ynez complex and Baywood Sand. Soil conditions at the MRA consist predominantly of weathered dune sand.

Vegetation in the Parker Flats MRA consists primarily of coastal coast live oak woodland with smaller areas of maritime chaparral, grassland, and coastal scrub (USACE/Jones & Stokes 1992). Vegetation varies from sparsely vegetated areas to heavy brush. Past field activities have noted the presence of poison oak in the area. As part of the Army's removal actions for MEC, manual and mechanical vegetation clearance was conducted to make the ground surface safe and accessible for MEC field crews. Manual and mechanical vegetation clearance in this report refers to manual and/or mechanical removal to a maximum 6-inch height except for trees, which are pruned to a height sufficient to allow human access below the tree canopies. In 2005, FORA, under the supervision of the Army, performed a prescribed burn on 147 acres in the Parker Flats MRA.

1.4 Overview of ESCA RP Activities

The 2008, 2009 and 2010 Annual Natural Resource Monitoring, Mitigation, and Management Reports prepared by the ESCA RP Team identified the habitat monitoring, vegetation clearance and cutting, and other field activities completed during these years (through October 15), respectively. This section includes an overview of the ESCA RP activities performed from October 16, 2010 through October 15, 2011 (“the 2011 reporting period”). Table 1 presents an overview of MRAs requiring natural resource monitoring, mitigation, and management activities associated with natural resources requirements where field activities were conducted by the ESCA RP Team during the 2011 reporting period.

Note: Scientific and common names of biological species included in this report are those employed in the HMP (USACE 1997) to maintain consistency with past requirements and documentation. If a species name(s) has changed according to an authoritative source (e.g., Latin names of plants [Baldwin et al. 2012]) or local usage of common names has changed, such “current” names are indicated in parentheses after the HMP name when it is first used in this report.

1.4.1 Future East Garrison MRA

Field activities for MEC remedial investigations in the Future East Garrison MRA within the habitat areas continued in 2011. Fieldwork included manual limbing of trees greater than 6 inches diameter at breast height (DBH) and mechanical vegetation cutting of undergrowth in the roads, trails and selected grids of parcels E11b.6.1 and E11b.7.1.1. As of October 15, 2011, approximately 104 acres of vegetation had been cut (Figure 6). Analog and Digital Geophysical Mapping (DGM) MEC remedial investigation within the habitat area continued in 2011. As of October 15, 2011, approximately 104 acres of MEC remedial investigation activities had been completed. MEC remedial investigations are expected to continue into 2012. Digging of anomalies included both near-surface digs using hand tools and subsurface removal using hand tools.

Other minor fieldwork included installing sign posts and trail markers, conducting brief surveys for erosion, removing trash and debris piles, and installing erosion control waddles.

Biologists’ reconnaissance surveys in 2010 indicated that the vegetation in the habitat parcels of the MRA needed to be mapped in greater detail to facilitate determination of monitoring locations and other natural resource-related mitigation measures. Accordingly, vegetation mapping was initiated in 2010 and continued into 2011. Further details concerning the vegetation mapping are included in Section 5.2.1. Baseline vegetation monitoring in the habitat parcels for HMP focus species (i.e., Monterey spineflower [*Chorizanthe pungens* var. *pungens*] and sand gilia [*Gilia tenuiflora* ssp. *arenaria*, also known as Monterey gilia]) and maritime chaparral vegetation (i.e., shrub transects) was ongoing as of the end of the 2011 reporting period and results will be provided in the 2012 Annual Natural Resource Report.

Monitoring of aquatic features (i.e., “vernal pools” and ponds) was performed in the spring of 2011. Further details concerning the surveys are included in Section 4.3.1.

1.4.2 Interim Action Ranges MRA

In October 2011, the ESCA RP Team commenced field activities in the Interim Action Ranges MRA Range 47 Special Case Area (SCA) and Range 44 SCA/Central Area Non-Completed Area (NCA; Figure 7). As of October 15, 2011 approximately 9.5 acres had been mechanically brush cut for the Interim Action Ranges MRA. MEC investigation and remedial activities as of October 15, 2011 consisted of DGM survey and data collection and associated target investigation had been completed for the approximate 9.5 acres. MEC investigation and remedial activities for the Interim Action Ranges MRA is ongoing. A vegetation monitoring survey initiated toward the end of the 2010 reporting period and completed in 2011 was performed in the habitat parcels for HMP focus species (i.e., Monterey spineflower, sand gilia, and seaside bird's-beak) and maritime chaparral vegetation (i.e., shrub transects). This monitoring effort was the seventh year post-burn survey. Further details concerning the survey are included in Section 5.2.2.

1.4.3 Parker Flats MRA

MEC-related field activities continued in the 2011 reporting period in the Parker Flats MRA (Figure 8). Vegetation clearance and manual limbing of trees greater than 6 inches DBH was conducted on approximately 167.8 acres of Parker Flats MRA habitat parcels in support of MEC investigation and remedial activities. DGM data collection and associated target investigation operations were completed in October 2009.

Other minor fieldwork included installing sign posts and trail markers in both the Parker Flats MRA Phase I and Phase II areas, conducting brief surveys for erosion, removing trash and debris piles, and installing erosion control waddles, as necessary.

The year 1 post-ESCA RP disturbance survey for Monterey spineflower was performed in the habitat parcel. Further details concerning the survey are included in Section 5.2.3.

1.4.4 Cumulative Vegetation Clearance in Habitat Parcels

Annual and cumulative to date (i.e., as of October 15, 2011) acreages of habitat parcels subjected to vegetation clearance by the ESCA RP are shown in Table 1.

2.0 NATURAL RESOURCE MONITORING AND MITIGATION MEASURES

Primary requirements for natural resource monitoring and mitigation associated with the ESCA RP are described in the HMP (USACE 1997; see Section 2.1) and BOs issued by the USFWS and are described in detail below.

2.1 Habitat Management Plan

Most of the natural resource monitoring and mitigation requirements associated with the ESCA RP are described in the HMP, Chapter 3, titled "Ordnance and Explosives Removal." Details of vegetation monitoring procedures are presented in Section 2.2.

Over the entire footprint of former Fort Ord (including the ESCA parcels as well as other areas not included in the ESCA agreement), MEC (formerly referred to as ordnance and explosives) investigation and remedial activities was anticipated to require removal of vegetation (possibly by burning to clear the ground surface), location by visual and electromagnetic means, and then either surface and/or subsurface removal. Surface-only removal areas are subjected to minimal disturbance of the soil and root systems of pre-existing vegetation. Subsurface removal areas are anticipated to range in size from a single cubic foot to several cubic feet, depending on the type, location, and position of MEC. The spatial extent of soil and root system disturbance in these areas is a function of the spatial extent of excavations required to complete subsurface removal. A potential method of disposal of MEC is in situ detonation, which would increase the amount of soil disturbed according to the HMP. Subsurface removal/investigation activities were planned for areas where historical record reviews and interviews indicate the possible presence of buried MEC or in impact areas where MEC may have penetrated the ground surface. In some cases, Army MEC subsurface removal efforts may involve substantial excavation and occasionally exceed depths of 10 feet below ground surface (USACE 1997).

Under the ESCA RP, the majority of MEC subsurface investigation activities in habitat parcels through October 15, 2011, required relatively minor soil excavation (i.e., small footprint and shallow “mag and dig” recovery).

Effects on sensitive species were anticipated in the HMP. Sensitive species and their habitats could be subjected to vegetation burning and cutting, whole plant excavation, crushing or trampling from movement of excavation equipment and removal team foot traffic, and on-site MEC detonation. Investigation of MEC “could occur in areas supporting approximately 75% of the occupied habitat of sand gilia and Monterey spineflower at former Fort Ord” (USACE 1997). The number of individuals and amount of habitat affected was undetermined because the locations and amount of MEC had not been quantified, but it was estimated that “approximately 50-70% of the entire range of sand gilia and about 75-95% of the entire range of Monterey spineflower are located on former Fort Ord” (USACE 1997). It was also known, however, that vegetation burning and cutting may temporarily benefit sand gilia and Monterey spineflower recruitment by removing overstory vegetation and loosening surface soil (i.e., by temporarily increasing the spatial extent of suitable microhabitat for the two species).

The HMP also anticipated effects to the black legless lizard (*Anniella pulchra*), the California red-legged frog (*Rana aurora draytonii*), California tiger salamander (CTS; *Ambystoma californiense*), the California linderiella (*Linderiella occidentalis*), and other species. Other sensitive plants anticipated to be affected included seaside bird's-beak (*Cordylanthus rigidus* spp. *littoralis*), Eastwood's ericameria (*Ericameria fasciculata*), coast wallflower (*Erysimum ammophilum*), toro manzanita (*Arctostaphylos montereyensis*), sandmat manzanita (*Arctostaphylos pumilla*), and Monterey ceanothus (*Ceanothus cuneatus* var. *rigidus*), but the geographic distributions of these species are more widespread than those of Monterey spineflower and sand gilia. Therefore, the potential effects of MEC investigation and remedial activities at the former Fort Ord were considered likely to have proportionately less overall effect on the other sensitive plant species' populations than they would on Monterey spineflower and sand gilia.

The main objective of the HMP's mitigation efforts for MEC investigation and remedial activities was to re-establish healthy, high-diversity maritime chaparral habitat (including HMP species) that has a variety of "seral" stages and age classes and that includes microhabitat for sand gilia, Monterey spineflower, seaside bird's-beak, and black legless lizard. These measures included an overall effort to minimize disturbance associated with MEC investigation including avoidance where feasible of known sensitive plant populations, a vegetation burning and restoration program planned to coordinate with MEC cleanup activities, an employee education program, and a series of measures to minimize impacts to the black legless lizard, California linderiella, CTS, and California red-legged frog.

Restoration to occur after MEC investigation and remedial activities was expected to bring the disturbed areas back to a naturally regenerating maritime chaparral habitat that is managed using controlled burning and other techniques that maximize the habitat value for HMP species. Restoration for sand gilia, Monterey spineflower, and seaside bird's-beak would be considered successful if, five years after disturbance, self-sustaining populations were observed in a mosaic of various stand ages of maritime chaparral, the amount of occupied habitat was measured to be comparable to 1992 levels, and population sizes were measured to be comparable to 1992 levels (USACE 1997).

Past experience with MEC investigation and remedial activities on the former Fort Ord reveals that plant communities generally recovered naturally and exhibited early stages of community development within a short timeframe (several years; Army 2009a). Per the BO for CTS, wetlands used by CTS, if disturbed, are required to be restored (USFWS 2005).

According to the HMP, after each year's monitoring, the management of restored maritime chaparral habitat will be modified to reflect the changing conditions and continued progression toward the success criteria. Corrective measures for chaparral habitat and the sensitive species that occur there included supplemental weeding, planting, or seeding. Corrective measures for vernal pool and pond restoration (referred to as "aquatic features" by ESCA RP Team) were planned to be evaluated on a case-by-case basis.

Species of concern are listed in Tables 2-1 and 2-2 in Chapter 2 of the HMP.

The period between transfer of the ESCA property from the Army to FORA and final approval by the regulatory agencies of the MEC investigation and remedial activities conducted by the ESCA RP Team is expected to be relatively short. During this period, caretaker (i.e., "interim") management requirements described in Chapter 4 of the HMP will be implemented by the ESCA RP Team in areas that are disturbed as a result of the ESCA RP field activities. These measures will prevent or minimize degradation of natural resources within such parcels (beyond what was required to complete MEC investigation and remedial activities) as a result of ESCA RP field activities. Such caretaker requirements include maintenance of fire breaks, limiting public access, providing for emergency vehicle access along the borderland boundary, and erosion and weed control, as needed, in all areas disturbed by the ESCA RP field activities. Management requirements associated with long-term management of the ESCA parcels will be implemented when the parcels transfer to the intended owners or, if transfer is substantially delayed, by FORA, as appropriate.

Chapter 4 of the HMP defines the intended purpose and designations of each parcel of the former Fort Ord. Development parcels are intended to promote economic recovery and will be developed without restrictions or guidelines. Parcels designated primarily for development require recipients of the land to follow guidelines or preserve certain areas. Other parcels are set aside as habitat reserves or corridors, and have specific management guidelines and restrictions on their development and uses. The ESCA MRAs are made up of several entire or partial parcels as defined by the HMP, and thus have multiple intended uses (see Section 1.3).

2.2 Vegetation Monitoring Protocol

In 2009, the “Protocol for Conducting Vegetation Monitoring in Compliance with the Installation-Wide Multispecies Habitat Management Plan at Former Fort Ord” (“the monitoring protocol”; Burlison 2009) was issued.

Vegetation monitoring is required in habitat parcels if vegetation is disturbed as a result of ESCA RP MEC investigation and remedial activity. The monitoring protocol described a requirement to perform a pre-disturbance (i.e., “baseline”) survey. “HMP annuals” are to be surveyed in the baseline year and in years 1, 3, 5, and 8 post-remediation (the ESCA RP Team refers to HMP annuals as “focus species” because not all of them are annuals). HMP shrubs and associated flora (i.e., maritime chaparral vegetation) are to be surveyed in the baseline year and in years 3, 5, 8, and 13 post-remediation. Note that, depending on the timing of the baseline monitoring effort and completion of the activities in the MRA, post-disturbance surveys may begin more than one year after the baseline survey (for focus species) and/or more than three years after the baseline survey (for shrub transects).

Vegetation monitoring methods include:

- 1) surveys of certain herbaceous plant species (i.e., focus species) targeting their respective suitable habitats, sampled with 5-meter diameter circular plots, and
- 2) surveys of maritime chaparral vegetation stratified by stand age and/or plant association, sampled with line-intercept transects and associated quadrat sampling.

The focus species surveys generally are conducted during the peak flowering period (April through September, depending on the species) and are intended to document population changes of the species after MEC investigation and remedial activities. The central maritime chaparral vegetation (i.e., shrub transect) surveys may be conducted at any time in the growing season and are intended to document recovery of the chaparral community after MEC investigation and remedial activities.

2.3 Wetlands Monitoring and Restoration Plan

Wetland monitoring performed at the Future East Garrison MRA aquatic features was based on the Wetlands Monitoring and Restoration Plan (Burlison 2006) and the Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander (Anon. 2003). The Wetlands Monitoring and Restoration Plan contains wetlands-specific monitoring protocol based on requirements in the HMP (USACE

1997) and the 2005 BO (USFWS 2005). The Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander was used specifically for guidance on aquatic larval sampling protocol for CTS.

2.4 Biological Opinions

USFWS has issued BOs to the Army, of which three are applicable to the ESCA RP. The BOs were issued by the USFWS to the Army, and the ESCA RP Team (particularly the Qualified Biologists [QBs]) acts as the Army's agent to implement relevant requirements of the BOs while conducting fieldwork within ESCA RP MRAs. In this role, the ESCA RP biologists are in frequent communication with Mr. William Collins, Base Realignment and Closure (BRAC) Wildlife Biologist, as needed to address natural resource compliance requirements.

Of the three applicable BOs, the 1999 opinion dated March 30, titled "Biological and Conference Opinion on the Closure and Reuse of Fort Ord, Monterey County, California (1-8-99-F/C-39R)" addresses the impacts that the closure and reuse of Fort Ord may have on nine species, which were at the time federally listed or proposed to be listed (USFWS 1999).

The October 22, 2002 "Biological and Conference Opinion on the Closure and Reuse of Fort Ord, Monterey County, California as it affects Monterey Spineflower Critical Habitat (1-8-01-F-70R)" (USFWS 2002) addresses the impacts that the closure and reuse of Fort Ord may have on the Monterey spineflower (*Chorizanthe pungens* var *pungens*) and its critical habitat. Army GIS data indicate that this critical habitat exists in certain ESCA RP MRAs.

The March 30, 2005 BO titled "Cleanup and Reuse of Former Fort Ord, Monterey County, California, as it affects California Tiger Salamander and Critical Habitat for Contra Costa Goldfields (1-8-04-F-25R)" (USFWS 2005) addresses the impacts that the closure and reuse of Fort Ord may have on CTS and critical habitat for Contra Costa goldfields. Army GIS data indicate that CTS occurs or is likely to occur within ESCA RP MRAs.

2.5 Weed Management

ESCA RP is responsible for monitoring and managing weed infestations that occur as a result of surface soil disturbances that are a consequence of MEC investigation and remedial activities in the ESCA parcels.

The focus and level of effort of the ESCA RP invasive weed monitoring, management, and abatement activities are intended to be consistent with those conducted by the Army. The primary species to be monitored and abated are:

- 1) pampas and/or jubata grass (*Cortaderia selloana* [Schultes] Asch. & Graebner, *C. jubata* [Lemoine] Stapf.)
- 2) French broom (*Genista monspessulana* [L.] L. Johnson)
- 3) hottentot fig or iceplant (*Carpobrotus* spp., especially *C. edulis*)

The goal of the weed abatement effort is to avoid degradation of ecological communities and especially sensitive species populations (as a result of weed invasion) in parcels not designated for development. (Note: The reference to Scotch broom control in the HMP [pp. 4-57] was intended to refer to French broom according to Mr. William Collins, BRAC Wildlife Biologist [U.S. Army 2009a].)

To comply with applicable weed management requirements, the ESCA RP Team developed a Weed Management Plan (ESCA RP Team 2010b). The plan identifies development of weed monitoring plans (minimum of one monitoring plan per year) followed by weed management activities as indicated by the monitoring results.

3.0 SUMMARY OF ESCA RP VEGETATION CLEARANCE AND MEC ACTIVITIES

The ESCA RP Team conducted vegetation clearance in habitat parcels in support of MEC activities in the Future East Garrison MRA, Interim Action Ranges MRA, and Parker Flats MRA.

3.1 Future East Garrison MRA

Site preparation activities for remedial investigation within the Future East Garrison MRA roads, trails, and select grids within the habitat areas began in October 2010. Preparatory work included manual limbing of trees greater than 6 inches DBH and mechanical vegetation cutting of undergrowth. As of October 15, 2011, approximately 96 acres of vegetation had been cut.

MEC remedial investigation within the habitat area of the Future East Garrison MRA was initiated on October 13, 2010 and is ongoing as of October 15, 2011 (Figure 6). The ESCA RP Team submitted Field Variance Form Number G4WP-001 Expanded Investigation Acreage in Habitat Reserve Area Parcel E11b.7.1.1, recommending additional grid investigation. As stated, approximately 96 acres of vegetation had been mechanically removed within the habitat area of the Future East Garrison MRA in support of MEC remedial investigation. Of this acreage, approximately 50 acres of central maritime chaparral were mechanically removed to support the MEC remedial investigation in parcel E11b.7.1.1. MEC remedial investigation included digging of anomalies, both near-surface digs using hand tools and subsurface removal using hand tools.

3.2 Interim Action Ranges MRA

In November 2009, the ESCA RP Team conducted a site reconnaissance of the Interim Action Ranges MRA in support of the Remedial Investigation/Feasibility Study Report. MEC investigations and remedial activities commenced in October 2011 and are ongoing as of October 15, 2011 (Figure 7). Site preparation work in the habitat area of the Interim Action Ranges MRA included vegetation clearance of approximately 9.5 acres. As of October 15, 2011, approximately 9.5 acres of vegetation had been mechanically removed in support of MEC investigation and remedial activities.

3.3 Parker Flats MRA

MEC remedial investigation consisting of an instrument-aided, analog near-surface investigation followed by a DGM investigation of the recreational trails network occurred in the habitat areas of the Parker Flats MRA between December 2008 and September 2009. Investigation of anomalies included both near-surface digs using hand tools and subsurface investigation using either hand tools or backhoes. The areas of MEC remedial investigation are shown on Figure 8 and involved removal of approximately 167.7 acres of vegetation in the habitat area of the Parker Flats MRA.

3.4 Cumulative Areas of Vegetation Clearance in Habitat Parcels

Table 1 presents a summary of habitat parcel areas subjected (in acres) to vegetation clearance performed by the ESCA RP Team. ESCA RP vegetation clearance in habitat parcels began in 2008. Areas cleared in 2008, 2009, 2010 and cumulative totals as of October 15, 2011, are shown in Table 1. De minimis vegetation clearance (i.e., minor vegetation removal to facilitate sign installation, vehicle access on trails, etc.) is not quantified but indicated as “DM” in the table. As of October 15, 2011, habitat parcels in four MRAs had experienced vegetation clearance. A total of 167.7 acres of vegetation had been cleared in the Parker Flats MRA to facilitate MEC investigation and remedial activities. A total of 95.6 acres had been cleared in the Future East Garrison MRA. A total of 9.5 acres had been cleared in the Interim Action Ranges MRA.

4.0 SUMMARY OF MONITORING AND MITIGATION MEASURES

Habitat monitoring, management, and mitigation activities performed by the ESCA RP Team during late 2007, 2008, 2009 and 2010) were documented in the 2008, 2009 and 2010 Annual Natural Resource Monitoring, Mitigation, and Management Reports (ESCA RP Team 2009, 2010a, 2011).

This section summarizes the habitat monitoring, management, and mitigation activities performed by the ESCA RP Team during the period from October 16, 2010 through October 15, 2011.

4.1 Qualified Biologist Memoranda

Some of the monitoring and mitigation activities identified in the HMP and BOs require evaluations to determine their applicability. There is no requirement for these evaluations to be documented; however, beginning in 2008, the ESCA RP Team has documented such evaluations via a series of technical memoranda developed by the Senior Qualified Biologist (SQB). In the 2011 reporting period, no QB Memoranda were finalized.

4.2 Natural Resource Impact Mitigation Checklists and Inspection Reports

In the past, the U.S. Army prepared “habitat checklists” that tabulated detailed mitigation measures to be employed during field activities. Such checklists were prepared to inform and assist field personnel in complying with HMP and BO requirements.

The ESCA RP Team developed a comparable document, the Natural Resource Impact Mitigation (NRIM) checklist, for its activities. The following checklists were developed and implemented during this reporting period. Copies of the NRIM checklists and inspection reports that were prepared during the reporting period are included in Appendix A.

4.2.1 Checklists

4.2.1.1 *Future East Garrison MRA*

A NRIM checklist was developed for vegetation removal and MEC activities in the habitat parcels of the Future East Garrison MRA. The checklist addressed all relevant mitigation measures, including location-specific measures to minimize impacts on aquatic features and CTS, sand gilia and Monterey spineflower populations. It also provided for preserving trees over 5 inches DBH whenever feasible. A copy of the checklist is included as Appendix A.

4.2.1.2 *Parker Flats Phase II MRA*

An October 15, 2009 revision to an earlier NRIM checklist was developed for vegetation removal and MEC activities in the habitat parcels of the Parker Flats Phase II MRA. The revision updated parcel numbers, parcel ownership, and locations of Monterey spineflower populations. It included mitigation measures to minimize impacts to CTS and Monterey spineflower and provided for preserving trees over 5 inches DBH whenever feasible. A copy of the checklist is included as Appendix A.

4.2.1.3 *Interim Action Ranges MRA*

A NRIM checklist was developed for vegetation removal and MEC activities in the habitat parcel of the Interim Action Ranges MRA. The checklist addressed all relevant mitigation measures, including location-specific measures to minimize impacts to aquatic features and CTS, sand gilia and Monterey spineflower populations. A revision to the checklist was generated to address additional MEC activities. A copy of the checklist is included in Appendix A.

4.2.2 Inspection Reports

NRIM inspections were performed by ESCA RP QBs to document compliance with mitigation measures in the checklists. Summaries of the inspections are presented below.

4.2.2.1 *Future East Garrison MRA*

On March 22, 2011, a QB conducted an inspection of vegetation cutting and MEC investigation activities in the eastern habitat parcel of Future East Garrison MRA to determine compliance with the respective NRIM checklist. The QB marked sand gilia and spineflower populations for avoidance. The QB also staked out aquatic features. Field personnel were observed to be following mitigation measures to minimize potential impacts to CTS. The QB flagged toro manzanitas larger than 6 inches DBH to be avoided during vegetation removal. Field personnel were observed to be following the mitigation measures in the checklist and there were no concerns to report. A copy of the inspection report is included in Appendix A.

4.2.2.2 *Interim Action Ranges MRA*

On June 9, 2011, a QB inspected vegetation cutting and ingress and egress routes in the Interim Action Ranges MRA. Field personnel were limiting ingress/egress routes to designated roads and corridors as described in the checklist. Vegetation removal was performed in accordance with the checklist mitigation measures. CTS radii were not staked; however, field personnel were provided maps showing CTS radii and were requested to use CTS mitigation measures in those areas. Personnel were following checklist mitigation measures and there were no concerns to report. A copy of the inspection report is included in Appendix A.

4.3 CTS Mitigation Measures Implemented

Additional ESCA RP Biologists (Tallis and Graham) were approved by USFWS to handle CTS for rescue and relocation. Approval documentation is included in Appendix B.

Along with the general impact minimization practices such as employee training, limiting ingress and egress to a work area to established roads and paths, and limiting soil disturbances to work areas only, further CTS-specific mitigation measures were implemented by the ESCA RP Team. A QB performed environmental awareness training of field personnel prior to initiation of fieldwork in the Future East Garrison MRA, placing special emphasis on CTS awareness, requirements, and mitigation measures. Personnel were advised that several aquatic features (potential breeding habitats for CTS) are present in the Future East Garrison MRA and the Interim Action Ranges MRA (Figure 10). Fieldwork supervisors also frequently coordinated with the QBs on the status of field operations so that the QBs were aware of where work was occurring. If more than 0.5 inches of rain had fallen within 24 hours of the initiation of fieldwork, field personnel were requested to carefully inspect equipment left overnight before starting work each day and to notify a QB if trapped CTS were encountered. Field personnel were also reminded of the mitigation measures associated with open pits, although the planned “mag and dig” operations were not expected to result in pits large enough to exceed the mitigation measure trigger thresholds and pits normally would be filled at the end of the day. They were also instructed, if a CTS were encountered in an open pit, to cover the pit to prevent desiccation of the animal and to call the SQB immediately.

No adult or juvenile CTS encounters occurred during the 2011 reporting period.

4.3.1 Aquatic Feature Monitoring in the Future East Garrison MRA

Monitoring of aquatic features (i.e., “vernal pools” and ponds) was conducted in the Future East Garrison MRA in spring 2011. The detailed report on aquatic feature monitoring is included in Appendix C. The findings from the detailed report are included in this section.

The SQB provided environmental awareness training to field personnel and supervisors prior to the beginning of MEC remedial investigation in the Future East Garrison MRA.

Two clusters of aquatic features occur within the MRA: one is located in the northeastern portion and the other in the southwestern portion. Aquatic features are habitats where CTS may breed and where larvae may develop during the wet season. Anticipating the possibility that ESCA RP Team MEC remedial investigation could occur within the features, monitoring was performed in 2010 and 2011 in accordance with the relevant protocols.

Rainfall data and ponding observations indicated that precipitation conditions in the 2011 wet season were sufficient to enable CTS migration/breeding. Aquatic features were monitored from January through June 2011. Water quality and ponding information was recorded as required. CTS larval surveys were performed in March, April and May under the direct supervision of a USFWS-approved biologist. Two CTS larvae were captured and no CTS adults were captured or observed during these surveys. These were the first record of CTS presence of either larvae or adults within the Future East Garrison MRA. Notifications of the larval captures were reported to the U.S. Army and USFWS (Appendix B). California fairy shrimp were not observed in the aquatic features in 2011, although they were observed in some of the features during the 2010 surveys. Other species commonly encountered during the surveys included Pacific tree frog (eggs, larvae and adults), bullfrogs (primarily sub-adults), and a number of invertebrate species, most commonly clam shrimp and water boatmen. Vegetation associated with the features was also documented.

During 2011, MEC remedial investigation occurred in the vicinity of the southwestern aquatic features. A QB coordinated with the MEC field personnel to flag off the three aquatic features so crews and equipment stayed at least 5 feet outside the high water mark. No vegetation or soil was affected in the aquatic features and no heavy equipment operated in the aquatic features. Based on the results of the 2010 and 2011 surveys and current work plans, it is unlikely that there will be impacts to CTS and/or the aquatic features from ESCA RP Team MEC investigation and remedial activities in the Future East Garrison MRA.

4.4 Other Wildlife

ESCA RP Team members perform animal rescue and/or relocation as needed to avoid or reduce impacts of the fieldwork on wildlife. There were two relocations of rattlesnakes performed by ESCA RP biologists during the 2011 reporting period: on June 17 and 23, both in the Interim Action Ranges MRA. Handling procedures minimized risk to human health and safety as well as minimizing injury to the animals (see QB Memorandum ESCA-wide QB 2; ESCA RP Team 2010a).

4.5 Vegetation Impact Mitigation Measures

Per the HMP and BOs, a number of impact minimization practices have been employed during field operations. These practices include employee environmental awareness training, limiting ingress and egress to a work area to established roads and paths whenever possible, and limiting vegetation clearance and soil disturbance to the minimum feasible area required to conduct MEC investigation and remedial activities. Where appropriate to avoid unnecessary impacts, locations of HMP plant species and/or their habitats were marked in the field to assist avoidance by field crews.

In the eastern habitat parcel of the Future East Garrison MRA, where vegetation removal was planned and stands of mature toro manzanita (*Arctostaphylos montereyensis*, an HMP species) occur, the largest individuals of toro manzanita were marked and their removal was avoided whenever feasible, to facilitate seed dispersal and seed bank augmentation.

4.6 Erosion Control

Consistent with the requirements of the HMP (USACE 1997) and BOs relevant to ESCA RP activities (USFWS 1999, 2002, and 2005), erosion control was implemented as needed in the parcels included in the ESCA RP. See particularly the 2005 BO (USFWS 2005, pp. 14-15) for a description of erosion control measures.

Areas adjacent to the borderland boundary where substantial disturbance of soil occurred as a result of ESCA RP activities and where there is risk of sheet flow and sedimentation into the NRMA are the focus of ESCA RP erosion monitoring and control. Such areas are monitored periodically.

On October 6, 2011, after substantial rainfall events, an ESCA RP Team member conducted a survey of the borderland boundary in the Seaside MRA. During the post-precipitation erosion control inspection, there were three areas of concern discovered where erosion of soil sediments from unpaved roads or non-vegetated areas within the NRMA were noted to have impacted the Blueline Road. The three areas of concern were noted as being the following:

- Broadway West Gate
- Austin North Gate
- Former Range 19 area

The ESCA RP Team wrote a memo to document the erosion issues and provided a copy to the Army for their review and corrective actions. (Appendix D)

No other areas of concern regarding erosion into the NRMA from ESCA RP parcels were observed during the reporting period.

4.7 Weed Management Activities

Consistent with the requirements of the HMP (USACE 1997) and BOs relevant to ESCA RP activities (USFWS 1999, 2002, and 2005), weed management activities were implemented in the parcels included in the ESCA RP. See particularly the 2005 BO (USFWS 2005, pp. 14-15) for a description of weed control measures.

4.7.1 Management Plan

The ESCA RP Team is responsible for monitoring weed infestations that occur as a result of surface soil disturbances related to MEC activities by ESCA RP personnel in the ESCA parcels. If weeds populate such disturbed areas in habitat parcels or threaten to disperse from disturbed areas in development parcels into nearby habitat parcels, appropriate abatement actions should be implemented as described in the ESCA RP Weed Management Plan, which was finalized in May 2010 (ESCA RP Team 2010b).

4.7.2 Areas of Soil Disturbance

ESCA RP activities that substantially disturb surface soils (i.e., subsurface MEC investigation and remedial activities, grading, and/or removal of surface soils in large areas) create potential sites for weed recruitment and population establishment. Major areas of soil were disturbed by ESCA RP activities in the Interim Action Ranges MRA in the 2011 reporting period. However, the excavation areas were still active at the end of the reporting period and monitoring of these areas was deferred because plant growth was not expected.

4.7.3 Monitoring Plan

The 2011 Weed Monitoring Plan was prepared on June 23 and updated after the reporting period of this report; however, because it covered activities prior to October 15, it is included in this report (see Appendix E).

The plan identified two locations for weed monitoring. The first area identified for monitoring was the area where stockpiles of iceplant were placed in the northeastern portion of the Seaside MRA (i.e., a development parcel) near the NRMA boundary. The stockpiles were generated during ESCA RP weed abatement activity in the parcel in 2010. Monitoring was performed to determine plant survival and the potential for plants and/or propagules to disperse across the NRMA boundary and into the habitat area. The second location to be monitored was the soil stockpiles located in the development parcel of the Interim Action Ranges MRA. Monitoring was performed to determine if target weed populations were present, were reproductive, and/or indicated a potential to disperse across the adjacent NRMA boundary and into the habitat parcel. The second location was monitored in November 2011 (after the reporting period for this report). That monitoring report will be included in the 2012 Annual Natural Resource Monitoring, Mitigation, and Management Report.

4.7.4 Monitoring Report Summary

On June 23, 2011, the iceplant stockpiles in the Seaside MRA were monitored by a QB. The stockpiles were monitored for survival and for the potential to recruit across the NRMA boundary. The physical dimensions of the stockpiles were measured. The iceplant plants in the piles were observed to be growing in-place; however, there was no immediate risk of near-term dispersal into the habitat parcel. Small sparse shoots of iceplant were observed to be growing in the area between the stockpiles and the NRMA boundary (about 30 meters apart). No mature or reproductive weed populations were observed and abatement was deemed unnecessary.

4.7.5 Abatement Activities

The weed monitoring report did not indicate a need for weed abatement. Consequently, no weed abatement activities were implemented in the 2011 reporting period.

5.0 VEGETATION MONITORING

Vegetation monitoring is required in habitat parcels if vegetation is disturbed as a result of ESCA RP MEC remedial investigations. “Baseline” surveys are conducted prior to disturbance and additional surveys are conducted post-disturbance. Two types of data are collected in these surveys: 1) focus species surveys for specific herbaceous non-perennial species (referred to as “HMP annuals” in the vegetation monitoring protocol [Burlerson 2009]) and 2) transect sampling for maritime chaparral and coastal scrub communities. Focus species are to be surveyed in years 1, 3, 5, and 8 post-remediation. Transect sampling is to be conducted in years 3, 5, 8, and 13 post-remediation.

5.1 Status of ESCA RP Vegetation Monitoring Since Inception

The overall status of vegetation monitoring activities initiated by the ESCA RP to date is shown in Table 2. As of the end of the current reporting period, ESCA RP has completed or initiated ten surveys in three munitions response areas (Future East Garrison, Interim Action Ranges, and Parker Flats MRAs). Six of the surveys were for focus species and four were for HMP shrubs.

5.2 Vegetation Monitoring Performed During the Reporting Period

Vegetation monitoring in the habitat parcels performed during reporting period are presented by MRA in this section. In some MRAs, monitoring was ongoing at the end of the 2010 reporting period that has also been captured in this report.

In addition to the vegetation monitoring efforts required by the protocol, ESCA RP biologists conducted reconnaissance surveys in the Future East Garrison and Interim Action Ranges MRAs in support of planning efforts. Detailed qualitative vegetation surveys were conducted in the habitat parcels of the Future East Garrison MRA as part of the work plan development process. Similar surveys were conducted in the accessible areas of the habitat parcels of the

Interim Action Ranges MRA to develop a monitoring plan. The inaccessible areas are those where soil disturbance will occur. ESCA RP personnel are not allowed to enter the inaccessible areas for safety reasons.

5.2.1 Future East Garrison MRA

Two major biological efforts were conducted in the Future East Garrison MRA during the 2010 and 2011 reporting periods: baseline vegetation monitoring and vegetation mapping. In addition to the vegetation monitoring efforts required by the protocol, ESCA RP biologists conducted reconnaissance surveys in the Future East Garrison MRA in support of planning efforts. Detailed qualitative vegetation surveys were conducted in the habitat parcels of the Future East Garrison MRA as part of the work plan development process. The 2011 monitoring efforts will be continued into the 2012 reporting period and will be reported in the next annual report.

Vegetation Mapping

The need to perform vegetation mapping became evident when reconnaissance fieldwork by ESCA RP biologists in late 2009 and early 2010 revealed that substantial portions of the MRA that previously had been mapped (on a coarse scale) as maritime chaparral were occupied by other types of vegetation. Accordingly, it was decided that the vegetation should be re-mapped in more detail to facilitate implementation of certain mitigation requirements. Using the vegetation mapping results, vegetation monitoring per the protocol (Burlison 2009) was completed in 2010. The mapping effort continued in 2011 in advance of ESCA RP MEC activities. Mapping was done to accurately identify and map areas of central maritime chaparral in the two habitat parcels to support mitigation measures in the HMP and 2005 BO. As part of this effort major physical and plant community elements were mapped and potential focus species habitat and vegetation stands were identified for baseline monitoring. The mapping was performed partly in the office using site history research and map-based identification of landscape elements and partly in the field by visually observing, identifying and documenting vegetation along most trails and roads in the Future East Garrison MRA. Details of the mapping effort are presented in Appendix F.

The central maritime chaparral mapping results enable accurate calculation of the amount of central maritime chaparral affected by MEC activities. This information also facilitates implementation of HMP mitigation measures to minimize impacts to central maritime chaparral. Examples of the type of mitigation measures that resulted from the mapping efforts are as follows:

- Identification of mature (15 to 20 feet tall) stands of toro manzanita (also known as Monterey manzanita) during field surveys led to development of a mitigation measure that was incorporated into the Natural Resource Impact Mitigation checklist: retention of mature (>6 inches DBH) toro manzanitas during mechanical vegetation removal. This measure enables continuing augmentation of the toro manzanita soil seed bank.
- The vegetation monitoring protocol provides that the sampling design for shrub transects located within stands of central maritime chaparral should use a stratification procedure

(Burluson 2009). Strata are based on stand structure and age, slope/aspect, and amount of herbaceous vegetation. The vegetation mapping information enabled efficient and accurate implementation of this design requirement during the baseline monitoring survey.

- The vegetation monitoring protocol includes requirements for sampling focus species (HMP forbs, HMP annuals; Burluson 2009). Potential focus species habitat was identified during the vegetation mapping effort so that close inspection for species' populations could be accomplished during the peak flowering period.

Details of the mapping effort are presented in Appendix F.

5.2.2 Interim Action Ranges MRA

Reporting for this MRA is divided into two sections: areas associated with SCAs and NCAs that fall within the IAR MRA, and the IAR MRA.

Special Case Areas and Non-Completed Areas within IAR MRA

Vegetation monitoring in support of the MEC field activities performed on SCAs/NCAs (Figure 7) found within the habitat parcels of the IAR MRA began in March 2010 and was ongoing as of the end of the 2011 reporting period. Detailed qualitative vegetation surveys were conducted in accessible areas of the habitat parcels of the IAR MRA to develop a monitoring plan. The inaccessible areas are those where soil disturbance will occur. ESCA RP personnel are not allowed to enter the inaccessible areas for safety reasons. Results of these monitoring efforts will be presented in the next annual report.

IAR MRA

The Army conducted a prescribed burn in the IAR MRA in 2003, followed by MEC clearance activities. The burn removed essentially all live above-ground vegetation. The Army's pre-burn baseline survey established sampling locations and generated baseline data for areas of central maritime chaparral. After the burn and cleanup activity disturbances, monitoring surveys were conducted to document the recovery of the shrub community as well as populations of species of concern (HMP species). The baseline data were used to assess the progress of vegetation recovery in the area.

The ESCA RP Team assumed responsibility for the monitoring program in the IAR MRA in 2008 (ESCA RP Team 2009). The monitoring survey was repeated in 2010. This section describes the relevant findings from Appendix H, which presents the detailed report on the results as well as evaluation of past survey results.

Results

Surveys of herbaceous HMP focus species were conducted 1, 2, 5 and 7 years after the 2003 burn and MEC cleanup. Populations of two of the species (sand gilia and Monterey spineflower) increased by approximately 1-2 orders of magnitude over baseline values within

1-2 years after the burn. By 2010, the most recent survey, populations of both species were reduced from their peaks, but were still nearly one order of magnitude larger than in the baseline survey. The consistency of population ratios of these species indicates that factors influencing annual population fluctuations similarly affect the populations of the two species. The third HMP focus species present in the survey area, seaside bird's-beak (a hemi-parasite), exhibited a different trend. One year after the burn, this species had a moderately reduced population but in the second year post-burn its population had increased by an order of magnitude over that in the baseline survey. By 2008, its population had increased to two orders of magnitude above that of the baseline. In 2010, the data revealed a slightly increased population compared with 2008, indicating that the species' population trend may have plateaued.

Central maritime chaparral shrub monitoring surveys using line-intercept transects were conducted 2, 5 and 7 years after the 2003 burn and MEC cleanup. Based on the generally known community development trajectory for this vegetation type, natural recovery during the 7-year period would produce a stand of initial intermediate-age central maritime chaparral; overall, a younger stand than that observed during the baseline survey (7-20+ year stands). Species richness of shrub and shrub-like plants on the transects in 2008-2010 was 31% higher compared with the baseline survey. All of the species recorded during the baseline survey had returned to the area by 2008 and 2010. In addition to the two (non-focus) HMP species recorded in 2000, a third (Eastwood's ericameria) was reported in 2008 and 2010. Species frequency of occurrence values revealed little change in 2008 and 2010 from those of the baseline survey, indicating that species presence and spatial distribution in 2010 had returned to that of the baseline survey. Bare ground decreased from 100% immediately after the burn to 22.2% in 2008 and 18.2% in 2010, indicating the steady maturation of the shrub canopy while maintaining ample amounts of habitat favorable for sustainability of populations of HMP focus species such as sand gilia and Monterey spineflower. The abundance data indicate that the vegetation has reached and by some parameters exceeded the expected early intermediate-age phase of recovery and is thus progressing satisfactorily toward development of a mature shrub community. The abundance in 2010 of two HMP shrub species had increased compared with the baseline, while one (sandmat manzanita) had decreased.

The only target weed species recorded on the transects (iceplant) was present on 40% of the transects in 2008 in low abundance ($\leq 5.8\%$). By 2010, frequency on transects had dropped to 20%, all percentage cover values had decreased, and the maximum percentage cover value on a transect was 3.8%. Therefore, although an exotic species invaded (or may already have been present), its population is in decline and no adverse impacts on native plant recovery are expected.

Findings

The disturbance caused by the 2003 prescribed burn mimicked that of a wild land fire event, which is considered to be a natural element in the ecology of most chaparral vegetation. Virtually all live above-ground vegetation was removed during the burn, most importantly large-statured shrub canopy. The post-disturbance vegetation changes described above are consistent with the anticipated natural ecological processes and plant community responses

following such disturbances. Initial opportunistic expansion of native herbaceous and subshrub populations was followed by decreasing abundance of opportunistic species as the plant community matured. Concomitantly, shrub cover has increased. Seven years after the disturbance, ample amounts of bare ground (i.e., “open” habitat) provide sufficient habitat for sustaining healthy populations of herbaceous HMP species. These results indicate that the native plant community and associated species populations have recovered appropriately, are sustainable, and that habitat values have not been adversely affected by the burn or the post-burn MEC clearance activities performed by the Army. The survey findings indicate that the plant community of the IAR MRA has recovered as expected to (and in some respects progressed beyond) the initial intermediate-age phase of community development and is on an appropriate and sustainable trajectory associated with high quality habitat. No further monitoring related to this disturbance is proposed.

5.2.3 Parker Flats MRA

Baseline shrub transect and focus species plot data were collected in the Parker Flats MRA in 2008 (ESCA RP 2009). The first year post-disturbance in the habitat parcels was 2011 (MEC activity is ongoing in the development parcels as of the end of the 2011 reporting period). The vegetation monitoring protocol provides that focus species plots will be re-sampled in the first year post-disturbance. Shrub transects are re-sampled beginning in year three post-disturbance (i.e., 2013).

The first year post-disturbance survey of Monterey spineflower populations in the habitat parcels of the Parker Flats Phase II MRA was performed in April 2011. Monterey spineflower was the only HMP focus species detected in the baseline survey in 2008. No additional focus species were identified during the 2011 survey in or near the sample plots established in 2008 for Monterey spineflower. Compared to the 2008 baseline data, Monterey spineflower exhibited a 60% decrease in frequency and a 70% decrease in abundance in sample plots. The 2011 wet season (October 2010 to September 2011) had a rainfall total of 14.57 inches. The rainfall total for the 2008 wet season was 12.42 inches (ESCA RP 2009). Thus, difference in annual rainfall totals between the 2008 and 2011 wet seasons does not explain the population differences that were recorded. However, masticated plant litter (“mulch”) from brush removal in 2008 to 2009 was present in some plots and may have affected Monterey spineflower recruitment. To evaluate this possible causative factor, mulch presence was quantified by visual estimations of cover in the plots. Five of the ten plots contained mulch. In those plots where mulch was present, Monterey spineflower populations were lower in 2011 than in 2008. In three plots where mulch was not present, Monterey spineflower populations were higher in 2011 than in 2008, while in the other two plots where mulch was not present, Monterey spineflower populations were lower in 2011 than in 2008. Overall, the results of the evaluation were inconclusive regarding a relationship between mulch cover and population differences. Nevertheless, removal of litter from the plots by hand raking prior to substantial rainfall in the 2012 wet season will be implemented as a corrective measure. Details of the monitoring results are presented in Appendix I.

6.0 RESTORATION PLANNING IN THE INTERIM ACTION RANGES MRA

In 2011, the ESCA RP Team determined that surface soil scraping would be needed in portions of the habitat parcel in the Interim Action Ranges MRA. This effort was initiated in response to EPA and DTSC direction in terms of MEC remedial requirements.

The Phase II Interim Action Work Plan for the Interim Action Ranges MRA was finalized on May 24, 2011. Ecological restoration may be required in habitat parcels where soil disturbance is not target-specific and is extensive. As of the date of this report, a comprehensive Habitat Restoration Plan (HRP) is being prepared by the ESCA RP Team for soil disturbance activities in the Interim Action Ranges MRA. The HRP will be submitted to FORA and to the U.S. Army for review and communication to USFWS for their approval.

In preparation for development of the restoration plan, baseline and other surveys of focus species and shrubs were conducted in 2010 and 2011 to provide input to the HRP. The results of these surveys will be included in the HRP and future survey reports, as appropriate.

To procure appropriate biological materials for the restoration effort, seed collection was initiated in 2011 and was ongoing as of the end of this report's reporting period. Details on these activities will be included in the HRP and the 2012 Annual Report.

7.0 REFERENCES

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Table 1
 Approximate Areas Affected (in Acres) by Field Activities Conducted by ESCA RP
 from October 16, 2010 through October 15, 2011
 2011 Annual Natural Resource Report
 FORA ESCA RP

MRA	Activity	Habitat Parcels
Future East Garrison	Overall Habitat Reserve Acreage	170
	Vegetation monitoring ^a	49.3
	Minor	DM
	Vegetation clearance	95.6
	MEC clearance	106.4
	Stockpile	0
Interim Action Ranges	Overall Habitat Reserve Acreage	206
	Vegetation monitoring ^a	9.5
	Minor	DM
	Soil Excavation	4.8
	Vegetation clearance	9.5
	MEC clearance	9.5
Parker Flats (Phase II)	Overall Habitat Reserve Acreage	168.3
	Vegetation monitoring ^a	26.7
	Minor	DM
	Vegetation clearance	167.7
	MEC clearance	482
	Stockpile	0

Notes:

DM = de minimis

MEC = munitions and explosives of concern

Minor = maintenance activity or construction support activity such as posting signage, surveying/staking, staging, etc.

MRA = Munitions Response Area

^a Vegetation monitoring areas are based on an estimate of the area within the habitat parcel(s) that is occupied by central maritime chaparral that was cut as of the end of the reporting period.

Table 2
 Status of ESCA RP Vegetation Monitoring Activities ^a
 2011 Annual Natural Resource Report
 FORA ESCA RP

MRA ^b	2008	2009	2010	2011
County North ^c		F (0) ^d		
Future East Garrison			FT (0)	T ^f
Interim Action Ranges (historical) ^e	F,T (5)		F,T (7)	
Parker Flats (Phase II)	F,T (0)			F (1)

Notes:

^a F = focus species sampling, T = transect sampling

^b Vegetation monitoring is required only in habitat parcels. The table reports only on monitoring activities that have been initiated by the ESCA RP Team to date.

^c Vegetation monitoring in the County North MRA was discontinued after focus species sampling was completed in 2009 because no further MEC investigation was deemed necessary. No parcel-wide vegetation clearance was performed in this MRA.

^d Numbers in parentheses indicate year post-disturbance (0 = baseline survey).

^e ESCA RP's monitoring in the Interim Action Ranges MRA (historical) is a continuation of vegetation monitoring that was initiated by the U.S. Army within the Ranges 43-48 MRA prior to the initiation of ESCA RP fieldwork. The ESCA RP portion of the Ranges 43-48 MRA is denominated the Interim Action Ranges MRA.

^f Additional field monitoring is being conducted in support of the 2011 findings. 2011 Future East Garrison MRA Vegetation Baseline Monitoring will be provided in the 2012 Annual Natural Resource Report.

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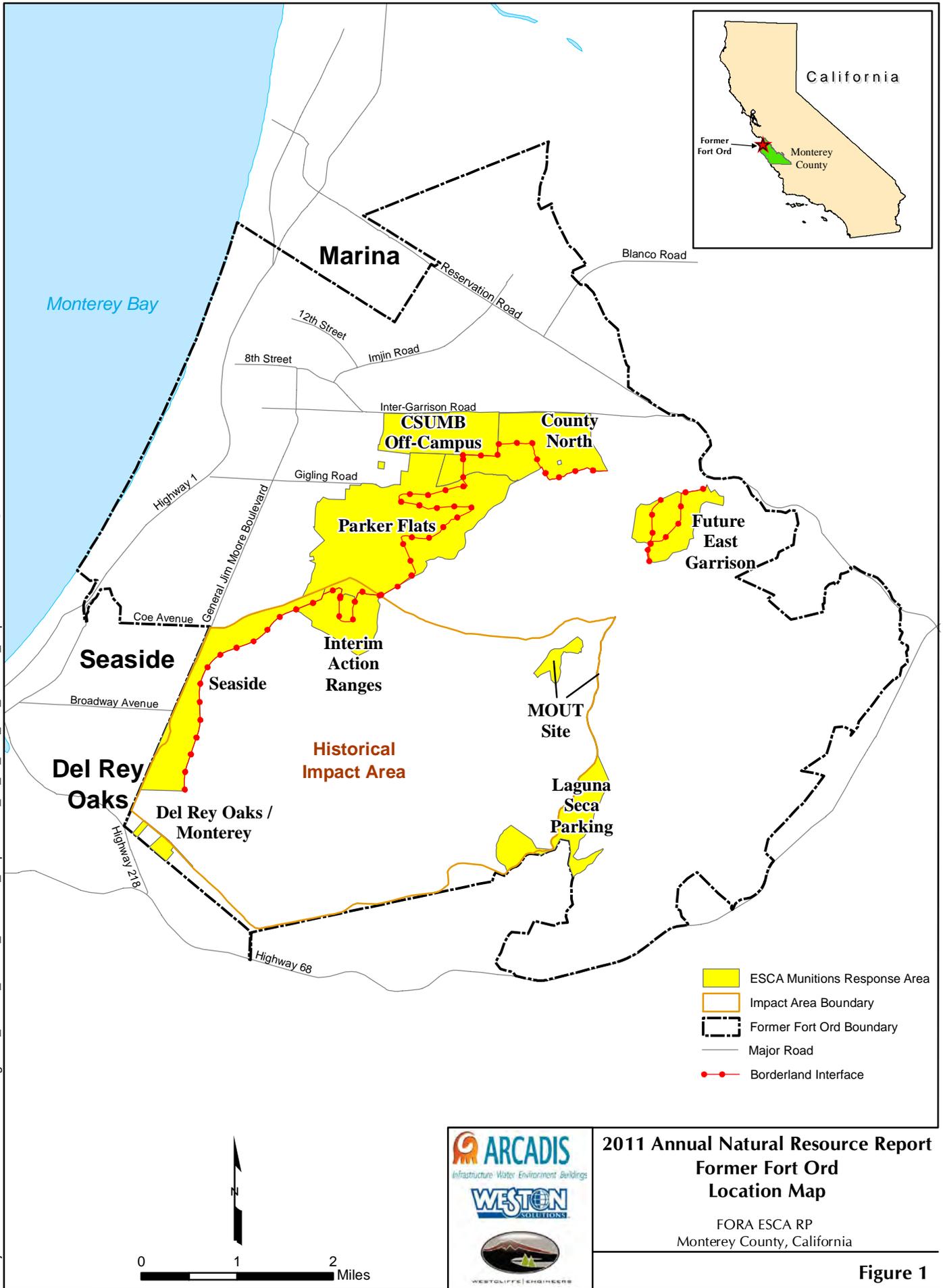
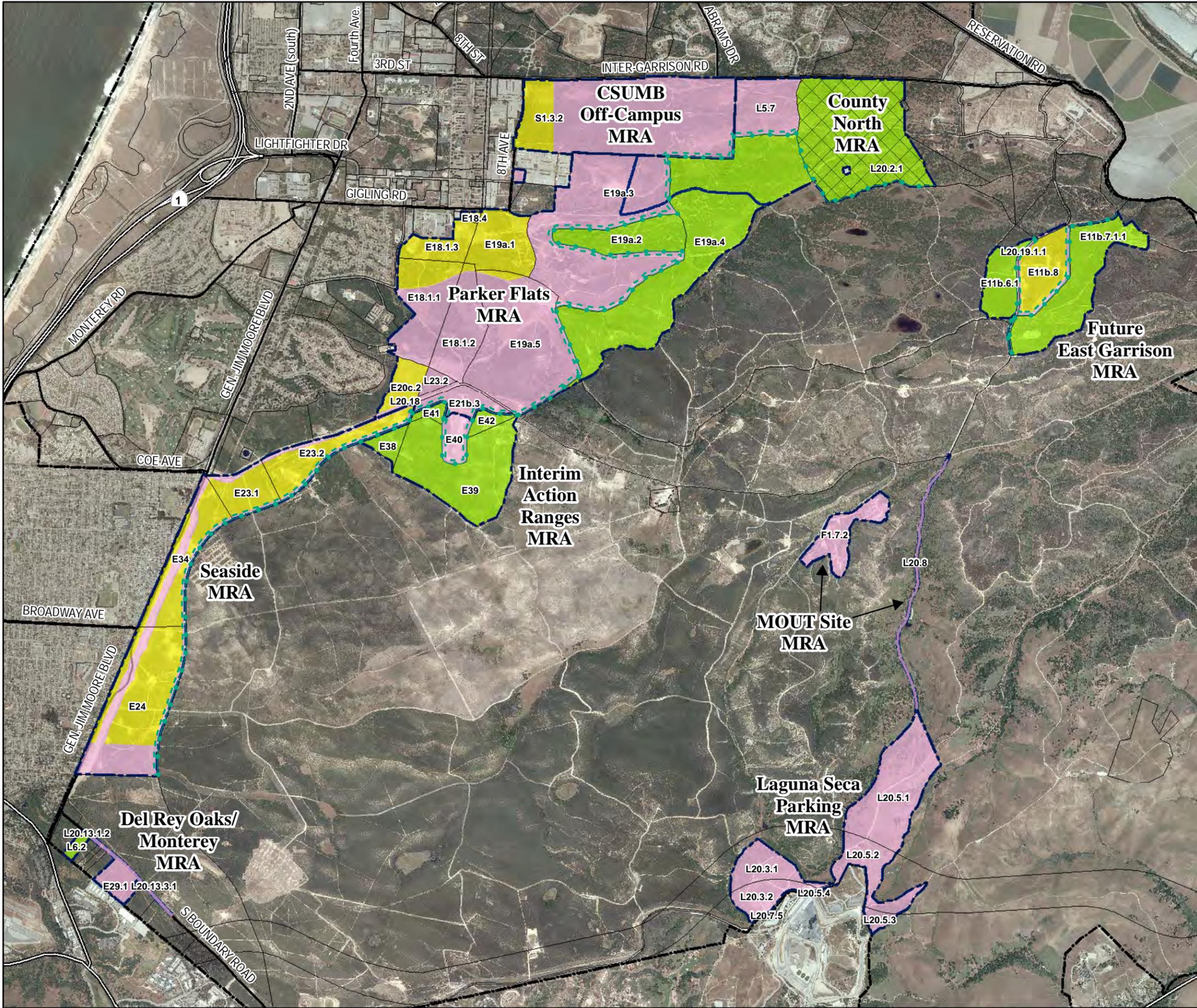


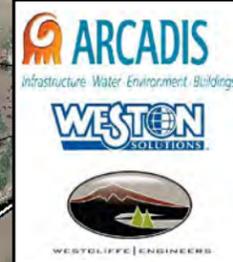
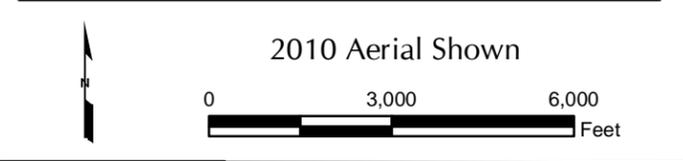
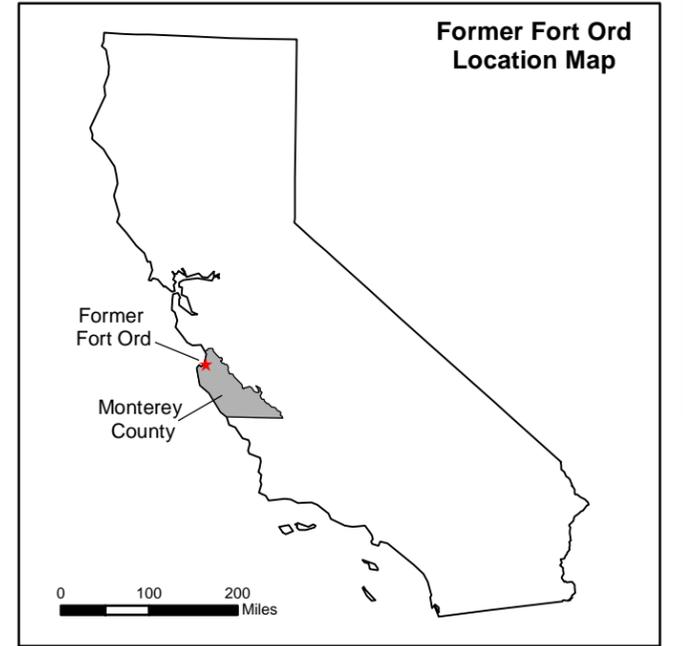
Figure 1

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Legend

- Munitions Response Area
 - Major Road
 - Borderland Interface
 - 100-Foot Buffer from Borderland Interface
 - USACE Parcel
 - Former Fort Ord Boundary
- Proposed Future Land Use**
- Residential
 - Non-Residential
 - Habitat Reserve
 - Habitat Corridor



**2011 Annual Natural Resource Report
ESCA Property
Proposed Future Land Use**

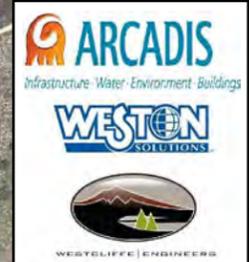
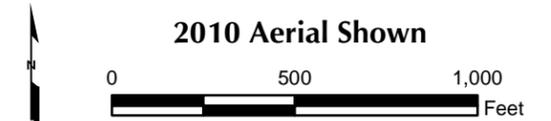
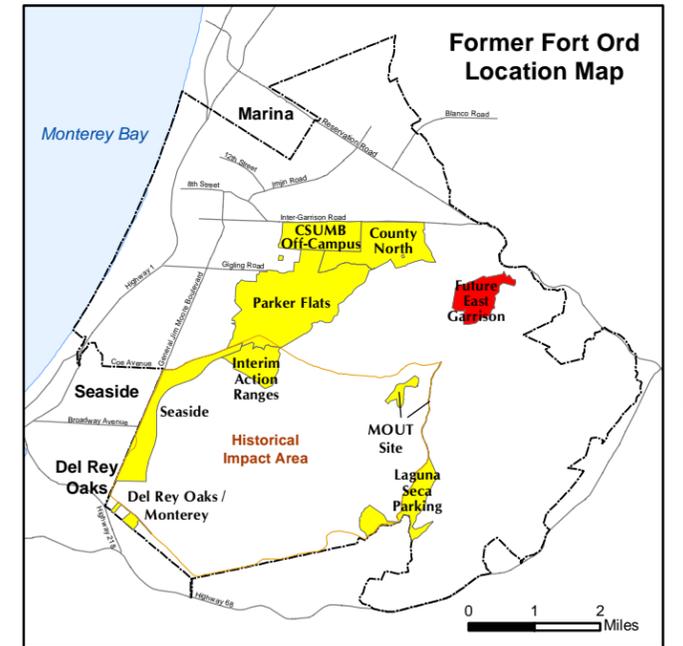
FORA ESCA RP
Monterey County, California

Figure 2



Legend

-  Munitions Response Area
-  USACE Parcel
-  Structure
-  Borderland Interface



**2011 Annual Natural Resource Report
Future East Garrison MRA**

FORA ESCA RP
Monterey County, California

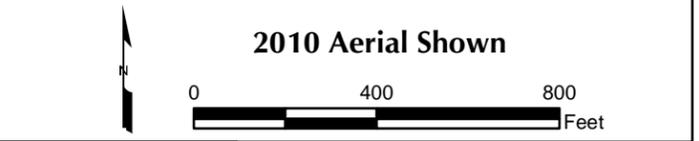
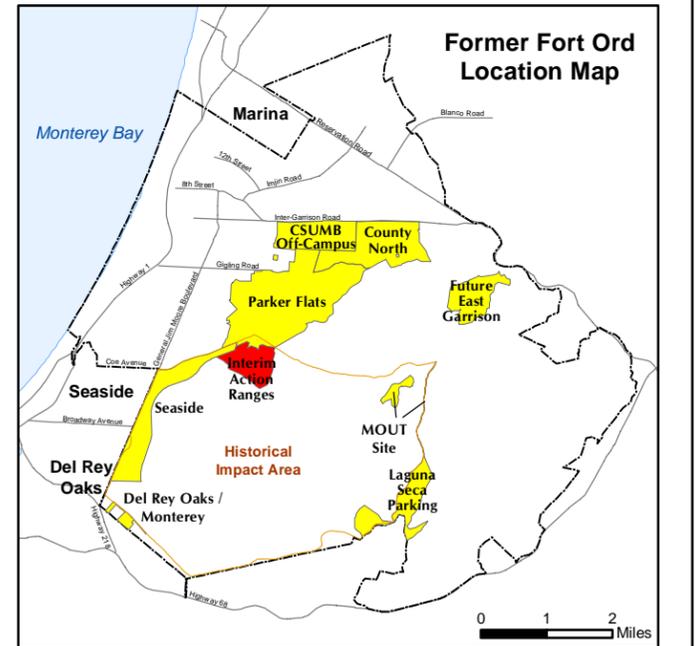
Figure 3

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-  Munitions Response Area
-  USACE Parcel
-  Structure
-  Borderland Interface

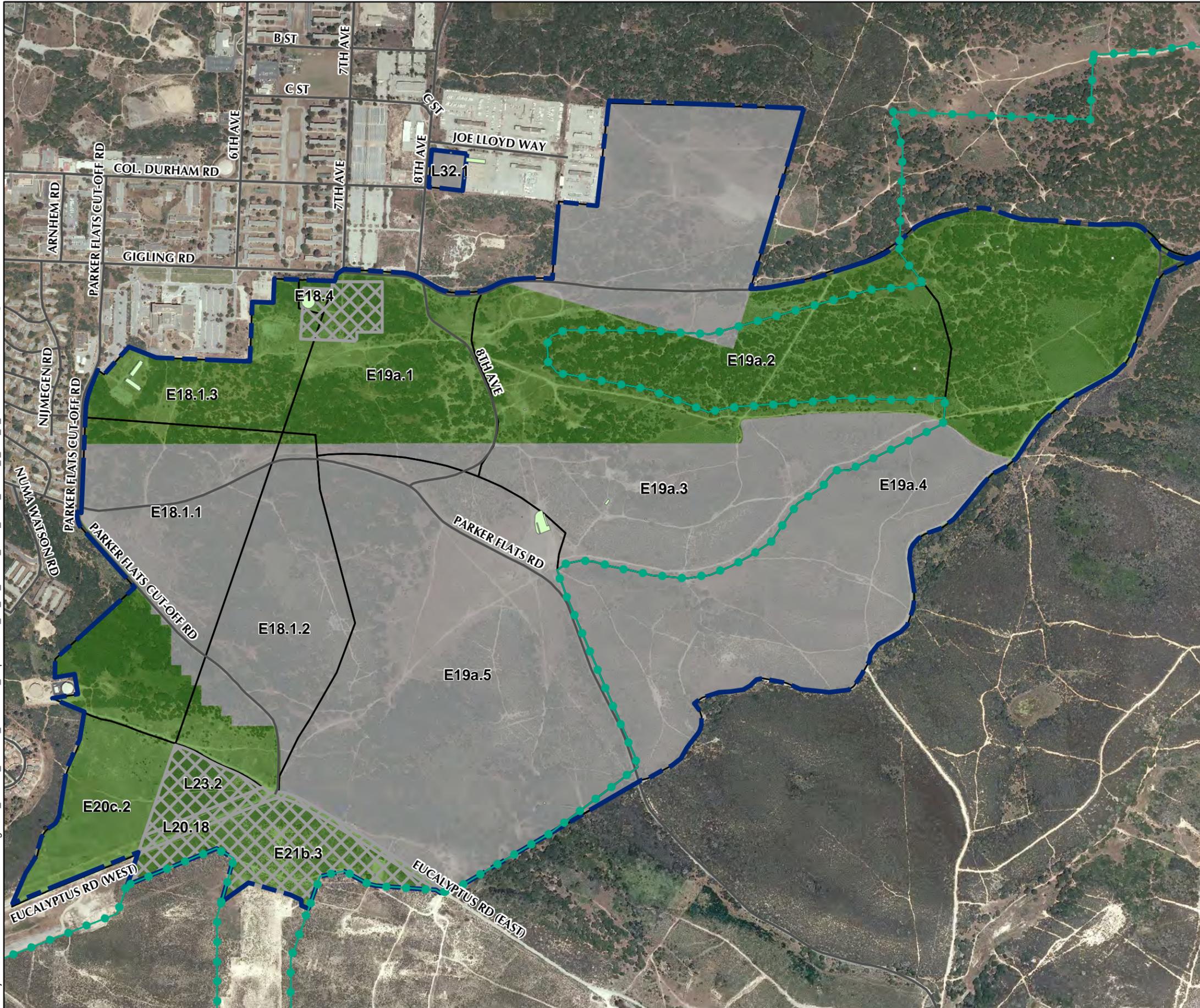


2011 Annual Natural Resource Report
Interim Action Ranges MRA

FORA ESCA RP
Monterey County, California

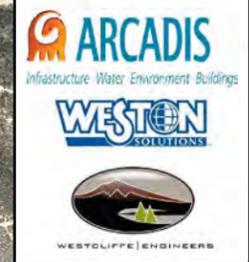
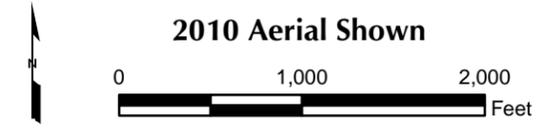
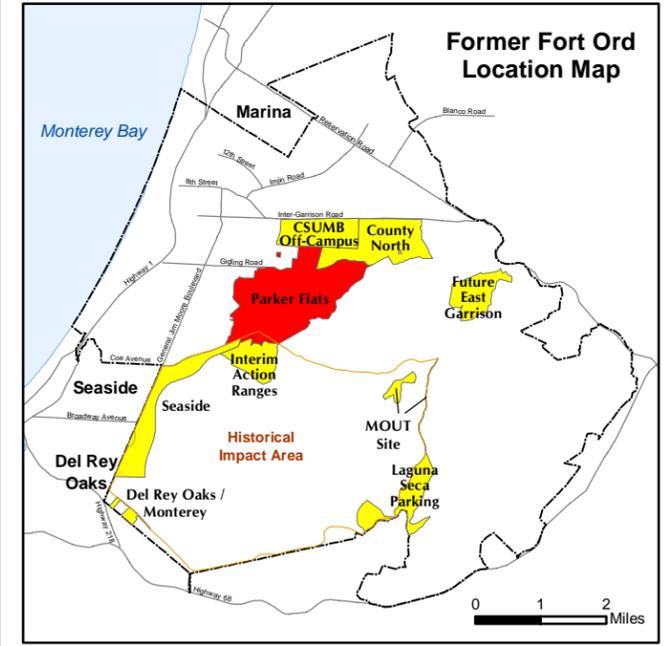
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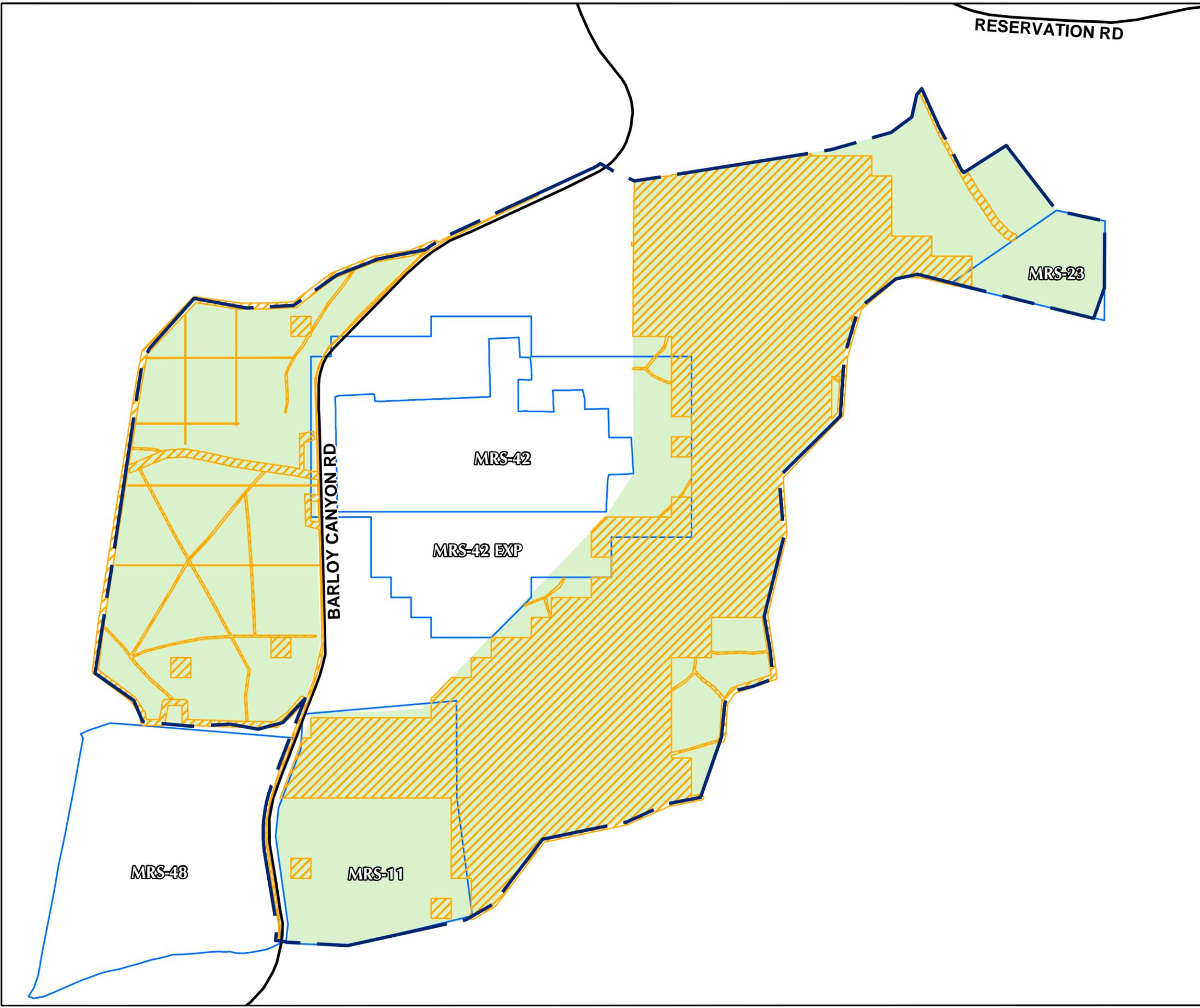
Legend

-  Munitions Response Area
-  Major Road
-  USACE Parcel
-  Phase I Remedial Investigation Area
-  Phase II Remedial Investigation Area
-  Phase II Remedial Investigation Area (Army Completed)
-  Structure
-  Borderland Interface



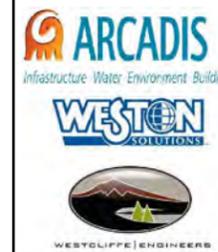
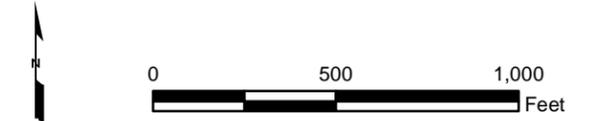
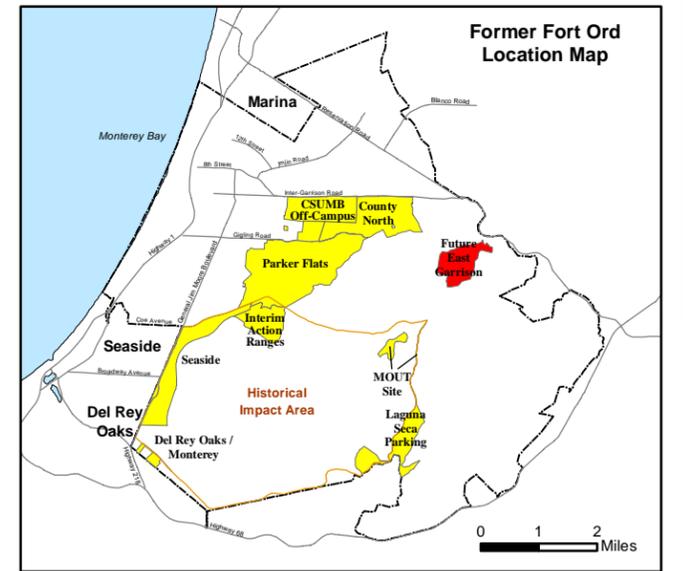
2011 Annual Natural Resource Report
 Parker Flats MRA
 FORA ESCA RP
 Monterey County, California

Figure 5



Legend

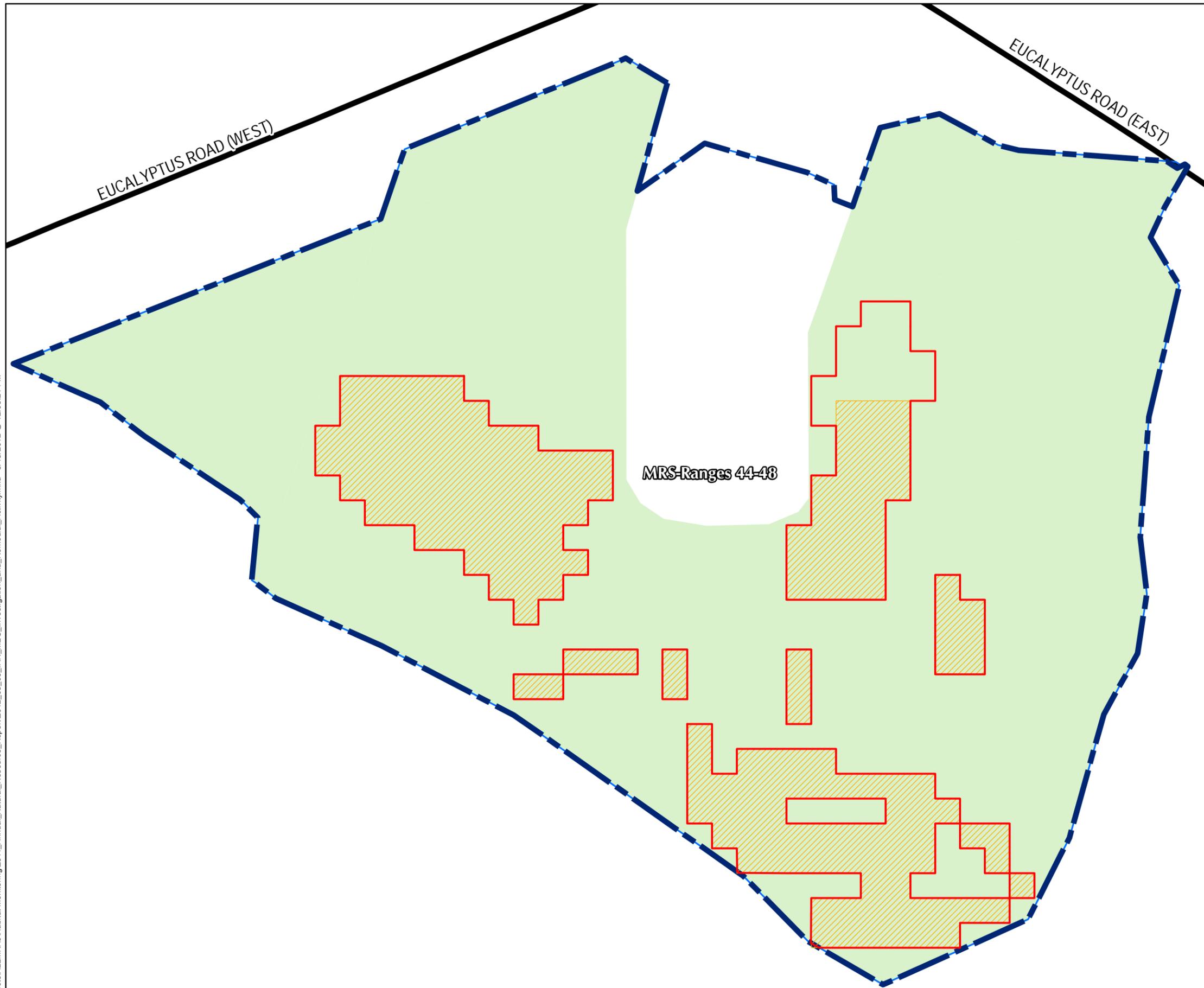
-  Area of MEC Investigation and Remedial Activities
-  Habitat Reserve
-  Munitions Response Area
-  Munitions Response Site
-  Major Road



2011 Annual Natural Resource Report
Future East Garrison MRA
MEC Investigation and Remedial Activity
FORA ESCA RP
Monterey County, California

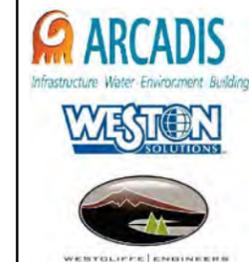
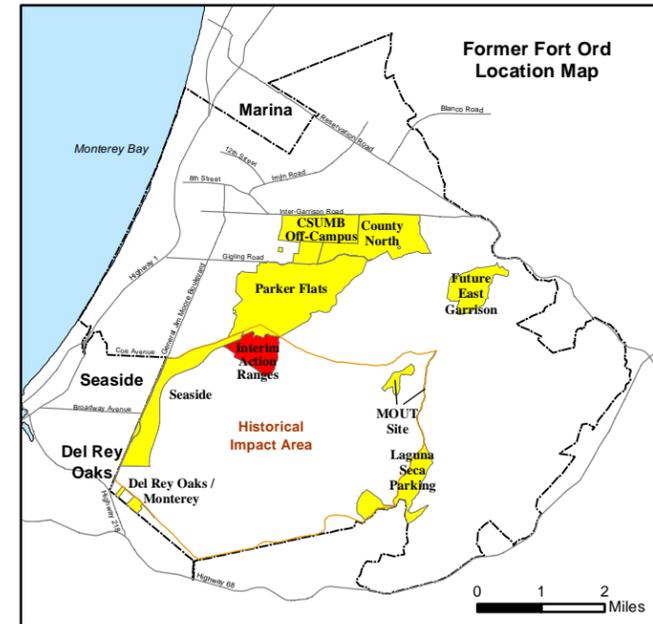
Figure 6

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Legend

-  Areas of MEC Investigation and Remedial Activities
-  Habitat Reserve
-  Special Case and Non-Completed Areas (Work Areas)
-  Munitions Response Area
-  Munitions Response Site
-  Major Road

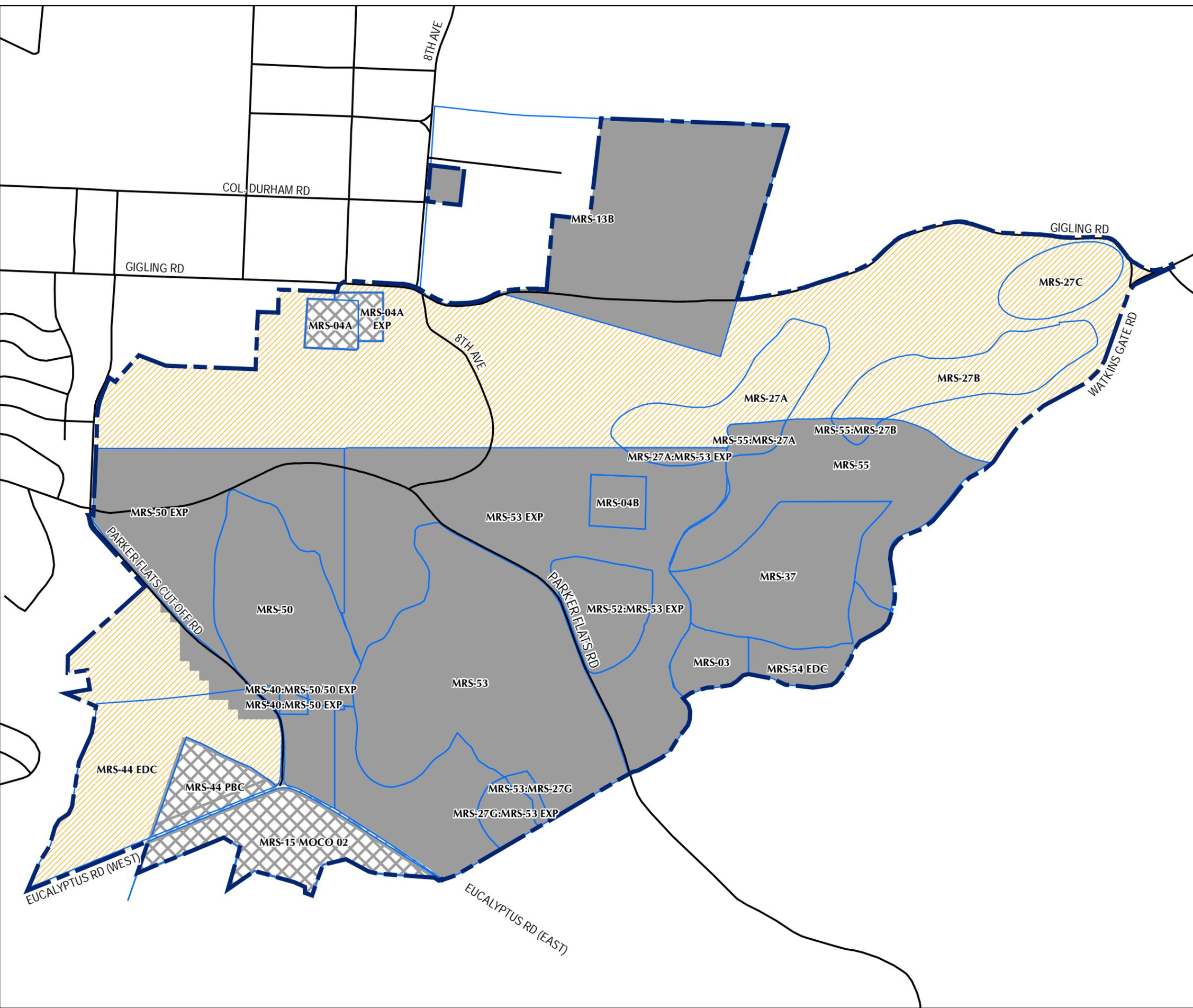


2011 Annual Natural Resource Report
Interim Action Ranges MRA
MEC Investigation and Remedial Activity

FORA ESCA RP
 Monterey County, California

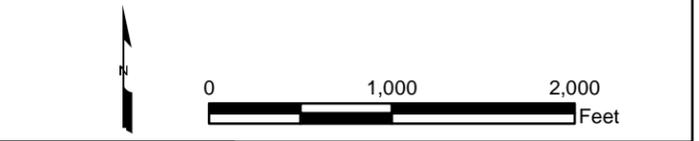
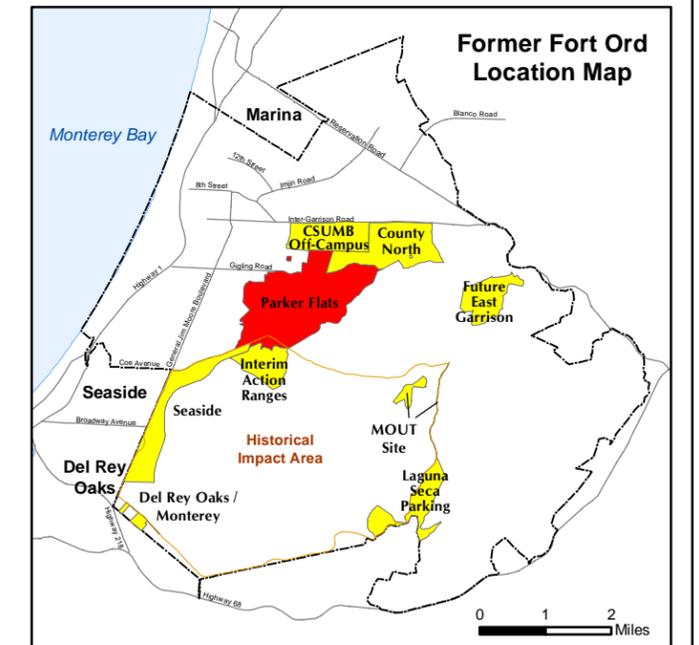
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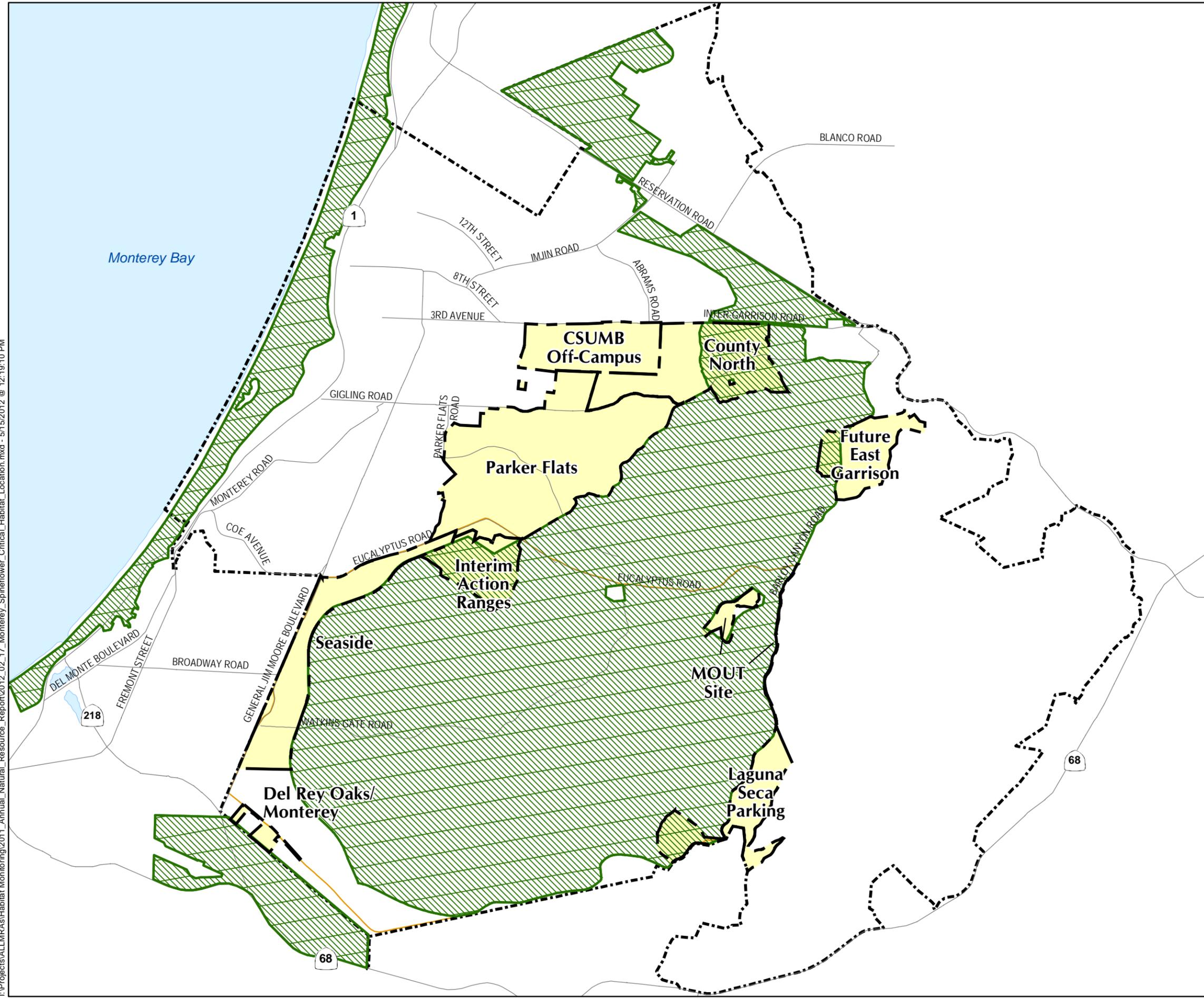
-  Phase II Area of Parker Flats MEC Investigation and Remedial Activities
-  Phase II ESCA Future Land Use - Habitat Reserve
-  Phase II Area (Army Completed)
-  Parker Flats Phase I Area
-  Munitions Response Area
-  Munitions Response Site
-  Major Road



2011 Annual Natural Resource Report
Parker Flats MRA
MEC Investigation and Remedial Activity
 FORA ESCA RP
 Monterey County, California

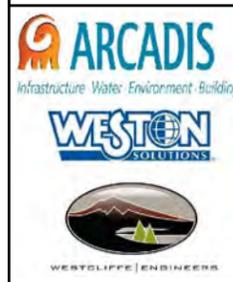
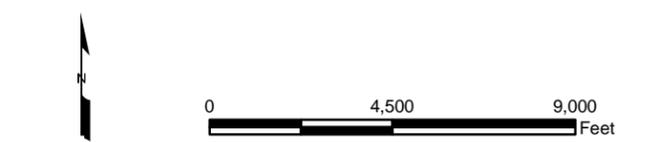
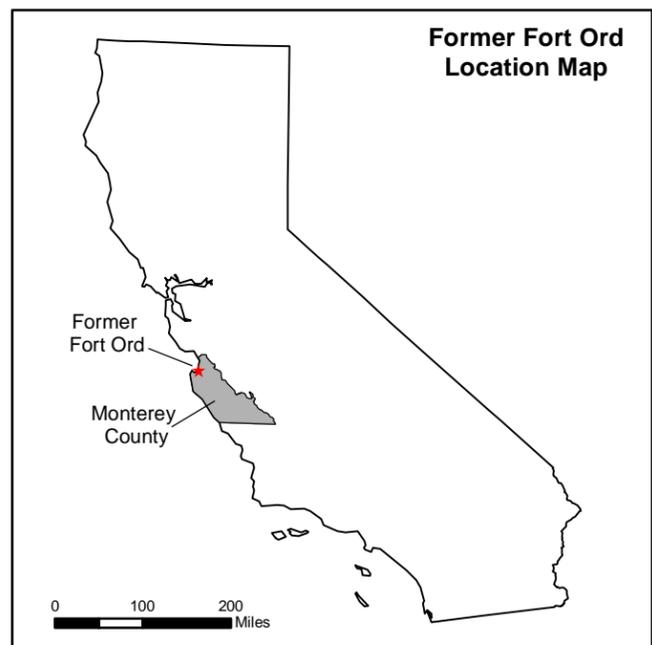
Figure 8

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Legend

-  Major Roads
-  Former Fort Ord Boundary
-  Impact Area Boundary
-  U.S. Fish and Wildlife Designated Monterey Spineflower Critical Habitat
-  ESCA Munitions Response Areas

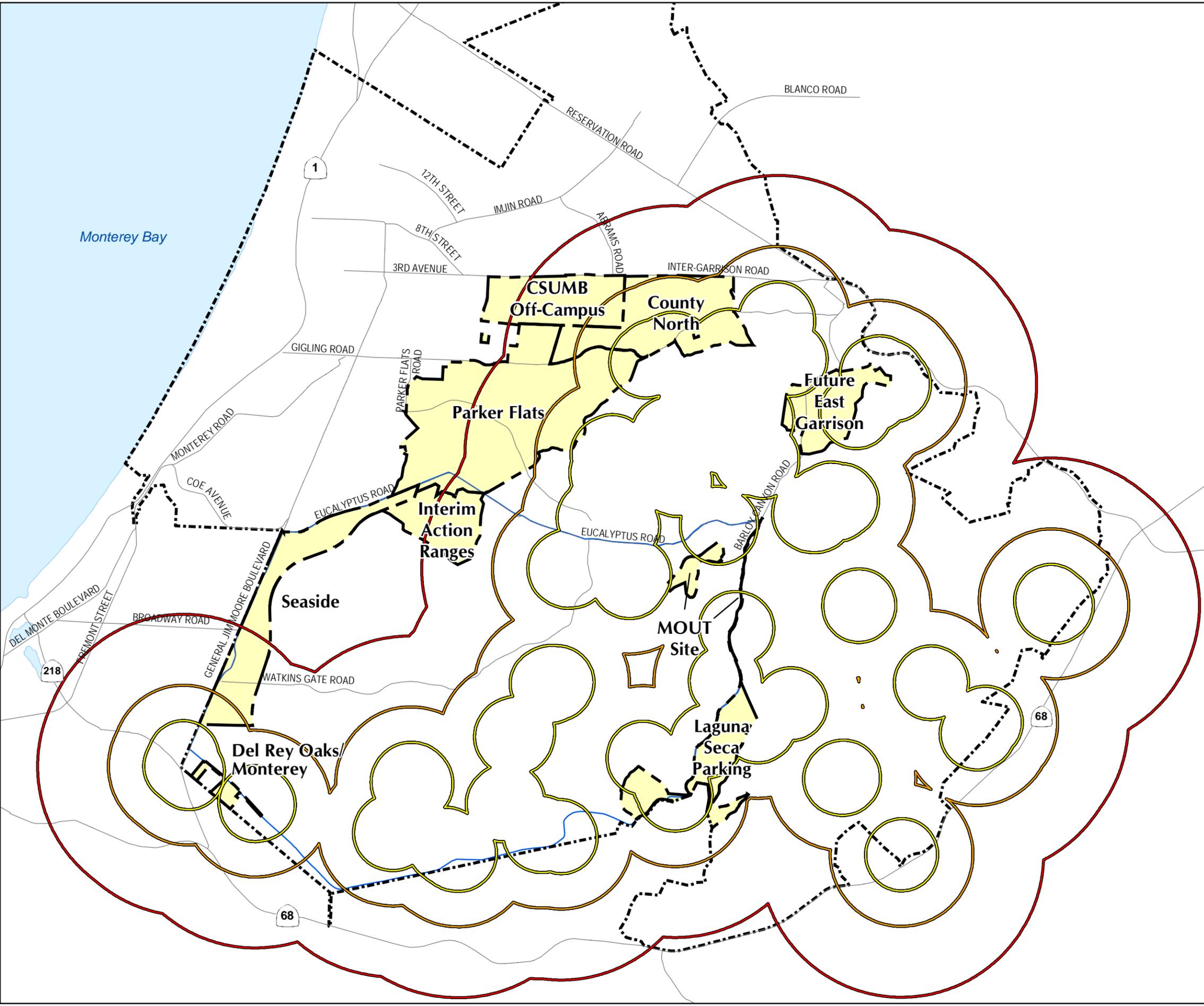


2011 Annual Natural Resource Report
Former Fort Ord
Monterey Spineflower
Critical Habitat Location

FORA ESCA RP
 Monterey County, California

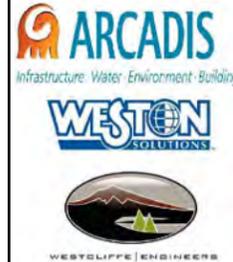
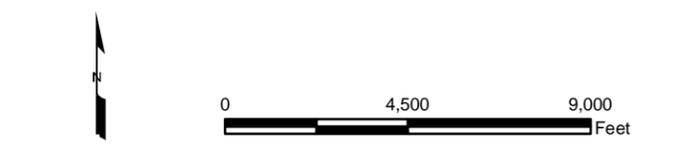
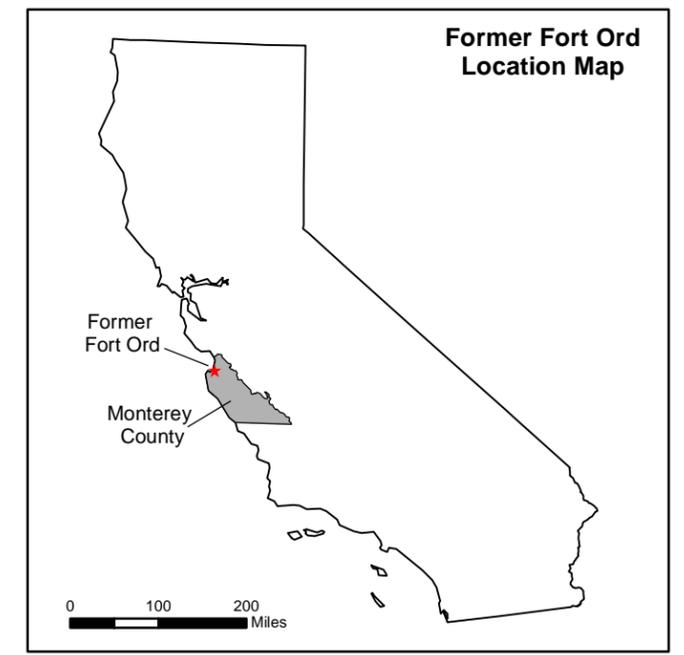
Figure 9

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Legend

- Major Roads
- Former Fort Ord Boundary
- Impact Area Boundary
- ESCA Munitions Response Areas
- U.S. Fish and Wildlife Designated California Tiger Salamander Habitat Zones**
- 500 M
- 1 KM
- 2 KM



2011 Annual Natural Resource Report
Former Fort Ord
California Tiger Salamander
Potential Habitat Zones

FORA ESCA RP
 Monterey County, California

Figure 10

APPENDIX A

Natural Resource Impact Mitigation Checklists and Inspection Reports

2011 Annual Natural Resource Monitoring, Mitigation, and Management Report

NATURAL RESOURCE IMPACT MITIGATION CHECKLIST

Checklist No. 5

Revision 0

Title: Future East Garrison MRA Habitat Parcels MEC Investigation

Notify the Senior Qualified Biologist (510-541-7509) before proceeding if it is proposed that work boundaries change, types of equipment change, additional vegetation removal is necessary, vegetation cutting methods change, or any other conditions change.

ESCA MRA:	Future East Garrison	Date:	10/4/10
Work to be conducted:	Surveying, vegetation removal along trails/roads, debris removal, instrument aided surface clearance, excavation (i.e., "mag and dig") as required to remove MEC/MD, field demolition of MEC as required.		
Relevant Work Plan Reference and Section(s):	Group 4 Remedial Investigation/feasibility Study Work Plan. (relevant sections and Appendix E, Response to Comments)		

1. LAND USE DESIGNATION:	<input checked="" type="checkbox"/> Habitat Reserve	Development <input type="checkbox"/> Non-Residential <input type="checkbox"/> Residential	<input type="checkbox"/> Other (specify):
2. LAND OWNER:	<input type="checkbox"/> Army	Parcel No(s). and/or Location:	
	<input checked="" type="checkbox"/> FORA	Parcel No(s). and/or Location::	E11b.6.1, E11b.7.1.1, L20.19.1.1 (See Figure 1)

FORA ESCA Remediation Program Team



FORA ESCA RP

IMPACT MITIGATION CHECKLIST No. 5, Rev. 0
 Future East Garrison MRA Habitat Parcels Investigation

Confidential Business Information

3. FEDERAL ESA SPECIES REPORTED IN PARCEL(S):		<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Flagged/Marked
Reported ESA Species [common name(s)]:	Sand gilia, Monterey spineflower, California tiger salamander (CTS) (potential)			
Reported Species' Location(s):	For sand gilia and Monterey spineflower, see Figure 1 (spring 2010 ESCA RP survey results); CTS are potentially present in all habitat locations.			
Grid Numbers:				
Restrictions:	<p>Off-road access is limited to vehicles/equipment required for completion of work activity. Excavations open overnight will be sloped or silt fenced to prevent trapping of CTS. For sand gilia and Monterey spineflower (see Figure 1): QB will be present during brush cutting and MEC clearance activities in Areas A and B. Brush cutting in Area B will be conducted using hand tools to minimize sand gilia habitat disruption on this steeply sloped area. Brush cutting personnel will minimize disturbance of the trail soil to the extent feasible while accomplishing vegetation removal. Mechanized brush cutting equipment will not be used in Area B unless deemed necessary and no alternative is feasible. QB will be present during MEC removal in Areas A-D. In Area B, MEC clearance personnel will minimize disturbance of the trail soil to the extent feasible while accomplishing their work. In Areas A-D, if excavation for MEC is required, the top 6-in. of soil will be separately stockpiled during the dig and replaced as the final 6-in. surface soil layer when the dig is backfilled. This procedure preserves the species' "seed bank" in the area. Demolitions are to be avoided in Areas A-D when feasible. In-place detonation may take place in these areas if, in the judgment of the Senior UXO Supervisor, it is required owing to safety concerns.</p>			

4. AQUATIC FEATURES (i.e., VERNAL POOLS/PONDS) PRESENT:		<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Flagged/Marked
Location(s):	Several aquatic features (AFs) are located in the northeastern area of the MRA and in the southern portion ("grenade range" area) (see Figure 2). Four CTS "watershed" circles (i.e., 500 m radii from the AFs) occur within the habitat parcels in the MRA (see Figure 3).			
Grid Number(s):	NA			

FORA ESCA RP

Work can proceed in pools/ponds?:	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Restrictions:	<p>One or two of the AFs in the northeastern area (AF68AB and AF68C within Area A on Figure 1) could potentially be affected by work activities, depending on the exact location of the investigation corridor in that area as well as the QB determination of the extent of the AF (historical polygons were determined to be somewhat inaccurate). No CTS were recorded in the past or in the ESCA RP 2009-2010 wet season CTS surveys conducted in these aquatic features and the ESCA RP USFWS-approved biologist for CTS larval surveys indicated that these two AFs were unlikely to be suitable habitat for CTS breeding. The boundaries of these AFs will be marked in the field. To the extent feasible, disturbance of aquatic features will be minimized during brush cutting. A QB will be present during brush cutting and MEC clearance work in AFs to monitor excavations (i.e., "mag and dig" excavation). The QB will implement the minimization, monitoring and restoration measures specified in the USFWS 2005 Biological Opinion as necessary if aquatic features will be affected. These measures include conducting work when areas are dry, characterizing soil profile, minimizing excavation area and depth, salvaging topsoil, etc.</p> <p>The work plan does not indicate that more than 10% of the area within 500 m of a potential CTS breeding site (i.e., "watersheds" in Figure 3) will be affected; therefore, no mitigation measures related to this issue are required.</p> <p>Demolitions are to be avoided in AFs when feasible. In-place detonation may take place in these areas if, in the judgment of the Senior UXO Supervisor, it is required owing to safety concerns. The QB will implement appropriate mitigation measures consistent with the 2005 Biological Opinion if any such detonations take place in AFs.</p>	

5. VEGETATION REMOVAL		
<input type="checkbox"/> None	Location(s):	
<input checked="" type="checkbox"/> Manual Removal	Location(s):	Area B on Figure 1.
Restrictions:	To the extent feasible, only manual vegetation removal should be used in Area B.	
<input checked="" type="checkbox"/> Mechanical Removal	Location(s):	Mechanical removal is allowed in all work areas except Area B. In Area B mechanical removal is allowed only if necessary and no other alternative is feasible as determined by the QB and the field personnel supervisor.
Restrictions:	Trees 5 inches in diameter (DBH) and larger will not be removed. Trees left in place will be limbed up to provide access for instrument aided surface clearing.	

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6. EROSION CONCERNS/SITE RESTORATION:
No excavations greater than 1 acre are anticipated. Existing erosion areas along roadways and trails will have waddles, berms, silt fences, or equivalent sediment controls installed as required by existing soil management and erosion control plans. In particular, Area B will be assessed by the QB for erosion control needs after work is complete to minimize erosion effects on sand gilia habitat.

7. SITE ACCESS: The MRA is accessed via Barloy Canyon Road.

8. ADDITIONAL SITE CONCERNS:
Monitoring of HMP Annuals and shrubs will be conducted as needed in accordance with the HMP and VMP.
Additional HMP species reported in the MRA include: Eastwoods' ericameria, Monterey ceanothus, sandmat manzanita, toro Manzanita, legless lizard, and Monterey ornate shrew (the latter species is not reported from the MRA, but is possibly present).

Attachments

- Figure 1. Future East Garrison MRA HMP Mitigation Measures Natural Resource Impact Mitigation Checklist.
- Figure 2. Future East Garrison MRA Aquatic Feature Locations.
- Figure 3. Future East Garrison MRA CTS Watershed Locations.
- Figure 4. Future East Garrison MRA Location of Aquatic Features in Investigation Corridor.

Approved:

**LFR Senior
Qualified Biologist:**



Date:

10/4/10

**ESCA RP Program
Manager:**



Date:

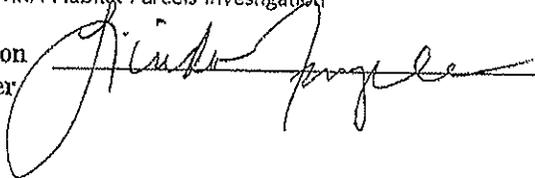
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IMPACT MITIGATION CHECKLIST No. 5, Rev. 0
Future East Garrison MRA Habitat Parcels Investigation

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ESCA Remediation
Program Manager:

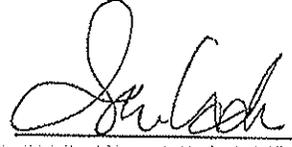


Date:

10/11/2010

Received:

FORA ESCA
Program Manager:



Date:

9/30/10

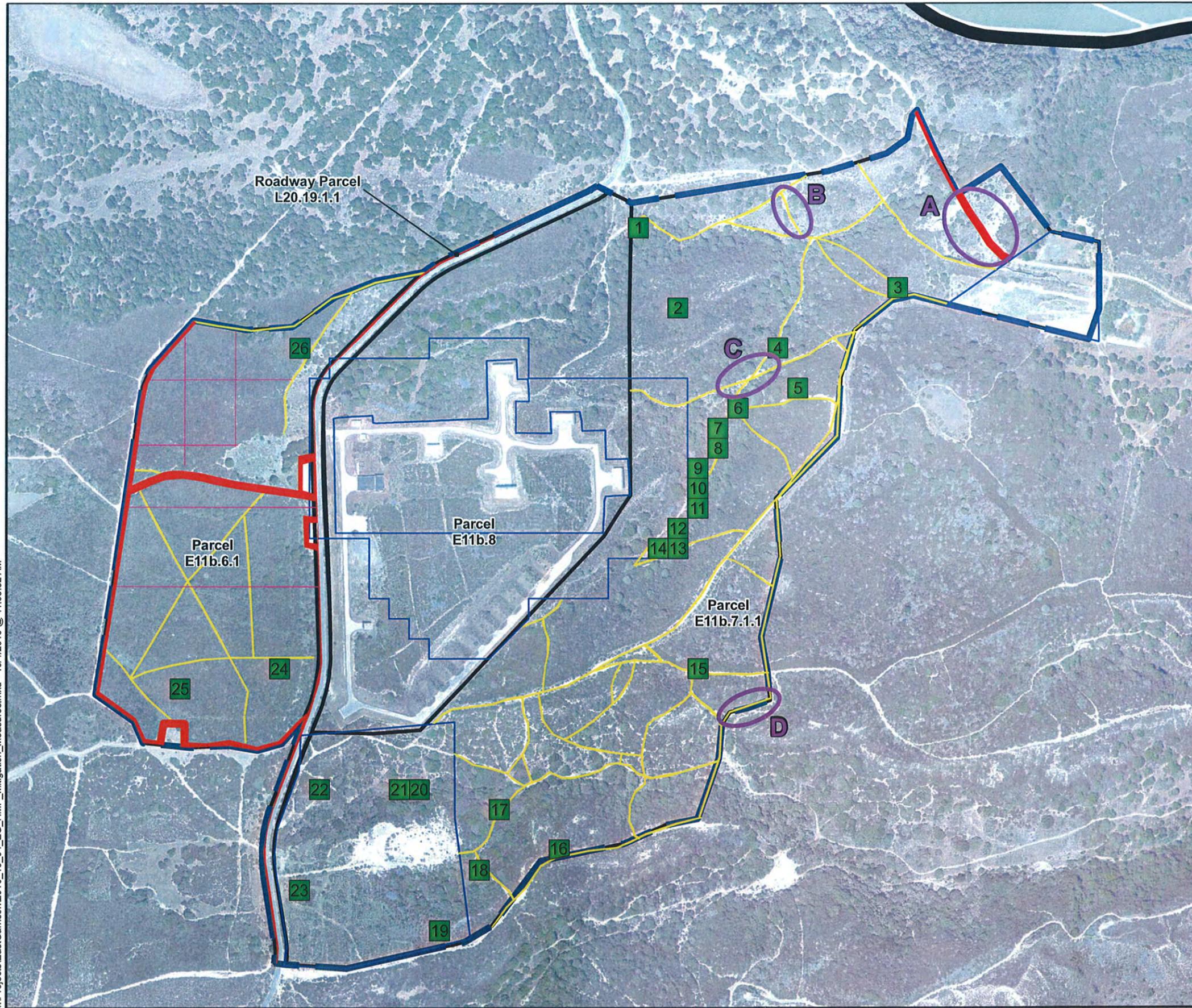
Wildlife Biologist
BRAC Fort Ord:

William K. Collins

Date:

11/4/10

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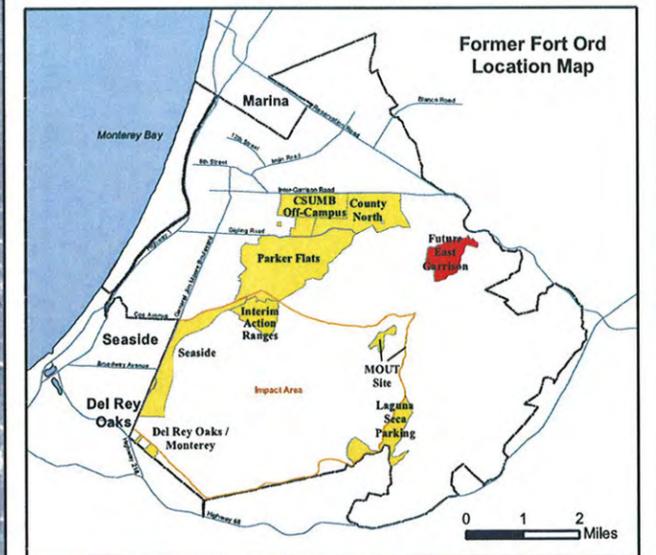


Legend

- Munitions Response Area Boundary
- MRS Boundary
- 10-ft Off of Roads - Approx. 4.3 ac.
- 10-ft Trail Investigation (5 feet on each side of Trail) - Approx. 7.0 ac.
- 4-ft Path for Bio-Transsects - Approx. 0.5 ac.
- USACE Parcel
- Grid Investigation - Approx. 5.9 ac.

HMP Mitigation Measure Areas

- A** Aquatic Features: Biologist must be present during brush cutting & mag & dig
- B** Sand gilia habitat on steep slope: Biologist must be present during brush cutting & mag & dig
- C** Monterey spineflower habitat: Biologist must be present during mag & dig
- D** Sand gilia habitat: Biologist must be present during mag & dig



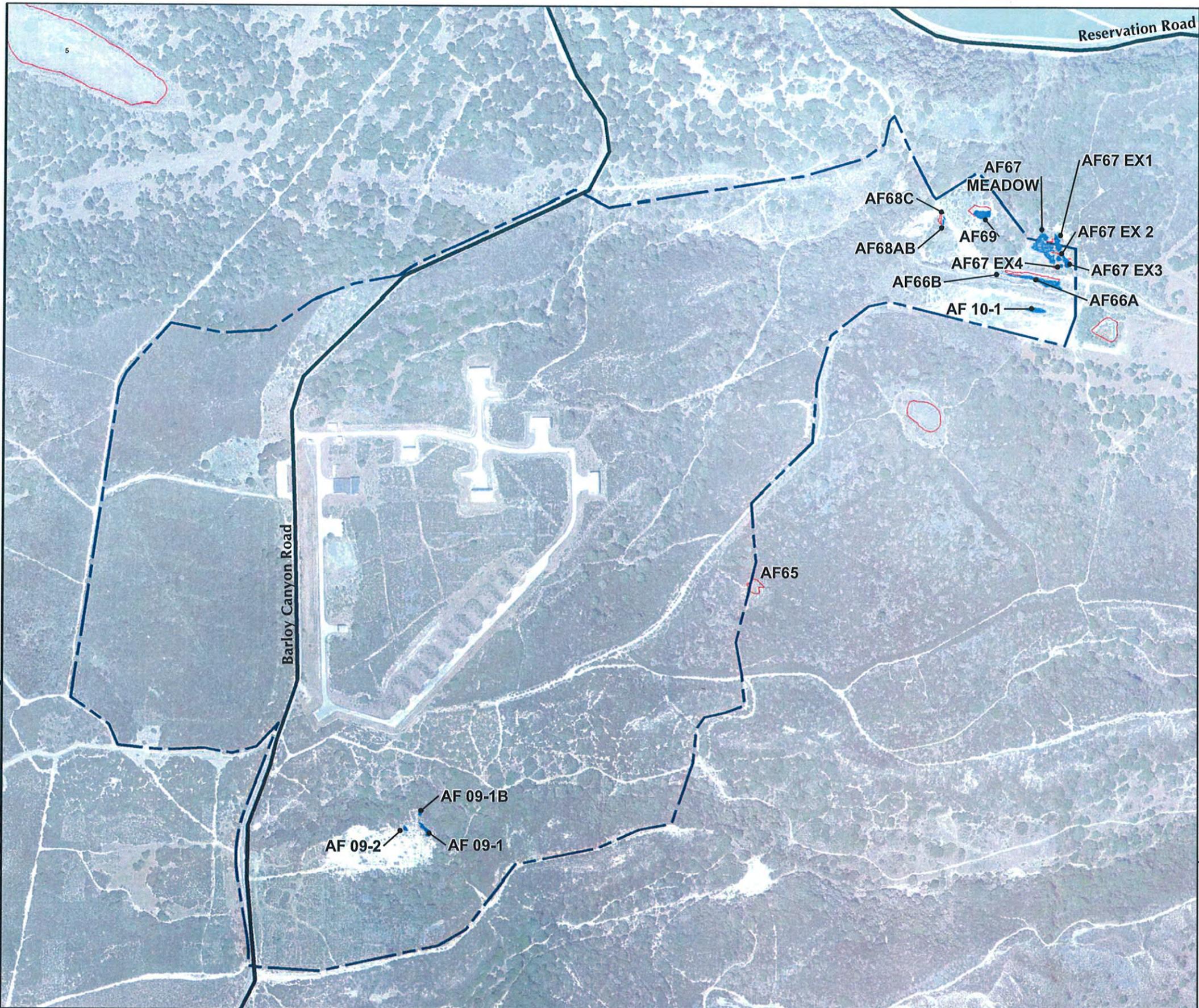
Future East Garrison MRA HMP Mitigation Measures Natural Resource Impact Mitigation Checklist

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Monterey County, California

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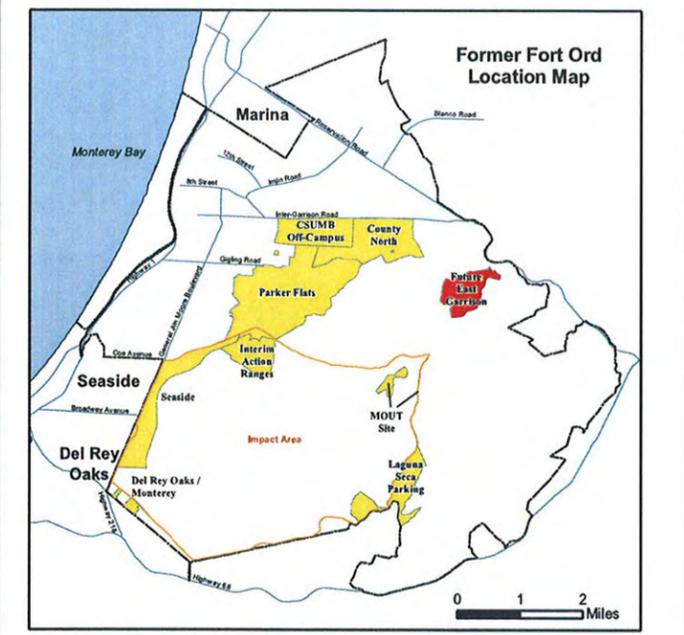
Figure 1

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Legend

-  Munitions Response Area
-  Major Road
-  Aquatic Feature Extents
-  Previous Aquatic Feature Boundary

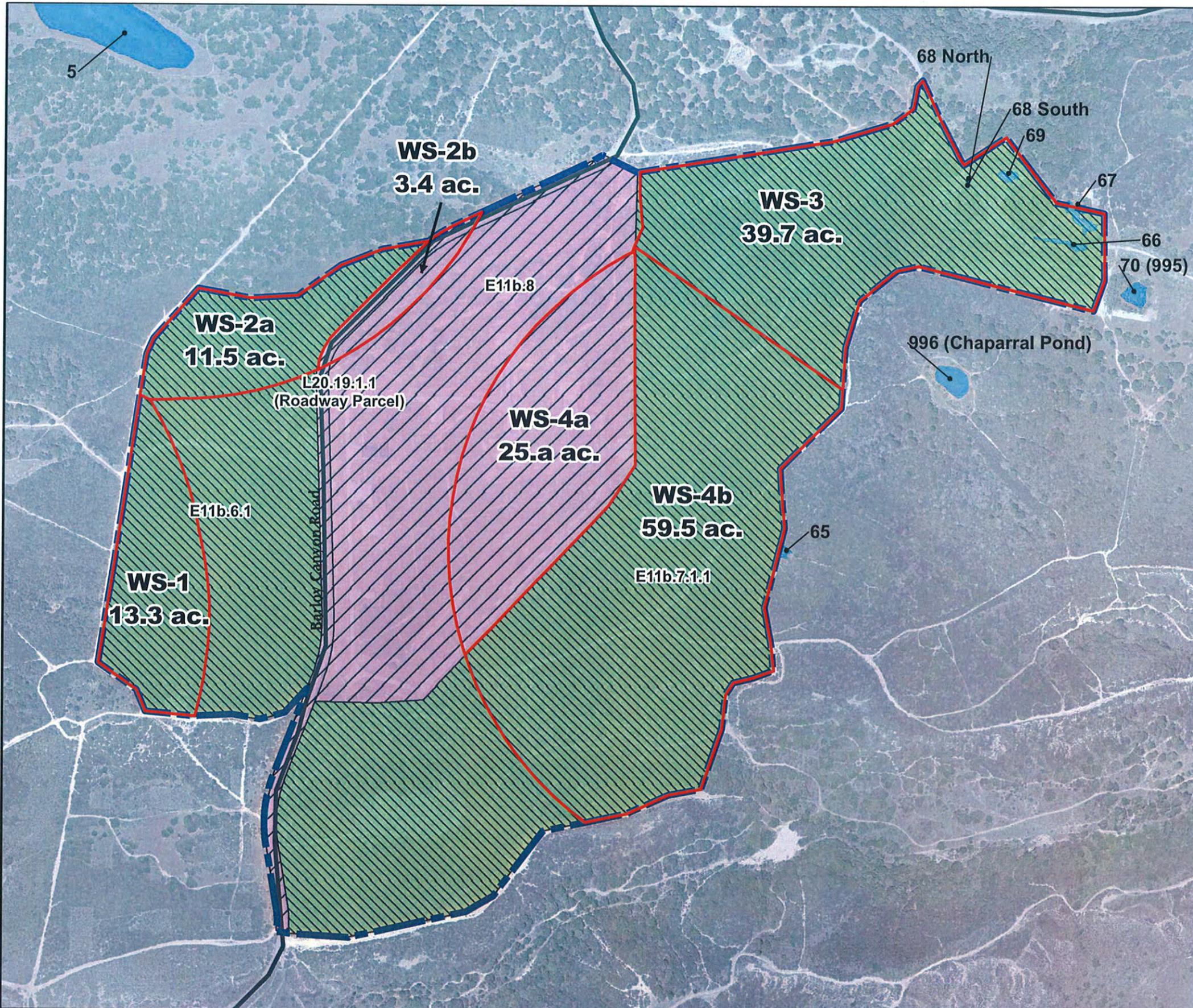


**Future East Garrison MRA
Aquatic Feature Locations**

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Monterey County, California

DRAFT **Figure 2**

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Legend

- Munitions Response Area
- Major Road
- Aquatic Features
- E11b.8 USACE Parcel
- WS-2a Watershed

Habitat Management Plan Category

- Development (includes future Residential and Non-Residential areas)
- Habitat Reserve

Former Fort Ord Location Map

0 1 2 Miles

0 500 1,000 Feet

**Future East Garrison MRA
CTS Watershed Locations**

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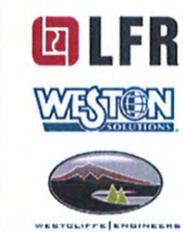
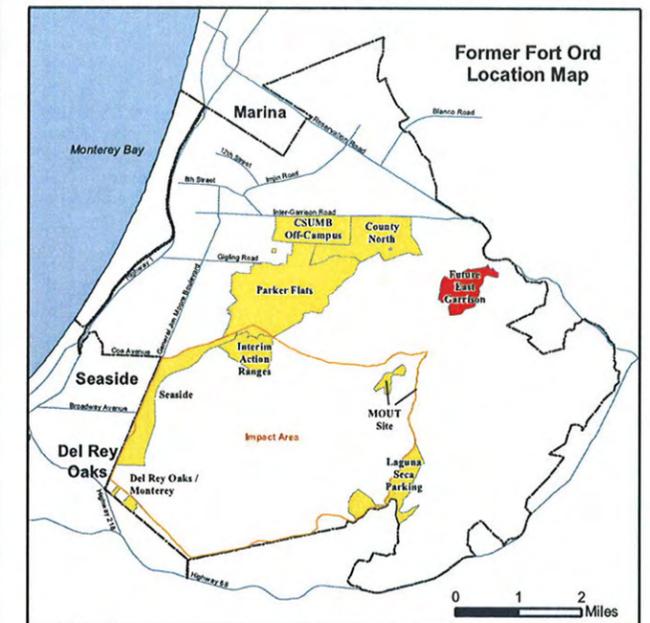
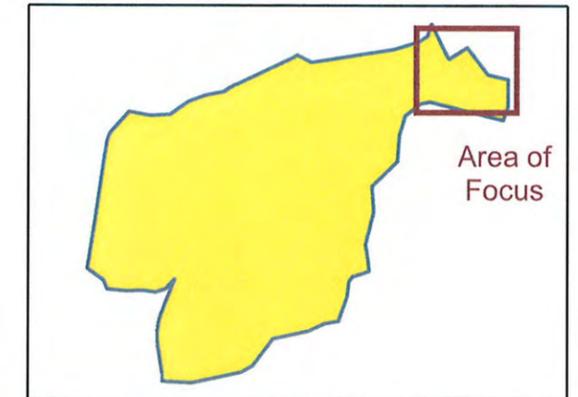
DRAFT Figure 3

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Legend

-  Munitions Response Area
-  Aquatic Feature Extents on March 8, 2010
-  10-ft Off of Edge of Road



**Future East Garrison MRA
Location of Aquatic Features
in Investigation Corridor**
FORA ESCA RP
Monterey County, California

DRAFT

Figure 4

NATURAL RESOURCE IMPACT MITIGATION CHECKLIST

Checklist No. 7

Revision 1

Title: Interim Action Ranges MRA MEC Design Study and Interim Remedial Actions

Notify the ESCA RP Senior Qualified Biologist (510-541-7509) before proceeding if it is proposed that work boundaries change, types of equipment change, additional vegetation removal is necessary, vegetation cutting methods change, or any other conditions change.

ESCA MRA:	Interim Action Ranges	Date:	10/13/11
Work to be conducted:	<p>MEC design study and interim remedial actions will be performed in habitat parcels. Work activities will include:</p> <ul style="list-style-type: none"> • field staking using GPS, • above ground vegetation removal along ingress/egress routes and within investigation transects in the Range 44 special case area (SCA) and non-completed areas (NCAs), • digital geophysical survey and anomaly investigation using excavation in the Range 44 SCAs and NCAs, • vegetation, root ball and soil removal and screening in Range 44 SCAs and NCAs if needed for MEC removal and safety reasons, soil transport to and from a screen plant and soil stockpiling in the development parcel, • vegetation, root ball and soil removal along design study transects and interim remedial action areas in the Range 47 SCA, soil transport to and from a screen plant and soil stockpiling in the development parcel, • digital geophysical survey and anomaly investigation using excavation in the Range 47 SCA, • instrument aided surface and sub-surface removal (i.e., “mag and dig”), as required for MEC remedial activities, • field demolition of MEC as required, and • backfill and re-contouring of excavated soil. 		
Relevant Work Plan Reference and Section(s):	<p>Final Phase II Interim Action Work Plan, Interim Action Ranges Munitions Response Area (relevant sections and Appendix B); Field Variance Form Nos. IARWP-002 (Range 47 berm), IARWP-003 (Range 47) and IARWP-004 (Range 44); pending approval</p>		

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IMPACT MITIGATION CHECKLIST No. 7, Rev. 1
Interim Action Ranges MRA MEC Investigation

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<p>1. LAND USE DESIGNATION:</p>	<p><input checked="" type="checkbox"/> Habitat Reserve</p>	<p>Development <input checked="" type="checkbox"/> Non-Residential <input type="checkbox"/> Residential</p>	<p><input type="checkbox"/> Other (specify):</p>
<p>2. LAND OWNER:</p>	<p><input type="checkbox"/> Army</p>	<p>Parcel No(s). and/or Location:</p>	
	<p><input checked="" type="checkbox"/> FORA</p>	<p>Parcel No(s). and/or Location:</p>	<p>See Figure 1 E38 – habitat parcel where support activities may occur (western portion of MRA) E39 - habitat parcel where initial MEC remedial activities will be performed (central portion of MRA) E40 – development parcel where support, sift plant and soil stockpiling activities will occur (central northern portion of MRA) E41 and E42 – habitat parcels where support activities may occur (northern portion of MRA)</p>

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<p>3. FEDERAL ESA SPECIES REPORTED IN PARCEL(S):</p>	<p><input checked="" type="checkbox"/> Yes</p>	<p><input type="checkbox"/> No</p>	<p><input type="checkbox"/> Flagged/Marked</p>
<p>Reported ESA Species [common name(s)]:</p>	<p>Monterey gilia, Monterey spineflower, California tiger salamander (CTS) (potential)</p>		
<p>Reported Species' Location(s):</p>	<p>Monterey gilia and Monterey spineflower populations occur on open sandy areas in many locations throughout the MRA (MACTEC 2005). CTS are potentially present in the eastern two-thirds of the MRA which is within 2 kilometers of a pond where CTS breeding has been reported (Figure 1).</p>		
<p>Grid Numbers:</p>	<p>In 2005, MACTEC mapped the species locations to grid blocks in the MRA. In 2010, monitoring for these species was performed in some grid cells that are immediately adjacent to the SCA/NCA polygons as well as in projected ingress/egress pathways and grid cells identified for annual monitoring.</p>		
<p>Restrictions:</p>	<p><u>General:</u> Work activities shall be conducted in such a manner as to minimize impacts to ESA-listed species and their habitats to the extent feasible while conducting MEC remedial and associated field activities. Field supervisors will work closely with ESCA RP Biologists to implement this general requirement.</p> <p><u>Vehicle and mechanized equipment operation:</u> Vehicle and mechanized equipment operation is restricted to existing roads and MEC remedial/support areas to the extent feasible. Off-road access is allowed for vehicles/equipment required for completion of work activity when restriction to existing roads is infeasible. If off-road vehicle and/or mechanized equipment movement is needed in areas not shown on Figure 3, the field work supervisor will contact an ESCA RP Biologist who will determine suitable mitigation measures (if any) to be implemented in the area. The biologist will consult with the Senior Qualified Biologist if necessary to make these determinations. Vehicles and mechanized equipment operations in such areas will be coordinated with an ESCA RP Biologist.</p> <p><u>Ingress/egress:</u> Ingress/egress routes where known sand gilia populations exist on the shoulder of roads will be avoided as feasible taking into account safety and operational requirements. The existing and planned routes are shown on Figure 3. If additional or more intensive activity becomes necessary in areas A and B shown on Figure 3 (e.g., expanding the width of the pathway to accommodate equipment), the Field Supervisor will contact an ESCA RP Biologist who will determine suitable mitigation measures (if any) to be implemented in the area. The biologist will consult with the Senior Qualified Biologist if necessary to</p>		

	<p>make these determinations.</p> <p><u>California Tiger Salamander Mitigation Measures:</u></p> <p>Field crews will implement the following CTS impact mitigation measures throughout the MRA (i.e., including habitat and development parcels):</p> <ol style="list-style-type: none"> 1) If a CTS is uncovered during excavation or other soil handling operations, operations will immediately stop in the area and an ESCA RP Biologist shall be contacted. 2) Field personnel shall not touch CTS that are discovered. Only a USFWS-approved biologist may handle CTS. 3) Operations shall not resume in the affected area until the CTS is removed from the operation area by a Qualified Biologist (i.e., USFWS-approved biologist) and after approval by said biologist to resume operations. 4) Between October 15 and March 31 if rainfall greater than 0.5 inches has occurred within 24 hours of the beginning of the work day (0700), all work areas not within a high-hazard area and within the 2 km radius (Figure 1) will be inspected for presence of CTS prior to start-up of operations (i.e., prior to activation of operational safety exclusion zones). Inspections will be done by personnel who have received Environmental Awareness Training which includes recognition of CTS. Particular examination will be made of contact points between vehicles, equipment and material with the ground surface, as well as depressions such as excavations and road ruts to assure that CTS are not present. If CTS are sighted animal will not be touched or moved and an ESCA RP Qualified (USFWS approved) Biologist shall be contacted. The affected vehicle/equipment shall not be moved or operated until a Qualified Biologist has given the go-ahead after removing the CTS. 5) Between October 15 and August 31, all open excavations not within a high-hazard area that are greater than 6 inches deep and 0.05 acre in extent or larger and are within the 2 km radius shown on Figure 1 shall be inspected prior to the start of the day's further excavation work on mornings during rains, when substantial rain (>0.5 inches) is forecast within 24 hours, or when rain has fallen within the last 24 hours. Operation of mechanized equipment shall not commence in such excavations until the biologist has completed such inspections. If CTS are discovered, equipment operation shall not commence in the area until a Qualified Biologist removes the animal(s) from the excavation and gives approval for the start of field work within the area. When possible, such excavations should be silt fenced, covered or ramped. The ramps will allow animals to escape. Ramps will be approximately 2 feet wide, no greater than 30
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	<p>degrees in slope, and placed not more than 100 ft apart. Earthen ramps should be used when possible. If silt fencing, covers or ramps are not possible cover boards or other adequate shelters will be placed in the depression to provide temporary shelter for CTS. A Qualified Biologist will inspect the ramps or shelter boards to ensure that they achieve the intended effect.</p> <p>6) The ESCA RP Senior Qualified Biologist shall notify the Army Wildlife Biologist “immediately” (i.e., within 24 hours or less) of the following: 1) handling of CTS, 2) discovery of injured or dead CTS as determined by a Qualified Biologist. Therefore, the Senior Qualified Biologist must be immediately notified by the onsite biologist of all such occurrences even if identification or other items require further confirmation.</p>
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4. HMP (NON-FEDERAL ESA) SPECIES REPORTED IN PARCEL(S):	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Flagged/Marked
Reported HMP Species [common name(s)]:	Eastwoods’ ericameria; Monterey ceanothus; sandmat, Hooker’s and toro manzanita; seaside bird’s beak; coast wallflower; and California black legless lizard. Potential habitat for Monterey ornate shrew was reported in the MRA in the HMP.		
Reported Species’ Location(s):	In the 1992 baseline survey, sandmat manzanita, Eastwoods’ ericameria and Monterey ceanothus were reported in high abundance throughout the MRA and seaside bird’s beak was reported only in the eastern ¾ of the MRA. Hooker’s and toro manzanita and coast wallflower are not abundant in the MRA. In the HMP, California black legless lizard and Monterey ornate shrew were reported to potentially occur in the MRA.		
Grid Numbers:	The non-federal ESA HMP species have not been mapped to grid numbers.		
Restrictions:	<p><u>General:</u> Work activities shall be conducted in such a manner as to minimize impacts to HMP species and their habitats to the extent feasible while conducting MEC remedial and associated field activities. Field supervisors will coordinate with the ESCA RP Biologist to implement this general requirement.</p> <p><u>Vehicle and mechanized equipment operation:</u> Same restrictions as for ESA species.</p> <p><u>Ingress/egress:</u> Same restrictions as for ESA species.</p>		

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IMPACT MITIGATION CHECKLIST No. 7, Rev. 1
Interim Action Ranges MRA MEC Investigation

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5. AQUATIC FEATURES (i.e., VERNAL POOLS/PONDS) PRESENT:		<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Flagged/Marked
Location(s):	No aquatic features (AFs) are located in the IAR MRA. A 2 km CTS radius occurs within the habitat parcels in the MRA (Figure 1).			
Grid Number(s):	N/A			
Work can proceed in pools/ponds?: N/A		<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Restrictions:				

6. VEGETATION REMOVAL		
<input type="checkbox"/> None	Location(s):	
<input type="checkbox"/> Manual Removal	Location(s):	
Restrictions:		
<input checked="" type="checkbox"/> Mechanical Removal	Location(s):	Mechanical vegetation removal will be required in the design study transects (Figure 2), Range 47 SCA interim remedial action per FVF No. IARWP-003 (Figure 4), Range 44 SCA-Northern Portion Design Study Expansion per FVF No. IARWP-004 (Figure 5) and on the ingress/egress corridors (Figure 3). For purposes of the design study and remedial action, mechanical vegetation removal includes near surface vegetation cutting with plant materials dropped in place and selected root raking activities with plant material hauled off-site. Plant materials hauled off-site may be brought back on-site for biological related activities and erosion control.
Restrictions:	Taking into consideration safety and operational requirements, oak trees 5 inches in diameter (DBH) will be left in place and limbed up as feasible. No trees over 5 inches DBH have been observed in the work areas.	

7. EROSION CONCERNS/SITE RESTORATION:

To complete the design study and interim remedial actions excavation and soil screening are planned for proposed 10 foot wide transects (Figure 2) and additional areas (Figure 4) in the Range 47 SCA. Digital geophysical survey, subsurface anomaly investigation operations, and excavation in Range 44 SCA and the NCAs (Figure 5) are planned. Erosion monitoring will be performed after significant rainfall and after the end of remediation activities. Erosion Best Management Practices as implemented in other MRAs by ESCA RP will be implemented as needed in areas of ESCA RP soil disturbance in SCAs/NCAs, along roadways and trails and in soil stockpile areas. Key focus of erosion control of the stockpiles in the development parcel will be to prevent soil erosion across the borderland boundary. Erosion BMPs to be implemented as needed may include crimped straw, waddles, berms, silt fences, plastic sheeting, etc.

8. SITE ACCESS:

The MRA is accessed via Eucalyptus Road to the north

9. ADDITIONAL SITE CONCERNS:

Excavation: During soil excavation along the investigation transects and all activities associated with the interim remedial actions in the Range 47 SCA and design study activities in Range 44 and the Central Area (Figure 3), the top 6 inches or top 12 inches of soil (“topsoil”) will be screened and separately stockpiled so that it may be replaced on the surface during backfill. This procedure preserves the species’ “seed bank,” nutrients and beneficial organisms, such as mycorrhizae and bacteria in the area. The topsoil will be stockpiled so that it is not mixed with known weed populations while being stored.

Backfill: Upon completion of the design study field work and subsequently approved excavations, subsoil and topsoil will be replaced in proper sequence and re-contouring of the site will be conducted.

Restoration and Monitoring: Site restoration and monitoring will be conducted per the relevant protocols and plans.

FORA ESCA RP

IMPACT MITIGATION CHECKLIST No. 7, Rev. 1
Interim Action Ranges MRA MEC Investigation

Confidential Business Information

Attachments

Figure 1. Interim Action Ranges MRA Natural Resource Impact Mitigation Checklist Ecological Profile Habitat Type

Figure 2. Interim Action Ranges MRA Natural Resource Impact Mitigation Checklist Proposed Design Study Transects and Work Area

Figure 3. Interim Action Ranges MRA Natural Resource Impact Mitigation Checklist Ingress/Egress Corridors

Figure 4. Interim Action Ranges MRA Natural Resources Impact Mitigation Checklist Range 47 SCA Interim Remedial Action

Figure 5. Interim Action Ranges MRA Natural Resources Impact Mitigation Checklist Range 44 SCA Design Study Expansion

Approved:

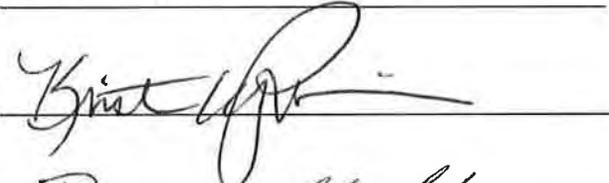
**ARCADIS Senior
Qualified Biologist:**



Date:

10/13/11

**ESCA RP Program
Manager:**



Date:

10/13/11

**ESCA RP Senior
UXO Supervisor**



Date:

10/13/11

Received:

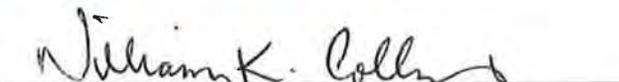
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Program Manager:**



Date:

10/13/11

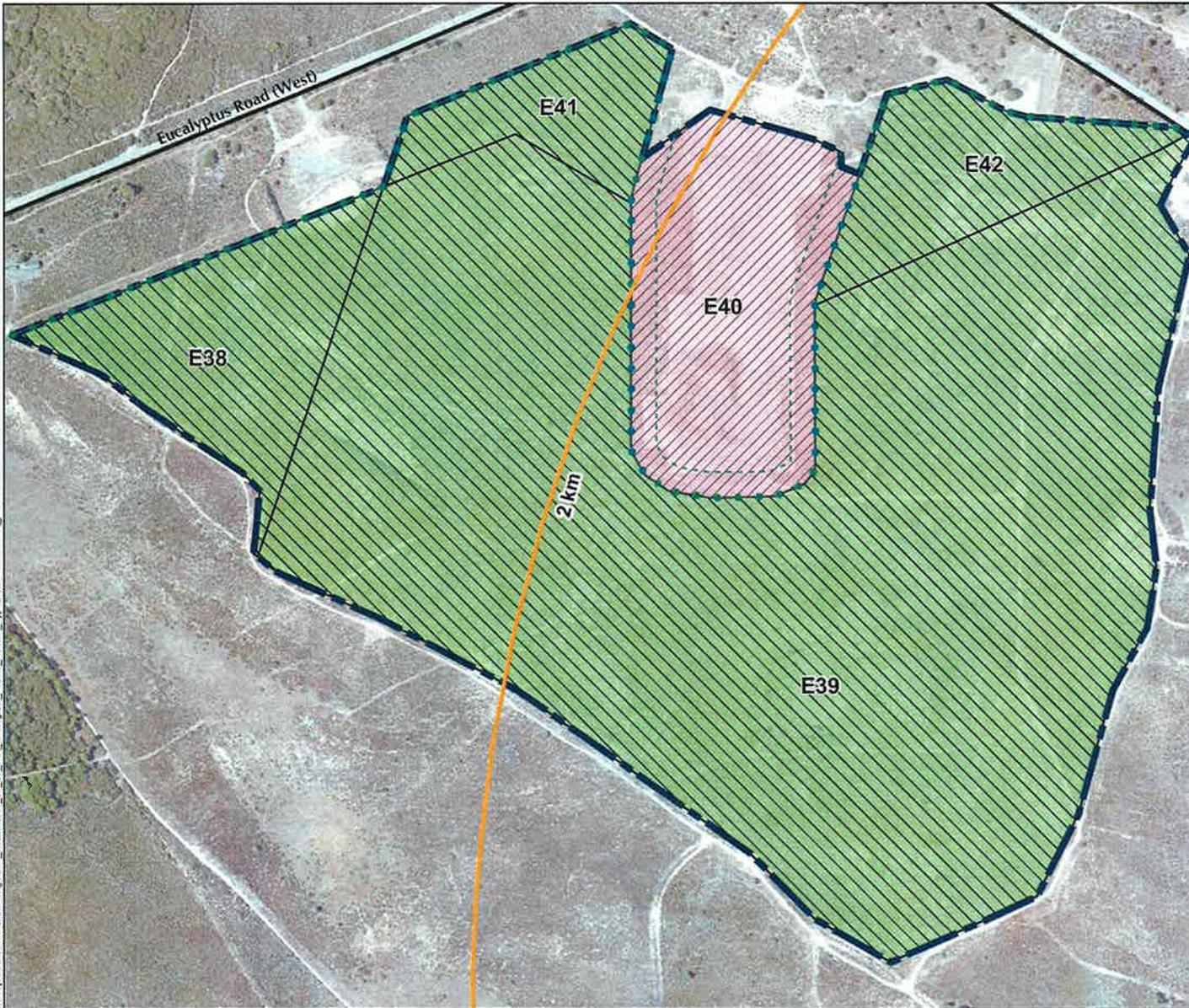
**Wildlife Biologist
BRAC Fort Ord:**



Date:

10/13/11

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Legend

- Munitions Response Area
- California Tiger Salamander Buffer
- Major Road
- USACE Parcel
- Borderland Interface
- 100-Foot Buffer from Borderland Interface

Habitat Management Plan Category

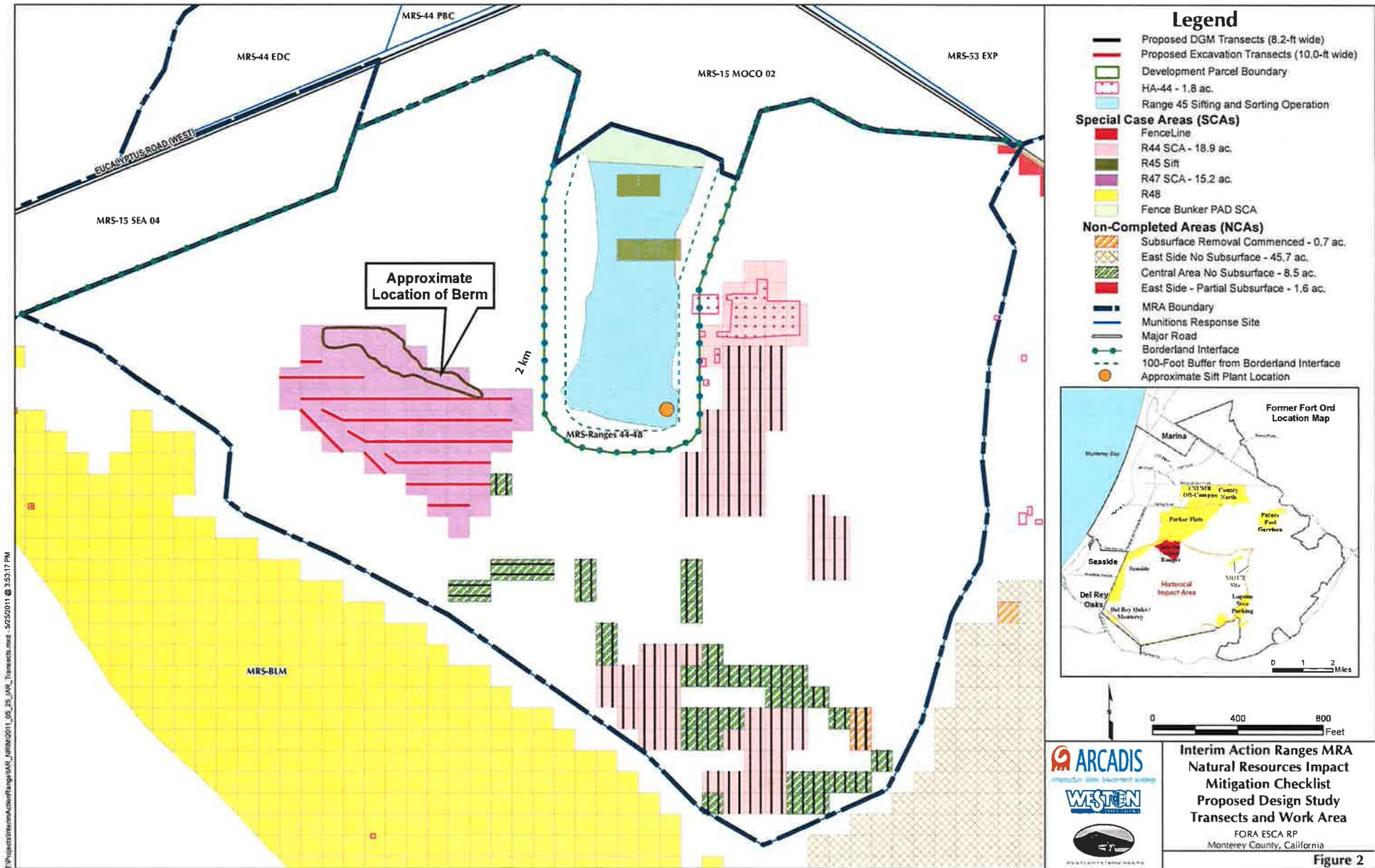
- Development (Including Residential)
- Habitat Reserve



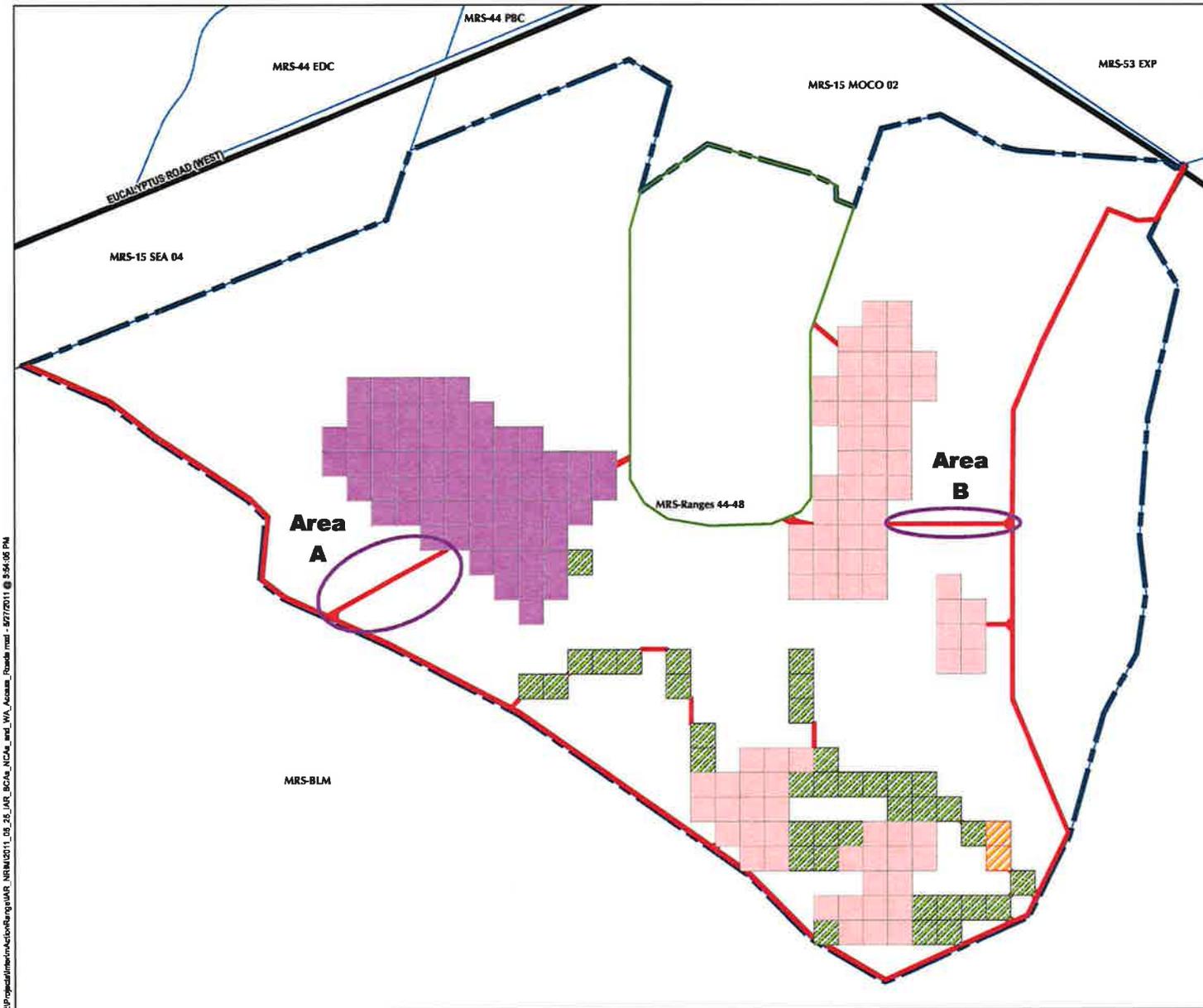
Interim Action Ranges MRA
Natural Resources Impact
Mitigation Checklist
Ecological Profile Habitat Type

FORA ESCA RP
Monterey County, California

Figure 1



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Legend

- MRA Boundary
- Munitions Response Site
- Major Road
- Potential Work Area Access Corridors/Roads - 4.8 ac.
- Development Parcel Boundary

Special Case Areas (SCAs)

- R44 SCA - 18.9 ac.
- R47 SCA - 15.2 ac.

Non-Completed Areas (NCAs)

- Subsurface Removal Commenced - 0.7 ac.
- Central Area No Subsurface - 8.5 ac.

Areas A and B: Sensitive sand gilia population locations. Field Supervisor will contact ESCA RP Biologist in advance if impacts/work activity beyond those anticipated in the Work Plan are to be conducted (e.g., widening corridor to accommodate additional traffic).

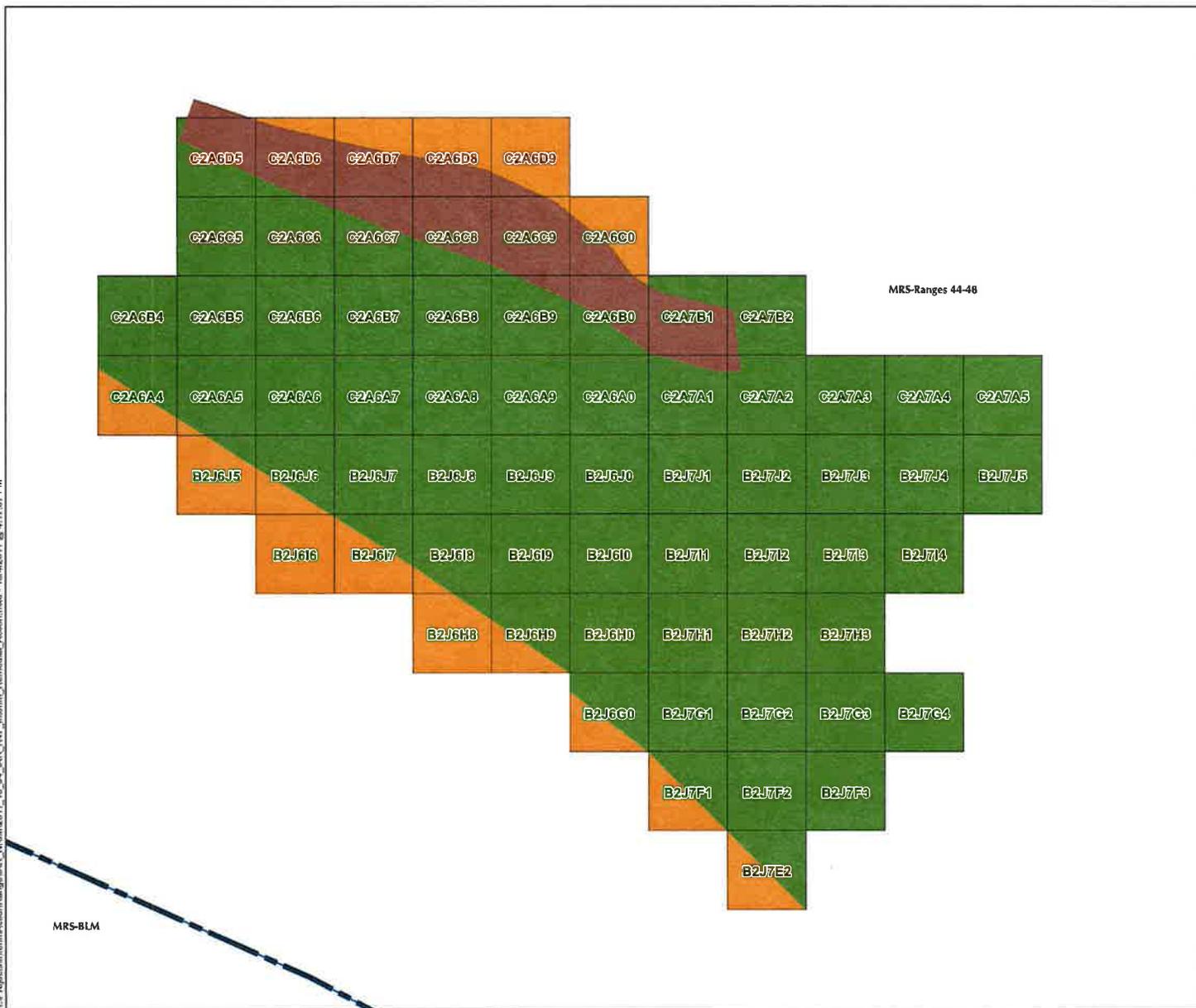
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Interim Action Ranges MRA
Natural Resources Impact
Mitigation Checklist
Ingress/Egress Corridors
 FORA ESCA RP
 Monterey County, California

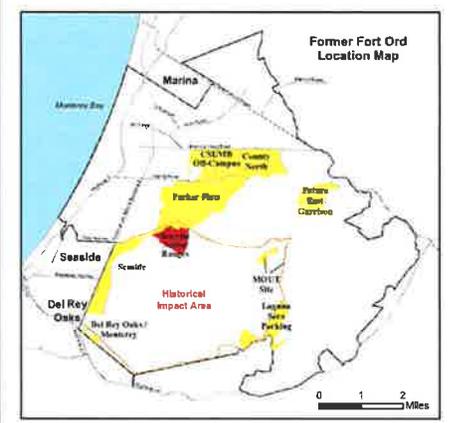
Figure 3

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Legend

- Area A = Excavation and Screening Recommended (11.9 ac.)
- Area B = DGM and Target Investigation Recommended (1.5 ac.)
- Area C = DGM and Target Investigation Recommended (2.0 ac.)
- Interim Action Ranges MRA Boundary
- Munitions Response Site



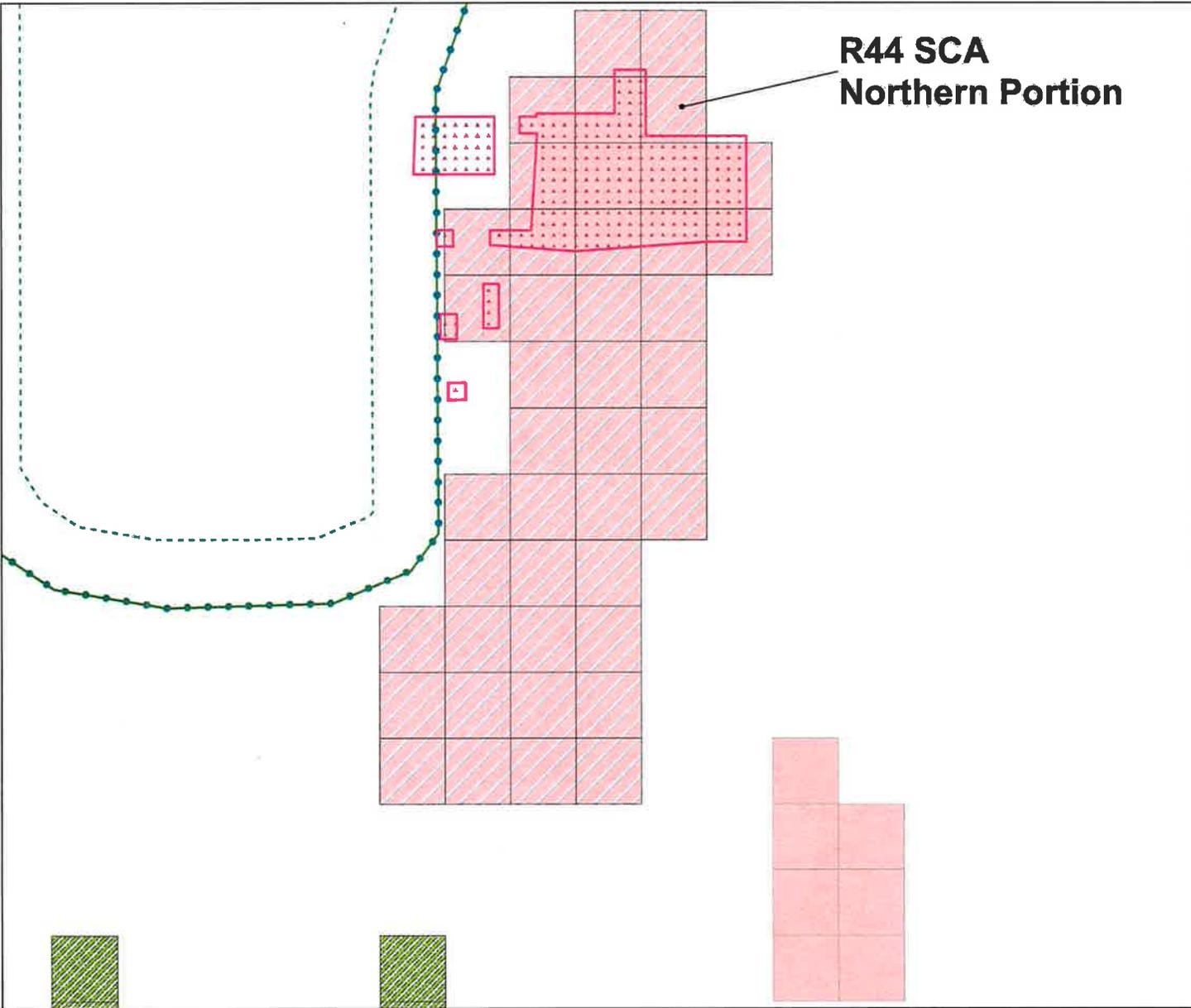
**Interim Action Ranges MRA
Natural Resources Impact
Mitigation Checklist
Range 47 SCA
Interim Remedial Action**

FORA ESCA RP
Monterey County, California

Figure 4

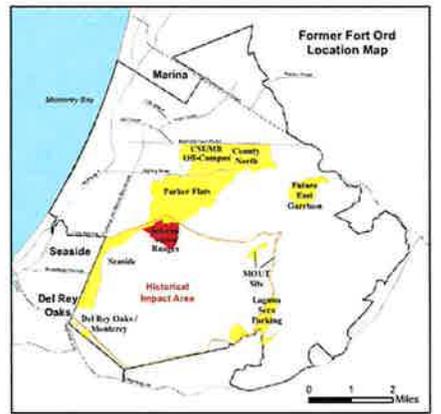
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R44 SCA Northern Portion



Legend

-  Proposed DGM Area (8.3 ac.)
-  HA-44 Remediation Area
-  R44 SCA
-  100-Foot Buffer from Borderland Interface
-  Borderland Interface
-  Development Parcel Boundary
- Non-Completed Areas (NCAs)**
-  Central Area No Subsurface



Interim Action Ranges MRA
 Natural Resources Impact
 Mitigation Checklist
 Range 44 SCA
 Design Study Expansion
 FORA ESCA RP
 Monterey County, California

Figure 5

NATURAL RESOURCE IMPACT MITIGATION CHECKLIST

Checklist No. 4

Revision 1

Title: Parker Flats MRA Phase II Habitat Parcels

Notify the Senior Qualified Biologist (510-541-7509) before proceeding if it is proposed that work boundaries change, types of equipment change, additional vegetation removal is necessary, vegetation cutting methods change, or any other conditions change.

ESCA MRA:	Parker Flats Phase II (habitat reserve)	Date:	10/15/09
Work to be conducted:	Surveying, vegetation removal, debris pile removal, instrument aided surface clearance, DGM of trails, excavation as required to remove MEC/MD, field demolition of MEC as required.		
Relevant Work Plan Reference and Section(s):	Parker Flats Qualified Biologist Memo No. 1 (PF QB Memo 1); Final Group 1 RI/FS Work Plan, Vol. 1 Work Plan. Seaside MRA and Parker Flats MRA Phase II. (relevant sections and Appendix E, Response to Comments)		

1. LAND USE DESIGNATION:	<input checked="" type="checkbox"/> Habitat Reserve	Development <input type="checkbox"/> Non-Residential <input type="checkbox"/> Residential	<input type="checkbox"/> Other (specify):
2. LAND OWNER:	<input type="checkbox"/> Army	Parcel No(s). and/or Location:	
	<input checked="" type="checkbox"/> FORA	Parcel No(s). and/or Location::	Parker Flats MRA; E19a.2 and E19a.4 (See Figure)

FORA ESCA Remediation Program Team



Westcliffe Engineers, Inc.

FORA ESCA RP

3. FEDERAL ESA SPECIES REPORTED IN PARCEL(S):		<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Flagged/Marked
Reported HMP Species [common name(s)]:	CTS, Monterey spineflower			
Reported Species' Location(s):	39.8 acres of parcel E19a.4 are within 500 m of vernal pool located in adjacent BLM area. Spineflower survey conducted in May 2008 (see Grid Numbers).			
Grid Numbers:	C3G5B9, C3G5C9, C3G5A6, C3G5A5, C3H3A5, C3G4B7, C3G4B6, C3G6E5			
Restrictions:	Off-road access limited to vehicles/equipment required for completion of work activity. Open excavations will be sloped or silt fenced to prevent trapping of CTS. QB will review excavation areas to determine if they will impact known spineflower locations. If an area where MEC excavation is required is documented as a known Monterey spineflower habitat, the top 6-in. of soil will be separately stockpiled during the dig and replaced as the final 6-in. surface soil layer when the dig is backfilled. This procedure preserves the species' "seed bank" in the area. See Parker Flats QB Memo No. 1.			

4. VERNAL POOLS/PONDS PRESENT:		<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Flagged/Marked
Location(s):				
Grid Number(s):				
Work can proceed in pools/ponds?:	<input type="checkbox"/> Yes	<input type="checkbox"/> No		
Restrictions:				

5. VEGETATION REMOVAL		
<input type="checkbox"/> None	Location(s):	

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<input type="checkbox"/> Manual Removal	Location(s):	
Restrictions:		
<input checked="" type="checkbox"/> Mechanical Removal	Location(s):	Throughout both parcels
Restrictions:	Trees 5 inches in diameter (DBH) and larger will not be removed. Trees left in place in habitat area will be limbed up to provide access for instrument aided surface clearing. See PF QB Memo 1. Manzanita burls will be preserved to the extent practicable.	

6. EROSION CONCERNS/SITE RESTORATION:

No excavations greater than 1 acre are anticipated. Excavation will only occur within trail buffers and trail convergence areas as required based on the findings of the DGM survey. The largest trail convergence area encompasses 0.36 acres and the longest trail segment buffer that may require excavation is 0.272 acres. Existing erosion areas along roadways and trails will have waddles, berms, silt fences, or equivalent sediment controls installed as required by existing soil management and erosion control plans.

7. SITE ACCESS:

Primarily via Gigling Road through 8th Ave gate

8. ADDITIONAL SITE CONCERNS:

Monitoring of HMP Annuals and shrubs will be conducted in accordance with HMP and VMP.

This revision eliminates the requirement for a tarp underneath surface soil replacement piles when conducting subsurface MEC clearance in HMP annual species locations.

Since the initial checklist was prepared, the area was transferred from the U.S. Army to FORA.

FORA ESCA RP

IMPACT MITIGATION CHECKLIST No. 4, rev. 1
Parker Flats MRA Phase II Habitat Parcels

Confidential Business Information

Approved:

LFR Senior

Qualified Biologist:



Date:

10/15/09

ESCA RP

Program Manager:



Date:

10/15/09

ESCA

Remediation

Program Manager



Date:

10/15/09

Approved
Received:

FORA ESCA

Program Manager:



Date:

10/19/09

Wildlife Biologist

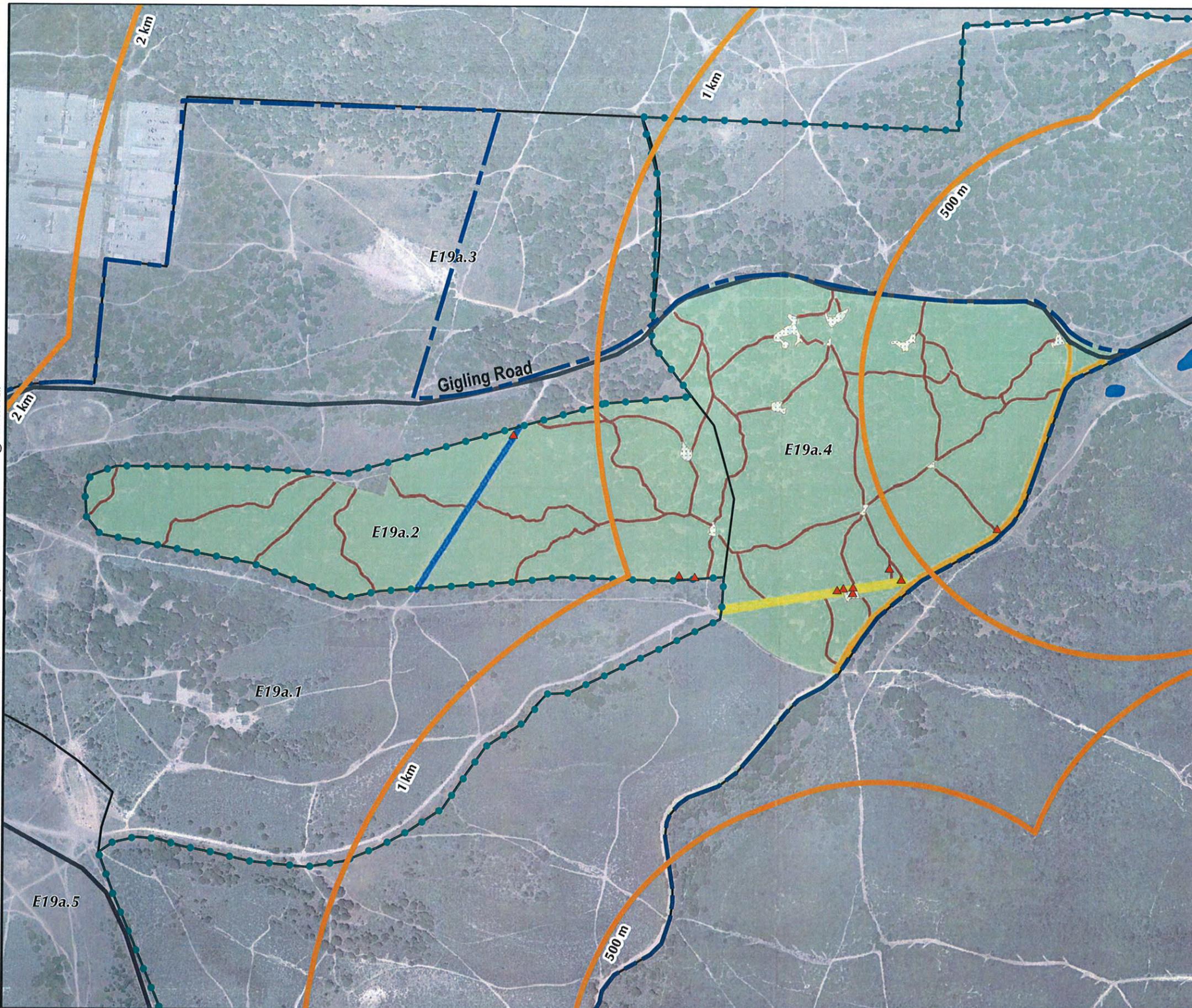
BRAC Fort Ord:



Date:

10/27/09

T:\Projects\Parker Flats\Biologist Habitat Monitoring\Habitat Reserve Monterey Spineflower Sample Locations.mxd - 11/14/2008 @ 11:35:00 AM



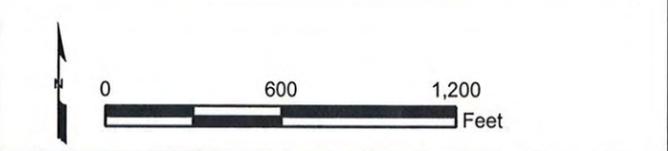
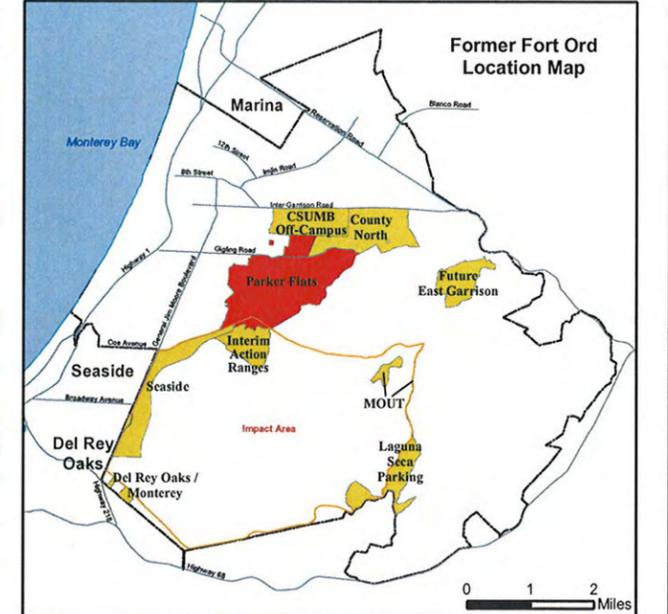
Legend

- Known Monterey Spineflower Location
- California Tiger Salamander Buffer
- Parcel Boundary and ID
- Aquatic Features
- Parker Flats MRA
- Major Road
- Borderland Interface
- Phase II Habitat Area

Trails and Roads

- Unpaved Road 1
- Unpaved Road 2
- Unpaved Road 3
- Trail
- Trail Convergence Areas

Source: Aerial Photo 2003



Known Locations of HMP Listed Species

FORA ESCA RP
Monterey County, California

DRAFT Figure 1



**QUALIFIED BIOLOGIST NRM CHECKLIST
FIELD INSPECTION REPORT – FORA/ESCA**

Munitions Response Area Future East Garrison Date 3/22/2011 Page 1 of 4

Site Visited in MRA Grenade range, mitigation areas B+C, NW part of Eastern habitat parcel

Other Documentation (i.e., maps, photos, etc.): NRM Checklist N°5 Rev. 0

Qualified Biologist(s) Joshua Tallis Escort/Other Bruce Moe

Weather/Site Conditions Partly cloudy, rain in last 24 hrs, 50's °F

Tasks to be Completed Inspect mitigation areas B+C, mark out ^{gilia+} spineflower habitat @ area B+C, flag aquatic features in grenade range, flag toro manzanitas

Other Work Being Conducted Onsite Vegetation cutting by Woolery, MEC investigation by Weston

Work-Force Onsite (Company Name) Weston and Woolery (veg. cutting)

CHECKLIST

1) General Impact Minimization Measures	a. Ingress/Egress procedures	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Followed up with:
	b. Soil disturbance minimized to work areas only, per supervisor	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Followed up with:
	c. Vehicles staying on existing roads to extent possible	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Followed up with:
	d. Erosion absent from Borderland Interface areas	<input type="checkbox"/> Yes <input type="checkbox"/> No N/A Followed up with:
2) Habitat Checklist	a. Compliance w/ any add'l measures req'd?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <u>Flagging placed around 2 aquatic features (see "activities"). Flagging placed on tree-like toro manzanitas. See "Toro" note below activities.</u> Followed up with: <u>None</u>

QUALIFIED BIOLOGIST IMPACT MITIGATION FIELD CHECKLIST – (CONTINUED)

Munitions Response Area Future East Garrison Date 3/22/2011 Page 2 of 4

3) CTS Related Impact Minimization Measures	a. 2-km buffer staked	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Crew are taking precautions for possible impacts to CTS. Entire area is within 2km of a CTS. Followed up with: breeding pond
	b. 1-km buffer staked	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No See above. Crew supervisors have maps showing CTS buffers. Followed up with:
3) CTS Related Impact Minimization Measures (cont'd)	c. 500 meter buffer staked	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Work plan does not indicate more than 10% of area within 500 m of aquatic features. Followed up with: w/ CTS CTS will be disturbed.
	d. Excavation silt fences ok	<input type="checkbox"/> Yes <input type="checkbox"/> No N/A Followed up with:

TIME	ACTIVITIES
1420	Safety meeting w/ Greg Clark @ trailer
1422	Depart w/B. Woe in separate vehicles
1430	JTT + BM @ grenade range in FEG. Flag out aquatic features AF09-1B and 09-2 where work is scheduled to occur. BM will return and erect stakes around aquatic features. JTT puts flagging on large tree-like toro manzanitas so crews do not cut them. Photos 2260-2261 of flagged areas
1446	JTT + BM drive to mitigation area B and put pin flags around the sand gilia population (plants beginning to flower.) JTT explains to Weston escort for veg crew that flagged area is to be avoided by crews. Photos 2262-2267
1500	JTT + BM drive to mitigation area C.

QUALIFIED BIOLOGIST IMPACT MITIGATION FIELD CHECKLIST – (CONTINUED)

Munitions Response Area Future East Garrison

Date 3/22/2011

Page 3 of 4

Route Copies To: _____

SIGNED _____

Reviewed _____
(Senior QB)

TIME

ACTIVITIES

1500 (cont'd) JTT puts pin flags around the Monterey spineflowers population so vehicle traffic avoids the area. Area has already been veg cut. BM will return to install tall stakes. JTT informs BM that ~~if~~ a biologist needs to be present if crews need to dig inside flagged area C. Photos 2268-2269.

1515 BM + JTT drive to 3rd step-out grid cells in far NW corner of eastern habitat parcel. JTT puts flagging on tree-like toro manzanitas prior to veg crew work. Photos 2270-2271. Photos 2272-2273 of veg cutting excavator. JTT notes that many of the manzanitas, even tree-like individuals, are not toro manzanitas. In some areas there are not many toro manzanitas in a whole grid cell.

1528 JTT departs F.E.G.

Notes

Toro Manzanitas: It was decided but not yet incorporated into an NRIW checklist revision that tree-like (>6" dbh) toro manzanitas would be limbed-up and left standing like oaks. This is the reason for flagging toro manzanitas. Crews were also trained to recognize them.



QUALIFIED BIOLOGIST IMPACT MITIGATION FIELD CHECKLIST – (CONTINUED)

Munitions Response Area Future East Granison

Date 3/22/2011

Page 4 of 4

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Reviewed [Signature]
(Senior QB)



**QUALIFIED BIOLOGIST NRM CHECKLIST
FIELD INSPECTION REPORT – FORA/ESCA**

Munitions Response Area Interim Action Ranges Date 6/9/2011 Page 1 of 3

Site Visited in MRA Ingress/egress corridors to Range 44 + 47 SCA's/NCA's

Other Documentation (i.e., maps, photos, etc.): NRM Checklist No 7 Rev. 0, Map A-JTT, 6/9/2011

Qualified Biologist(s) Joshua Tallis + Phil Lebednick Escort/Other Tony Clark

Weather/Site Conditions Morning marine layer, 60's °F

Tasks to be Completed Inspect vegetation cutting in ingress and egress areas. Inspect areas A+B

Other Work Being Conducted Onsite Equipment prep for soil + veg removal in Range 47 and sifting operations.

Work-Force Onsite (Company Name) Weston

CHECKLIST

1) General Impact Minimization Measures	a. Ingress/Egress procedures	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Traffic maintained on designated roads/corridors Followed up with:
	b. Soil disturbance minimized to work areas only, per supervisor	<input type="checkbox"/> Yes <input type="checkbox"/> No N/A Followed up with:
	c. Vehicles staying on existing roads to extent possible	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No see "a" Followed up with:
	d. Erosion absent from Borderland Interface areas	<input type="checkbox"/> Yes <input type="checkbox"/> No N/A Followed up with:
2) Habitat Checklist	a. Compliance w/ any add'l measures req'd?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Mechanical vegetation removal on access corridors Followed up with:



QUALIFIED BIOLOGIST IMPACT MITIGATION FIELD CHECKLIST - (CONTINUED)

Munitions Response Area Interim Action Ranges Date 6/9/2011 Page 2 of 3

3) CTS Related Impact Minimization Measures	a. 2-km buffer staked	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Crews given map showing 2-km buffer area and requested to use CTS awareness throughout IAR MRA. Followed up with: <u>Buffer not staked</u>
	b. 1-km buffer staked	<input type="checkbox"/> Yes <input type="checkbox"/> No N/A Followed up with:
3) CTS Related Impact Minimization Measures (cont'd)	c. 500 meter buffer staked	<input type="checkbox"/> Yes <input type="checkbox"/> No N/A Followed up with:
	d. Excavation silt fences ok	<input type="checkbox"/> Yes <input type="checkbox"/> No N/A Followed up with:

TIME

ACTIVITIES

10:46

Inspect vegetation cutting + masticating along work previously completed along ingress and egress corridors in the IAR MRA. Begin by inspecting the access corridor running from the SW side of R47 SCA to the NRMA boundary. This area is called "Area A" on the NRIM Checklist No 7 Rev. 0. The veg was cut to the ground on either side of the road and masticated vegetation left on the ground. The resulting rd width is approx. 21ft. More vegetation was cut on the W side of the rd as previously requested by Joshua Tallis, because of a known sand gilia population to the E side.

QUALIFIED BIOLOGIST IMPACT MITIGATION FIELD CHECKLIST – (CONTINUED)

Munitions Response Area Interim Action Ranges Date 6/9/2011 Page 3 of 3

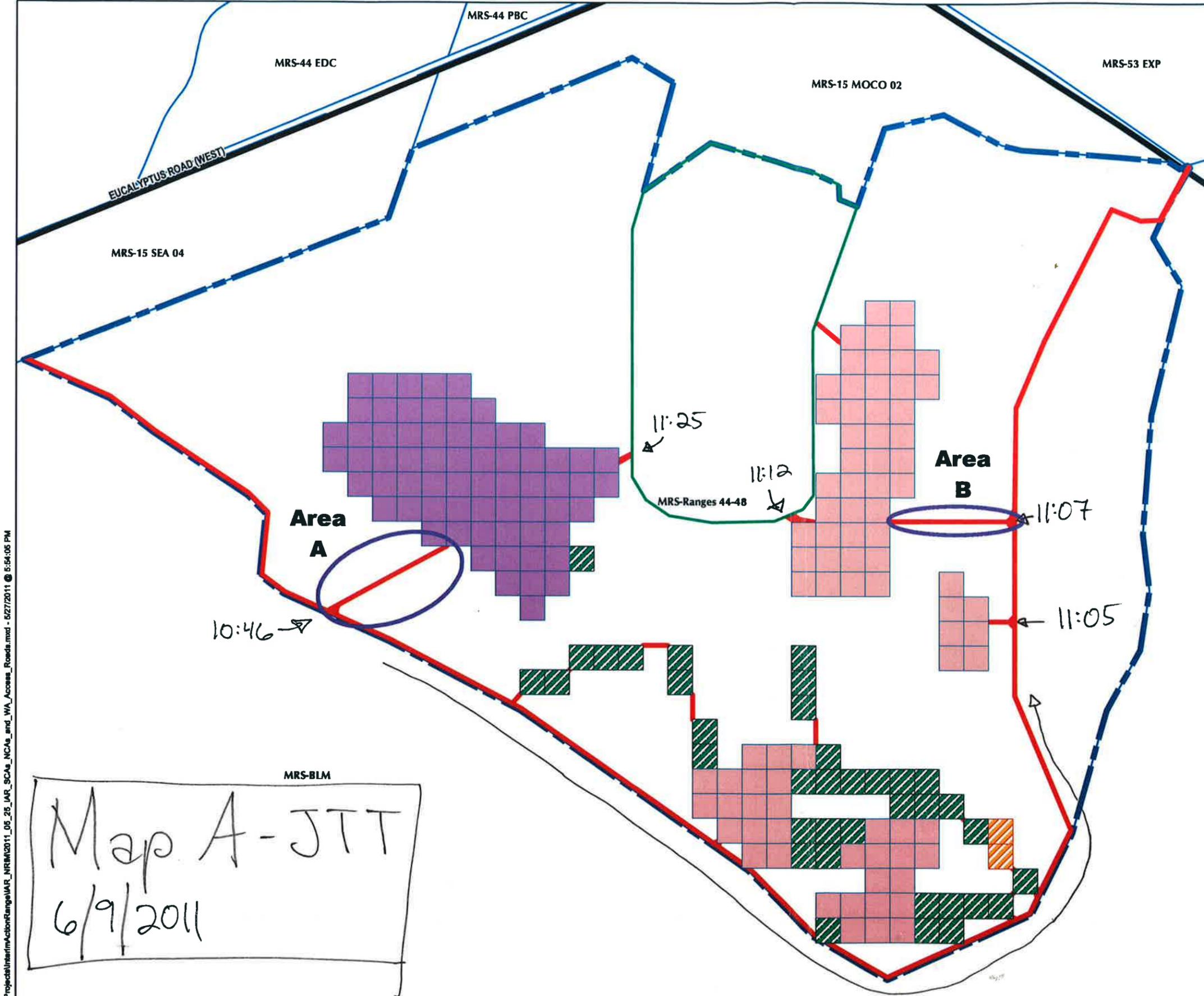
TIME	ACTIVITIES
(cont'd)	There was no know visible erosion or excessive vehicle disturbance. 3 photos taken
1105	Drive around the S and E sides of the IAR. No veg cutting was observed along these roads!
1107	Inspect veg cutting along newly cut corridor into range A7 44 SCA (see Map A-JTT 6/9/2011). Veg cut in accordance with NRIM checklist guidelines. Access corridor @ Area B inspected. Veg cut in accordance with NRIM checklist. Veg cut equally on either side of rd. No visible impact to sand gilia populations. See Map A-JTT-6/9/2011
11:12	Inspect short access corridor on W side of R44 SCA. Veg cut correctly. No signs of erosion or off-road vehicle use. See Map A-JTT-6/9/2011
11:25	Inspect access corridor on E side of R47. Veg cut in accordance with NRIM checklist. No erosion or off-road vehicle use observed.
1152	Depart IAR MRA

Route Copies To: _____

SIGNED _____

Reviewed _____

(Senior QB)

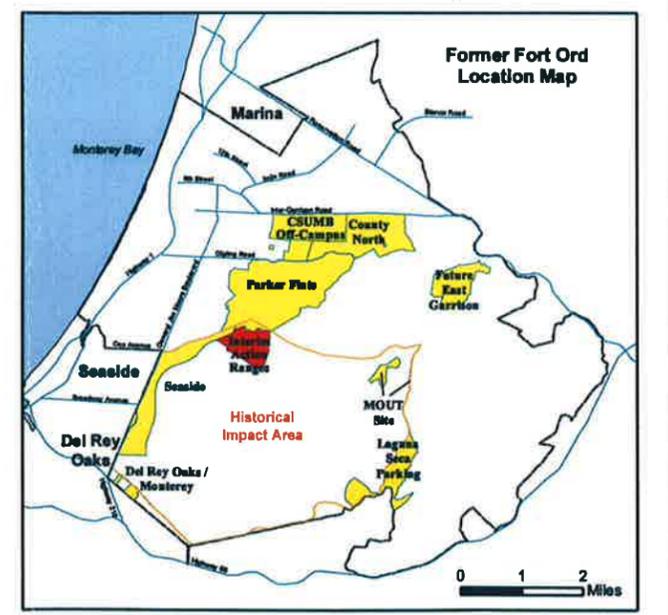


- ### Legend
- — — MRA Boundary
 - Munitions Response Site
 - Major Road
 - Potential Work Area Access Corridors/Roads - 4.8 ac.
 - Development Parcel Boundary

- ### Special Case Areas (SCAs)
- R44 SCA - 18.9 ac.
 - R47 SCA - 15.2 ac.

- ### Non-Completed Areas (NCAs)
- Subsurface Removal Commenced - 0.7 ac.
 - Central Area No Subsurface - 8.5 ac.

Areas A and B: Sensitive sand gilia population locations. Field Supervisor will contact ESCA RP Biologist in advance if impacts/work activity beyond those anticipated in the Work Plan are to be conducted (e.g., widening corridor to accommodate additional traffic).



T:\Projects\InterimActionRanges\IAR_NRM\2011_05_26_IAR_SCAs_NCAs_and_WA_Access_Roads.mxd - 5/27/2011 @ 5:54:05 PM



Interim Action Ranges MRA Natural Resources Impact Mitigation Checklist Ingress/Egress Corridors

FORA ESCA RP
Monterey County, California

Figure 3

APPENDIX B

**Documentation of Approval by USFWS for California Tiger Salamander
Handling by ESCA RP Biologists**

2011 Annual Natural Resource Monitoring, Mitigation, and Management Report



United States Department of the Interior

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



IN REPLY REFER TO:
81440-2011-TA-0408

August 12, 2011

Phil Lebednik, Ph.D.
ESCA RP Senior Qualified Biologist
ARCADIS U.S., Inc.
2033 North Main Street, Suite 340
Walnut Creek, California 94596-3727

Subject: Approval of Biologists to Conduct California Tiger Salamander Capture and Relocation Activities during Munitions and Explosives of Concern Cleanup on Former Fort Ord (1-8-04-F-25R)

Dear Dr. Lebednik:

We have reviewed your request, dated July 1, 2011, for our approval of Thomas A. Graham and Joshua T. Tallis, to conduct capture and relocation activities involving the federally threatened California tiger salamander (*Ambystoma californiense*), pursuant to the subject biological opinion. Your request for approval is made pursuant to term and condition 6(b) of the subject biological opinion.

Based on the information you provided, we have determined that Mr. Graham and Mr. Tallis have sufficient training and experience to capture and relocate California tiger salamanders. We therefore approve these individuals as lead field designees pursuant to the subject biological opinion. Please note that this authorization is valid only for activities conducted in association with the biological opinion, Cleanup and Reuse of Former Fort Ord, Monterey, County, California, as it affects California Tiger Salamander and Critical Habitat for Contra Costa Goldfields (1-8-04-F-25R (Service 2005)).

If you have any questions, please contact Lena Chang of my staff at (805) 644-1766, extension 302.

Sincerely,

Douglass M. Cooper
Deputy Assistant Field Supervisor



REFERENCES CITED

[Service] U.S. Fish and Wildlife Service. 2005. Biological opinion for the cleanup and reuse of former Fort Ord, Monterey County, California, as it affects California tiger salamander and critical habitat for Contra Costa goldfields (1-8-04-F-25R). U.S. Fish and Wildlife Service, Ventura Fish and Wildlife Office, Ventura, California.

APPENDIX C

**Future East Garrison MRA Aquatic Feature Monitoring Report
2011 Annual Natural Resource Monitoring, Mitigation, and Management Report**

FORA ESCA REMEDIATION PROGRAM

Appendix C. 2011 Aquatic Features Monitoring Report Future East Garrison Munitions Response Area

Former Fort Ord
Monterey County, California

May 25, 2012

Prepared for:

FORT ORD REUSE AUTHORITY

920 2nd Avenue, Suite A
Marina, California 93933



Environmental Services Cooperative Agreement
No. W9128F-07-2-01621
and
FORA Remediation Services Agreement (3/30/07)

Document Control Number: 09595-12-057-001

Prepared by:



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- D Aquatic Survey Field Data Sheets
- E Water Quality Monitoring Data Sheets

ACRONYMS AND ABBREVIATIONS

ARCADIS	ARCADIS U.S., Inc.
Army	United States Department of the Army
BO	Biological Opinion
CTS	California tiger salamander
DPS	distinct population segments
ESCA	Environmental Services Cooperative Agreement
ESCA RP	Environmental Services Cooperative Agreement Remediation Program
FORA	Fort Ord Reuse Authority
HMP	Habitat Management Plan
m	meter
MEC	munitions and explosives of concern
MRA	Munitions Response Area
NRIM	Natural Resource Impact Mitigation
NTU	nephelometric turbidity units
USACE	U.S. Army Corps of Engineers
USFWS	United States Fish and Wildlife Service

1.0 INTRODUCTION

This 2011 aquatic feature monitoring report was prepared for the Fort Ord Reuse Authority (FORA) under the Environmental Services Cooperative Agreement (ESCA) by ARCADIS U.S., Inc. (ARCADIS), Weston Solutions, Inc., and Westcliffe Engineers, Inc. (“the ESCA Remediation Program [RP] Team”). The report documents aquatic feature monitoring conducted in the Future East Garrison Munitions Response Area (MRA) in advance of munitions and explosives of concern (MEC) fieldwork, which began in the fourth quarter of 2010. The monitoring was conducted to satisfy a requirement of the Installation-Wide Multispecies Habitat Management Plan (HMP; USACE 1997) and the 2005 United States Fish and Wildlife Service (USFWS) Biological Opinion (“2005 BO”; USFWS 2005). In the 2005 BO, “wetlands” on the former Fort Ord are described as “vernal pools or ponds.” Some of these “wetlands” may not exhibit all of the characteristics of vernal pools or ponds as generally defined. These “wetlands” may only exhibit a few and/or a limited degree of such characteristics and are more accurately described as local depressions where some ponding occurs under certain rainfall conditions and which qualitatively exhibit one or more wetland characteristics. Furthermore, the term “wetland” may have various specific technical and/or regulatory meanings, depending on the context of the discussion. Accordingly, to avoid possible confusion about the status of these features at the former Fort Ord, this report refers to these locations as “aquatic features,” in lieu of the terms “wetlands,” “vernal pools,” and/or “ponds.”

Aquatic feature monitoring is required when there is possibility of impacting aquatic feature habitat or wetland HMP species of concern during MEC investigation and remedial activities (hereinafter termed “MEC activities”) as described in the HMP and the “Wetland Monitoring and Restoration Plan for Munitions and Contaminated Soil Remedial Activities at Former Fort Ord” (“Wetland Monitoring and Restoration Plan”; Burleson 2006). The Wetland Monitoring and Restoration Plan included updates from the 2005 BO and superseded the Jones & Stokes 1997 Wetland Restoration Plan that was cited in the 2005 BO.

1.1 Purpose

The purpose of this report is to present the results of the second consecutive year of aquatic surveys in the Future East Garrison MRA that were conducted in the spring of 2011 in advance of MEC field activities in the vicinity of aquatic features. Aquatic features constitute potential breeding habitat wherein adults, eggs, and/or larvae of the HMP species California tiger salamander (CTS; *Ambystoma californiense*; federal-Endangered Species Act listed as threatened) may be present at certain times of the year. HMP species California fairy shrimp (*Linderiella occidentalis*; not listed) also may be present in the aquatic features.

Surveys were conducted in the Future East Garrison MRA because MEC activities could affect potential CTS and California fairy shrimp habitat. A “baseline” survey is required to establish preexisting conditions that may be used as a reference if the aquatic feature is affected and/or if restoration is required. The decision to survey an aquatic feature is based on an evaluation of suitability. Factors such as the presence of conditions potentially suitable for CTS and California fairy shrimp, the proximity of potential breeding habitat to upland habitat

suitable for CTS adults, and the documented presence of CTS in nearby aquatic features are used to determine suitability.

The primary goal of these surveys was to determine whether or not adults and/or larvae of CTS and/or California fairy shrimp are present in the Future East Garrison MRA. A second goal was to describe the general baseline physical, chemical, and biological characteristics of the features.

According to the 2005 BO, if CTS are not recorded in an aquatic feature during the surveys conducted in the first two years when using the “Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander” (Appendix A, hereinafter termed “CTS Survey Guidance”), no further surveys for CTS are required for that feature even if MEC activities are conducted after the second year of surveys. If MEC activities are conducted in the vicinity of an aquatic feature, additional mitigation measures, such as preservation of seed bank, preservation of California fairy shrimp eggs, and maintenance of an impermeable layer, may be required depending on the extent of disturbance in the feature.

In the 2010 surveys, CTS were not observed and California fairy shrimp were observed in three of the aquatic features (ESCA RP 2011).

1.2 Location of Survey Sites

The survey sites are located within the Future East Garrison MRA at the former Fort Ord in Monterey County, about 8 miles north of the City of Monterey, County of Monterey, California. The Future East Garrison MRA encompasses approximately 251.8 acres in the northeastern portion of the former Fort Ord (Figure C-1). The MRA contains relatively flat plateaus intersected by somewhat deep drainages flowing to the north and east. There are two clusters of aquatic features and the features within each cluster were observed or presumed to be hydrologically connected either directly or indirectly. One cluster is located in the northeastern portion of the MRA and the other is in the southwestern portion. These areas are referred to as “NE Aquatic Features” and “SW Aquatic Features” on Figures C-2 and C-3. Additional details regarding the aquatic features in the Future East Garrison MRA are presented in Section 3 of this report.

Vegetation surrounding the aquatic features consists primarily of central maritime chaparral and coastal coast live oak woodland (Figure C-3; USACE/Jones & Stokes 1992). The density of this vegetation varies from open (i.e., initial phase or less than three years growth) to dense canopy (i.e., mature phase or greater than six years growth). Much of the terrain surrounding the aquatic features is unvegetated sandstone, which appears to have experienced anthropogenic activity in the past, such as scraping. Vegetation within the aquatic features is typically herbaceous and includes wetland indicator species. Elevation in Future East Garrison ranges from approximately 50 meters (m) to 147.5 m above mean sea level. Surface soils are generally characterized as aeolian (sand dune) and terrace (river deposits), which consist of unconsolidated materials of the Aromas and Old Dune Sand formations. The primary soil types are Arnold-Santa Ynez Complex and Dissected Xerorthents. Soil/sediment

of some aquatic features have characteristics of transitional to wetland soils; however, most are mineral soil with little organic material, which is more characteristic of an excavation.

1.3 Survey Season

The “wet season” is defined in this report as the period from October 1 of one year through September 30 of the succeeding year, and is referred to by the year in which the wet season ends (i.e., the 2011 wet season spans the period October 1, 2010 through September 30, 2011).

According to the CTS Survey Guidance, aquatic feature larval “surveys should be conducted once each in March, April, and May, with at least 10 days between surveys. If pools are likely to dry prior to the completion of three surveys, the sampling schedule should be shifted accordingly” (Anon. 2003; Appendix A).

1.4 Species of Special Interest in Surveys

Wetland plants and a number of animal species are of special interest in surveys of aquatic features on the former Fort Ord as discussed in the HMP. These include CTS (the primary focus of the surveys), California fairy shrimp, California red-legged frog (*Rana draytonii*), southwestern pond turtle (*Actinemys marmorata*), and Contra Costa goldfields (*Lasthenia conjugens*). The status and prior records of these species in the Future East Garrison MRA are reviewed in the following sections.

1.4.1 California Tiger Salamander

CTS are grouped into three distinct population segments (DPS) within the state. These include the Sonoma County DPS, the Central Valley and Interior coast range DPS, and the Santa Barbara County DPS. Both the Sonoma County and Santa Barbara County DPS’ are federally listed as endangered. The Central Valley DPS is federally listed as threatened.

The area making up former Fort Ord, including the Future East Garrison MRA, is within the documented geographic range of the CTS and is included as part of the Central Valley DPS of CTS. This population of CTS and specifically those populations in Monterey County have been influenced by the introduction of non-native tiger salamander sub-species resulting in a high level of hybridization in the population. Evidence of hybridization has not changed the protected status of CTS in Monterey County. CTS are known to occur on the former Fort Ord. The following are two excerpts from the 2006 Wetland Monitoring and Restoration Plan:

“CTS larvae were found in eight ponds and vernal pools throughout the installation during field surveys conducted in 1992 but were not found during surveys conducted in 1994; however, not all ponds were re-sampled. CTS larvae were observed in two additional water bodies during the 1995 surveys of three sites. Possible CTS eggs were also observed in two other water bodies (Burlison 2006).”

“In 2003, students and faculty from University of California, Davis surveyed 14 ponds on Bureau of Land Management (BLM) Public Lands at former Fort Ord for CTS and found CTS larvae in 13 ponds using dip net methods (Army 2004).”

None of the aquatic features where CTS were observed in the above surveys were located within the Future East Garrison MRA and there are no other pre-2011 records of CTS breeding activity and/or larvae from the Future East Garrison MRA to our knowledge. The pre-2011 documented CTS breeding sites that are closest to the Future East Garrison MRA are shown on Figure C-2.

1.4.2 California Fairy Shrimp

California fairy shrimp occur in certain ephemeral freshwater habitats. An individual's life span is limited to the duration of ponding in a particular location. Under suitable conditions, eggs that are resistant to desiccation (referred to variously as cysts, resting eggs, etc.) are deposited in the sediment and these eggs hatch to reestablish a population when the location is ponded in the following or subsequent years (Zedler 1987). California fairy shrimp has been reported in eight wetlands at the former Fort Ord during 1992, 1994, 1995, and 1996 surveys. Prior to 2010, California fairy shrimp had not been reported in the Future East Garrison MRA, but the species was observed in three aquatic features during the 2010 ESCA RP survey.

1.4.3 Other Species

Other species of special interest may co-occur with CTS and California fairy shrimp and/or in similar aquatic habitats. These species include California red-legged frog, southwestern pond turtle, and Contra Costa goldfields. At the time the HMP was completed (1997) these species had not been documented to occur at the former Fort Ord.

After 1997, California red-legged frog and Contra Costa goldfields were detected at the former Fort Ord, but neither were located within the Future East Garrison MRA. To our knowledge southwestern pond turtle has not been reported to occur on the former Fort Ord to date.

2.0 MITIGATION MEASURES ASSOCIATED WITH AQUATIC FEATURES

A number of mitigation measures associated with conducting MEC investigation and remedial activities in aquatic features and described in the 2005 BO, the HMP, and the Wetland Monitoring and Restoration Plan are intended to avoid or minimize impacts to HMP wetland species and their habitats or to restore such habitats if impacts exceed a specific threshold. This report addresses the mitigation requirement that pre-disturbance monitoring is to be performed in aquatic habitats where MEC activities could result in impacts.

In accordance with the regulatory requirements, the ESCA RP Team implemented environmental training and monitoring of MEC activities specific to aquatic features.

2.1 2005 Biological Opinion

The 2005 BO (1-8-04-F-25R) was released by USFWS on March 14, 2005 and addresses how cleanup and reuse of the former Fort Ord may affect federally threatened CTS and Contra Costa goldfields. The 2005 BO states that prior to MEC investigation and remedial activities in wetlands, the United States Department of the Army (Army) needs to “conduct [an] employee education program” and “conduct pre-activity surveys of hydrology, vegetation, and wildlife (including aquatic surveys for California tiger salamanders in mid-April), prior to MEC removal actions. Control sites may be included in the evaluation.” This report addresses these requirements.

2.1.1 Compliance with Employee Training Requirement

The Environmental Awareness Training module for the Future East Garrison MRA included training on the different habitat types, the HMP species that could be found in the MRA, and the Natural Resource Impact Mitigation (NRIM) Checklist No.5 Revision 0 and No. 7 Revision 0. The ESCA RP Senior Qualified Biologist provided this training to field personnel and supervisors before the start of work. The NRIM checklist No. 5 Revision 0 included a map of aquatic features and a requirement that a biologist be present during vegetation and MEC investigation and remedial work in aquatic feature AF68AB (Figure C-4), the only aquatic feature within the footprint of the work plan.

2.1.2 Compliance with USFWS CTS Larval Survey Approval Requirement

The 2005 BO requires that the biologist(s) performing surveys for larval CTS in aquatic features be USFWS-approved for this specific purpose or that they perform the work under the direct and immediate supervision of a USFWS-approved biologist. Per the USFWS’ letter dated February 8, 2008 (USFWS 2008), Mr. Mitchell Siemens was approved to perform surveys for larval CTS for the ESCA RP. Mr. Siemens was present at and either performed and/or directly supervised the CTS larval survey work in the Future East Garrison MRA in 2010 and 2011. Assisting Mr. Siemens in 2011 was Joshua Tallis, who was under Mr. Siemens’ direct supervision at all times.

At the times of the surveys, Mr. Siemens held a CTS protocol survey permit from USFWS (USFWS Permit Number TE-190302-0). Technically, this permit is not relevant to approval of the ESCA RP work that was performed pursuant to the USFWS approval of February 8, 2008; however, the permit requires an annual report. Accordingly, Mr. Siemens submitted an annual report to the permit contact at USFWS on December 31, 2011 (ARCADIS 2011) describing the ESCA RP CTS larval surveys.

2.1.3 Compliance with MEC Activity Monitoring Requirement

During 2011, MEC investigation activities, including vegetation mastication and concrete debris removal, occurred in the vicinity of the SW aquatic features. A Qualified Biologist coordinated with the MEC field personnel to flag off the three aquatic features (AF09-1, AF09-1B, and AF09-2) with high visibility flagging prior to work in this area (Appendix B,

Photos 7-9), so crews and equipment stayed at least 5 feet outside the high water mark. No vegetation or soil was affected in the aquatic features and no heavy equipment operated in the aquatic features.

2.1.4 Compliance with Notification Requirement

The ESCA RP Senior Qualified Biologist notified Mr. Bill Collins of the Army regarding the CTS larval captures. Both notification emails are included in Appendix C. Photographs, such as those in Appendix B, Photos 1-4, and capture locations were provided with notifications.

3.0 PRIOR SURVEYS

3.1 Base-wide 1992 Aquatic Feature Mapping

In 1992, Jones & Stokes mapped aquatic features and conducted surveys for CTS and California fairy shrimp (USACE/Jones & Stokes 1992). Each aquatic feature identified in the report was labeled with a unique number. ESCA RP Biologists have added “AF” before each of these numbers to indicate that they refer to aquatic features. Four aquatic features were identified and surveyed in 1992 that fall within the current Future East Garrison MRA boundary. These features were labeled AF66, AF67, AF68, and AF69 (Figure C-4). In the 1992 report, none of the Future East Garrison MRA aquatic features were reported to be breeding habitat for CTS or California fairy shrimp.

A fifth aquatic feature that was mapped in 1992, AF65, is positioned on the eastern boundary of the MRA (Figure C-2). The polygon for this feature extends slightly into the Future East Garrison MRA. Reconnaissance surveys conducted in December 2009 and early 2010 determined that the portion of the polygon within the MRA is mature chaparral, and not an aquatic habitat; accordingly, this aquatic feature was not included in the 2010 and 2011 Future East Garrison MRA monitoring surveys. An open area with grasses and forbs as well as slight depressions occurs east of the Future East Garrison MRA boundary. This area was visited twice during the spring of 2011 and no ponding of water was observed.

3.2 Reconnaissance Surveys Conducted in 2009 and 2010 by ESCA RP Biologists

In December 2009, field reconnaissance surveys were conducted after rainfall events by ESCA RP Biologists in the Future East Garrison MRA. The purposes of these surveys were to locate aquatic features that had been mapped in 1992, determine if there were any unreported aquatic features, and assess the ponding condition of the features.

3.2.1 Aquatic Features Mapped in 1992

All of the aquatic features in the Future East Garrison MRA that had been mapped in 1992 are situated in the northeastern corner of the MRA. In the first field visit in early December 2009, there was no ponding in the 1992 mapped aquatic features. Although the features generally were located using data from the 1992 surveys, their exact locations and extents were somewhat uncertain based on the topography that was observed in the field.

Reconnaissance surveys conducted after rainfall in the latter half of December 2010 revealed the presence of minor ponding in some of the 1992 mapped aquatic features. Depending on the given topography and the amount of standing water that is present at any given time, one or more contiguous water bodies were found to exist within the footprint of the 1992 designated aquatic features. As additional rainfall events occurred in early 2010, ponding depth increased and several of the basins within a feature merged into a single water body. Aquatic features AF66, AF67, and AF68 were subdivided into interconnected but separate aquatic features. For example, as shown on Figure C-4, AF66A flows into AF66B. AF67 was subdivided into four excavations (AF67-EX1, AF67-EX2, AF67-EX3, and AF67-EX4) and includes a large meadow that flooded and contains wet meadow vegetation (AF67 Meadow). After sufficient rainfall, all five AF67 aquatic features were encompassed within a single ponded area.

Although none of the features exhibited highly suitable conditions for CTS breeding, AF66, AF67, and AF69 were considered to be potential breeding habitats. AF68 (N and S units) appeared to be too small for CTS breeding. Notwithstanding these observations, the ESCA RP Biologists decided that all of the 1992 aquatic features would be monitored in 2010 and 2011 in accordance with Appendix A, because of their prior designation as potential CTS habitat and because all but one of them appeared to contain potentially suitable habitat. The 1992 numbering scheme was enhanced to accommodate sub-basins that exist during low ponding periods in some of the aquatic features.

3.2.2 Aquatic Features Newly Observed in 2009 and 2010 Monitoring

During the late 2009 and early 2010 reconnaissance surveys, several unmapped aquatic features were observed. One new aquatic feature AF10-1, as shown on Figure C-4, was identified for monitoring due to potential suitable CTS breeding habitat and its close proximity to recorded CTS breeding habitat, AF70, located outside the MRA (Figure C-2). AF10-1 is a concrete impoundment formerly used for washing vehicles (Appendix B, Photo 12). Although AF10-1 contains potential suitable breeding habitat, the area surrounding this aquatic feature, largely comprised of exposed sandstone and central maritime chaparral, appears to be sub-optimal upland habitat for CTS.

In the southwestern portion of Future East Garrison MRA, three new aquatic features, AF09-1, AF09-1B, and AF09-2 were identified (Figure C-5). These features are surrounded by upland habitat consisting of mostly central maritime chaparral and exposed sandstone that appears to be sub-optimal upland habitat for CTS. Aquatic Features AF10-1, AF09-1, AF09-1B, and AF09-2 were thought to represent marginal to poor quality habitat for CTS. Aquatic sampling of these features continued in the 2011 surveys.

There are 14 aquatic feature units (i.e., aquatic features or sub-basins within a feature) in the Future East Garrison MRA that were identified as potential CTS breeding habitat and/or California fairy shrimp habitat. All of the features are located in parcel number E11b.7.1.1 (Figure C-2). Some of the units were mapped and surveyed by Jones & Stokes in 1992 (USACE/Jones & Stokes 1992). Additional aquatic features and/or units were identified in 2009 and 2010 by ESCA RP Biologists. Aquatic features in the northeastern portion of the Future East Garrison MRA are less than 500 m from an aquatic feature, located outside the

Future East Garrison MRA boundary, where CTS have previously been observed (Figure C-2). Aquatic features in the southwestern portion of the Future East Garrison MRA are less than 1 kilometer from an aquatic feature where CTS previously had been observed but which is positioned outside the Future East Garrison MRA boundary.

4.0 METHODS

The 2010 and 2011 surveys followed essentially the same protocol and methods. The study design and methods were consistent with the HMP, the Wetland Monitoring and Restoration Plan, and the USFWS survey protocols detailed in the CTS Survey Guidance (Appendix A).

4.1 Personnel

The 2005 BO requires that the biologist(s) performing surveys for larval CTS in aquatic features be USFWS-approved for this specific purpose or that they perform the work under the direct supervision of a USFWS-approved biologist.

4.2 Monitoring Parameters

The following parameters were recorded for each surveyed aquatic feature. The periods when the parameters were recorded are described in Section 5.

4.2.1 Duration and Depth of Inundation

The duration of inundation in an aquatic feature was recorded as the length of time during which ponded water was present in the feature based on periodic observation. When depth was recorded there was not a separate recording of water presence.

Depth was measured at the deepest point, with two exceptions, using stream gauges installed in 2010. The gauge at AF10-1 was installed above the deepest point because it was unsafe to access the deepest point. The gauge at AF67 Meadow may not have been at the deepest point because the deepest point could not be determined due to the large size and subtle elevation differences in the feature. The stream gauges were designed to last for two years of monitoring.

4.2.2 Turbidity

Turbidity of water in the aquatic features was measured twice during the aquatic surveys. Water samples were collected in wide-mouth 4-ounce Teflon seal screw-top glass sample jars. Turbidity was determined in the laboratory using a Horiba U-10 Water Quality Meter. The calibration procedure recommended by the manufacturer was implemented prior to measurements on each batch of samples. Data were recorded in nephelometric turbidity units (NTU) on data sheets.

4.2.3 Hydrogen Ion Concentration (pH)

Hydrogen ion concentration or pH (potential of hydrogen is a measure of acidity/alkalinity) of water in the aquatic features was measured twice during the aquatic surveys. Water samples were collected in wide-mouth 4-ounce Teflon seal screw-top glass sample jars. The pH level was determined in the laboratory using a Horiba U-10 Water Quality Meter. The calibration procedure and standard buffer solutions provided by the manufacturer were used prior to measurements on each batch of samples.

4.2.4 California Tiger Salamander

CTS aquatic surveys were conducted in accordance with the CTS Survey Guidance (Appendix A).

Larval sampling for CTS employed dip-nets (Appendix B, Photo 9) and a small-mesh 20x4 feet beach seine. The CTS Survey Guidance indicates that surveys should be conducted once each month in March, April, and May with no less than 10 days between each survey effort. After each dip or sweep, the net or seine was visually inspected for CTS larvae and adults.

4.2.5 California Fairy Shrimp

Surveys for adults of HMP species California fairy shrimp (*Lindieriella occidentalis*) were conducted during CTS surveys. After each dip or sweep, the net or seine was visually inspected for California fairy shrimp adults.

4.2.6 Other Aquatic Species

Dominant invertebrates other than California fairy shrimp were documented on data sheets during aquatic surveys.

4.2.7 Aquatic Feature Vegetation

Vegetation cover was documented in all aquatic features and along the shoreline once during the spring when ponding was near its maximum. Vegetation in the aquatic features was recorded as total percentage cover according to the following categories: submerged vegetation, emergent vegetation, not vegetated, and not visible (generally too turbid to determine). Shoreline vegetation was recorded separately according to the percentage of the shoreline vegetated at a specific cover class or range. The shoreline cover classes are 0%, 1-25%, 26-50%, and 51-100% vegetated. This was accomplished by visually assessing the vegetation cover class of each 1 m length of shoreline, dividing the total meters of shoreline by 100 and using this to calculate the percentage of each vegetation cover class around the aquatic feature (e.g., AF66A: 3% of shoreline contains 0% cover; 85% of shoreline contains 1-25% vegetation cover; 11% of shoreline contains 26-50% vegetation cover; and 1% of the shoreline contains 51-100% vegetation cover).

5.0 RESULTS

Aquatic feature monitoring in the Future East Garrison MRA was conducted between January and June 2011. In total, 14 aquatic feature “units” were surveyed. Eleven aquatic features were monitored in the northeast (Figure C-4) and three aquatic features were monitored in southwest (Figure C-5) of the Future East Garrison MRA. The aquatic features within each of these two locations were presumed to be similar in microbiological properties and potentially hydrologically connected. All of the “units” are described as “aquatic features” in this report.

All 14 aquatic features were monitored for duration and depth of ponding; turbidity; pH; presence of CTS larvae and adults; presence of California fairy shrimp adults; and vegetation species and cover. The results for each monitoring parameter are described below. Aquatic survey field data sheets are presented in Appendix D and water quality monitoring data sheets are presented in Appendix E. Representative photographs of the aquatic features and monitoring activities are presented in Appendix B.

The total precipitation during the 2011 wet season at the Monterey peninsula airport (National Oceanographic and Atmospheric Administration weather station; international call sign KMRY) was 19.96 inches, which is 145.5% of the 13 year average (1999 to 2011 wet seasons). The monthly distribution of precipitation during the 2011 wet season is presented on Figure C-6. The 2011 wet season rainfall observations indicate that precipitation conditions were sufficient to enable CTS migration/breeding. Observations on ponding in the aquatic features (see Section 5.2.1) are consistent with this conclusion.

5.1 Personnel

Aquatic feature monitoring was performed by ESCA RP Biologists who were coordinated by the ESCA RP Senior Qualified Biologist, Phillip Lebednik. The three CTS larval surveys were performed by Mitchell Siemens who has been approved by USFWS to perform these surveys. Joshua Tallis assisted Mr. Siemens in all three surveys and worked under his direct supervision.

5.2 Monitoring Parameters

5.2.1 Duration and Depth of Inundation

Observations of inundation and depth were performed in January, March, April, and May 2011. The results are presented in Table C-1. Extent of ponding was recorded in 2010 (ESCA RP 2011). The 2010 extent of ponding records were used to show the footprint of the aquatic features as shown on Figures C-2 through C-5.

Ponded water began to be observed in the aquatic features beginning in January 2011 as shown in Table C-1. On the last day of monitoring (June 22), all the aquatic features were dry except for AF67-EX1, AF67-EX2, AF67-EX3, AF69, and AF10-1. AF10-1 holds water throughout the year during normal years because it is a cement lined basin.

5.2.2 Turbidity

Turbidity was measured twice, on March 28 and April 21, 2011, during the aquatic surveys. Data were recorded on data sheets (Appendix E). Results are presented in Table C-1. On March 28, the least turbid sample measured 0 NTU and was collected from AF10-1, which is a concrete-lined basin and has minimal soil input. In the most turbid aquatic feature, AF67-EX3, 99 NTU was recorded. This feature is a largely un-vegetated excavation and is situated downgradient from a steep embankment. On April 21, the least turbid aquatic feature was AF10-1 (0 NTU) and the most turbid aquatic feature was AF68AB (>800 NTU), which is a roadside depression and downgradient of a rapidly eroding canyon.

5.2.3 Hydrogen Ion Concentration (pH)

Hydrogen ion concentration or pH was measured twice, on March 28 and April 21, 2011, during the aquatic surveys. Data were recorded on data sheets (Appendix E). The results are presented on Table C-1. On March 28, pH ranged from 6.12 to 7.07. On April 21, pH ranged from 5.29 to 6.61.

5.2.4 California Tiger Salamander

CTS larval surveys were conducted in the aquatic features on clear days, typically between 0900 and 1400 hours, on March 28 to 29, April 21 to 22, and May 5 to 6, 2011. No CTS adults were captured or observed during the surveys. However, as described below, the first records of CTS larvae in the Future East Garrison MRA were obtained during the 2011 surveys.

Weather conditions, field-determined water quality data, and general habitat characteristics were recorded on field data sheets. Aquatic features to be surveyed were first observed from an upland location for several minutes to detect CTS activity prior to the start of dip-netting. Following these observations, dip-netting ensued over a representative portion of the feature. In all but one of the features surveyed, dip-netting occurred in 90% or more of the surface area of the feature. The seine was used to survey three features (AF67-EX2, AF67-EX3, and AF69) that were greater than 4 feet deep in some locations and whose depth impeded sufficient survey coverage by use of a dip-net. The seine was not deployed in the smaller and shallower features because adequate coverage was attained by dip-netting. In two features (AF67-EX3 and AF67-EX4), the presence of obstructions and dense aquatic vegetation precluded efficient use of the seine. In these locations, special care was taken to provide adequate sampling of the feature by use of dip-nets.

Included in the group of aquatic features to be surveyed was AF10-1, an abandoned cement lined basin (Appendix B, Photo 12). This feature measures approximately 10 m wide by 50 m long and up to 2.5 m deep and supports a dense growth of cattails (*Typha* sp.). AF10-1 differed from the other sampled features in that access was restricted by sharply sloping side walls, the depth exceeded safe hip-wader freeboard, submerged debris was present, and dense mats of dead and living cattails restricted access within the feature. These factors presented challenges regarding personnel safety and sampling ability. It was not possible to effectively deploy the seine in this feature. To resolve these challenges, the feature was surveyed by

deploying an inflatable boat and by rigging a taught rope along the centerline and spanning the entire length of the feature. The rope enabled one biologist to maneuver the boat and fix its position as necessary, while a second biologist conducted dip-net sampling. On one occasion one biologist both maneuvered the boat and dip-netted effectively. The dip-net handle was long enough to enable sweeps of near-bottom areas from the boat. This arrangement provided a safe work environment for the biologists while enabling thorough dip-net sampling across the entire feature.

On April 21, 2011 at AF67-EX2 (Figure C-4) one CTS larva was observed in the dip-net during aquatic surveys (Appendix B, Photos 1-2). The larva was not injured based on visual examination. It was photographed and released quickly. Dip-netting was terminated immediately after the larva was identified. The ESCA RP Senior Qualified Biologist notified Mr. Bill Collins of the Army regarding the larval capture (see Section 2.1.4). The notification email is included in Appendix C. Photographs and capture location were provided. One juvenile bullfrog (*Rana catesbeiana*) was also observed at the aquatic feature prior to commencing dip-net surveys.

On May 5, 2011 one CTS larva was observed in the dip-net during the survey at AF66A (Figure C-4; Appendix B, Photos 3-4). The larva was not injured based on visual examination. It was photographed and released. Dip-netting was terminated immediately after the larva was identified. The ESCA RP Senior Qualified Biologist notified Mr. Bill Collins of the U. S. Army regarding the larval capture (see Section 2.1.4). The notification email is included in Appendix C. Photographs and capture location were provided. Pacific chorus frog (*Hyla regilla*) and clam shrimp (order *Diplostraca*) were observed in abundance in AF66A.

Eleven of the 14 aquatic feature units surveyed occurred in close proximity to one another as a cluster of water bodies in the northeastern portion of the Future East Garrison MRA and were regarded as features with similar microbiological constituents (Figure C-4). After completion of survey work at these units, hands, gear that came in contact with the water (i.e., waders and shoe treads), and survey equipment were disinfected using a 70% ethanol solution. This measure was taken as a precaution to minimize the risk of potential disease vector cross-contamination between the southwestern and northeastern aquatic feature clusters (Figure C-2).

5.2.5 California Fairy Shrimp

California fairy shrimp were not observed in aquatic features during the surveys, including those features where the species was recorded in 2010 (AF09-1, AF09-1B, and AF67-EX1; ESCA RP 2011).

5.2.6 Other Aquatic Species

Other aquatic species commonly encountered during the spring surveys included Pacific chorus frog eggs, larvae, and adults; primarily sub-adult bullfrogs (*Rana catesbeiana*); and numerous invertebrate species, most commonly clam shrimp (order *Diplostraca*), damselfly (suborder *Zygoptera*) naiads; water boatmen (Family *Corixidae*); diving beetles (Order *Coleoptera*); midge larvae (Family *Chromomidae*); and mosquito larvae (Family *Culicidae*).

Bullfrogs, a known predator of CTS, were present in AF66A, AF67-EX2, AF67-EX3, and AF10-1.

California red-legged frog and southwestern pond turtle were not observed during the surveys.

5.2.7 Aquatic Feature Vegetation

An aquatic feature plant list was compiled throughout the monitoring season, as species were observed during fieldwork (Table C-3). Vegetation cover associated with the aquatic features was assessed by visual observation on April 21 through 22 in conjunction with the aquatic sampling activity. The cover results are presented in Table C-2. Vegetation cover and species' presence varied widely from feature to feature.

Contra Costa goldfields (*Lasthenia conjugens*) was not observed during the surveys.

6.0 FINDINGS

The Senior Qualified Biologist provided environmental awareness training to field personnel and supervisors prior to the beginning of MEC investigation and remedial activities in the Future East Garrison MRA.

Two clusters of aquatic features occur within the MRA: one is located in the northeastern portion and the other in the southwestern portion. Aquatic features are habitats where the CTS may breed and where larvae may develop during the wet season. Anticipating the possibility that ESCA RP Team MEC investigation and remedial activities could occur within the features, monitoring was performed in 2010 and 2011 in accordance with the relevant protocols.

Rainfall data and ponding observations indicated that precipitation conditions in the 2011 wet season were sufficient to enable CTS migration/breeding. Aquatic features were monitored from January to June, 2011. Water quality and ponding information was recorded as required. CTS larval surveys were performed in March, April, and May under the direct supervision of a USFWS-approved biologist. Two CTS larvae were captured and no CTS adults were captured or observed during these surveys. These were the first record of CTS presence of either larvae or adults within the Future East Garrison MRA. Notifications of the larval captures were reported to the Army and USFWS (Appendix C). California fairy shrimp were not observed in the aquatic features in 2011, although they were observed in some of the features during the 2010 surveys. Other species commonly encountered during the surveys included Pacific tree frog (eggs, larvae, and adults), bullfrogs (primarily sub-adults), and a number of invertebrate species, most commonly clam shrimp and water boatmen. Vegetation associated with the features was also documented.

During 2011, MEC investigation activities occurred in the vicinity of the SW aquatic features. A Qualified Biologist coordinated with the MEC field personnel to flag off the three aquatic features so crews and equipment stayed at least 5 feet outside the high water mark. No vegetation or soil was affected in the aquatic features and no heavy equipment operated in

the aquatic features. Based on the results of the 2010 and 2011 surveys and current work plans, it is unlikely that there will be impacts to CTS and/or the aquatic features from ESCA RP Team MEC investigation and remedial activities in the Future East Garrison MRA.

7.0 REFERENCES

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Table C-1
Water Quality and Depth in Aquatic Features
2011 Aquatic Feature Monitoring Report

Aquatic Features	Water Depth (ft)					Turbidity (NTU)		pH	
	31-Jan 2011	28-29-Mar 2011	21-Apr 2011	5-6-May 2011	22-Jun 2011	28-Mar 2011	21-Apr 2011	28-Mar 2011	21-Apr 2011
AF66A	1.58	2.22	1.76	1.34	Dry	95	111	6.69	5.29
AF66B	4.25	0.42	Dry	Dry	Dry	96	Dry	6.33	Dry
AF67 Meadow	5.1	0.86	Dry	Dry	Dry	22	Dry	6.74	Dry
AF67-EX1	1.34	4.6	3.89	0.42	2.36	32	39.4	6.4	6.51
AF67-EX2	2.9	3.48	3.01	1.72	1.69	29	49.4	6.59	6.39
AF67-EX3	1.08	2.53	2.09	Dry	0.86	99	98.1	6.6	6.5
AF67-EX4	0.86	1.75	1.02	3.38	Dry	29	90.1	6.62	6.21
AF68AB	Dry	0.33	0.17	Dry	Dry	90	>800	6.2	6.15
AF68C	Dry	0.33	Dry	Dry	Dry	22	Dry	6.37	Dry
AF69	2.48	4.14	3.79	3.49	2.59	96	75.1	6.41	6.16
AF10-1	2.14	3.92	3.54	3.27	2.48	0	0	7.07	6.61
AF09-1	0.78	0.98	0.46	Dry	Dry	15	6.5	6.62	5.43
AF09-1B	0.14	0.49	Dry	Dry	Dry	47	Dry	6.86	Dry
AF09-2	0.94	1.08	Dry	Dry	Dry	69	Dry	6.12	Dry

Table C-2
Aquatic Feature Vegetation Cover
2011 Aquatic Feature Monitoring Report

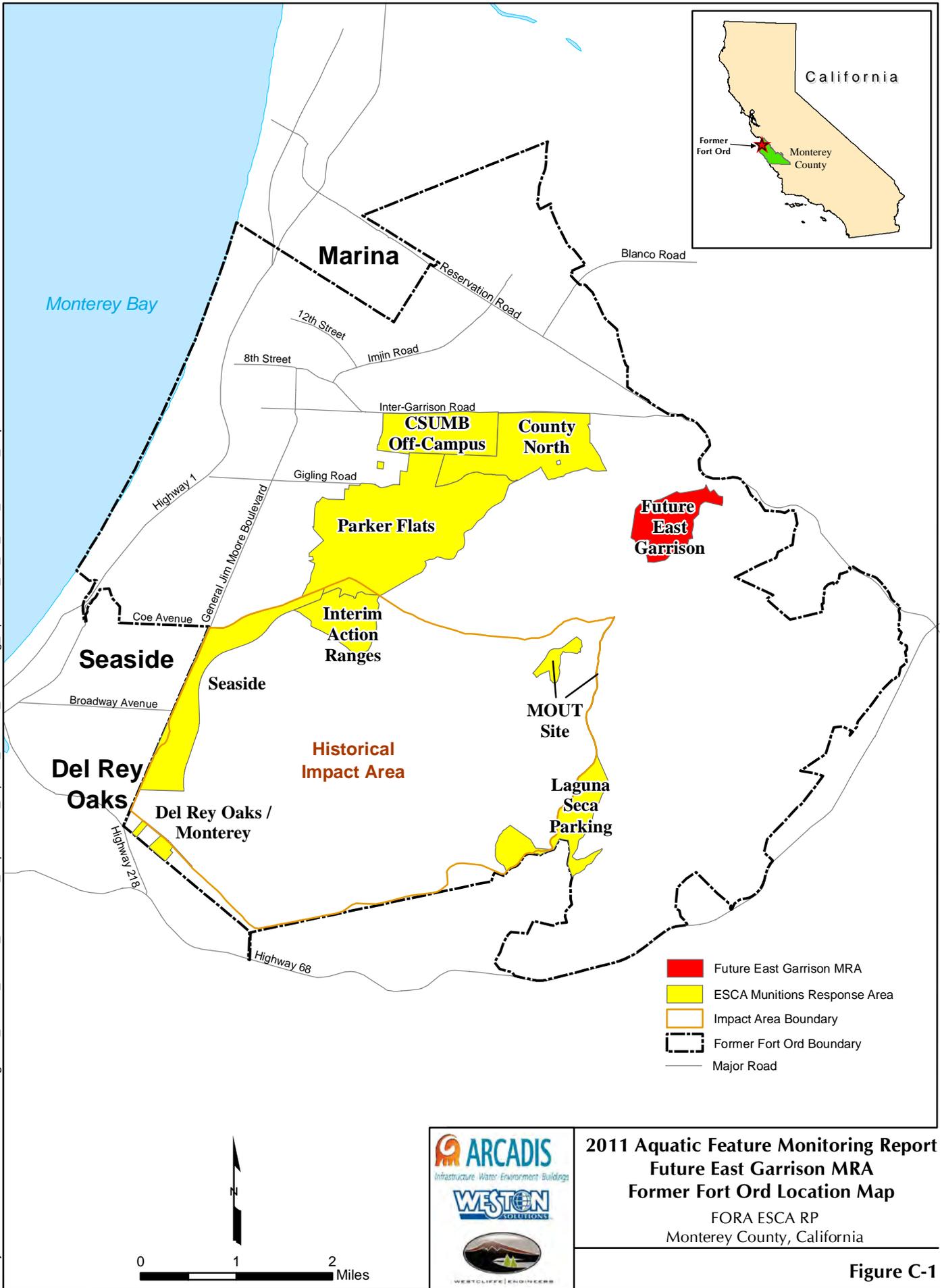
Aquatic Feature #	Percent Aquatic Feature Area				Percent Aquatic Feature Shoreline Vegetated (Cover Class)			
	Submerged Vegetation	Emergent Vegetation	Not Vegetated	Not Visible (too turbid)	0%	1-25%	26-50%	51-100%
AF66A	3	14	8	40	3	85	11	1
AF66B	0	7	93	0	9	82	9	0
AF67 Meadow	0.5	48	51.5	0	4	92	4	0
AF67-EX1	1	1	3	95	9	91	0	0
AF67-EX2	0.5	2	0.5	97	0	75	25	0
AF67-EX3	0.5	2	0	97.5	0	81	19	0
AF67-EX4	0	0.5	0	99.5	0	87	13	0
AF68AB	0	6	56	38	0	100	0	0
AF68C	0	20	80	0	0	90	10	0
AF69	0.5	1	2	96.5	9	91	0	0
AF 10-1	3	20	5	72	100	0	0	0
AF09-1	10	28.5	55.5	6	3	90	7	0
AF09-1B	0	17	83	0	30	70	0	0
AF09-2	Dry	Dry	Dry	Dry	6	88	6	0

Table C-3
 Plant Species Observed in Aquatic Features and Along Margins
 2011 Aquatic Features Monitoring Report

Scientific Name	Common Name	AF66A	AF66B	AF67-EX1	AF67-EX2	AF67-EX3	AF67-EX4	AF67 Meadow	AF68AB	AF68C	AF69	AF10-1	AF09-1	AF09-1B	AF09-2
<i>Avena fatua</i> *	Wild oat	x													
<i>Baccharis pilularis</i> var <i>consanguinea</i>	Coyote brush			x	x	x		x				x			
<i>Bromus diandrus</i> *	Ripgut brome	x	x												
<i>Bromus hordeaceus</i> *	Soft chess	x													
<i>Bromus madritensis</i> ssp. <i>Rubens</i> *	Red brome						x								
<i>Bromus racemosus</i> *	Smooth-flowered soft cheat	x													
<i>Carex brevicaulis</i>	Short-stem sedge											x	x	x	
<i>Centaureum davyi</i>	Davy's centaury						x								
<i>Chlorogalum pomeridianum</i> var. <i>pomeridianum</i>	Soap plant/amole	x													
<i>Cistus creticus</i> *	rock-rose	x	x												
<i>Cotula coronopifolia</i> *	Brass buttons						x								
<i>Cyperus eragrostis</i>	Tall cyperus	x								x					
<i>Eleocharis acicularis</i> var. <i>aciculari</i>	Needle spikerush											x	x		
<i>Eleocharis macrostachya</i>	Common spikerush	x	x	x	x	x	x			x		x	x	x	
<i>Euthamia occidentalis</i>	Western goldenrod											x			
<i>Geranium dissectum</i>	Cut-leaved geranium	x	x				x	x	x			x			
<i>Heteromeles arbutifolia</i>	Toyon							x							
<i>Hordeum</i> sp.*							x								
<i>Juncus bufonius</i> var. <i>occidentalis</i>	Toad rush							x	x						
<i>Juncus occidentalis</i>	Western rush							x	x			x	x	x	
<i>Juncus phaeocephalus</i> var. <i>phaeocephalus</i>	Brown-headed rush	x	x	x	x	x	x	x	x			x		x	
<i>Lolium multiflorum</i> *	Annual wildrye								x						
<i>Luzula comosa</i>	Pacific wood rush			x	x	x	x								
<i>Mellilotus indica</i> *	Indian melilot	x	x					x							
<i>Plantago coronopus</i> *	Cut-leaved plantain	x	x		x	x	x		x	x		x		x	
<i>Pogogyne serpylloides</i>	Thymeleaf mesamint						x								
<i>Polypogon monspeliensis</i> *	rabbitsfoot grass			x											
<i>Psilocarphus brevissimus</i> var. <i>brevissimus</i>	Woolly marbles											x	x		
<i>Quercus agrifolia</i>	Coast live oak	x		x	x	x	x		x						x
<i>Rumex crispus</i> *	Curly doc	x	x	x	x	x	x	x	x	x					
<i>Rumex salicifolius</i>	Willow doc														
<i>Salix lasiolepis</i>	Arroyo willow	x	x	x	x	x	x	x	x	x		x			
<i>Sisyrinchium bellum</i>	Blue-eyed grass	x													
<i>Sonchus asper</i> ssp. <i>Asper</i> *	Prickly sow thistle											x			
<i>Toxicodendron diversilobum</i>	Poison oak							x							
<i>Trifolium hirtum</i> *	Rose clover			x	x	x	x								
<i>Typha latifolia</i>	Broadleaf cattail														x
<i>Vicia</i> sp.	Vetch sp.								x						

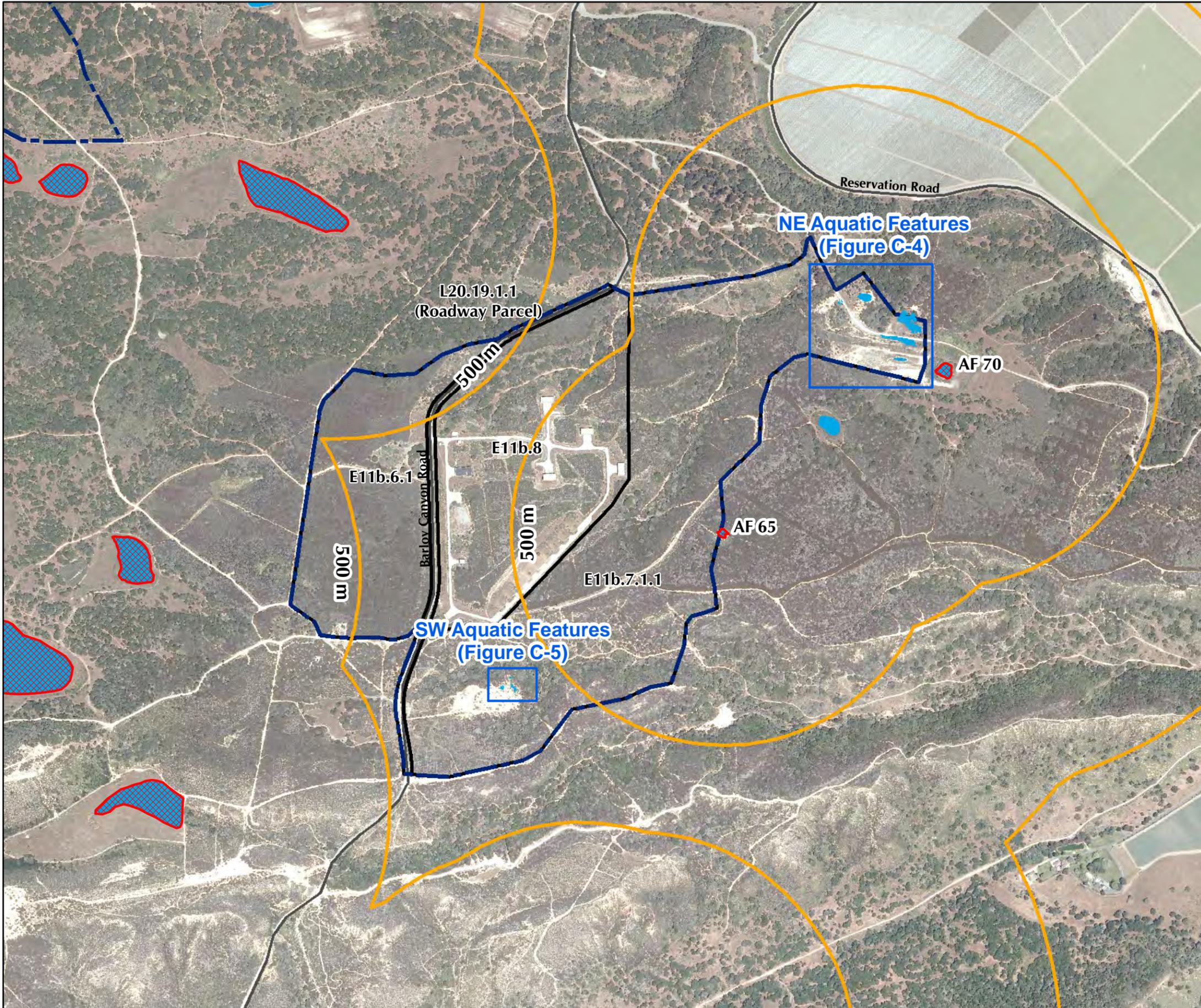
* Non-native species

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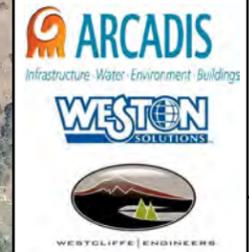
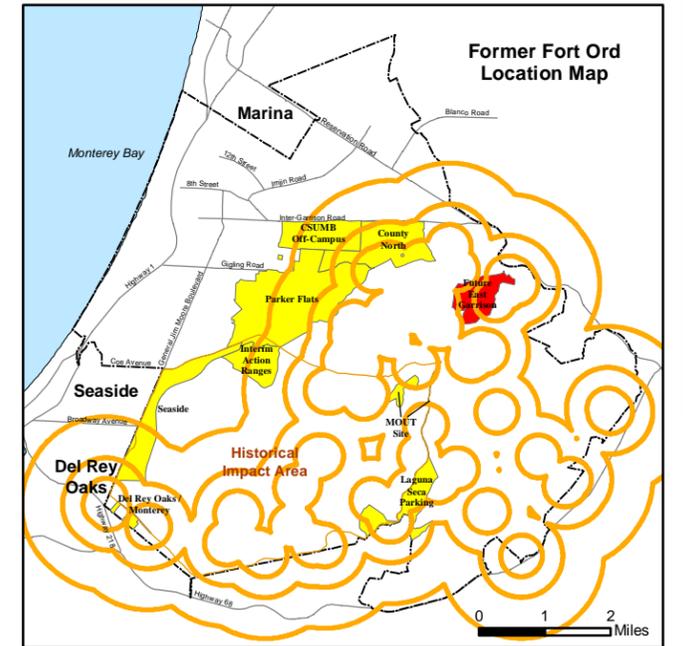
2011 Aquatic Feature Monitoring Report
Future East Garrison MRA
Former Fort Ord Location Map
FORA ESCA RP
Monterey County, California

Figure C-1



Legend

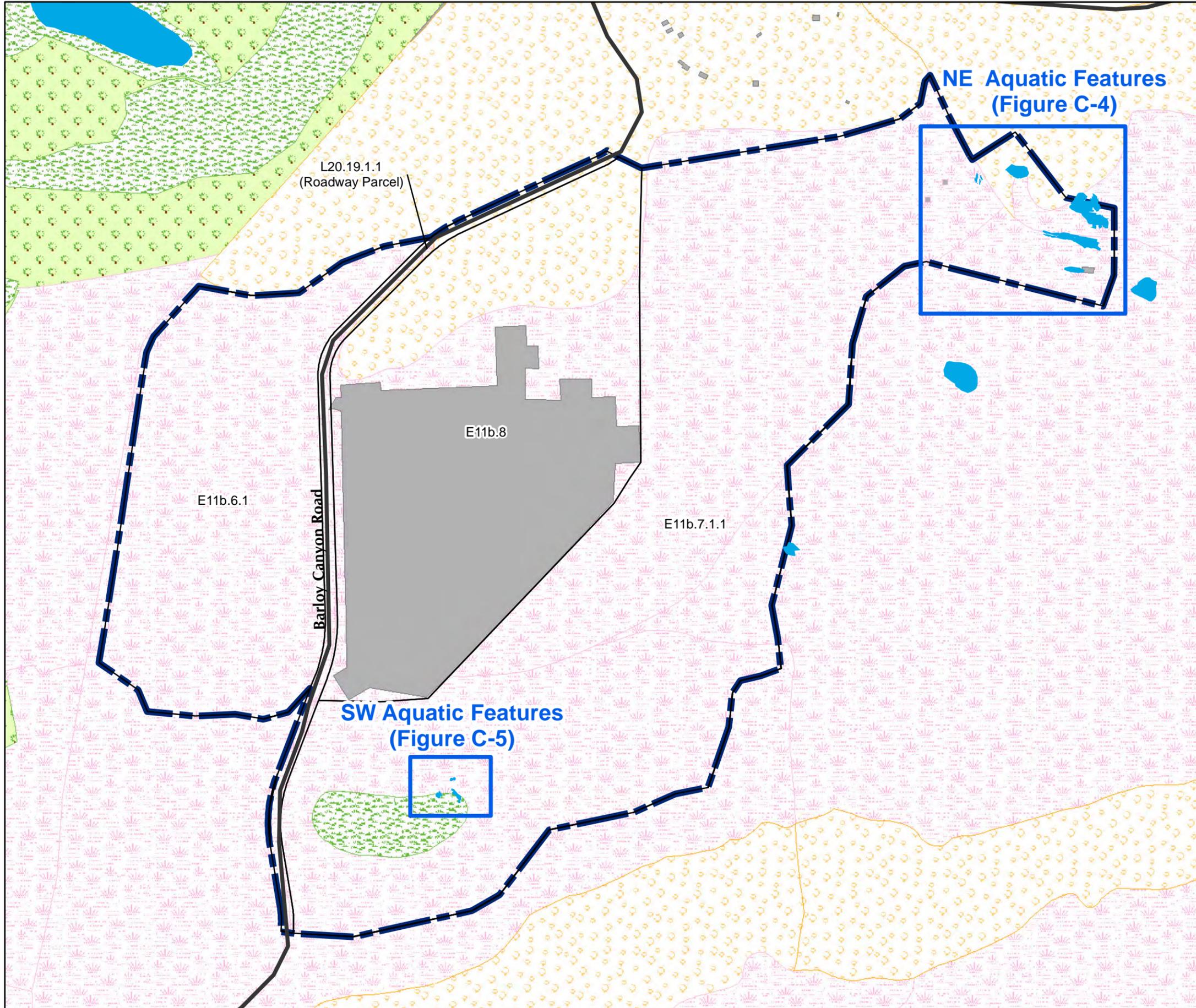
-  Munitions Response Area
-  California Tiger Salamander (CTS) Buffer
-  Major Road
-  Aquatic Features
-  Aquatic Feature with Documented CTS Presence (Prior to ESCA RP 2010-2011 Aquatic Survey)
-  E11b.8 USACE Parcel



2011 Aquatic Feature Monitoring Report
Future East Garrison MRA
Pre-2011 Documented CTS Presence
 FORA ESCA RP
 Monterey County, California

Figure C-2

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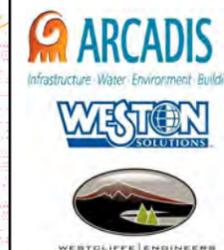
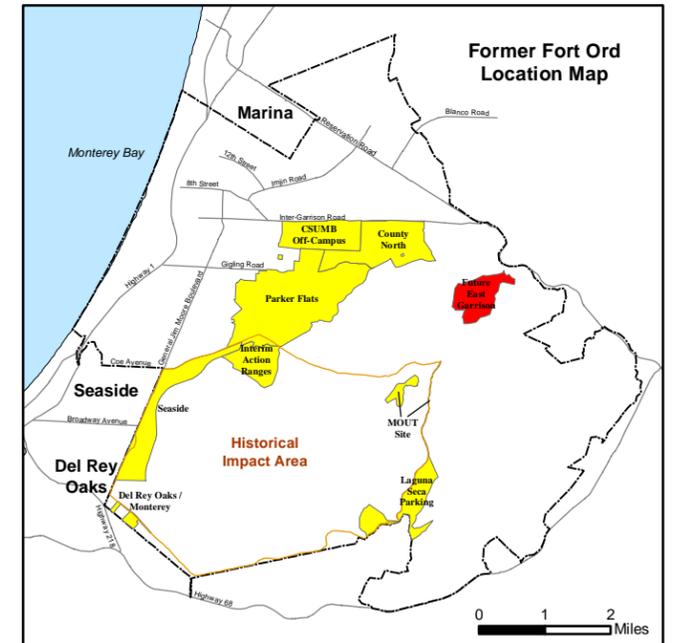
Legend

- Munitions Response Area
- Major Road
- USACE Parcel

Vegetation Type

- Grassland*
- Maritime Chaparral*
- Inland Coast Live Oak Woodland*
- Coastal Coast Live Oak Woodland*
- Aquatic Feature**
- Developed / Disturbed*

*Source: Flora and Fauna Baseline Study of Fort Ord, California, Jones and Stokes Association Inc., December 1992.
 **Aquatic features within the MRA represent the extent of water in March 2010. Aquatic features outside the MRA are from the above listed source from 1992.

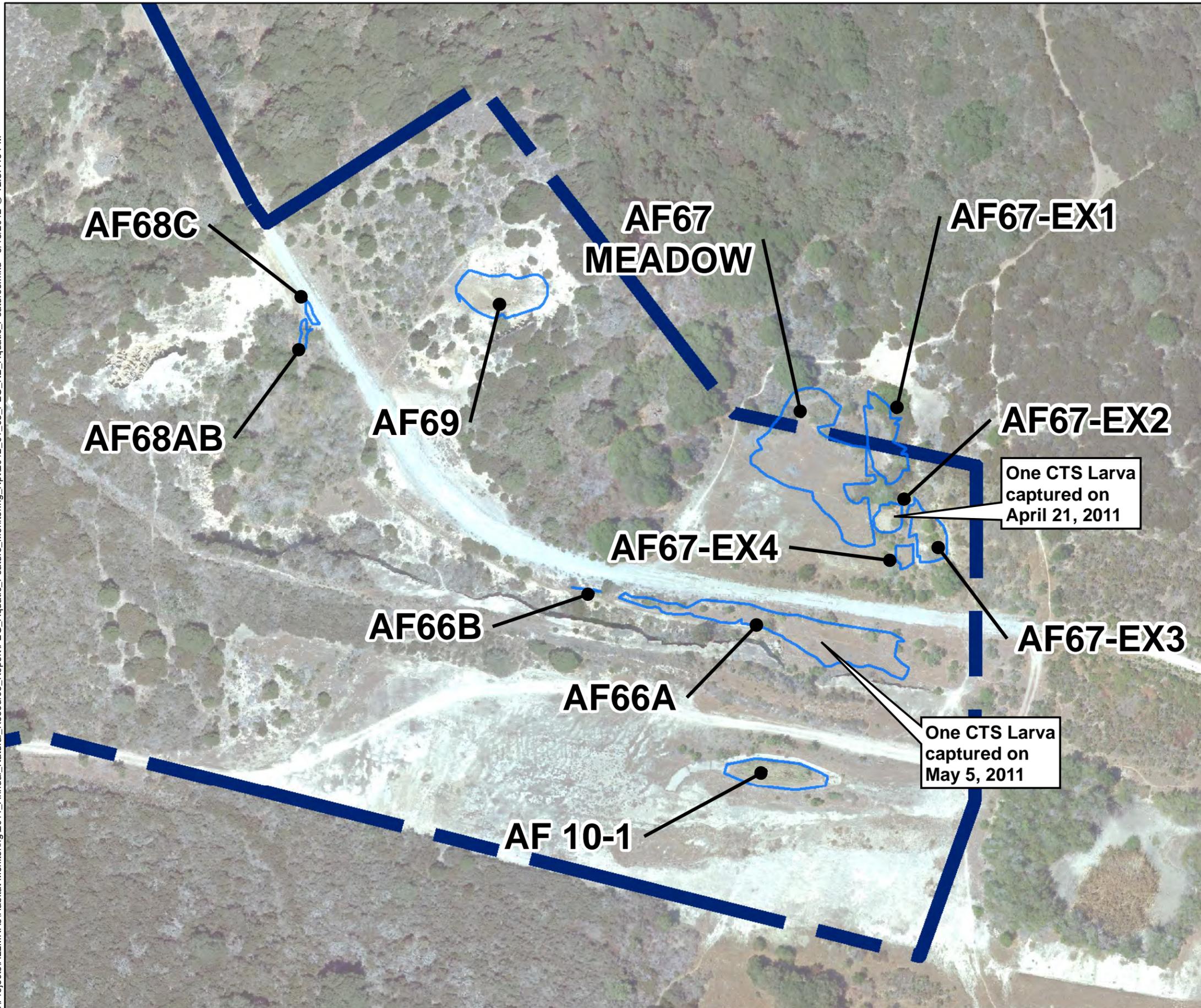


2011 Aquatic Feature Monitoring Report
Future East Garrison MRA
Generalized Vegetation Communities

FORA ESCA RP
 Monterey County, California

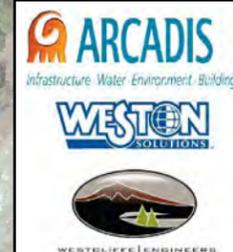
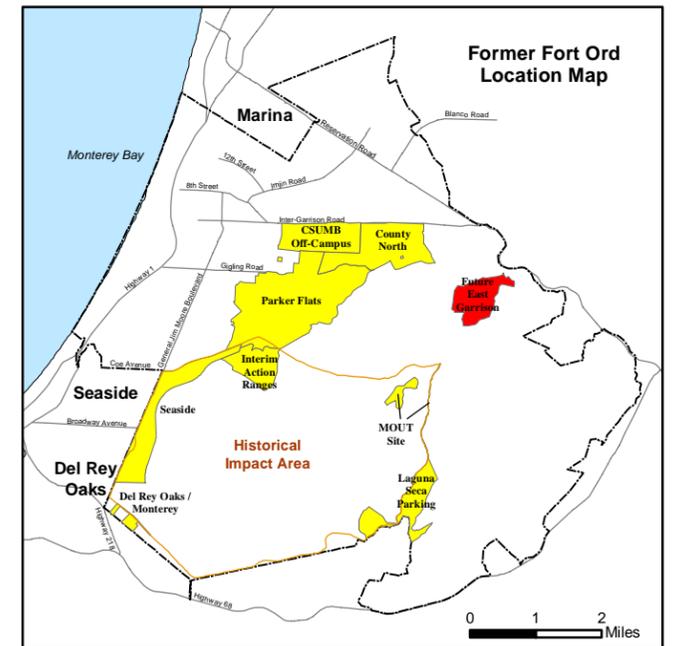
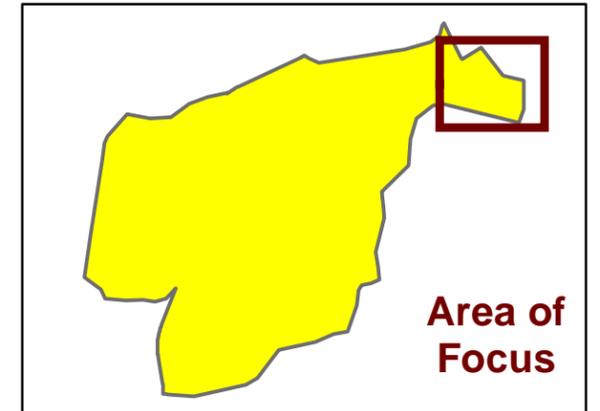
Figure C-3

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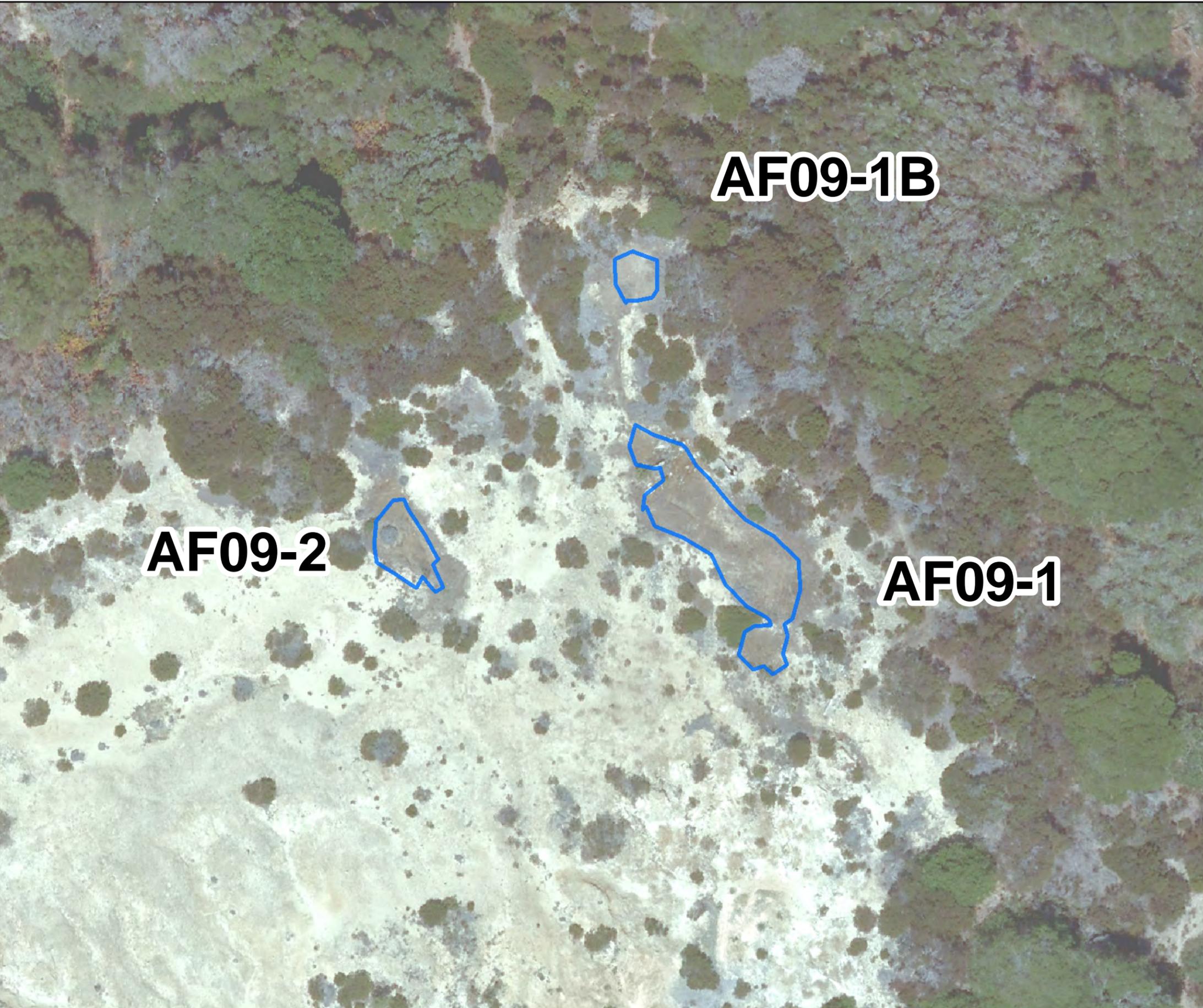
Legend

- Munitions Response Area
- North East (NE) Aquatic Features as of March 2010



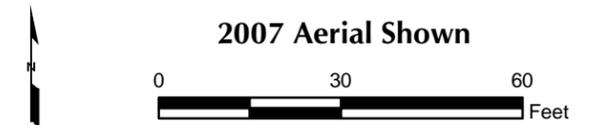
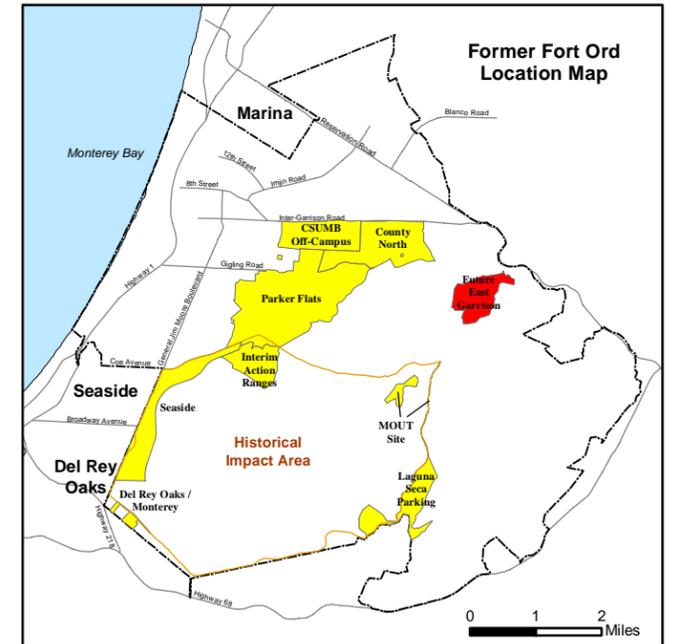
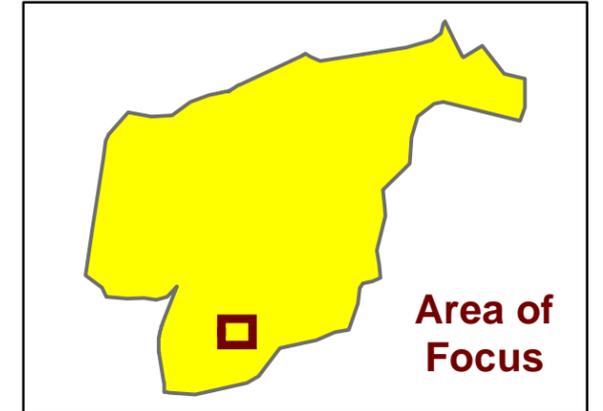
2011 Aquatic Feature Monitoring Report
Future East Garrison MRA
NE Aquatic Features
 FORA ESCA RP
 Monterey County, California

Figure C-4



Legend

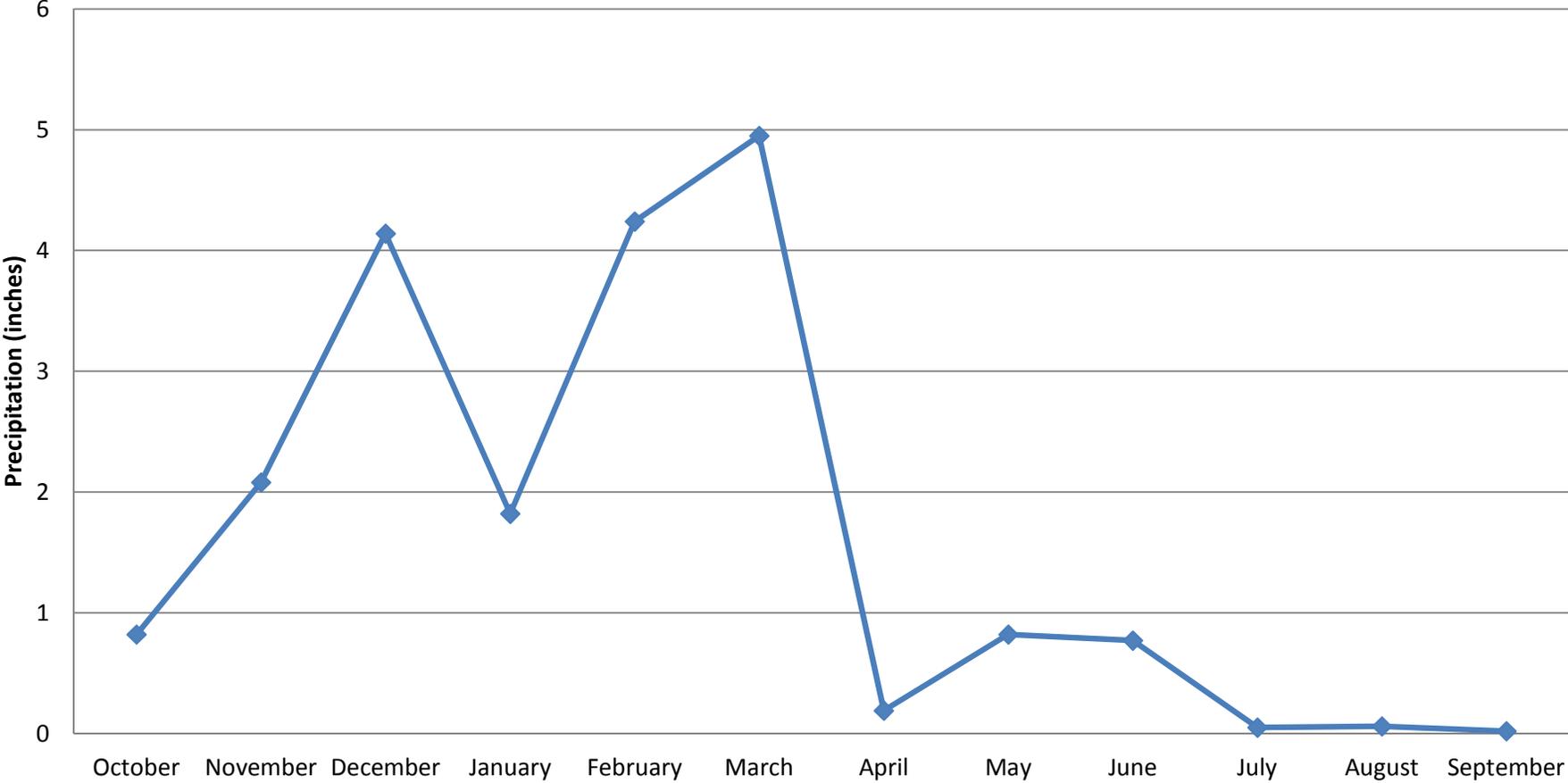
 South West (SW) Aquatic Features as of March 2010



2011 Aquatic Feature Monitoring Report
Future East Garrison MRA SW Aquatic Features
 FORA ESCA RP
 Monterey County, California

Figure C-5

Figure C-6
2011 Wet Season Rainfall
(October 2010 - September 2011)



APPENDIX A

Interim Guidance on Site Assessment and Field Surveys for
Determining Presence or a Negative Finding of the
California Tiger Salamander, October 2003

2011 Aquatic Feature Monitoring Report
Future East Garrison Munitions Response Area

**Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a
Negative Finding of the California Tiger Salamander
October 2003**

The Santa Barbara County population of the California tiger salamander (*Ambystoma californiense*) was federally listed as endangered on September 21, 2000 (65 FR 57242). The Sonoma County Distinct Population Segment (DPS) of the California tiger salamander was listed as endangered on July 22, 2002 (67 FR 47727). The Central California DPS of the California tiger salamander was proposed for listing as threatened on May 23, 2003 (68 FR 28648). The Santa Barbara and Sonoma County DPSs were proposed for reclassification from endangered to threatened, on May 23, 2003 (68 FR 28648). The California Department of Fish and Game (Department) considers the California tiger salamander throughout its entire range to be a species of special concern.
(Special Animals List July 2003 <http://www.dfg.ca.gov/whdab/html/lists.html>)

The Service and Department have received numerous requests for guidance in planning for the protection of the California tiger salamander (CTS) at the sites of proposed and existing land use activities. This document provides interim guidance for two procedures to accurately assess the likelihood of CTS presence in the vicinity of a project site, including: (1) an assessment of CTS locality records and potential CTS habitat in and around the project area; and (2) focused field surveys of breeding pools and their associated uplands to determine whether CTS are likely to be present.

Because CTS use aquatic and upland habitats during their life cycle, they may be present in either or both habitats on a given property. For sites with suitable breeding habitat, two consecutive seasons of negative larval surveys and a negative upland drift fence study in the intervening fall/winter are recommended to support a negative finding. For sites with no suitable aquatic breeding habitat, but where suitable upland habitat exists, two consecutive seasons of negative upland drift fence studies are recommended to support a negative finding.

If the following Guidance is followed completely, the results of these site assessments and field surveys will be considered valid by the Service and Department. Results of the site assessments and field surveys should be reported to the appropriate Service's Field Office, if appropriate the Service's Regional Office in Portland, Oregon pursuant to the terms and conditions of the permittee's section 10(a)(1)(A) recovery permit, and to the Department and other agencies or offices as required. Details regarding the recommended content and/or format of reports are provided throughout the remainder of this document.

Surveyors must obtain permission of the landowner before implementing any surveys or research on the CTS. In locations where the CTS is federally listed surveyors should obtain a Recovery Permit for this species pursuant to section 10(a)(1)(A) of the Endangered Species Act of 1973, as amended, prior to implementing the guidance. For surveys that may ultimately be used in support of a negative finding, it is recommended that surveyors consult with Service biologists on their study design before beginning work. If surveyors are working in areas with other federally listed species that are likely to be captured incidentally during CTS surveys, surveyors should also possess a valid 10(a)(1)(A) permit for these species (e.g., California red-legged frog, vernal pool tadpole shrimp, etc.). For all locations, the surveyor should hold an active Scientific Collecting Permit from the Department that specifically names CTS surveys as an authorized activity. Authorization Number 9, without explicit permission for handling CTS, is not adequate for CTS surveys.

Site Assessment for the California tiger salamander

Available information about CTS and their habitats in the vicinity of the project should be used to determine the likelihood that CTS may occur there and if field surveys are appropriate. The project proponent should compile and submit to the Service and the Department the following information:

Element 1. Is the project site within the range of the CTS?

The surveyor should review the attached maps or referenced weblink to determine if the project site is within the range of the CTS. For Sonoma County, refer to the attached county map. For Santa Barbara County, refer to http://ventura.fws.gov/Images/CTS_Range.jpg. For Monterey, San Benito, and San Luis Obispo counties, contact the Ventura Fish and Wildlife Office at the address provided below. For all other areas, refer to the attached map of California ([Sonoma County \(pdf\)](#), [All of California \(pdf\)](#)).

Element 2. What are the known localities of CTS within the project site and within 3.1 miles (5.0 kilometers) (km) of the project boundaries?

This is to place the project site in a regional perspective. The surveyor should consult the California Natural Diversity Data Base (CNDDDB) maintained by the Department to determine known localities of the CTS. The Sacramento or Ventura Fish and Wildlife Offices should be contacted for localities within their respective jurisdictions. Other information sources on local occurrences of CTS should be consulted. These sources may include, but are not limited to, biological consultants, local residents, amateur herpetologists, resources managers and biologists from municipal, state, and Federal agencies, environmental groups, and herpetologists at museums and universities. The surveyor should note in their report all known CTS localities within the project site and within 3.1 miles of the project boundaries; if there are no localities within 3.1 miles, the nearest locality should be noted.

Element 3. What are the habitats within the project site and within 1.24 miles (2 km) of the project boundaries?

This distance is based on the observed mobility of the species. Describe the upland and aquatic habitats within the project site and within 1.24 miles of the project boundaries. Characteristics of the site that should be recorded include acreage, elevation, topography, plant communities, presence and types of water bodies, fossorial mammal species and their burrows, current land use, a description of adjacent lands, and an assessment of potential barriers to CTS movement. Use of aerial photographs is necessary to characterize potential breeding habitats that are not part of the project site under consideration. The aquatic habitats should be mapped and characterized (e.g., natural vernal pools, stockponds, drainage ditches, creeks, types of vegetation, surface area, depth, approximate drying date). Suitable upland habitat, including locations of underground refugia, for CTS should be mapped as well, with a focus on areas where small mammal burrows are located or are most dense.

Reporting and interpretation of the site assessment

Site assessments should include, but are not limited to, the following information: (1) photographs of the project site(s); (2) survey dates and times; names of evaluator(s); (3) a description of the site assessment methods used; (4) a list of CTS localities, as requested above; and (5) a map of the site(s) showing habitat as requested above. Maps should be of similar nature to a U.S. Geological Survey (USGS) 7.5-minute (1:24,000) topographic maps -or- Geographic Information System (GIS) data depicting the site(s) and the area within 5 kilometers

(3.2 miles) of its boundaries. The report should be provided to the appropriate Service field office and Department regional office prior to initiating field surveys.

After completing items 1-3 of the site assessment (as above), send a report to the appropriate Service field office and Department regional office. Based on the information provided from the site assessment, the Service and Department will provide recommendations as to the appropriateness of field surveys. Surveys should not be initiated until recommended by the Service and Department.

Interim Presence/Negative Finding Survey Guidance for the California Tiger Salamander

Biological field surveys should be conducted for all sites with potential CTS habitat. Due to its unique life history, the CTS can be difficult to detect depending on weather and time of year. Aquatic sampling for larvae during spring months can be the most effective way to determine if CTS are present in a given area. However, especially if environmental conditions are unfavorable, CTS may not breed successfully in a given year. After metamorphosis CTS spend most of each year on land, emerging from refugia only occasionally, usually on rainy nights. CTS have been observed on land 1.24 miles from any potential breeding pool.

At sites that contain both upland habitat and potential breeding habitat (i.e., pools that contain standing water continuously for at least 10 weeks, extending into April), aquatic sampling during two breeding seasons and a drift fence study in the intervening winter should be conducted to support a negative finding. At sites that contain appropriate upland habitat only, but where there is a known or potential breeding site accessible within 1.24 miles, a two-year drift fence study should be conducted.

In years with little rainfall, upland emergence may be reduced and CTS may not breed. Field surveys conducted in years with at least 70% of average rainfall between September 1 and April 1, at the nearest National Oceanic and Atmospheric Administration climate station are most reliable. Data from survey seasons not meeting this criterion will also be considered; surveyors should provide strong justification that their data are reliable including but not limited to local climate (e.g., daily rainfall totals, pond filling date, pond drying date) and biological survey data (e.g., other species captured during each sampling interval).

Aquatic larval sampling

1. Aquatic larval surveys of potential breeding pools should be repeated three times each season. Surveys should be conducted once each in March, April, and May, with at least 10 days between surveys. If pools are likely to dry prior to the completion of three surveys, the sampling schedule should be shifted accordingly.
2. Captured CTS should remain in nets for the minimum amount of time necessary, but no longer than 5 minutes. During this time, larvae should not be kept out of water for more than 30 seconds. Photographs should document a representative sample of captured CTS.
3. Disruption to the pond's bottom should be minimized. Shallow areas where young larvae may occur should be traversed in the most direct and least disturbing manner possible.
4. Sampling should cease once presence has been determined to minimize disturbance of pool flora and fauna. If CTS are detected at a pond, subsequent visits to that pond are not necessary.

5. Ponds should be initially sampled using D-shaped or similar, long-handled dipnets with 1/8th inch (3.2mm) or finer mesh. If CTS larvae are not captured in the first 50 dipnet sweeps, covering representative portions of the pond, seines should be used.

6. If dipnetting has been unsuccessful, seines should be used to sample 100% of the surface area of ponds smaller than 1 acre and at least 30% of the surface area of larger pools, including a representative sample from different water depths and vegetated and non-vegetated areas. One eighth inch (3.2 mm) or finer mesh minnow seines with weights along the bottom and floats along the top edge should be used, with dowling or PVC pipe attached to the end of the seine so the bottom edge can be dragged along the bottom of the pool. Whenever possible, the seine should be pulled from one edge of the pond to the other.

7. Use of minnow traps will be considered on a case-by-case basis. Minnow trapping for CTS larvae should only be conducted in habitats that are too deep to adequately survey with dipnets and seines, or in which dense vegetation impedes normal dipnetting/seining activities. In these cases the surveyor should submit to the Service a written minnow trap sampling design based on the requirements detailed below. No minnow trapping should be conducted in ponds known to support state or federally threatened or endangered animals (e.g., California red-legged frogs (*Rana aurora draytonii*)). In areas where California red-legged frogs may occur, minnow trapping should be preceded by negative surveys following the Service guidelines for this species. To conduct minnow trap sampling in pools known to contain California red-legged frogs, surveyors must possess a valid Recovery Permit for this species pursuant to section 10(a)(1)(A) of the Endangered Species Act of 1973, as amended.

Minnow trapping should be conducted in the following manner:

a. Minnow traps should be monitored for three three-day intervals between March 1 and May 15 (for a total of nine days of trapping per site). Trapping intervals should be separated by at least ten days. Minnow trap surveys should immediately cease if CTS presence is determined.

b. Minnow trapping should be avoided during warm periods when air temperatures reach 80 degrees Fahrenheit or when water temperatures reach 70 degrees Fahrenheit or warmer, to prevent the possibility of mortality due to reduced oxygen availability.

c. Minnow traps should be deployed overnight and checked frequently enough to ensure that larvae are not killed or injured. Traps should be checked at least once per day.

d. A minimum of four traps should be placed in each pond. For larger ponds, traps should be distributed along the shoreline with no more than 75 ft (23 m) between traps. Each trap should be clearly marked with the name, telephone number, and State and Federal permit number of the surveyor. Traps should be anchored to stakes set near the shoreline. Steel braided fishing line or heavy cord works well for this purpose; galvanized wire and stainless steel wire should not be used because these wires may kink and break. If livestock are present, we recommend that the surveyor devise a method to anchor the trap in a manner to prevent entanglement of livestock. Brightly colored flagging should be affixed to each anchor point. For extra security, a float attached to each trap can aid in detection. If a minnow trap is lost, every effort should be made to recover it to avoid the possibility of leaving behind a trap that can kill a variety of species over time.

e. Traps should be deployed to the deepest parts of ponds and in shoreline areas with aquatic vegetation growth.

9. Data regarding the type and quality of each pool sampled should be recorded. At a minimum, these data should include the date and time, location, type of water body (e.g., vernal pool, seasonal wetland, artificial impoundment, etc.), dimension and depth of pond, water temperature, turbidity, presence of aquatic vegetation (submergent and emergent), and dominant invertebrates and all vertebrates observed. Photographs of pools and adjacent upland areas are helpful and copies should be included in the final report.

10. Surveyors should follow guidance below for disinfecting equipment and clothing after surveying a pond and before entering a new pond, unless the two ponds are hydrologically connected to one another. These recommendations are adapted from the Declining Amphibian Population Task Force's Code which can be found in their entirety at: <http://www.mpm.edu/collect/vertzo/herp/daptf/fcode.html>.

a. All dirt and debris, including mud, snails, plant material (including fruits and seeds), and algae, should be removed from nets, traps, boots, vehicle tires and all other surfaces that have come into contact with water. Cleaned items should be rinsed with clean water before leaving each study site.

b. Boots, nets, traps, etc., should then be scrubbed with either a 70 % ethanol solution, a bleach solution (0.5 to 1.0 cup of bleach to 1.0 gallon of water), QUAT 128 (quaternary ammonium, use 1:60 dilution), or a 6% sodium hypochlorite 3 solution and rinsed clean with water between study sites. Cleaning equipment in the immediate vicinity of a pond or wetland should be avoided. Care should be taken so that all traces of the disinfectant are removed before entering the next aquatic habitat.

c. When working at sites with known or suspected disease problems, disposable gloves should be worn and changed between handling each animal.

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

Upland Habitat Survey Methods

A drift fence study conducted during fall and winter is the primary method used to study CTS in upland habitats. To support a negative finding, an upland drift fence study should be included. Although less intrusive methods (see below) may also be used to determine presence of the CTS, these methods are less reliable and thus cannot be used to support a negative finding.

Because CTS have been observed to make breeding migrations of at least 0.6 miles (1 km), the project proponent or the Service may assume presence of CTS if a known breeding pond lies within 1 km and no significant barriers exist. Examples of significant physical barriers include high-density residential or urban development and Interstate Highways, while features such as golf courses, disked fields, and most paved roads are not considered barriers.

For sites with at least one accessible potential breeding pool, we recommend that a one-year drift fence study be conducted during the winter between two consecutive seasons of aquatic larval surveys (if presence of CTS was not established during the first season of aquatic sampling). We recommend that a two year drift fence study be conducted if: 1) a site has

suitable upland habitat and a potential breeding pool lies within 1.2 miles (2 km); 2) on-site ponds cannot be adequately sampled using aquatic methods (e.g., deep impoundments with known presence of California red-legged frogs); or 3) if non-native predators or poor water quality may preclude detection of CTS during larval sampling (i.e., due to mortality of the larvae).

1. We recommend that a proposal to conduct a drift fence study be submitted in writing to the Service and the Department. The results of studies not approved by the Service and Department may not be accepted in support of a negative finding. The proposal should include an aerial photograph of the study site indicating all potential on- and off-site breeding locations identified in the site assessment and an overlay with the proposed drift fence study design clearly delineated. We recommend that drift fence study designs incorporate the following:

a. For sites with at least one suitable breeding pond (i.e., ponds that contain standing water for at least 10 continuous weeks in most years), the ponds should be surrounded by drift fences installed 10 - 50 ft from the high water line. Sections of drift fence should be spaced regularly around the pond, focusing on areas where salamanders are most likely to be captured. We recommend that each section of fence be at least 30 ft (9.2 m) long, and that the total distance between fence sections be no greater than the total length of installed fence (i.e., >50% of the circumference fenced). There should be no more than 33 ft (10 m) between pitfall traps, and drift fences should be constructed such that during periods when traps are closed, openings at least every 66 ft (20 m) allow animal passage.

b. For all sites, we also recommend upland drift fences. Unless a strong rationale can be presented, drift fence equaling at least 90% of the site perimeter should be installed. The exact placement of fences should be selected to maximize the probability of capturing CTS (e.g., in grassland areas with high densities of mammal burrows; along site boundaries closest to identified potential breeding pools; with pitfalls situated away from areas where flooding is likely). Pitfalls should be spaced less than 33 ft apart. To the extent possible drift fences and pitfalls should be placed to minimize the number of flooded buckets. Each section of fence should be a minimum of 30 ft (9.2 m) long, unless topography, property lines, or other circumstances dictate. Upland drift fences should be constructed such that during periods when traps are closed, openings at least every 66 ft (20 m) allow animal passage.

2. Arrays should be approved and constructed by 15 October. Beginning on or before October 15, pitfall buckets should be opened before sunset if there was any rain during the day or if at 2 PM rain is forecast for the remainder of the day or subsequent night with 70% or greater probability (based on the nearest National Weather Service forecast - available at <http://www.wrh.noaa.gov/Sacramento/>). Traps should be open each night and checked each morning until no rain has fallen within the preceding 24 hours. Nights of high relative humidity (greater than 75% relative humidity) should be considered equivalent to rain events once onsite or nearby seasonal wetlands have become inundated with standing water, regardless of its depth, surface area, or duration. The above guidance should be followed until 20 nights of surveying under the proper conditions has been conducted. After 20 nights of surveying is completed, and until March 15, pitfall buckets should be opened before sunset if there was any rain during the day, or if at 2 PM rain is forecast for the remainder of the day or subsequent night with 70% or greater probability. Traps will be checked the next morning, and unless it is still raining or more rain is forecast, the traps can be closed until the next rain event.

3. Drift fences should be constructed from a material that is durable, weather resistant, and appropriate for the area in which it will be installed; proposals should describe the materials to be used. Examples include aluminum flashing, silt fencing, untreated wood particle board, shade cloth, window screen, Vexar plastic mesh, etc. Hardware cloth may be useful for short segments of fence that experience heavy overland water flow. Drift fences should be buried at least 3 inches (8 cm) underground and extend at least 1 ft (31 cm) above the ground. All drift fences require regular inspections and maintenance, especially after each significant storm event. If drift fences are installed incorrectly and/or have insufficient maintenance this may call into question the reliability of the data. Unless special authorization is received from the Service and Department to maintain drift fences through non-sampling months, drift fencing should be disassembled by April 1.
4. Pitfall traps should not be placed in a manner that will disturb or destroy rodent burrows or other refugia that could be used by CTS.
5. Excessive pitfall flooding may invalidate a study. To avoid flooding traps should be placed preferentially in slightly elevated locations where flooding is less likely. Pitfalls in locations likely to flood should be free of holes. If ground saturation forces a pitfall out of the soil it can be weighted down with cement, gravel or other suitable materials.
6. All pitfall traps should have a rigid lid that closes securely. When not in use, traps should be closed in a manner that precludes entry by CTS and other animals.
7. Pitfall traps should be cylindrical, non-galvanized, metal or plastic containers. They should be at least 2-gallons in size and 8 in (20 cm) deep.
8. Each pitfall trap should contain noncellulose sponges or other nontoxic absorbent material which should be kept moist at all times.
9. Each pitfall trap should have a rigid cover with legs one to two inches high to provide shade and shed water during extreme rain events.
10. When in use, pitfall traps should be checked as often as necessary, but at a minimum one time a day, with one of these checks occurring between one hour before sunrise and noon. Whenever possible, traps should be opened just before dark and checked and closed the following morning.
11. When not in use, the drift fence and pitfall traps should be inspected weekly to ensure the system has not been disturbed by vandals, wildlife, fallen trees, wind, etc. Repairs to fences should be completed prior to the next night of sampling.
12. Pitfall traps should be placed as far as possible from ant nests. If an ant nest develops within 10 feet of an existing pitfall trap, the pitfall trap should be moved, removed from the field, or closed.
13. Captured CTS should be released as near as possible to the point of capture, in a manner that maximizes their survival. CTS should be released into the mouth of a small mammal burrow or other suitable refugia. CTS should be watched after release to be sure that they are in a safe location and are not susceptible to increased predation risk.

14. Once a CTS is captured, all traps and drift fences should be emptied and removed within 24 hours, and holes in the ground which contain traps should be filled in.

15. In addition, to minimize mortality of small mammals that may become trapped during surveys, each pitfall trap should also incorporate either jute twine, as described in Karraker (2001; <http://www.fs.fed.us/psw/rsl/projects/wild/karraker/karraker4.pdf>), a rodent safe-house as described in Padgett-Flohr and Jennings (2001), or other material as approved by the Service and Department.

16. Each pitfall trap should be marked with the name, telephone number, and Department permit number.

Other methods

Other methods, such as visual egg surveys, night driving, nocturnal surveys, fiber optic scoping and cover-boards, may be used to determine presence of the CTS, but these techniques may not be accepted in support of a negative finding. Deviations from this guidance may be approved on a case-by-case basis if a strong rationale can be presented.

Reporting

If one or more CTS are captured or detected a representative sample of the embryo(s), larva(e), or transformed salamander(s) should be photographed. The Service and the Department should be contacted by telephone within 3 working days if CTS are captured. If any mortality of California tiger salamander occurs, specimens should be collected, preserved by freezing, and the Service and the Department contacted by telephone within 1 work day.

For each survey location, a final report detailing the survey results should be submitted to the Service and the Department within one month of the last site visit. The written report should include, but is not be limited to, the following information: names of surveyors and copies of permits and authorizations, a description and map at the appropriate resolution of the type and quality of upland and aquatic habitats and land uses at the site; a map indicating the location of water bodies sampled for larvae; a map indicating the location of drift fences and pitfalls. The survey report also should include survey methods used, the dates and times of surveys, rainfall totals by date, nightly minimum temperatures, number and length of dipnet sweeps made, number of passes with seine, total estimated area seined, records of upland and aquatic animals captured, and pond water temperature, turbidity, and maximum depth at each aquatic sampling. If CTS are detected on the site, the report should include a map indicating the precise location of all CTS observations and captures, the number of CTS egg masses, larvae, sub-adults and adults observed, and photographic verification of CTS from the site. Site photographs may also be helpful in interpreting survey results. For the Department, survey reports should also include CNDDDB field locality forms. Locality information should be in the form of UTM or latitude/longitude (degree, minute, second) coordinates.

In the case of a negative finding including a season with 70% of average rainfall, additional information (e.g., pond filling/drying dates, quantity and timing of rainfall during each sampling interval, temperatures) supplied by the surveyor, may assist the Service and the Department in their decision whether or not to accept the data.

Contact Information:

U.S. Fish and Wildlife Service

For an application or guidance on how to obtain a Federal permit or for reporting, please contact:

For areas within the For hydrobasins south of and including Great Valley hydrobasin:

U.S. Fish and Wildlife Service

Sacramento Fish and Wildlife Office

Attn: Permit Coordinator Attn: Permit Coordinator

2800 Cottage Way, W-2605

Sacramento, California 95825

(916) 414-6547

Santa Cruz County:

U.S. Fish and Wildlife Service

Ventura Fish and Wildlife Office

2493 Portola Road, Suite B

Ventura, California 93003

(805) 644-1766

<http://endangered.fws.gov/permits/>

Please refer to <http://ventura.fws.gov/areas/responsibilities.html> for a map showing U.S. Fish and Wildlife Office jurisdictions.

California Department of Fish and Game

For Department reporting or questions regarding land use activity guidance, a map of regional offices and telephone numbers is available at <http://www.dfg.ca.gov/regions/regions.html>

For State of California Scientific Collecting permit applications and information, please contact:

California Department of Fish and Game

License and Revenue Branch

3211 S Street

Sacramento, California 95816

(916) 227-2271

For additional State permit information, please refer to:

<http://www.dfg.ca.gov/licensing/pdffiles/fq1547.pdf> (How to Obtain a Scientific Collecting Permit)

<http://www.dfg.ca.gov/hcpb/ceqacesa/rsrchpermit/mou/whenneedmou.shtml> (When is the MOU Required?)

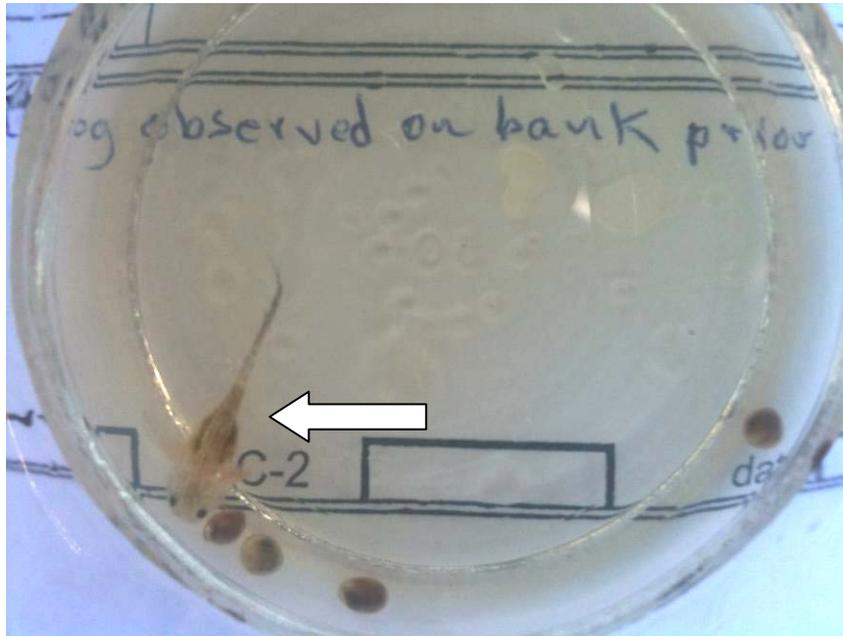
<http://www.dfg.ca.gov/licensing/pdffiles/fq1476.pdf> (Scientific Collecting Regulations)

<http://www.dfg.ca.gov/licensing/pdffiles/fq1379e.pdf> (Scientific Collecting Permit Attachment)

APPENDIX B

Photolog

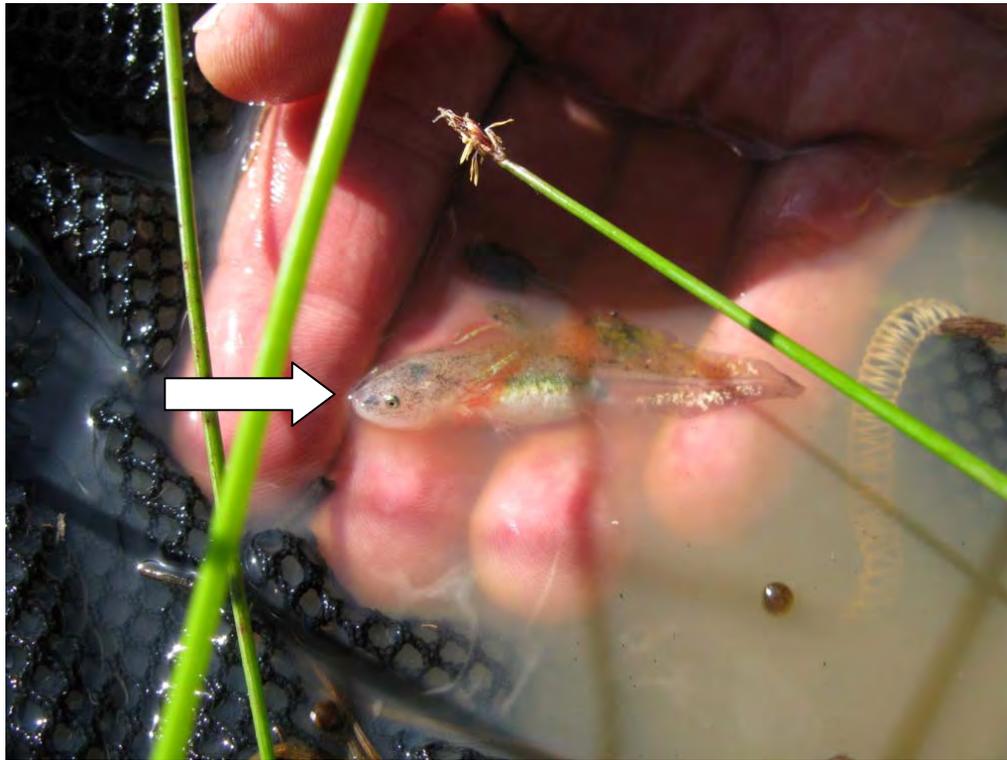
**2011 Aquatic Feature Monitoring Report
Future East Garrison Munitions Response Area**



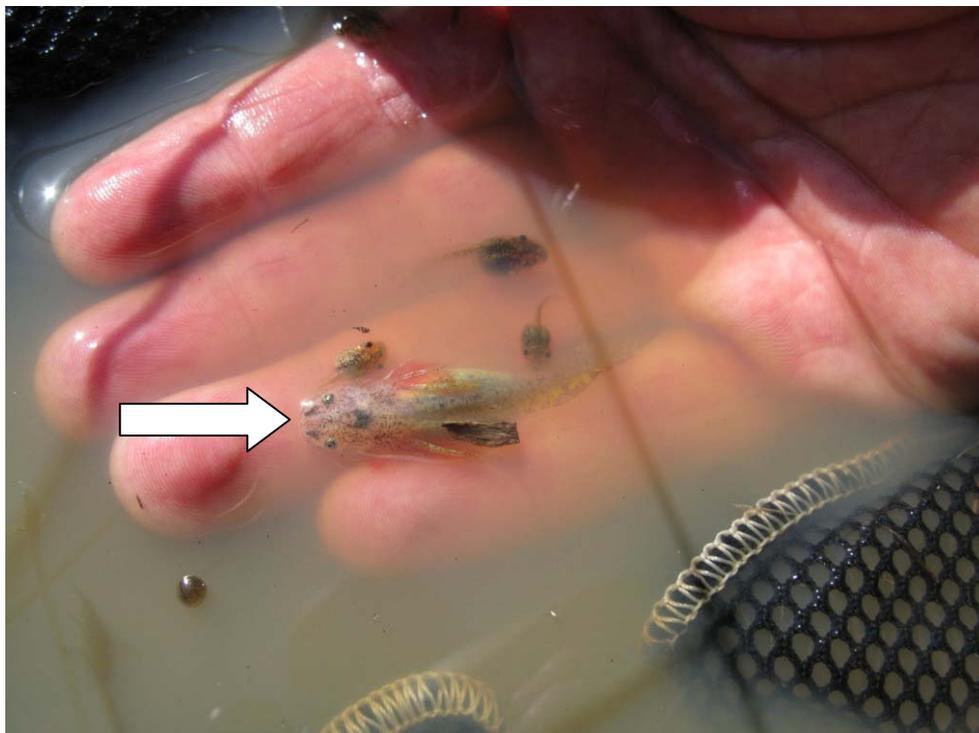
Photograph 1: California tiger salamander larva (arrow) observed in Aquatic Feature AF67-EX2; April 21, 2011



Photograph 2: California tiger salamander larva (arrow) observed in Aquatic Feature AF67-EX2; April 21, 2011



Photograph 3: California tiger salamander larva (arrow) observed in Aquatic Feature AF66A; May 5, 2011



Photograph 4: California tiger salamander larva (arrow) observed in Aquatic Feature AF66A; May 5, 2011



Photograph 5: Aquatic Feature AF66A; 2011



Photograph 6: Aquatic Feature AF68C; 2011



Photograph 7: Aquatic Feature AF09-2 showing stakes and flagging to alert field crews of aquatic feature presence; 2011



Photograph 8: Aquatic Feature AF09-1B showing stakes and flagging to alert field crews of aquatic feature presence; 2011



Photograph 9: Aquatic Feature AF09-1B showing stakes and flagging to alert field crews of aquatic feature presence; 2011



Photograph 10: Aquatic Feature AF09-1 prior to staking and flagging; 2011



Photograph 11: Aquatic Feature AF69; 2011



Photograph 12: Aquatic Feature AF10-1; 2011



Photograph 13: East end of AF66A; June 22, 2011



Photograph 14: West end of AF66A; June 22, 2011



Photograph 15: AF67-EX2; June 22, 2011



Photograph 16: AF67-EX3; June 22, 2011



Photograph 17: AF67-EX4; June 22, 2011



Photograph 18: AF69; June 22, 2011

APPENDIX C

Notification of Larval Captures

2011 Aquatic Feature Monitoring Report
Future East Garrison Munitions Response Area

Tallis, Joshua

From: Lebednik, Phillip
Sent: Friday, April 22, 2011 3:53 PM
To: Collins, William (Fort Ord)
Cc: Reimer, Kristie; Spill, Chris; Tallis, Joshua
Subject: ESCA RP - INFO ONLY: CTS larva captured in Future East Garrison MRA

Applicability: ecological

Location: FEG MRA

Document: 2005 BO

Bill:

I want to let you know that Mitch Siemens and Tessa Chapman captured a single small CTS larva in one of the excavation pits at AF67 in the northeast portion of the FEG MRA yesterday. This is especially noteworthy as we found no CTS in the area in all three surveys last year, nor in last month's survey. We had considered that the excavation pits were sub-optimal habitats owing to the absence of submerged vegetation, but still considered them to be potential breeding locations. Apparently breeding can be successful even in such sub-optimal habitats at Fort Ord. The find also demonstrates that our team is conducting very robust sampling and is able to detect very low densities of larvae.

Let me know if you have any questions regarding this find.

Have a great weekend, Phil

Phillip A. Lebednik, Ph.D. | Principal Scientist | phillip.lebednik@arcadis-us.com

ARCADIS U.S., Inc. | 2033 North Main Street, Suite 340 | Walnut Creek, CA 94596-3727

Direct: 925-296-7848

T. 925.274.1100 x 67848 | M. 510.541.7509 | F. 925.274.1103

www.arcadis-us.com

Tallis, Joshua

From: Lebednik, Phillip
Sent: Monday, May 09, 2011 12:40 PM
To: Collins, William (Fort Ord)
Cc: Reimer, Kristie; Tallis, Joshua; Siemens, Mitch; Spill, Chris; Stan Cook
Subject: ESCA RP - INFO ONLY: Second capture of CTS larva in Future East Garrison MRA and summary of 2011 CTS larval surveys

Applicability: Ecological

Location: Future East Garrison MRA

Document: USFWS BO 2005

Hello Bill:

The ESCA RP biology team, led by USFWS-approved biologist Mitch Siemens, captured a second CTS larva during the May survey last week (May 5).

The individual was ca 5 cm long with initial forelimb development (early metamorphose stage). Sampling was terminated at the site when the larva was captured.

This capture occurred in aquatic feature AF66-A, which is located about 125 ft south of the site where a CTS larva was captured last month (AF67-EX2). To our knowledge, CTS previously had not been reported to breed at AF66-A, although we sampled it in 2010 and in March and April of this year. However, it was considered to be potential breeding habitat. This site is visually more suitable for CTS larval rearing than AF67-EX2, with extensive emergent/submerged vegetation and a gradually sloping topography. The capture occurred in a patch of spike rush, a typical microhabitat for larvae.

Last week's effort concludes the ESCA RP 2011 CTS larval surveys in Future East Garrison MRA. One larva each was recorded at two sites in the northeastern portion of the MRA, both of which are proximal to a known breeding site (AF70) a short distance (300-400 ft) southeast of these sites but outside the Future East Garrison MRA boundary. One site had been considered to be of low habitat quality (based on visual observation) whereas the second had been considered to be of higher habitat quality. Larvae were not recovered in several nearby aquatic features, nor in the newly-identified aquatic features in the southern portion of Future East Garrison MRA, near the "grenade range." Note that all of the aquatic features referred to in this message are within habitat parcels.

In contrast to the 2011 survey, no larvae were captured in our 2010 survey in any of the Future East Garrison MRA aquatic features sites.

The results of the ESCA RP 2010-2011 surveys reinforce the perception that CTS breeding site utilization is difficult to predict based either on habitat characteristics (other than ponding) or on historical non-capture records. The role that such apparently marginal habitats (i.e., habitats with sporadic and low density larval populations) play in the population ecology of the species is difficult to determine, in particular owing to the absence of survival-to-breeding-maturity information.

Let me know if you have any questions or need further information.

Regards, Phil

Phillip A. Lebednik, Ph.D. | Principal Scientist | phillip.lebednik@arcadis-us.com

ARCADIS U.S., Inc. | 2033 North Main Street, Suite 340 | Walnut Creek, CA 94596-3727

Direct: 925-296-7848

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APPENDIX D

Aquatic Survey Field Data Sheets

**2011 Aquatic Feature Monitoring Report
Future East Garrison Munitions Response Area**

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date 3/28/11	Begin Time: 1326	End Time: 1405	Observer(s): M. Siemens J. Tallis
Locality: Fort Ord	County: Monterey		State/Province: CA.
MRA: East Garrison	Aquatic Feature #: 66A 092	UTM North: —	UTM East: —

Weather: Clear <u>Pt. Cloudy</u>	Wind: Calm <u>Light 3-7 mph</u>	Water Temp: 63°-70° F ≈	Air Temp: ≈ 68° F
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	—	N/A	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	Juv + eggs	Y (N)	Yes 100%	Yes	<u>Visual</u> Trapped Aural Hand Collected <u>Dip net/Seine</u> Voucher Collected? Yes No
B. boreas	—	Y (N)	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
<u>Bullfrogs</u>	Juvenile	Y (N)	—	—	<u>Visual</u> Trapped <u>Aural</u> Hand Collected <u>Dip net/Seine</u> Voucher Collected? Yes No

Origin: <u>Natural</u> Man-made	Drainage: Permanent <u>Occasional</u>	Depth: (read from staff gauge) 2.22 Ft.
Description: <u>Temporary Lake/Pond</u> Permanent Lake Marsh/Bog Spring/Seep <u>+</u> Stream Other <u>vernal pool</u>		Primary Substrate: <u>Silt/Mud</u> Bedrock Sand/Gravel Cobble
Color: Clear <u>Stained</u>	Turbidity: Clear <u>Cloudy</u>	
Fish Present: Yes <u>No</u>	Fish Species: <u>0</u>	Bullfrogs Present: <u>Yes</u> No
Aquatic Vegetation: % of aquatic feature with: submerged vegetation <u>10%</u> emergent vegetation <u>20%</u> not vegetated <u>10%</u> too turbid to determine <u>60%</u>		Common Wetland Plant Species (m=only on margin) <u>Post pond because of insufficient plant development.</u>
Shoreline emergent vegetation: % of aquatic feature shoreline that is vegetated: 0% <u>3</u> 26-50% <u>12</u> 1-25% <u>30</u> 51-100% <u>5</u>		

Comments: - ~10 juvenile bullfrogs observed / majority of Nha tadpoles in early stages of dev.
 - Chem shrimp common in pool
 - dansel fly larvae common in pool

Q/C-1 MS date: 3/28/11 Q/C-2 JTT date: 3/29/11

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date 3/28/11	Begin Time: 1418	End Time: 1422	Observer(s): M. Siemels J. Tallis
Locality: Fort Ord		County: Monterey	State/Province: CA.
MRA: East Garrison		Aquatic Feature #: 66B	UTM North _____
		UTM East _____	

Weather: Clear Overcast <u>Pt. Cloudy</u> Rain	Wind: Calm Strong <u>Light 3-5 mph</u>	Water Temp: <u>~70° F</u>	Air Temp: <u>~68° F</u>
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	—	N/A	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	—	Y <u>N</u>	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
B. boreas	—	Y <u>N</u>	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
—	—	Y <u>N</u>	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: <u>Natural</u> Man-made	Drainage: Permanent <u>Occasional</u>	Depth: _____ (read from staff gauge) <u>5"</u>	
Description: Permanent Lake Marsh/Bog Spring/Seep <u>Stream</u> <u>Other pond pool</u>		Substrate: Primary <u>Silt/Mud</u> Bedrock Sand/Gravel Cobble	
Color: Clear <u>Stained</u>		Turbidity: Clear <u>Cloudy</u>	
Fish Present: Yes <u>No</u>		Fish Species: _____	
		Bullfrogs Present: Yes <u>No</u>	
Aquatic Vegetation:		Common Wetland Plant Species (m=only on margin)	
% of aquatic feature with:			
submerged vegetation	—	<u>Postponed because of insufficient plant development</u>	
emergent vegetation	—		
not vegetated	—		
too turbid to determine	—		
Shoreline emergent vegetation:			
% of aquatic feature shoreline that is vegetated:			
0%	—	26-50%	—
1-25%	—	51-100%	—

Comments: - Currently not connected to 66A
- Very shallow / difficult to survey with net.

Q/C-1 MS date: 3/29/11 Q/C-2 JTT date: 3/29/11

California Tiger Salamander Aquatic Survey Data Sheet
FORA ESCA RP

Date <u>3/28/11</u>	Begin Time: <u>≈ 1400</u>	End Time: <u>≈ 1430</u>	Observer(s): <u>J. Tallis</u> <u>M. Siemens</u>
Locality: <u>Fort Ord</u>	County: <u>Monterey</u>	State/Province: <u>CA.</u>	
MRA: <u>East Garrison</u>	Aquatic Feature #: <u>67 meadow</u>	UTM North <u>—</u>	UTM East <u>—</u>

Weather: <u>Clear</u> <u>Pt. Cloudy</u> <u>Overcast</u> <u>Rain</u>	Wind: <u>Calm</u> <u>Strong</u> <u>Light 4-5 mph</u>	Water Temp: <u>≈ 65-70° F</u>	Air Temp: <u>≈ 68° F</u>
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	—	N/A	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	—	<u>Y</u> N	<u>yes</u>	<u>yes</u>	<u>Visual</u> Trapped <u>Aural</u> Hand Collected <u>Dip net/Seine</u> Voucher Collected? Yes No
B. boreas	—	Y <u>N</u>	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
—	—	Y <u>N</u>	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: <u>Natural</u> <u>Man-made</u>	Drainage: <u>Permanent</u> <u>Occasional</u>	Depth: <u>10.5 inches</u> (read from staff gauge)
Description: <u>Permanent Lake</u> <u>Marsh/Bog</u> <u>Spring/Seep</u> <u>Stream</u> <u>Other</u> <u>wet pool</u>	Primary <u>Silt/Mud</u> <u>Bedrock</u>	Substrate: <u>Sand/Gravel</u> <u>Cobble</u>
Color: <u>Clear</u> <u>Stained</u>	Turbidity: <u>Clear</u> <u>Cloudy</u>	
Fish Present: Yes <u>No</u>	Fish Species: <u>—</u>	Bullfrogs Present: Yes <u>No</u>

Aquatic Vegetation: % of aquatic feature with: submerged vegetation <u>—</u> emergent vegetation <u>—</u> not vegetated <u>—</u> too turbid to determine <u>—</u>	Common Wetland Plant Species (m=only on margin) <u>Postponed because of insufficient plant development</u>
Shoreline emergent vegetation: % of aquatic feature shoreline that is vegetated: 0% <u>—</u> 26-50% <u>—</u> 1-25% <u>—</u> 51-100% <u>—</u>	

Comments: → Hyla Larvae, eggs observed & one adult heard
→ Few Larvae present

Q/C-1 MS date: 3/28/11 Q/C-2 JTT date: 3/29/11

California Tiger Salamander Aquatic Survey Data Sheet
FORA ESCA RP

3/29/11

Date: 3/25/11 3/29/11	Begin Time: 1515 2:10:30	End Time: 21041	Observer(s): M. Siemens J. Tallis
Locality: Fort Ord	County: Monterey	State/Province: CA.	
MRA: East Garrison	Aquatic Feature #: 67 EXC-1	UTM North: -	UTM East: -

Weather: Clear <u>Pt. Cloudy</u>	Overcast Rain	Wind: Calm <u>Light 4-8 mph</u>	Strong	Water Temp: 60°-68°F	Air Temp: ≈ 67°F
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	-	N/A	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	-/-	Y <u>(N)</u>	-	Yes	Visual Trapped Aural Hand Collected <u>Dip net/Seine</u> Voucher Collected? Yes No
B. boreas	-	Y <u>(N)</u>	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
-	-	Y <u>(N)</u>	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: Natural <u>Man-made</u>	Drainage: Permanent <u>Occasional</u>	Depth: 4.6 FT (read from staff gauge)
Description: Permanent Lake Temporary Lake/Pond	Marsh/Bog Stream	Spring/Seep <u>Other Excavation</u>
Primary: <u>Silt/Mud</u>	Bedrock	Substrate: Sand/Gravel Cobble
Color: Clear	<u>Stained</u>	Turbidity: Clear <u>Cloudy</u>
Fish Present: Yes <u>(No)</u>	Fish Species: -	Bullfrogs Present: Yes <u>(No)</u>
Aquatic Vegetation: % of aquatic feature with: submerged vegetation <input type="checkbox"/> <u>✓</u> emergent vegetation <input type="checkbox"/> <u>✓</u> not vegetated <input type="checkbox"/> <u>✓</u> too turbid to determine <input type="checkbox"/> <u>✓</u>	Common Wetland Plant Species (m=only on margin) <u>Postponed due to insufficient plant development</u>	
Shoreline emergent vegetation: % of aquatic feature shoreline that is vegetated: 0% <input type="checkbox"/> <u>✓</u> 26-50% <input type="checkbox"/> <u>✓</u> 1-25% <input type="checkbox"/> <u>✓</u> 51-100% <input type="checkbox"/> <u>✓</u>		

Comments:

Q/C-1 MS date: 3/29/11 Q/C-2 JTT date: 3/29/11

California Tiger Salamander Aquatic Survey Data Sheet
FORA ESCA RP

Date <u>3/28/11</u>	Begin Time: <u>~1440</u>	End Time: <u>~1455</u>	Observer(s): <u>J. Tallis</u> <u>M. Siemens</u>
Locality: Fort Ord	County: Monterey	State/Province: CA.	
MRA: East Garrison	Aquatic Feature #: <u>67EX-2</u>	UTM North	UTM East

Weather: Clear Overcast <u>Pt. Cloudy</u> Rain	Wind: Calm Strong <u>Light 5-10 mph</u>	Water Temp: <u>62°-68° F</u>	Air Temp: <u>~67° F</u>
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	—	N/A	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	500	Y <u>(N)</u>	<u>Yes</u>	<u>Yes</u>	<u>Visual</u> Trapped Aural Hand Collected <u>Dip net/Seine</u> Voucher Collected? Yes No
B. boreas	—	Y <u>(N)</u>	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
—	—	Y <u>(N)</u>	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: <u>Natural</u> <u>Man-made</u>	Drainage: <u>Permanent</u> <u>Occasional</u>	Depth: <u>3.48 Ft.</u> (read from staff gauge)
Description: <u>Permanent Lake</u> <u>Temporary Lake/Pond</u>	<u>Marsh/Bog</u> <u>Stream</u>	<u>Spring/Seep</u> <u>Other excavation</u>
Color: <u>Clear</u> <u>Stained</u>	Turbidity: <u>Clear</u> <u>Cloudy</u>	Primary <u>Silt/Mud</u> Bedrock Substrate: <u>Sand/Gravel</u> Cobble

Fish Present: Yes (No) Fish Species: — Bullfrogs Present: Yes (No)

Aquatic Vegetation:

% of aquatic feature with:	
submerged vegetation	—
emergent vegetation	—
not vegetated	—
too turbid to determine	—

Shoreline emergent vegetation:

% of aquatic feature shoreline that is vegetated:

0%	—	26-50%	—
1-25%	—	51-100%	—

Common Wetland Plant Species (m=only on margin)

Postponed because of insufficient plant development

Comments: -Clam shrimp present in high numbers

Q/C-1 MMS date: 3/28/11 Q/C-2 J+T date: 3/29/11

California Tiger Salamander Aquatic Survey Data Sheet
FORA ESCA RP

Date: 3/28/11	Begin Time: ≈ 1454	End Time: 1511	Observer(s): M. Siemens J. Tallis
Locality: Fort Ord	County: Monterey	State/Province: CA.	
MRA: East Garrison	Aquatic Feature #: 67EX-3	UTM North	UTM East

Weather: Clear Overcast <u>Pt. Cloudy</u> Rain	Wind: Calm Strong <u>Light 4-8 mph</u>	Water Temp: 63°-70°	Air Temp: ≈ 67°
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	—	N/A	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	—	Y (N)	— yes	—	<u>Visual</u> Trapped Aural Hand Collected <u>Dip net/Seine</u> Voucher Collected? Yes No
B. boreas	—	Y (N)	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
—	—	Y (N)	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: Natural <u>Man-made</u>	Drainage: Permanent <u>Occasional</u>	Depth: 2.53 Ft. (read from staff gauge)
Description: Permanent Lake Marsh/Bog Spring/Seep Temporary Lake/Pond Stream Other <u>excavation</u>	Primary: <u>Silt/Mud</u> Bedrock	Substrate: Sand/Gravel Cobble
Color: Clear <u>Stained</u>	Turbidity: Clear <u>Cloudy</u>	
Fish Present: Yes <u>No</u>	Fish Species: —	Bullfrogs Present: <u>Yes</u> No
Aquatic Vegetation: % of aquatic feature with: submerged vegetation — emergent vegetation — not vegetated — too turbid to determine —	Common Wetland Plant Species (m=only on margin) <u>Postponed because of insufficient plant development</u>	
Shoreline emergent vegetation: % of aquatic feature shoreline that is vegetated: 0% — 26-50% — 1-25% — 51-100% —		

Comments: — one juvenile bullfrog heard jumping from bank — clam shrimp present in low numbers — Hyla larvae present in low numbers
Q/C-1 <u>MMS</u> date: 3/28/11 Q/C-2 <u>JTT</u> date: 3/28/11

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date 3/28/11	Begin Time: 1442	End Time: 1448	Observer(s): M. Siemens J. Tallis
Locality: Fort Ord		County: Monterey	State/Province: CA.
MRA: East Garrison		Aquatic Feature #: 67EX-4	UTM North _____ UTM East _____

Weather: Clear Overcast <u>Pt. Cloudy</u> Rain	Wind: Calm Strong <u>Light 4-8 mph</u>	Water Temp: 62-67 F Air Temp: ~ 67 F
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	—	N/A	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	—	Y <u>(N)</u>	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
B. boreas	—	Y <u>(N)</u>	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
—	—	Y <u>(N)</u>	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: Natural <u>Man-made</u>	Drainage: Permanent <u>Occasional</u>	Depth: _____ (read from staff gauge) 1.75 Ft
Description: Permanent Lake Marsh/Bog Spring/Seep Temporary Lake/Pond Stream Other <u>excavation</u>		Primary: <u>Silt/Mud</u> Bedrock
Color: Clear <u>Stained</u>		Substrate: Sand/Gravel Cobble
Turbidity: Clear <u>Cloudy</u>		
Fish Present: Yes <u>(No)</u>		Fish Species: — Bullfrogs Present: Yes <u>(No)</u>
Aquatic Vegetation:		Common Wetland Plant Species (m=only on margin)
% of aquatic feature with:		<u>Postponed because of insufficient plant development</u>
submerged vegetation	—	
emergent vegetation	—	
not vegetated	—	
too turbid to determine	—	
Shoreline emergent vegetation:		
% of aquatic feature shoreline that is vegetated:		
0%	—	26-50% <u>—</u>
1-25%	—	51-100% <u>—</u>

Comments: — clam shrimp present in low numbers

Q/C-1 MIS date: 3/28/11 Q/C-2 JTT date: 3/29/11

California Tiger Salamander Aquatic Survey Data Sheet
FORA ESCA RP

Date: 3/28/11	Begin Time: 1530	End Time: 1540	Observer(s): J. Tallis M. Siemens
Locality: Fort Ord	County: Monterey	State/Province: CA.	
MRA: East Garrison	Aquatic Feature #: 68 South AB	UTM North: —	UTM East: —

Weather: Clear <u>Pt. Cloudy</u>	Overcast Rain	Wind: Calm <u>Light 5-10 mph</u>	Strong	Water Temp: <u>62-68</u> °F	Air Temp: <u>~ 67</u> °F
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	—	N/A	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	—	Y <u>(N)</u>	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
B. boreas	—	Y <u>(N)</u>	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
—	—	Y <u>(N)</u>	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: <u>Natural</u> Man-made	Drainage: <u>Occasional</u> Permanent	Depth: <u>3.9"</u> (read from staff gauge)
Description: Permanent Lake Temporary Lake/Pond	Marsh/Bog Stream	Spring/Seep Other <u>depression</u>
Color: Clear <u>Stained</u>	Turbidity: Clear <u>Cloudy</u>	Primary: <u>Silt/Mud</u> Bedrock
Substrate: Sand/Gravel Cobble	Fish Present: Yes <u>No</u>	Fish Species: —
Bullfrogs Present: Yes <u>No</u>	Aquatic Vegetation:	
% of aquatic feature with:		Common Wetland Plant Species (m=only on margin)
submerged vegetation	—	<u>Postponed because of insufficient plant development</u>
emergent vegetation	—	
not vegetated	—	
too turbid to determine	—	
Shoreline emergent vegetation:		
% of aquatic feature shoreline that is vegetated:		
0%	—	26-50%
1-25%	—	51-100%

Comments:

Q/C-1 MS date: 3/28/11 Q/C-2 JTT date: 3/28/11

California Tiger Salamander Aquatic Survey Data Sheet
FORA ESCA RP

Date: 3/28/11	Begin Time: 1530	End Time: 1540	Observer(s): M. Siemens J. Tallis
Locality: Fort Ord	County: Monterey	State/Province: CA.	
MRA: East Garrison	Aquatic Feature #: 68C	UTM North: —	UTM East: —

Weather: <u>Clear</u> Overcast Pt. Cloudy Rain	Wind: Calm Strong <u>Light 5-8 mph</u>	Water Temp: 62-65°F	Air Temp: ≈ 67°F
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	—	N/A	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	—	Y <u>N</u>	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
B. boreas	—	Y <u>N</u>	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
—	—	Y <u>N</u>	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: <u>Natural</u> Man-made	Drainage: Permanent <u>Occasional</u>	Depth: 3.9" (read from staff gauge)
Description: Permanent Lake Marsh/Bog Spring/Seep Temporary Lake/Pond Stream Other <u>depression</u>	Primary: <u>Silt/Mud</u> Bedrock	Substrate: Sand/Gravel Cobble
Color: Clear <u>Stained</u>	Turbidity: Clear <u>Cloudy</u>	
Fish Present: Yes <u>No</u>	Fish Species: —	Bullfrogs Present: Yes <u>No</u>
Aquatic Vegetation: % of aquatic feature with: submerged vegetation — emergent vegetation — not vegetated — too turbid to determine —	Common Wetland Plant Species (m=only on margin) <u>Postponed because of insufficient plant development</u>	
Shoreline emergent vegetation: % of aquatic feature shoreline that is vegetated: 0% — 26-50% — 1-25% — 51-100% —		

Comments:

Q/C-1 MIS date: 3/28/11 Q/C-2 JTT date: 3/29/11

California Tiger Salamander Aquatic Survey Data Sheet
FORA ESCA RP

Date <u>3/29/11</u>	Begin Time: <u>1054</u>	End Time: <u>1120</u>	Observer(s): <u>J. Tallis</u> <u>M. Siemmens</u>
Locality: Fort Ord	County: Monterey	State/Province: CA.	
MRA: East Garrison	Aquatic Feature #: <u># 69</u>	UTM North —	UTM East —

Weather: Clear <u>Pt. Cloudy</u>	Overcast Rain	Wind: Calm <u>Light 2-4 mph</u>	Strong	Water Temp: <u>62-67°F</u>	Air Temp: <u>~68°F</u>
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	—	N/A	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	<u>-/-</u>	Y <u>(N)</u>	<u>yes</u>	<u>yes</u>	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
B. boreas	—	Y <u>(N)</u>	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
—	—	Y <u>(N)</u>	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: <u>Natural</u> Man-made	Drainage: <u>Permanent</u> Occasional	Depth: <u>4.14 Ft</u> (read from staff gauge)
Description: Permanent Lake Temporary Lake/Pond	Marsh/Bog Stream	Spring/Seep <u>Other Quarry</u>
Primary <u>Silt/Mud</u>	Bedrock Substrate: Sand/Gravel Cobble	
Color: Clear <u>Stained</u>	Turbidity: Clear <u>Cloudy</u>	
Fish Present: Yes <u>No</u>	Fish Species: <u>—</u>	Bullfrogs Present: Yes <u>No</u>
Aquatic Vegetation: % of aquatic feature with: submerged vegetation <input checked="" type="checkbox"/> emergent vegetation <input checked="" type="checkbox"/> not vegetated <input type="checkbox"/> too turbid to determine <input type="checkbox"/>	Common Wetland Plant Species (m=only on margin) <u>Postponed due to insufficient plant development</u>	
Shoreline emergent vegetation: % of aquatic feature shoreline that is vegetated: 0% <input type="checkbox"/> 26-50% <input checked="" type="checkbox"/> 1-25% <input checked="" type="checkbox"/> 51-100% <input type="checkbox"/>		

Comments:

Q/C-1 M/S date: 3/29/11 Q/C-2 JTT date: 3/29/11

California Tiger Salamander Aquatic Survey Data Sheet
FORA ESCA RP

Date <u>3/29/11</u>	Begin Time: <u>0852</u>	End Time: <u>1002</u>	Observer(s): <u>M. Siemens</u> <u>J. Tallis</u>
Locality: Fort Ord	County: Monterey	State/Province: CA.	
MRA: East Garrison	Aquatic Feature #: <u>10-1 Tank Wash</u>	UTM North —	UTM East —

Weather: <u>Pt. Cloudy</u>	Overcast Rain	Wind: <u>Calm</u> Light	Strong	Water Temp: <u>60-65°F</u>	Air Temp: <u>65°F</u>
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	—	N/A	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	<u>1-</u>	Y <u>(N)</u>	<u>Yes</u>	—	Visual Trapped Aural Hand Collected <u>Dip net/Seine</u> Voucher Collected? Yes No
B. boreas	—	Y <u>(N)</u>	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
—	—	Y <u>(N)</u>	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: <u>Man-made</u>	Natural	Drainage: <u>Permanent</u>	Occasional	Depth: <u>3.92 ft.</u>	(read from staff gauge)
Description: Permanent Lake Temporary Lake/Pond		Marsh/Bog Stream	Spring/Seep <u>Other</u>	Primary <u>Cement lined Tank Wash</u>	Silt/Mud Bedrock Substrate: Sand/Gravel Cobble <u>Cement</u>
Color: Clear		<u>Stained</u>	Turbidity: <u>Clear</u> Cloudy		
Fish Present: Yes <u>No</u>	Fish Species: —		Bullfrogs Present: <u>Yes</u> No		
Aquatic Vegetation: % of aquatic feature with: submerged vegetation — emergent vegetation — not vegetated — too turbid to determine —			Common Wetland Plant Species (m=only on margin) <u>Postponed due to insufficient plant development</u>		
Shoreline emergent vegetation: % of aquatic feature shoreline that is vegetated: 0% — 26-50% — 1-25% — 51-100% —					

Comments: - At least eight large adult bullfrogs observed in tank wash / no eggs, larvae or juvs. observed
- RWBS present
- Hyla larvae present in small #s

Q/C-1 MS date: 3/29/11 Q/C-2 JTT date: 3/29/11

California Tiger Salamander Aquatic Survey Data Sheet
FORA ESCA RP

Date 3/29/11	Begin Time: 1204	End Time: 1214	Observer(s): M. Siowens J. Tallis
Locality: Fort Ord	County: Monterey	State/Province: CA.	
MRA: East Garrison	Aquatic Feature #: 09-1	UTM North —	UTM East —

Weather: <input checked="" type="radio"/> Clear Pt. Cloudy	<input type="radio"/> Overcast <input type="radio"/> Rain	Wind: <input checked="" type="radio"/> Calm Light	<input type="radio"/> Strong	Water Temp: 63°-68°F	Air Temp: ~70°F
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	—	N/A	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	-/-	Y <input checked="" type="radio"/>	yes	yes	Visual Trapped Aural Hand Collected <input checked="" type="radio"/> Dip net/Seine Voucher Collected? Yes No
B. boreas	—	Y <input checked="" type="radio"/>	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
—	—	Y <input checked="" type="radio"/>	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: <input checked="" type="radio"/> Natural <input type="radio"/> Man-made	Drainage: <input checked="" type="radio"/> Permanent <input type="radio"/> Occasional	Depth: 0.98 ft. (read from staff gauge)
Description: <input type="radio"/> Permanent Lake <input type="radio"/> Temporary Lake/Pond	<input type="radio"/> Marsh/Bog <input type="radio"/> Stream	<input type="radio"/> Spring/Seep <input checked="" type="radio"/> Other depression
Color: <input checked="" type="radio"/> Clear <input type="radio"/> Stained	Turbidity: <input type="radio"/> Clear <input checked="" type="radio"/> Cloudy	Primary <input checked="" type="radio"/> Silt/Mud Substrate: <input type="radio"/> Sand/Gravel <input type="radio"/> Bedrock <input type="radio"/> Cobble
Fish Present: Yes <input checked="" type="radio"/> No	Fish Species: —	Bullfrogs Present: Yes <input checked="" type="radio"/> No
Aquatic Vegetation: % of aquatic feature with: submerged vegetation <input type="checkbox"/> — emergent vegetation <input type="checkbox"/> — not vegetated <input type="checkbox"/> — too turbid to determine <input type="checkbox"/> —		Common Wetland Plant Species (m=only on margin) <u>Postponed due to insufficient plant development</u>
Shoreline emergent vegetation: % of aquatic feature shoreline that is vegetated: 0% <input type="checkbox"/> — 26-50% <input type="checkbox"/> — 1-25% <input type="checkbox"/> — 51-100% <input type="checkbox"/> —		

Comments: - No fairy shrimp observed but were found in this pool last year
- Hyla eggs & tadpoles common

Q/C-1 MS date: 3/29/11 Q/C-2 STT date: 3/29/11

California Tiger Salamander Aquatic Survey Data Sheet
FORA ESCA RP

Date 3/29/11	Begin Time: 1220	End Time: 1230	Observer(s): M. Siemens J. Tallis
Locality: Fort Ord	County: Monterey	State/Province: CA.	
MRA: East Garrison	Aquatic Feature #: 09-1B	UTM North	UTM East

Weather: <input checked="" type="radio"/> Clear Pt. Cloudy	<input type="radio"/> Overcast <input type="radio"/> Rain	Wind: <input type="radio"/> Calm <input checked="" type="radio"/> Light 3-5 mph	<input type="radio"/> Strong	Water Temp: 65-72 F	Air Temp: ~ 70 F
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	-	N/A	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	-	Y <input checked="" type="radio"/> N	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
B. boreas	-	Y <input checked="" type="radio"/> N	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
-	-	Y <input checked="" type="radio"/> N	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: <input checked="" type="radio"/> Natural Man-made	Drainage: <input checked="" type="radio"/> Permanent <input checked="" type="radio"/> Occasional	Depth: 0.49 Ft. (read from staff gauge)
Description: <input type="radio"/> Permanent Lake <input type="radio"/> Marsh/Bog <input type="radio"/> Spring/Seep <input type="radio"/> Temporary Lake/Pond <input checked="" type="radio"/> Stream <input checked="" type="radio"/> Other depression	Primary <input checked="" type="radio"/> Silt/Mud Bedrock	Substrate: <input type="radio"/> Sand/Gravel <input type="radio"/> Cobble
Color: <input type="radio"/> Clear <input checked="" type="radio"/> Stained	Turbidity: <input type="radio"/> Clear <input checked="" type="radio"/> Cloudy	
Fish Present: Yes <input checked="" type="radio"/> No	Fish Species: -	Bullfrogs Present: Yes <input checked="" type="radio"/> No
Aquatic Vegetation: % of aquatic feature with: submerged vegetation <input type="checkbox"/> - emergent vegetation <input type="checkbox"/> - not vegetated <input type="checkbox"/> - too turbid to determine <input type="checkbox"/> -	Common Wetland Plant Species (m=only on margin) Postponed due to insufficient plant development	
Shoreline emergent vegetation: % of aquatic feature shoreline that is vegetated: 0% <input type="checkbox"/> - 26-50% <input type="checkbox"/> - 1-25% <input type="checkbox"/> - 51-100% <input type="checkbox"/> -		

Comments: - No fairy shrimp observed but found in this pool last year
- No Myle observed

Q/C-1 **MS** date: **3/29/11** Q/C-2 **JTT** date: **3/29/11**

California Tiger Salamander Aquatic Survey Data Sheet
FORA ESCA RP

Date 3/29/11	Begin Time: 1154	End Time: 1203	Observer(s): M. Siemens J. Tallis
Locality: Fort Ord	County: Monterey	State/Province: CA.	
MRA: East Garrison	Aquatic Feature #: 09-2	UTM North -	UTM East -

Weather: <input checked="" type="radio"/> Clear Pt. Cloudy	<input type="radio"/> Overcast <input type="radio"/> Rain	Wind: <input type="radio"/> Calm <input checked="" type="radio"/> Light 23 mph	<input type="radio"/> Strong	Water Temp: 64-68 F	Air Temp: 70 F
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	-	N/A	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	-/-	Y <input checked="" type="radio"/>	Yes	Yes	Visual Trapped Aural Hand Collected <input checked="" type="radio"/> Dip net/Seine Voucher Collected? Yes No
B. boreas	-	Y <input checked="" type="radio"/>	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
-	-	Y <input checked="" type="radio"/>	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: <input checked="" type="radio"/> Natural Man-made	Drainage: <input checked="" type="radio"/> Permanent <input checked="" type="radio"/> Occasional	Depth: 1.08 Ft. (read from staff gauge)
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Description: <input type="radio"/> Permanent Lake <input type="radio"/> Marsh/Bog <input type="radio"/> Spring/Seep <input type="radio"/> Temporary Lake/Pond <input checked="" type="radio"/> Stream <input checked="" type="radio"/> Other depression	Primary <input checked="" type="radio"/> Silt/Mud Bedrock Substrate: Sand/Gravel Cobble
Color: <input type="radio"/> Clear <input checked="" type="radio"/> Stained	Turbidity: <input type="radio"/> Clear <input checked="" type="radio"/> Cloudy

Fish Present: Yes <input checked="" type="radio"/> No	Fish Species: -	Bullfrogs Present: Yes <input checked="" type="radio"/> No
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Aquatic Vegetation: % of aquatic feature with:
 submerged vegetation
 emergent vegetation
 not vegetated
 too turbid to determine

Common Wetland Plant Species (m=only on margin)
 Postponed due to insufficient plant development

Shoreline emergent vegetation:
 % of aquatic feature shoreline that is vegetated:

0%	<input type="checkbox"/>	26-50%	<input type="checkbox"/>
1-25%	<input type="checkbox"/>	51-100%	<input type="checkbox"/>

Comments:

Q/C-1 **MS** date: **3/29/11** Q/C-2 **JTT** date: **3/29/11**

California Tiger Salamander Aquatic Survey Data Sheet
FORA ESCA RP

Date: 4-21-11	Begin Time: 0930	End Time: 0958	Observer(s): M. Siemens T. Chapman		
Locality: Fort Ord		County: Monterey	State/Province: CA.		
MRA: East Garrison		Aquatic Feature #: 66A	UTM North: -	UTM East: -	

Weather: Clear Overcast Pt. Cloudy Rain	Wind: Calm Strong Light	Water Temp: ~60°F	Air Temp: ~62°F
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	-/-	N/A	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	-/-	Y (N)	yes	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes (No)
B. boreas	-/-	Y (N)	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
-	-	Y (N)	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: Natural Man-made	Drainage: Permanent Occasional	Depth: 1.76 ft (read from staff gauge)
Description: Permanent Lake Marsh/Bog Spring/Seep Temporary Lake/Pond Stream Other depression	Primary: Silt/Mud Bedrock	Substrate: Sand/Gravel Cobble
Color: Clear Stained	Turbidity: Clear Cloudy	
Fish Present: Yes (No)	Fish Species: -	Bullfrogs Present: Yes (No) juvenile
Aquatic Vegetation:		Common Wetland Plant Species (m=only on margin)
% of aquatic feature with:		Insufficient plant development
submerged vegetation	3	
emergent vegetation	14	
not vegetated	8	
too turbid to determine	40	
Shoreline emergent vegetation:		
% of aquatic feature shoreline that is vegetated:		
0%	3	26-50% 11
1-25%	85	51-100% 1

Comments: ~ Hundreds of Hyla larvae & clam shrimp present

Q/C-1 MIS date: 4-22-11 Q/C-2 JTT date: 4-22-11

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date 4-21-11	Begin Time: 1000	End Time: 1002	Observer(s): M. Siemens T. Chapman
Locality: Fort Ord		County: Monterey	State/Province: CA.
MRA: East Garrison		Aquatic Feature #: 66B	UTM North — UTM East —

Weather: Clear Overcast <u>Pt. Cloudy</u> Rain	Wind: Calm Strong <u>Light 5-10 mph</u>	Water Temp: <u>dry</u> Air Temp: 65° F
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	—	N/A	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	—	Y N	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
B. boreas	—	Y N	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
—	—	Y N	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: <u>Natural</u> Man-made	Drainage: Permanent <u>Occasional</u>	Depth: <u>dry</u> (read from staff gauge)
Description: Permanent Lake Marsh/Bog Spring/Seep Temporary Lake/Pond Stream <u>Other depression</u>		Primary: <u>Silt/Mud</u> Bedrock
Color: Clear Stained		Substrate: Sand/Gravel Cobble
Fish Present: Yes <u>No</u>		Turbidity: Clear Cloudy
Fish Species: —		Bullfrogs Present: Yes <u>No</u>
Aquatic Vegetation:		Common Wetland Plant Species (m=only on margin)
% of aquatic feature with:		<u>Insufficient plant development</u>
submerged vegetation	0	
emergent vegetation	7	
not vegetated	93	
too turbid to determine	0	
Shoreline emergent vegetation:		
% of aquatic feature shoreline that is vegetated:		
0%	9	26-50% <u>9</u>
1-25%	82	51-100% <u>0</u>

Comments: DRY

Q/C-1 MS date: 4-22-11 Q/C-2 JTT date: 4-22-11

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date 4-21-11	Begin Time: 11:15	End Time: 11:17	Observer(s): M. Siemens T. Chapman, J. Tallis
Locality: Fort Ord		County: Monterey	State/Province: CA.
MRA: East Garrison		Aquatic Feature #: 67 Meadow	UTM North: - UTM East: -

Weather: Clear Overcast <u>Pt. Cloudy</u> Rain	Wind: Calm Strong <u>Light</u> 8-12 mph	Water Temp: Dry	Air Temp: ~67°F
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	-	N/A	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	-	Y N	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
B. boreas	-	Y N	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
	-	Y N	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: <u>Natural</u> Man-made	Drainage: <u>Occasional</u> Permanent	Depth: <u>Dry</u> (read from staff gauge)
Description: <u>Temporary Lake/Pond</u> Permanent Lake Marsh/Bog Spring/Seep Stream Other		Primary: <u>Silt/Mud</u> Bedrock
Color: <u>Clear</u> Stained N/A		Substrate: Sand/Gravel Cobble
Fish Present: Yes <u>No</u>		Turbidity: <u>Clear</u> Cloudy N/A
Fish Species: -		Bullfrogs Present: Yes <u>No</u>
Aquatic Vegetation: % of aquatic feature with: submerged vegetation <u>0.5%</u> emergent vegetation <u>48</u> not vegetated <u>51.5</u> too turbid to determine <u>0</u>		Common Wetland Plant Species (m=only on margin) <u>Insufficient Plant Development</u>
Shoreline emergent vegetation: % of aquatic feature shoreline that is vegetated: 0% <u>4</u> 26-50% <u>4</u> 1-25% <u>92</u> 51-100% <u>0</u>		

Comments: J. Tallis completed veg covers on 4/22/11 and then completed data sheet

Q/C-1 JJT date: 4/22/11 Q/C-2 FLC date: 5/19/11

California Tiger Salamander Aquatic Survey Data Sheet
FORA ESCA RP

Date: 4-21-11	Begin Time: ~ 1100	End Time: 1114	Observer(s): M. Siemeas T. Chapman
Locality: Fort Ord	County: Monterey	State/Province: CA.	
MRA: East Garrison	Aquatic Feature #: 67EX1	UTM North: —	UTM East: —

Weather: Clear <u>Pt. Cloudy</u>	Overcast Rain	Wind: Calm <u>Light</u>	Strong <u>8-12 mph</u>	Water Temp: ~ 65° F	Air Temp: ~ 67° F
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	-/-	N/A	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	-/-	Y <u>(N)</u>	yes	-	Visual Trapped Aural Hand Collected <u>Dip net/Seine</u> Voucher Collected? Yes <u>No</u>
B. boreas	-	Y <u>(N)</u>	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
-	-	Y N	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: Natural <u>Man-made</u>	Drainage: Permanent <u>Occasional</u>	Depth: 3.89 ft. (read from staff gauge)
Description: Permanent Lake Temporary Lake/Pond	Marsh/Bog Stream	Spring/Seep <u>Other excavation</u>
Color: Clear <u>Stained</u>	Turbidity: Clear <u>Cloudy</u>	Primary Substrate: Silt/Mud Sand/Gravel Cobble
Fish Present: Yes <u>No</u>	Fish Species: —	Bullfrogs Present: Yes <u>No</u>
Aquatic Vegetation:		Common Wetland Plant Species (m=only on margin)
% of aquatic feature with:		<u>Insufficient plant development</u>
submerged vegetation	1	
emergent vegetation	1	
not vegetated	3	
too turbid to determine	95	
Shoreline emergent vegetation:		
% of aquatic feature shoreline that is vegetated:		
0%	9	26-50% 0
1-25%	91	51-100% 0

Comments: - Hyla Larvae present in moderate numbers
- No fairy shrimp observed (present in this pool last year)

Q/C-1 MCS

date: ~~4-22-11~~

Q/C-2 JTT

date: 4-22-11

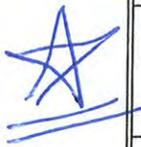
4-22-11

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date 4-21-11	Begin Time: 10:28	End Time: 10:53	Observer(s): M. Siemens T. Chapman	
Locality: Fort Ord		County: Monterey		State/Province: CA.
MRA: East Garrison		Aquatic Feature #: 67EX2	UTM North —	UTM East —

Weather: Clear Overcast Pt. Cloudy Rain	Wind: Calm Strong Light 8-10 mph	Water Temp: ≈ 63° F Air Temp: ≈ 66° F
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	-/-	N/A	<u>YES</u>	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Photos Taken
H. regilla	-/-	Y <input checked="" type="checkbox"/> N	yes	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
B. boreas	—	Y N	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes <input type="checkbox"/> No <input type="checkbox"/>
—	—	Y N	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes <input type="checkbox"/> No <input type="checkbox"/>

Origin: Natural <input type="checkbox"/> Man-made <input checked="" type="checkbox"/>	Drainage: Permanent <input type="checkbox"/> Occasional <input checked="" type="checkbox"/>	Depth: 3.01 ft. (read from staff gauge)
Description: Permanent Lake <input type="checkbox"/> Marsh/Bog <input type="checkbox"/> Spring/Seep <input type="checkbox"/> Temporary Lake/Pond <input type="checkbox"/> Stream <input type="checkbox"/> Other excavation <input checked="" type="checkbox"/>		Primary Substrate: Silt/Mud <input checked="" type="checkbox"/> Bedrock <input type="checkbox"/> Sand/Gravel <input type="checkbox"/> Cobble <input type="checkbox"/>
Color: Clear <input type="checkbox"/> Stained <input checked="" type="checkbox"/>		Turbidity: Clear <input type="checkbox"/> Cloudy <input checked="" type="checkbox"/>
Fish Present: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		Fish Species: — Bullfrogs Present: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Aquatic Vegetation:		Common Wetland Plant Species (m=only on margin)
% of aquatic feature with:		<u>Insufficient plant development</u>
submerged vegetation	0.5	
emergent vegetation	2	
not vegetated	0.5	
too turbid to determine	97	
Shoreline emergent vegetation:		
% of aquatic feature shoreline that is vegetated:		
0%	0	26-50% 25
1-25%	75	51-100% 0

Comments: - One juvenile bullfrog observed on bank prior to survey with net.
- One CTS Larvae found in dip net & photographed / released

Q/C-1 MS date: 4-22-11 Q/C-2 JTT date: 4-22-11

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date 4-21-11	Begin Time: 1017	End Time: 1026	Observer(s): M. Siemens T. Chapman
Locality: Fort Ord		County: Monterey	State/Province: CA.
MRA: East Garrison		Aquatic Feature #: 67EXB	UTM North — UTM East —

Weather: Clear Overcast Pt. Cloudy Rain	Wind: Calm Strong Light 5-10 mph	Water Temp: ~63° F Air Temp: ~65° F
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	-/-	N/A	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	-/-	Y (N)	Yes	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes (No)
B. boreas	-/-	Y (N)	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
—	—	Y (N)	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: Natural Man-made	Drainage: Permanent Occasional	Depth: 2.09 ft. (read from staff gauge)
Description: Permanent Lake Marsh/Bog Spring/Seep Temporary Lake/Pond Stream Other excavation		Primary Substrate: Silt/Mud Bedrock Sand/Gravel Cobble
Color: Clear Stained		Turbidity: Clear Cloudy
Fish Present: Yes (No)		Fish Species: — Bullfrogs Present: Yes (No)
Aquatic Vegetation:		Common Wetland Plant Species (m=only on margin)
% of aquatic feature with:		Insufficient plant development
submerged vegetation	0.5	
emergent vegetation	2	
not vegetated	0	
too turbid to determine	97.5	
Shoreline emergent vegetation:		
% of aquatic feature shoreline that is vegetated:		
0%	0	26-50% 19
1-25%	81	51-100% 0

Comments: -Hyla larvae present in moderate numbers
-Clam shrimp present "

Q/C-1 775 date: 4-22-11 Q/C-2 JTT date: 4-22-11

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date 4-21-11	Begin Time: 1005	End Time: 1010	Observer(s): M. Siemens T. Chapman
Locality: Fort Ord		County: Monterey	State/Province: CA.
MRA: East Garrison		Aquatic Feature #: 67 EX 4	UTM North <u> </u> UTM East <u> </u>

Weather: Clear <input type="checkbox"/> Overcast <input type="checkbox"/> <u>Pt. Cloudy</u> Rain <input type="checkbox"/>	Wind: Calm <input type="checkbox"/> Strong <input type="checkbox"/> <u>Light 5-10 mph</u>	Water Temp: <u>63°</u> Air Temp: <u>67°</u> F
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	-/-	N/A	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	-/-	Y <input checked="" type="checkbox"/> N	Yes	-	Visual Trapped Aural Hand Collected <u>Dip net/Seine</u> Voucher Collected? Yes <input checked="" type="checkbox"/> No
B. boreas	-	Y <input checked="" type="checkbox"/> N	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
-	-	Y N	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: Natural <input type="checkbox"/> <u>Man-made</u>	Drainage: Permanent <input type="checkbox"/> <u>Occasional</u>	Depth: <u>1.02 ft</u> (read from staff gauge)
Description: Permanent Lake <input type="checkbox"/> Marsh/Bog <input type="checkbox"/> Spring/Seep <input type="checkbox"/> Temporary Lake/Pond <input type="checkbox"/> Stream <input type="checkbox"/> <u>Other excavation</u>		Primary Substrate: <u>Silt/Mud</u> Bedrock <input type="checkbox"/> Sand/Gravel <input type="checkbox"/> Cobble <input type="checkbox"/>
Color: Clear <input type="checkbox"/> <u>Stained</u>		Turbidity: Clear <input type="checkbox"/> <u>Cloudy</u>

Fish Present: Yes No **Fish Species:** **Bullfrogs Present:** Yes No

Aquatic Vegetation:	Common Wetland Plant Species (m=only on margin)
% of aquatic feature with:	<u>Inufficient plant development</u>
submerged vegetation	<u>0</u>
emergent vegetation	<u>0.5</u>
not vegetated	<u>0</u>
too turbid to determine	<u>99.5</u>
Shoreline emergent vegetation:	
% of aquatic feature shoreline that is vegetated:	
0%	<u>0</u>
1-25%	<u>87</u>
26-50%	<u>13</u>
51-100%	<u>0</u>

Comments: - Hyla larvae present in low numbers
- clam shrimp " " "

Q/C-1 MMS date: 4-22-11 Q/C-2 JTT date: 4-22-11

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date 4/21-11	Begin Time: 1140	End Time: 1150	Observer(s): M. Siemens T. Chapman
Locality: Fort Ord		County: Monterey	State/Province: CA.
MRA: East Garrison		Aquatic Feature #: 68 AB	UTM North: — UTM East: —

Weather: Clear Overcast Pt. Cloudy Rain	Wind: Calm Strong Light 5-10mph	Water Temp: ≈ 70°F Air Temp: ≈ 68°F
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	+	N/A	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	—	Y (N)	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
B. boreas	—	Y (N)	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
—	—	Y N	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: <u>Natural</u> Man-made	Drainage: Permanent <u>Occasional</u>	Depth: ≈ 2.0" (inches) (read from staff gauge)	
Description: Permanent Lake Marsh/Bog Stream <u>Other depression</u>		Primary Substrate: <u>Silt/Mud</u> Bedrock Sand/Gravel Cobble	
Color: Clear <u>Stained</u>		Turbidity: Clear <u>Cloudy</u>	

Fish Present: Yes No **Fish Species:** — **Bullfrogs Present:** Yes No

<p>Aquatic Vegetation:</p> <p>% of aquatic feature with:</p> <table style="width: 100%;"> <tr><td>submerged vegetation</td><td style="text-align: center;">0</td></tr> <tr><td>emergent vegetation</td><td style="text-align: center;">6</td></tr> <tr><td>not vegetated</td><td style="text-align: center;">56</td></tr> <tr><td>too turbid to determine</td><td style="text-align: center;">38</td></tr> </table> <p>Shoreline emergent vegetation:</p> <p>% of aquatic feature shoreline that is vegetated:</p> <table style="width: 100%;"> <tr> <td>0%</td><td style="text-align: center;">0</td> <td>26-50%</td><td style="text-align: center;">0</td> </tr> <tr> <td>1-25%</td><td style="text-align: center;">100</td> <td>51-100%</td><td style="text-align: center;">0</td> </tr> </table>	submerged vegetation	0	emergent vegetation	6	not vegetated	56	too turbid to determine	38	0%	0	26-50%	0	1-25%	100	51-100%	0	<p>Common Wetland Plant Species (m=only on margin)</p> <p style="font-size: 1.2em; color: blue;">Insufficient plant development</p>
submerged vegetation	0																
emergent vegetation	6																
not vegetated	56																
too turbid to determine	38																
0%	0	26-50%	0														
1-25%	100	51-100%	0														

Comments: Mosquito Larvae common

Q/C-1 MIS date: 4-22-11 Q/C-2 JTT date: 2011-04-22

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date <u>4-21-11</u>	Begin Time: <u>1130</u>	End Time: <u>1140</u>	Observer(s): <u>M. Siemens</u> <u>T. Chapman</u>
Locality: Fort Ord		County: Monterey	State/Province: CA.
MRA: East Garrison		Aquatic Feature #: <u>68C</u>	UTM North: <u>—</u> UTM East: <u>—</u>

Weather: <input checked="" type="checkbox"/> Clear <input type="checkbox"/> Overcast <input checked="" type="checkbox"/> Pt. Cloudy <input type="checkbox"/> Rain	Wind: <input checked="" type="checkbox"/> Calm <input type="checkbox"/> Strong <input checked="" type="checkbox"/> Light <u>5-10 mph</u>	Water Temp: <u>Dry</u>	Air Temp: <u>≈ 67° F</u>
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	<u>—</u>	N/A	<u>—</u>	<u>—</u>	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	<u>—</u>	Y N	<u>—</u>	<u>—</u>	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
B. boreas	<u>—</u>	Y N	<u>—</u>	<u>—</u>	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
	<u>—</u>	Y N	<u>—</u>	<u>—</u>	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: <input checked="" type="checkbox"/> Natural <input type="checkbox"/> Man-made	Drainage: <input checked="" type="checkbox"/> Permanent <input checked="" type="checkbox"/> Occasional	Depth: <u>Dry</u> (read from staff gauge)
Description: <input type="checkbox"/> Permanent Lake <input type="checkbox"/> Marsh/Bog <input type="checkbox"/> Spring/Seep <input type="checkbox"/> Temporary Lake/Pond <input type="checkbox"/> Stream <input checked="" type="checkbox"/> Other <u>Depression</u>		Primary <input checked="" type="checkbox"/> Silt/Mud <input type="checkbox"/> Bedrock
Substrate: <input type="checkbox"/> Sand/Gravel <input type="checkbox"/> Cobble		Turbidity: <input checked="" type="checkbox"/> Clear <input type="checkbox"/> Cloudy

Fish Present: Yes No Fish Species: _____ Bullfrogs Present: Yes No

Aquatic Vegetation: % of aquatic feature with: submerged vegetation: <u>0</u> emergent vegetation: <u>20</u> not vegetated: <u>80</u> too turbid to determine: <u>0</u>	Common Wetland Plant Species (m=only on margin) <u>Insufficient plant development</u>
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Shoreline emergent vegetation:
 % of aquatic feature shoreline that is vegetated:

0%	<u>0</u>	26-50%	<u>10</u>
1-25%	<u>90</u>	51-100%	<u>0</u>

Comments: DRY

Q/C-1 MS date: 4-22-11 Q/C-2 JTT date: 4-22-11

California Tiger Salamander Aquatic Survey Data Sheet
FORA ESCA RP

Date 4-22-11	Begin Time: \approx 11:30	End Time: \approx 11:55	Observer(s): M. Siemens J. Tallis
Locality: Fort Ord	County: Monterey	State/Province: CA.	
MRA: East Garrison	Aquatic Feature #: 69	UTM North —	UTM East —

Weather: Clear Pt. Cloudy	<input checked="" type="radio"/> Overcast Rain	Wind: Calm <input checked="" type="radio"/> Light 3-8 mph	Strong	Water Temp: \approx 63° F	Air Temp: \approx 67° F
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	-/-	N/A	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	-/-	Y <input checked="" type="radio"/> N	Yes	Yes	Visual Trapped Aural Hand Collected <input checked="" type="radio"/> Dip net/Seine Voucher Collected? Yes <input checked="" type="radio"/> No
B. boreas	-	Y <input checked="" type="radio"/> N	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
-	-	Y <input checked="" type="radio"/> N	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: Natural <input checked="" type="radio"/> Man-made	Drainage: Permanent <input checked="" type="radio"/> Occasional	Depth: 3.79 ft (read from staff gauge)
Description: Permanent Lake Temporary Lake/Pond	Marsh/Bog Stream	Spring/Seep <input checked="" type="radio"/> Other Quarry exc.
Color: Clear	<input checked="" type="radio"/> Stained	Turbidity: Clear <input checked="" type="radio"/> Cloudy
Fish Present: Yes <input checked="" type="radio"/> No	Fish Species: —	Bullfrogs Present: Yes <input checked="" type="radio"/> No
Aquatic Vegetation: % of aquatic feature with:	Common Wetland Plant Species (m=only on margin)	
submerged vegetation	insufficient plant development	
emergent vegetation		
not vegetated		
too turbid to determine		
Shoreline emergent vegetation: % of aquatic feature shoreline that is vegetated:		
0%	9	26-50%
1-25%	91	51-100%
	0	0

Comments: - Hyla egg masses + Larvae present in good numbers

Q/C-1 MS date: 4-22-11 Q/C-2 JTT date: 4-22-11

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date 4-22-11	Begin Time: 0930	End Time: ~1000	Observer(s): M. Siemens J. Tallis T. Chapman	
Locality: Fort Ord		County: Monterey	State/Province: CA.	
MRA: East Garrison		Aquatic Feature #: 10-1 Tank Wash	UTM North —	UTM East —

Weather: Clear Overcast Pt. Cloudy Rain	Wind: Calm Strong Light 4-7 mph	Water Temp: ~63° F	Air Temp: ~63° F
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	-/-	N/A	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	-/-	Y <input checked="" type="checkbox"/>	yes	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes <input checked="" type="checkbox"/> No
B. boreas	-	Y <input checked="" type="checkbox"/>	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
-	-	Y <input checked="" type="checkbox"/>	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: Natural <input checked="" type="checkbox"/> Man-made	Drainage: Permanent <input checked="" type="checkbox"/> Occasional	Depth: 3.54 m ft (read from staff gauge)
Description: Permanent Lake Temporary Lake/Pond	Marsh/Bog Stream	Spring/Seep Other <input checked="" type="checkbox"/> Cement lined Tank wash
Color: Clear	<input checked="" type="checkbox"/> Stained	Turbidity: Clear <input checked="" type="checkbox"/> Cloudy

Fish Present: Yes No **Fish Species:** — **Bullfrogs Present:** Yes No *many large adults present*

Aquatic Vegetation:		Common Wetland Plant Species (m=only on margin)	
% of aquatic feature with:		Insufficient plant development	
submerged vegetation	3		
emergent vegetation	20		
not vegetated	5		
too turbid to determine	72		
Shoreline emergent vegetation:			
% of aquatic feature shoreline that is vegetated:			
0%	0	26-50%	0
1-25%	0	51-100%	0
→ Concrete lined. No shoreline veg.			

Comments: — Several adult bullfrog present in AF upon arrival
 — Hyla larvae present in low numbers
 — Deep swaths with net difficult due to large amounts of moss + dead cattail leaves

Q/C-1 MS date: 4-22-11 Q/C-2 JTT date: 4-22-11

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date 4-21-11	Begin Time: 1349	End Time: 1400	Observer(s): M. Siemens T. Chapman
Locality: Fort Ord		County: Monterey	State/Province: CA.
MRA: East Garrison		Aquatic Feature #: 09-1	UTM North — UTM East —

Weather: Clear Overcast <u>Pt. Cloudy</u> Rain	Wind: Calm Strong <u>Light</u> 8-12 mph	Water Temp: <u>~72° F</u> Air Temp: <u>~68° F</u>
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	-/-	N/A	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	-/-	Y <u>(N)</u>	yes	-	<u>Visual</u> Trapped Aural Hand Collected <u>Dip net/Seine</u> Voucher Collected? Yes <u>No</u>
B. boreas	-/-	Y <u>(N)</u>	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
-	-	Y N	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: <u>Natural</u> Man-made	Drainage: Permanent Occasional	Depth: 0.46 ft (read from staff gauge)
Description: Permanent Lake Marsh/Bog Spring/Seep Temporary Lake/Pond Stream <u>Other depression</u>		Primary: <u>Silt/mud</u> Bedrock
Color: Clear <u>Stained</u>		Substrate: Sand/Gravel Cobble
Turbidity: Clear Cloudy		

Fish Present: Yes (No) **Fish Species:** — **Bullfrogs Present:** Yes (No)

Aquatic Vegetation: % of aquatic feature with:	Common Wetland Plant Species (m=only on margin)
submerged vegetation	<u>Insufficient plant development</u>
emergent vegetation	
not vegetated	
too turbid to determine	

Shoreline emergent vegetation:
% of aquatic feature shoreline that is vegetated:

0%	<u>3</u>	26-50%	<u>7</u>
1-25%	<u>90</u>	51-100%	<u>0</u>

Comments: Hyla larvae present in moderate #s.

Q/C-1 JMS date: 4-22-11 Q/C-2 JTT date: 4-22-11

California Tiger Salamander Aquatic Survey Data Sheet
FORA ESCA RP

Date 4-21-11	Begin Time: 1343	End Time: 1345	Observer(s): M. Siemens T. Chapman
Locality: Fort Ord		County: Monterey	State/Province: CA.
MRA: East Garrison		Aquatic Feature #: 09-1B	UTM North — UTM East —

Weather: Clear Overcast <u>Pt. Cloudy</u> Rain	Wind: Calm Strong <u>Light</u> 8-12 mph	Water Temp: DRY	Air Temp: ≈ 67° F
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	—	N/A	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	—	Y N	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
B. boreas	—	Y N	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
—	—	Y N	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: <u>Natural</u> Man-made	Drainage: Permanent <u>Occasional</u>	Depth: DRY (read from staff gauge)
Description: Permanent Lake Marsh/Bog Spring/Seep Temporary Lake/Pond Stream <u>Other: Depression</u>	Primary: <u>Silt/Mud</u> Bedrock	Substrate: Sand/Gravel Cobble
Color: Clear Stained	Turbidity: Clear Cloudy	

Fish Present: Yes No **Fish Species:** — **Bullfrogs Present:** Yes No

Aquatic Vegetation:	Common Wetland Plant Species (m=only on margin)
% of aquatic feature with:	<u>Insufficient plant development</u>
submerged vegetation	
emergent vegetation	
not vegetated	
too turbid to determine	
Shoreline emergent vegetation:	
% of aquatic feature shoreline that is vegetated:	
0% <u>30</u> 26-50% <u>0</u>	
1-25% <u>70</u> 51-100% <u>0</u>	

Comments: DRY

Q/C-1 MS date: 4-22-11 Q/C-2 JTT date: 4-22-11

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date 4-21-11	Begin Time: 1340	End Time: 1342	Observer(s): M. Siemens T. Chapman
Locality: Fort Ord		County: Monterey	State/Province: CA.
MRA: East Garrison		Aquatic Feature #: 09-2	UTM North — UTM East —

Weather: Clear Overcast <u>Pt. Cloudy</u> Rain	Wind: Calm Strong <u>Light</u> 8-12 mph	Water Temp: <u>Dry</u>	Air Temp: <u>~ 68° F</u>
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	—	N/A	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	—	Y N	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
B. boreas	—	Y N	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
—	—	Y N	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: <u>Natural</u> Man-made	Drainage: Permanent <u>Occasional</u>	Depth: (read from staff gauge) <u>DRY</u>
Description: Permanent Lake Marsh/Bog Spring/Seep Temporary Lake/Pond Stream <u>Other depression</u>		Primary Substrate: <u>Silt/Mud</u> Bedrock Sand/Gravel Cobble
Color: <u>Clear</u> Stained		Turbidity: <u>Clear</u> Cloudy

Fish Present: Yes No — **Fish Species:** — **Bullfrogs Present:** Yes No —

Aquatic Vegetation:	Common Wetland Plant Species (m=only on margin)
% of aquatic feature with:	<u>Insufficient plant development</u>
submerged vegetation	_____
emergent vegetation	_____
not vegetated	_____
too turbid to determine	_____
Shoreline emergent vegetation:	
% of aquatic feature shoreline that is vegetated:	
0% <u>6</u>	26-50% <u>88</u>
1-25% <u>88</u>	51-100% <u>0</u>

Comments:
DRY

Q/C-1 WIS date: 4-22-11 Q/C-2 JTT date: 4-22-11

California Tiger Salamander Aquatic Survey Data Sheet
FORA ESCA RP

Date: 5.5.11	Begin Time: 0923	End Time: 0943	Observer(s): Carole Hofer Mitch Siemens		
Locality: Fort Ord		County: Monterey	State/Province: CA.		
MRA: East Garrison		Aquatic Feature #: 66A 66A	UTM North: —	UTM East: —	

Weather: <input checked="" type="radio"/> Clear <input type="radio"/> Overcast <input type="radio"/> Pt. Cloudy <input type="radio"/> Rain	Wind: <input checked="" type="radio"/> Calm <input type="radio"/> Strong <input type="radio"/> Light	Water Temp: ≈ 69° F	Air Temp: ≈ 66° F
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	-/-	N/A	~5cm. <u>Yes</u>	—	Visual Trapped Aural Hand Collected <u>Dip net/Seine</u> Voucher Collected? Yes <input checked="" type="radio"/> No
H. regilla	-/-	Y <input checked="" type="radio"/> N	Yes	—	Visual Trapped Aural Hand Collected <u>Dip net/Seine</u> Voucher Collected? Yes No
B. boreas	-/-	Y <input checked="" type="radio"/> N	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
—	-/-	Y <input checked="" type="radio"/> N	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: <input checked="" type="radio"/> Natural <input type="radio"/> Man-made	Drainage: <input type="radio"/> Permanent <input checked="" type="radio"/> Occasional	Depth: 1.34 FT (read from staff gauge)
Description: Permanent Lake Marsh/Bog Spring/Seep Temporary Lake/Pond Stream Other <u>depression</u>		Primary Substrate: <input checked="" type="radio"/> Silt/Mud <input type="radio"/> Bedrock <input type="radio"/> Sand/Gravel <input type="radio"/> Cobble
Color: <input checked="" type="radio"/> Clear <input type="radio"/> Stained		Turbidity: <input type="radio"/> Clear <input checked="" type="radio"/> Cloudy

Fish Present: Yes No **Fish Species:** — **Bullfrogs Present:** Yes No sub-adults numerous

Aquatic Vegetation:
% of aquatic feature with:
submerged vegetation
emergent vegetation
not vegetated
too turbid to determine

Shoreline emergent vegetation:
% of aquatic feature shoreline that is vegetated:
0% 1-25% 26-50% 51-100%

Common Wetland Plant Species (m=only on margin)

Surveyed on 4.21.11

Comments:
- One CTS Larvae observed in dip-net after ≈ 10th net attempt. Photographs taken and Larvae released unharmed. No further net attempts following confirmation of presence in AF ~~66A~~ 66
- Hyla larvae & clam shrimp abundant

Q/C-1 MS date: 5.6.11 Q/C-2 date:

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date 5.5.11	Begin Time: 0951	End Time: 1001	Observer(s): Carrie Hofer M. Siemens
Locality: Fort Ord		County: Monterey	State/Province: CA.
MRA: East Garrison		Aquatic Feature #: 67-EX1	UTM North _____ UTM East _____

Weather: <input checked="" type="radio"/> Clear <input type="radio"/> Overcast <input type="radio"/> Pt. Cloudy <input type="radio"/> Rain	Wind: <input checked="" type="radio"/> Calm <input type="radio"/> Strong <input type="radio"/> Light	Water Temp: ≈ 66°F Air Temp: ≈ 70°F
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	-/-	N/A	-	-	Visual Trapped Aural Hand Collected <input checked="" type="radio"/> Dip net/Seine Voucher Collected? Yes No
H. regilla	-/yes	Y <input checked="" type="radio"/> N	Yes	-	Visual Trapped Aural Hand Collected <input checked="" type="radio"/> Dip net/Seine Voucher Collected? Yes No
B. boreas	-	Y <input checked="" type="radio"/> N	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
<i>Thamnophis sirtalis</i> - garter snake	-/1	Y N NA	-	-	<input checked="" type="radio"/> Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: <input checked="" type="radio"/> Natural <input checked="" type="radio"/> Man-made	Drainage: <input type="radio"/> Permanent <input checked="" type="radio"/> Occasional	Depth: 0.42 ft (read from staff gauge)
Description: <input type="radio"/> Permanent Lake <input type="radio"/> Marsh/Bog <input type="radio"/> Spring/Seep <input checked="" type="radio"/> Temporary Lake/Pond <input type="radio"/> Stream <input type="radio"/> Other excavation		Primary Substrate: <input checked="" type="radio"/> Silt/Mud <input type="radio"/> Bedrock <input type="radio"/> Sand/Gravel <input type="radio"/> Cobble
Color: <input type="radio"/> Clear <input checked="" type="radio"/> Stained		Turbidity: <input type="radio"/> Clear <input checked="" type="radio"/> Cloudy
Fish Present: Yes <input checked="" type="radio"/> No		Fish Species: _____ Bullfrogs Present: Yes <input checked="" type="radio"/> No
Aquatic Vegetation: % of aquatic feature with: submerged vegetation <input checked="" type="checkbox"/> emergent vegetation <input checked="" type="checkbox"/> not vegetated <input checked="" type="checkbox"/> too turbid to determine <input checked="" type="checkbox"/> surveyed on 4.21.11		
Shoreline emergent vegetation: % of aquatic feature shoreline that is vegetated: 0% <input checked="" type="checkbox"/> 1-25% <input checked="" type="checkbox"/> 26-50% <input checked="" type="checkbox"/> 51-100% <input checked="" type="checkbox"/>		
Common Wetland Plant Species (m=only on margin) _____ _____ _____ _____		

Comments: - Hyla Larvae & metamorphs present in moderate #s
- Clam shrimp " " " " " "

Q/C-1 date: 5-6-11 Q/C-2 date: 5-6-11

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date: 5.5.11	Begin Time: 1007	End Time: 1016	Observer(s): C. Hofer M. Siemens
Locality: Fort Ord		County: Monterey	State/Province: CA.
MRA: East Garrison		Aquatic Feature #: 67-EX2	UTM North: — UTM East: —

Weather: <input checked="" type="radio"/> Clear <input type="radio"/> Overcast <input type="radio"/> Pt. Cloudy <input type="radio"/> Rain	Wind: <input checked="" type="radio"/> Calm <input type="radio"/> Strong <input type="radio"/> Light	Water Temp: ≈ 65° F Air Temp: ≈ 70° F
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	- / -	N/A	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	- / -	Y <input checked="" type="radio"/> N	yes	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
B. boreas	-	Y <input checked="" type="radio"/> N	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
-	-	Y N	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: <input checked="" type="radio"/> Natural <input type="radio"/> Man-made	Drainage: <input type="radio"/> Permanent <input checked="" type="radio"/> Occasional	Depth: 1.72 ft (read from staff gauge)										
Description: <input type="radio"/> Permanent Lake <input type="radio"/> Marsh/Bog <input type="radio"/> Spring/Seep <input checked="" type="radio"/> Temporary Lake/Pond <input type="radio"/> Stream <input checked="" type="radio"/> Other Excavation		Primary Substrate: <input checked="" type="radio"/> Silt/Mud <input type="radio"/> Bedrock <input type="radio"/> Sand/Gravel <input type="radio"/> Cobble										
Color: <input type="radio"/> Clear <input checked="" type="radio"/> Stained		Turbidity: <input type="radio"/> Clear <input checked="" type="radio"/> Cloudy										
Fish Present: Yes <input checked="" type="radio"/> No		Fish Species: — Bullfrogs Present: Yes <input type="radio"/> No										
Aquatic Vegetation:												
<table style="width: 100%;"> <tr> <td style="width: 50%;">% of aquatic feature with:</td> <td style="width: 50%;">Common Wetland Plant Species (m=only on margin)</td> </tr> <tr> <td>submerged vegetation</td> <td>_____</td> </tr> <tr> <td>emergent vegetation</td> <td>_____</td> </tr> <tr> <td>not vegetated</td> <td>_____</td> </tr> <tr> <td>too turbid to determine</td> <td>_____</td> </tr> </table>			% of aquatic feature with:	Common Wetland Plant Species (m=only on margin)	submerged vegetation	_____	emergent vegetation	_____	not vegetated	_____	too turbid to determine	_____
% of aquatic feature with:	Common Wetland Plant Species (m=only on margin)											
submerged vegetation	_____											
emergent vegetation	_____											
not vegetated	_____											
too turbid to determine	_____											
Surveyed on 4.21.11 Shoreline emergent vegetation: % of aquatic feature shoreline that is vegetated:												
0% <input checked="" type="checkbox"/>	1-25% <input checked="" type="checkbox"/>	26-50% <input checked="" type="checkbox"/> 51-100% <input type="checkbox"/>										

Comments: - Myla tadpoles & clam shrimps present in good #s
Q/C-1 <input type="checkbox"/> MS date: 5.6.11
Q/C-2 <input type="checkbox"/> JH date: 5-6-11

California Tiger Salamander Aquatic Survey Data Sheet
FORA ESCA RP

Date 5-5-11	Begin Time: 1023	End Time: 1039	Observer(s): C. Hofer M. Siemens
Locality: Fort Ord	County: Monterey	State/Province: CA.	
MRA: East Garrison	Aquatic Feature #: 67-EX4	UTM North —	UTM East —

Weather: <input checked="" type="radio"/> Clear <input type="radio"/> Overcast Pt. Cloudy <input type="radio"/> Rain	Wind: <input checked="" type="radio"/> Calm <input type="radio"/> Strong Light	Water Temp: ≈ 65° F	Air Temp: ≈ 72° F
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	-/-	N/A	—	—	Visual Trapped Aural Hand Collected <input checked="" type="checkbox"/> Dip net/Seine Voucher Collected? Yes No
H. regilla	-/-	Y <input checked="" type="radio"/> N	Yes	—	Visual Trapped Aural Hand Collected <input checked="" type="checkbox"/> Dip net/Seine Voucher Collected? Yes No
B. boreas	-/-	Y <input checked="" type="radio"/> N	—	—	Visual Trapped Aural Hand Collected <input checked="" type="checkbox"/> Dip net/Seine Voucher Collected? Yes No
—	-/-	Y N	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: <input checked="" type="radio"/> Natural <input type="radio"/> Man-made	Drainage: <input type="radio"/> Permanent <input checked="" type="radio"/> Occasional	Depth: 3.38 ft (read from staff gauge)
Description: Permanent Lake Temporary Lake/Pond	Marsh/Bog Stream	Spring/Seep <input checked="" type="checkbox"/> Other Excavation
Color: Clear <input checked="" type="radio"/> Stained	Turbidity: Clear <input checked="" type="radio"/> Cloudy	Primary Substrate: <input checked="" type="checkbox"/> Silt/Mud <input type="checkbox"/> Bedrock <input type="checkbox"/> Sand/Gravel <input type="checkbox"/> Cobble
Fish Present: Yes <input checked="" type="radio"/> No	Fish Species: —	Bullfrogs Present: <input checked="" type="radio"/> Yes <input type="radio"/> No
Aquatic Vegetation: % of aquatic feature with: submerged vegetation emergent vegetation not vegetated too turbid to determine	Common Wetland Plant Species (m=only on margin)	
Surveyed on 4.21.11		
Shoreline emergent vegetation: % of aquatic feature shoreline that is vegetated:		
0% <input checked="" type="checkbox"/> 1-25% <input checked="" type="checkbox"/> 26-50% <input checked="" type="checkbox"/> 51-100% <input checked="" type="checkbox"/>		

Comments: - Hyla tadpoles present in moderate #s
- No Linderiella observed

Q/C-1 MS date: 5-6-11 Q/C-2 JH date: 5-6-11

California Tiger Salamander Aquatic Survey Data Sheet
FORA ESCA RP

Date 5-5-11	Begin Time: 1046	End Time: 1046	Observer(s): M. Siemens C. Hofer
Locality: Fort Ord	County: Monterey	State/Province: CA.	
MRA: East Garrison	Aquatic Feature #: 66-13	UTM North —	UTM East —

Weather: <u>Clear</u> Overcast Pt. Cloudy Rain	Wind: <u>Calm</u> Strong Light	Water Temp: —	Air Temp: 75° F
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	—	N/A	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	—	Y N	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
B. boreas	—	Y N	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
—	—	Y N	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: <u>Natural</u> Man-made	Drainage: Permanent <u>Occasional</u>	Depth: — (read from staff gauge) Dry
Description: Permanent Lake Marsh/Bog Spring/Seep Temporary Lake/Pond Stream <u>Other depression</u>	Primary Substrate: <u>Silt/Mud</u> Bedrock Sand/Gravel Cobble	
Color: <u>Clear</u> Stained	Turbidity: <u>Clear</u> Cloudy	
Fish Present: <u>Yes</u> No	Fish Species: —	Bullfrogs Present: Yes <u>No</u>
Aquatic Vegetation: % of aquatic feature with: submerged vegetation emergent vegetation not vegetated too turbid to determine	Common Wetland Plant Species (m=only on margin)	
Surveyed on 4-21-11		
Shoreline emergent vegetation: % of aquatic feature shoreline that is vegetated:		
0% <u>X</u> 1-25% <u>X</u> 26-50% <u>X</u> 51-100% <u>X</u>		

Comments: <u>Dry</u>
Q/C-1 <u>MMS</u> date: <u>5-6-11</u> Q/C-2 <u>JTH</u> date: <u>5-6-11</u>

California Tiger Salamander Aquatic Survey Data Sheet
FORA ESCA RP

Date: 5.5.11	Begin Time: 1115	End Time: 1120	Observer(s): C. Hoyer M. Stowers
Locality: Fort Ord	County: Monterey	State/Province: CA.	
MRA: East Garrison	Aquatic Feature #: 68-C	UTM North: —	UTM East: —

Weather: <u>Clear</u> Overcast Pt. Cloudy Rain	Wind: <u>Calm</u> Strong Light	Water Temp: —	Air Temp: 76°F
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	—	N/A	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	—	Y N	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
B. boreas	—	Y N	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
—	—	Y N	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: <u>Natural</u> Man-made	Drainage: Permanent <u>Occasional</u>	Depth: (read from staff gauge) Dry								
Description: Permanent Lake Marsh/Bog Spring/Seep Temporary Lake/Pond Stream <u>Other depression</u>	Primary Substrate: <u>Silt/Mud</u> Bedrock Sand/Gravel Cobble	Turbidity: Clear <u>Cloudy</u>								
Color: Clear <u>Stained</u>	Fish Present: Yes <u>No</u>	Fish Species: Bullfrogs Present: Yes <u>No</u>								
Aquatic Vegetation: % of aquatic feature with: submerged vegetation emergent vegetation not vegetated too turbid to determine	Common Wetland Plant Species (m=only on margin)									
<table border="1"> <tr><td>0%</td><td>X</td><td>26-50%</td><td>X</td></tr> <tr><td>1-25%</td><td>X</td><td>51-100%</td><td>X</td></tr> </table>	0%	X	26-50%	X	1-25%	X	51-100%	X	 	
0%	X	26-50%	X							
1-25%	X	51-100%	X							
Shoreline emergent vegetation: % of aquatic feature shoreline that is vegetated:										

Comments: <u>Dry</u>
Q/C-1 <u>1115</u> date: <u>5-6-11</u> Q/C-2 <u>TTT</u> date: <u>5-6-11</u>

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date 5.5.11	Begin Time: 1115	End Time: 1120	Observer(s): C. Hofer M. Stenous
Locality: Fort Ord		County: Monterey	State/Province: CA.
MRA: East Garrison		Aquatic Feature #: 68AB	UTM North _____ UTM East _____

Weather: <input checked="" type="radio"/> Clear <input type="radio"/> Overcast <input type="radio"/> Pt. Cloudy <input type="radio"/> Rain	Wind: <input checked="" type="radio"/> Calm <input type="radio"/> Strong <input type="radio"/> Light	Water Temp: _____ Air Temp: 76° F
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	-	N/A	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	-	Y N	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
B. boreas	-	Y N	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
-	-	Y N	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: <input checked="" type="radio"/> Natural <input type="radio"/> Man-made	Drainage: <input type="radio"/> Permanent <input checked="" type="radio"/> Occasional	Depth: _____ (read from staff gauge)	Dry
Description: <input type="radio"/> Permanent Lake <input type="radio"/> Marsh/Bog <input type="radio"/> Spring/Seep <input type="radio"/> Temporary Lake/Pond <input type="radio"/> Stream <input checked="" type="radio"/> Other depression		Primary Substrate: <input checked="" type="radio"/> Silt/Mud <input type="radio"/> Bedrock <input type="radio"/> Sand/Gravel <input type="radio"/> Cobble	
Color: <input checked="" type="radio"/> Clear <input type="radio"/> Stained		Turbidity: <input checked="" type="radio"/> Clear <input type="radio"/> Cloudy	

Fish Present: Yes No **Fish Species:** _____ **Bullfrogs Present:** Yes No

<p>Aquatic Vegetation: % of aquatic feature with: submerged vegetation <input checked="" type="checkbox"/></p> <p>emergent vegetation <input checked="" type="checkbox"/></p> <p>not vegetated <input checked="" type="checkbox"/></p> <p>too turbid to determine <input checked="" type="checkbox"/></p> <p>Surveyed on 4.21.11</p> <p>Shoreline emergent vegetation: % of aquatic feature shoreline that is vegetated;</p> <p>0% <input checked="" type="checkbox"/> 1-25% <input checked="" type="checkbox"/> 26-50% <input checked="" type="checkbox"/> 51-100% <input checked="" type="checkbox"/></p>	<p>Common Wetland Plant Species (m=only on margin)</p> <hr/>
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Comments: DRY

Q/C-1 1115 date: 5.6.11 Q/C-2 JTH date: 5-6-11

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date 5-6-11	Begin Time: 0930	End Time: 1000	Observer(s): J. Tallis M. Siemens
Locality: Fort Ord		County: Monterey	State/Province: CA.
MRA: East Garrison		Aquatic Feature #: Tank Wash 10-1	UTM North _____ UTM East _____

Weather: Clear Overcast <u>Pt. Cloudy</u> Rain	Wind: Calm Strong <u>Light</u>	Water Temp: ~ 59° F Air Temp: ~ 67° F
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Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	-/-	N/A	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	-/-	Y (N)	yes	-	Visual Trapped Aural Hand Collected <u>Dip net/Seine</u> Voucher Collected? Yes No
B. boreas	-/-	Y (N)	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
-	-	Y (N)	-	-	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: Natural <u>Man-made</u>	Drainage: Permanent <u>Occasional</u>	Depth: 3.27 Ft (read from staff gauge)	
Description: Permanent Lake Marsh/Bog Spring/Seep Temporary Lake/Pond Stream <u>Other Tank Wash</u>		Substrate: Primary Silt/Mud Bedrock Sand/Gravel Cobble <u>Cement</u>	
Color: Clear <u>Stained</u>		Turbidity: <u>Clear</u> Cloudy	

Fish Present: Yes No **Fish Species:** _____ **Bullfrogs Present:** Yes No

Aquatic Vegetation: % of aquatic feature with: submerged vegetation <input checked="" type="checkbox"/> emergent vegetation <input checked="" type="checkbox"/> not vegetated <input checked="" type="checkbox"/> too turbid to determine <input type="checkbox"/> <i>Surveyed on 4.21.11</i>	Common Wetland Plant Species (m=only on margin) _____ _____ _____ _____ _____
Shoreline emergent vegetation: % of aquatic feature shoreline that is vegetated:	
0% <input checked="" type="checkbox"/>	26-50% <input checked="" type="checkbox"/>
1-25% <input type="checkbox"/>	51-100% <input type="checkbox"/>

Comments: - Adult & sub-adult bullfrogs present

Q/C-1 MMS date: 5-6-11 Q/C-2 JHT date: 5-6-11

California Tiger Salamander Aquatic Survey Data Sheet
FORA ESCA RP

Date: 5.6.11	Begin Time: ~ 1040	End Time: 1100	Observer(s): J. Tallis M. Siemens		
Locality: Fort Ord		County: Monterey	State/Province: CA.		
MRA: East Garrison		Aquatic Feature #: 69	UTM North: —	UTM East: —	

Weather: <input checked="" type="radio"/> Clear <input type="radio"/> Overcast <input type="radio"/> Pt. Cloudy <input type="radio"/> Rain	Wind: <input type="radio"/> Calm <input checked="" type="radio"/> Light <input type="radio"/> Strong	Water Temp: ~ 63° F	Air Temp: ~ 69° F
--	---	----------------------------	--------------------------

Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	-/-	N/A	-	-	Visual Trapped Aural Hand Collected <input checked="" type="radio"/> Dip net/Seine Voucher Collected? Yes No
H. regilla	-/-	Y <input checked="" type="radio"/> N	Yes	Yes	Visual Trapped Aural Hand Collected <input checked="" type="radio"/> Dip net/Seine Voucher Collected? Yes No
B. boreas	-/-	Y <input checked="" type="radio"/> N	-	-	Visual Trapped Aural Hand Collected <input checked="" type="radio"/> Dip net/Seine Voucher Collected? Yes No
-	-	Y <input checked="" type="radio"/> N	-	-	Visual Trapped Aural Hand Collected <input checked="" type="radio"/> Dip net/Seine Voucher Collected? Yes No

Origin: <input checked="" type="radio"/> Natural <input checked="" type="radio"/> Man-made	Drainage: <input type="radio"/> Permanent <input checked="" type="radio"/> Occasional	Depth: 3.49 ft (read from staff gauge)
Description: <input type="radio"/> Permanent Lake <input type="radio"/> Marsh/Bog <input type="radio"/> Spring/Seep <input type="radio"/> Temporary Lake/Pond <input checked="" type="radio"/> Stream <input checked="" type="radio"/> Other Quarry	Primary Substrate: <input checked="" type="radio"/> Silt/Mud <input type="radio"/> Sand/Gravel <input type="radio"/> Bedrock <input type="radio"/> Cobble	Turbidity: <input type="radio"/> Clear <input checked="" type="radio"/> Cloudy
Fish Present: Yes <input checked="" type="radio"/> No	Fish Species: —	Bullfrogs Present: Yes <input checked="" type="radio"/> No
Aquatic Vegetation: % of aquatic feature with: submerged vegetation <input checked="" type="checkbox"/> emergent vegetation <input checked="" type="checkbox"/> not vegetated <input checked="" type="checkbox"/> too turbid to determine <input checked="" type="checkbox"/>		Common Wetland Plant Species (m=only on margin)
Shoreline emergent vegetation: % of aquatic feature shoreline that is vegetated: 0% <input checked="" type="checkbox"/> 1-25% <input checked="" type="checkbox"/> 26-50% <input checked="" type="checkbox"/> 51-100% <input checked="" type="checkbox"/>		

Comments: Hyla Larvae plentiful

Q/C-1 MS date: 5.6.11 Q/C-2 JT date: 5.6.11

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date 5-6-11	Begin Time: 1222	End Time: 1226	Observer(s): J. Tallis M. Siemens	
Locality: Fort Ord		County: Monterey		State/Province: CA.
MRA: East Garrison		Aquatic Feature #: 09-2	UTM North —	UTM East —

Weather: <input checked="" type="radio"/> Clear <input type="radio"/> Overcast <input type="radio"/> Pt. Cloudy <input type="radio"/> Rain	Wind: <input type="radio"/> Calm <input type="radio"/> Light <input checked="" type="radio"/> Strong	Water Temp: —	Air Temp: ≈ 68°F
--	---	----------------------	-------------------------

Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	—	N/A	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	—	Y N	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
B. boreas	—	Y N	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
—	—	Y N	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: <input checked="" type="radio"/> Natural <input type="radio"/> Man-made	Drainage: <input type="radio"/> Permanent <input checked="" type="radio"/> Occasional	Depth: — (read from staff gauge) Dry
Description: <input type="radio"/> Permanent Lake <input type="radio"/> Marsh/Bog <input type="radio"/> Spring/Seep <input checked="" type="radio"/> Temporary Lake/Pond <input type="radio"/> Stream <input checked="" type="radio"/> (Other) depression		Primary Substrate: <input checked="" type="radio"/> Silt/Mud <input type="radio"/> Bedrock
Color: <input checked="" type="radio"/> Clear <input type="radio"/> Stained	Turbidity: <input checked="" type="radio"/> Clear <input type="radio"/> Cloudy	

Fish Present: Yes No **Fish Species:** — **Bullfrogs Present:** Yes No

Aquatic Vegetation: % of aquatic feature with: submerged vegetation <input checked="" type="checkbox"/> emergent vegetation <input checked="" type="checkbox"/> not vegetated <input checked="" type="checkbox"/> too turbid to determine <input checked="" type="checkbox"/> Surveyed on 4.21.11	Common Wetland Plant Species (m=only on margin) _____ _____ _____ _____ _____
Shoreline emergent vegetation: % of aquatic feature shoreline that is vegetated: 0% <input checked="" type="checkbox"/> 1-25% <input checked="" type="checkbox"/> 26-50% <input checked="" type="checkbox"/> 51-100% <input checked="" type="checkbox"/>	

Comments: DRY

Q/C-1 MS date: 5-8-11 Q/C-2 JT date: 5-6-11

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date 5.6.11	Begin Time: 1728	End Time: 1230	Observer(s): J. Tallis M. Siemens
Locality: Fort Ord		County: Monterey	State/Province: CA.
MRA: East Garrison		Aquatic Feature #: 09-1	UTM North: _____ UTM East: _____

Weather: <input checked="" type="radio"/> Clear <input type="radio"/> Overcast <input type="radio"/> Pt. Cloudy <input type="radio"/> Rain	Wind: <input type="radio"/> Calm <input checked="" type="radio"/> Strong <input type="radio"/> Light	Water Temp: _____	Air Temp: ≈ 68° F
---	---	-------------------	-------------------

Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	—	N/A	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	—	Y N	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
B. boreas	—	Y N	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
—	—	Y N	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: <input checked="" type="radio"/> Natural <input type="radio"/> Man-made	Drainage: <input checked="" type="radio"/> Permanent <input checked="" type="radio"/> Occasional	Depth: _____ (read from staff gauge) DRY	Description: <input type="radio"/> Permanent Lake <input type="radio"/> Marsh/Bog <input type="radio"/> Spring/Seep <input checked="" type="radio"/> Primary <input checked="" type="radio"/> Silt/Mud <input type="radio"/> Bedrock <input type="radio"/> Temporary Lake/Pond <input type="radio"/> Stream <input checked="" type="radio"/> Other depression <input type="radio"/> Substrate: Sand/Gravel Cobble
Color: <input checked="" type="radio"/> Clear <input type="radio"/> Stained		Turbidity: <input checked="" type="radio"/> Clear <input type="radio"/> Cloudy	
Fish Present: Yes <input type="radio"/> No <input checked="" type="radio"/>		Fish Species: _____	
Bullfrogs Present: Yes <input type="radio"/> No <input checked="" type="radio"/>			
Aquatic Vegetation: % of aquatic feature with: submerged vegetation <input checked="" type="checkbox"/> emergent vegetation <input checked="" type="checkbox"/> not vegetated <input type="checkbox"/> too turbid to determine <input type="checkbox"/> Surveyed on 4.21.11		Common Wetland Plant Species (m=only on margin) _____ _____ _____ _____ _____ _____ _____ _____ _____ _____	
Shoreline emergent vegetation: % of aquatic feature shoreline that is vegetated: 0% <input checked="" type="checkbox"/> 1-25% <input type="checkbox"/> 26-50% <input checked="" type="checkbox"/> 51-100% <input type="checkbox"/>			

Comments: DRY

Q/C-1 M/S date: 5.6.11 Q/C-2 JH date: 5.6.11

California Tiger Salamander Aquatic Survey Data Sheet
FORA ESCA RP

Date 5-6-11	Begin Time: 1230	End Time: 1232	Observer(s): J. Tallis M. Sicmonds		
Locality: Fort Ord		County: Monterey	State/Province: CA.		
MRA: East Garrison		Aquatic Feature #: 09-1b	UTM North	UTM East	

Weather: <input checked="" type="radio"/> Clear <input type="radio"/> Overcast <input type="radio"/> Pt. Cloudy <input type="radio"/> Rain	Wind: <input type="radio"/> Calm <input type="radio"/> Light <input checked="" type="radio"/> Strong	Water Temp: _____	Air Temp: <u>~68°F</u>
--	---	--------------------------	-------------------------------

Species	Adults/Juv.	Calling	larvae	Egg Masses	Survey Method(s)
CTS	—	N/A	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
H. regilla	—	Y N	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
B. boreas	—	Y N	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No
—	—	Y N	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: <input checked="" type="radio"/> Natural <input type="radio"/> Man-made	Drainage: <input type="radio"/> Permanent <input checked="" type="radio"/> Occasional	Depth: _____ (read from staff gauge) <u>Dry</u>
Description: <input type="radio"/> Permanent Lake <input type="radio"/> Marsh/Bog <input type="radio"/> Spring/Seep <input checked="" type="radio"/> Temporary Lake/Pond <input type="radio"/> Stream <input checked="" type="radio"/> Other depression	Primary: <input checked="" type="radio"/> Silt/Mud <input type="radio"/> Bedrock	Substrate: <input type="radio"/> Sand/Gravel <input type="radio"/> Cobble
Color: <input checked="" type="radio"/> Clear <input type="radio"/> Stained	Turbidity: <input type="radio"/> Clear <input type="radio"/> Cloudy	
Fish Present: <input type="radio"/> Yes <input checked="" type="radio"/> No	Fish Species: _____	Bullfrogs Present: <input type="radio"/> Yes <input checked="" type="radio"/> No
Aquatic Vegetation: % of aquatic feature with: submerged vegetation <input checked="" type="checkbox"/> emergent vegetation <input checked="" type="checkbox"/> not vegetated <input checked="" type="checkbox"/> too turbid to determine <input checked="" type="checkbox"/> <u>surveyed on 4-21-11</u>		Common Wetland Plant Species (m=only on margin) _____ _____ _____ _____ _____
Shoreline emergent vegetation: % of aquatic feature shoreline that is vegetated: 0% <input checked="" type="checkbox"/> 1-25% <input checked="" type="checkbox"/> 26-50% <input type="checkbox"/> 51-100% <input type="checkbox"/>		

Comments: DRY

Q/C-1 MTS date: 5-6-11 Q/C-2 PT date: 5/6/11

APPENDIX E

Water Quality Monitoring Data Sheets

**2011 Aquatic Feature Monitoring Report
Future East Garrison Munitions Response Area**

Aquatic Feature Water Quality Data

Sample Collection Date: March 28, 2011 Collected By: JTT Analysis by: JTT (Joshua Tallis)
 Equipment Used: Horiba U-10 Analysis Date: April 6, 2011
 pH Meter: " "
 Turbidity Meter: " "

pH Calibration: Auto Cal Solution 4.0 pH / 4.49 mS/cm / 0 NTU
 Turbidimeter blank (Y/N): same as above.

AF	Sample Color	Opaque Y/N	pH	NTU	Comment
AF66-A	Light brown	N	6.69	95	
AF66-B	Med brown	Y	6.33	96	
AF67 Meadow	Light brown	Y	6.74	22	
AF67-EX1	Light brown	Y	6.40	32	
AF67-EX2	Light brown	Y	6.59	29	
AF67-EX3	Med brown	Y	6.60	99	
AF67-EX4	Med brown	Y	6.62	29	
AF68-AB	Med brown	N Y	6.20	90	
AF68-C	Med brown	N Y	6.37	22	
AF69	Light brown	N	6.41	96	
AF10-1	Light brown yellow	N	7.07	0	
AF09-1	Yellow brown	N	6.62	15	
AF09-1B	Yellow brown	N	6.86	47	
AF09-2	Yellow brown	Y	6.12	69	

Notes:

QC 1 Joshua Tallis

Date April 6, 2011

QC 2 Jessa Chapman

Date April 6, 2011

APPENDIX D

Erosion Memorandum

2011 Annual Natural Resource Monitoring, Mitigation, and Management Report

MEMORANDUM

Date: 19 January 2012

To: Stan Cook, FORA ESCA Program Manager

From: Kristie Reimer, ESCA RP Program Manager
Tessa Chapman, ESCA RP Field Operations Manager

CC: Chris Spill, ESCA RP Project Manager
Linda Temple, ESCA RP Remediation Project Manager

Subject: **2011 Erosion Control Inspections, Seaside Munitions Response Area**

The FORA ESCA Remediation Program (RP) Team has been performing pre- and post-precipitation erosion control inspections along the unpaved road adjacent to the Natural Resources Management Area (NRMA) borderland interface in the Seaside Munitions Response Area (MRA), also referred to as “the Blueline Road” (Figure 1). During a pre-precipitation erosion control inspection on 03 October 2011, no evidence of eroding soil sediments was observed. On 06 October 2011, following a rain event that week of more than 2 inches of accumulated rainfall; a post-precipitation erosion control inspection was conducted. During the post-precipitation erosion control inspection, there were three areas of concern discovered where erosion of soil sediments from unpaved roads or non-vegetated areas within the NRMA were noted to have impacted the Blueline Road. The three areas of concern are noted below and shown on Figure 1:

- Broadway West Gate
- Austin North Gate
- Former Range 19 Area

Examples of the observed erosion at the Broadway West Gate are documented in the four attached photographs. Continued erosion in the identified areas of concern may eventually compromise the integrity of the Blueline Road and will continue to carry soils from within the NRMA into the Seaside MRA. As presented in this Memo, the ESCA RP Team requests that FORA forward this memo to the Army and the Bureau of Land Management, with the request to them to address the erosion issues in the identified areas of concern.

Your assistance in this matter is appreciated. If you have any questions regarding this request, please contact me at (831) 883-3672.

Attachments:

Photographs 1 through 4 – Broadway West Gate Erosion

Figure 1 – Seaside MRA Erosion Control Inspection Areas of Concern

FORA ESCA Remediation Program Team



Photo 1



Photo 2

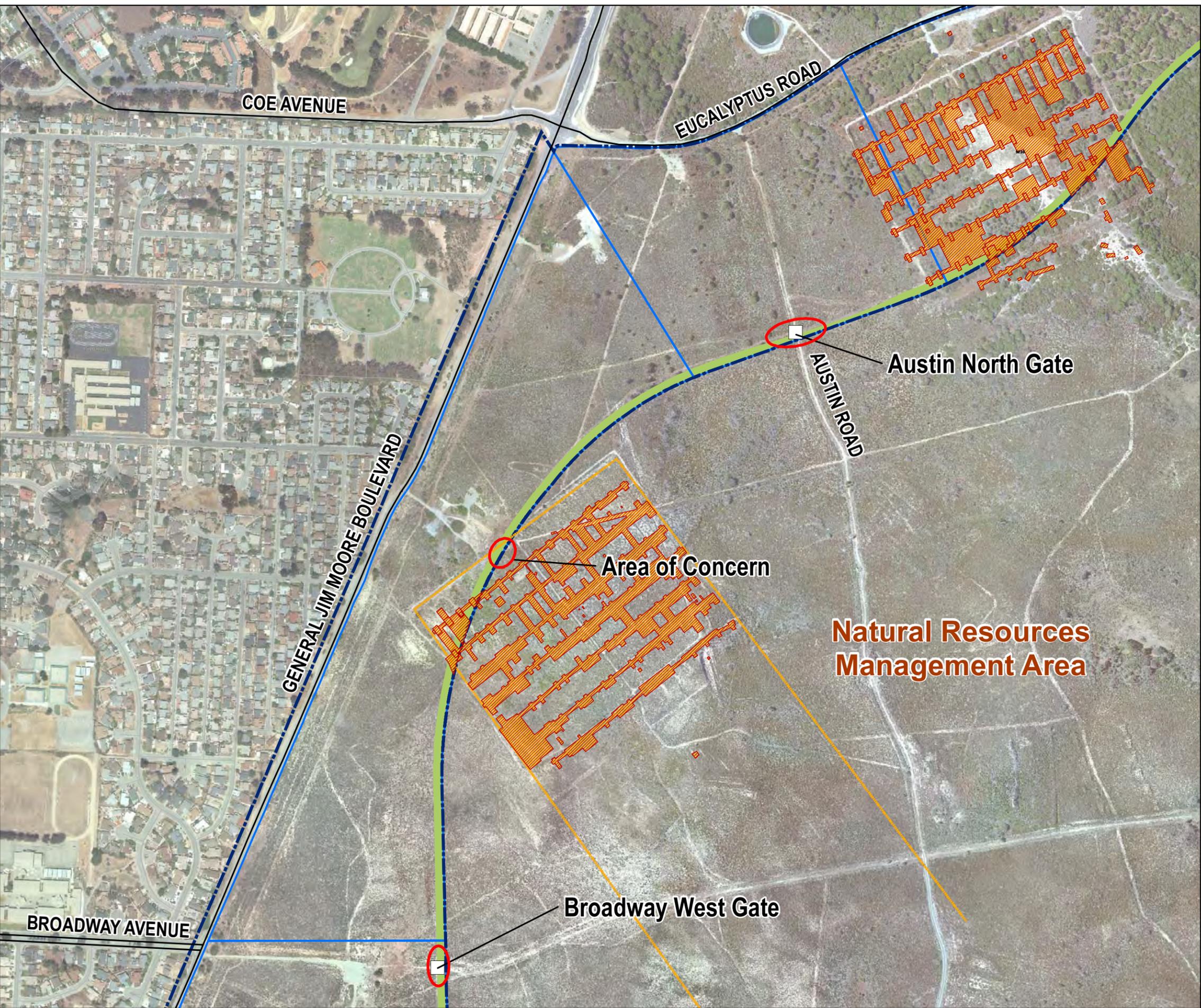


Photo 3



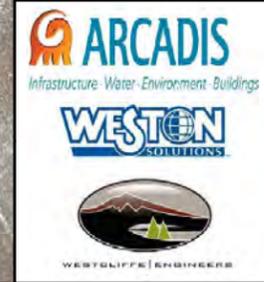
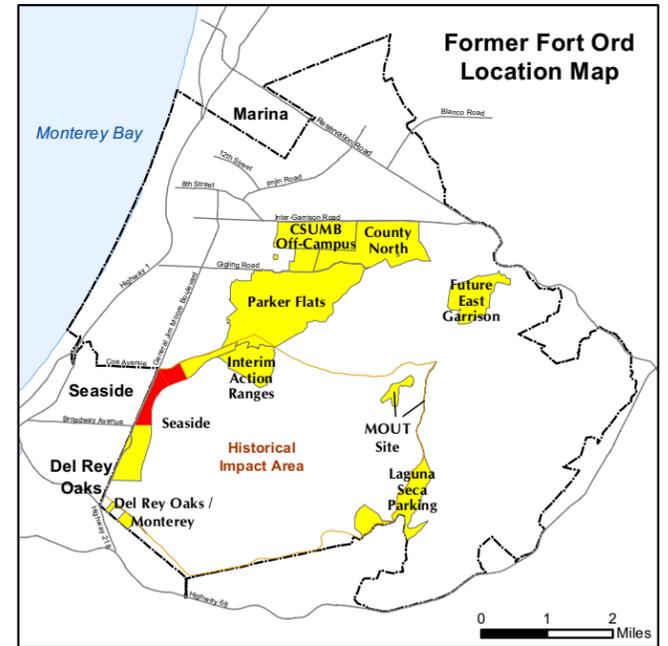
Photo 4

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Legend

-  Area of Concern
-  Gate
-  Former Range 19
-  Unpaved Road (Referred to as the Blueline Road)
-  Major Road
-  Seaside MRA Boundary
-  MRS Boundary
-  Army Soil Remediation Area



Seaside MRA Erosion Control Inspection Areas of Concern

FORA ESCA RP
Monterey County, California

Figure 1

APPENDIX E

Weed Monitoring Plan and Reports

2011 Annual Natural Resource Monitoring, Mitigation, and Management Report

2011 WEED MONITORING PLAN – FORA/ESCA RP

Munitions Response Area: Interim Action Ranges MRA, Seaside MRA, ESCA-wide

Parcel(s):

Date: June 23, 2011, updated December 22, 2011

Area(s) to be monitored: Interim Action Ranges MRA, Seaside MRA, ESCA-wide

Scope of monitoring effort:

- 1) Perform monitoring of iceplant piles in Seaside MRA (June 23, 2011). These piles are near the NRMA boundary. Monitor for plant survival and potential for plants and/or propagules to migrate into the NRMA.
- 2) Perform monitoring during November of excavated soil stockpiles located in the development parcel in the Interim Action Ranges MRA, to determine if target weed populations are evident and reproductive.
- 3) Very little rainfall has occurred in the 2011 portion of the 2012 wet season (i.e., from October-December 2011). Currently (December 22), weather forecasts indicate that no rain is likely to fall before January 1, 2012. Therefore, conditions for weed sprouting during this period are considered to be marginal at best and no additional weed monitoring is proposed for 2011. Weed monitoring in early 2012 may be considered after substantial rainfall events occur.

ESCA RP

ESCA RP Weed Monitoring Report

Date: January 6, 2012

Prepared by: Carrie Hofer

MRA/Parcel and Specific Locations Monitored: IAR MRA Development Parcel, Soil Stockpiles.

Monitoring Personnel: C. Hofer

Date Monitored: November 28, 2011

Purpose: Soil stockpiles from excavation activities in the Interim Action Ranges MRA habitat parcels were placed in the development parcel (see Figure 1). Weeds that grow on the stockpiles (particularly topsoil containing seed bank) have the potential to recruit across the Natural Resource Management Area boundary ("borderland boundary" or "blue line"). The purpose of this monitoring effort was to determine if weeds had grown on the stockpiles and if they could recruit into the habitat parcels.

Monitoring Protocol/procedure: C. Hofer inspected each soil stockpile in the IAR MRA Development Parcel looking for signs of weed and other plant growth. The primary stockpiles of concern are those noted as Topsoil in field notes and maps. Monitoring was conducted on foot under the escort of Weston UXO support.

Results: No individuals of the target weed species (ice plant, French broom, pampas grass) were observed on the topsoil piles during the monitoring effort. As-yet unidentified minor growth of a variety of species was noted primarily occurring along the base perimeter of a number of stockpiles, both topsoil and non-topsoil.

Recommendations: None indicated by J. Tallis at the time of assessment. Further identification of plant growth based on photographs may be undertaken in the future.

Field Documentation: See Photograph Numbers 2885 to 2913, and respective field note book scans for respective assessment date.

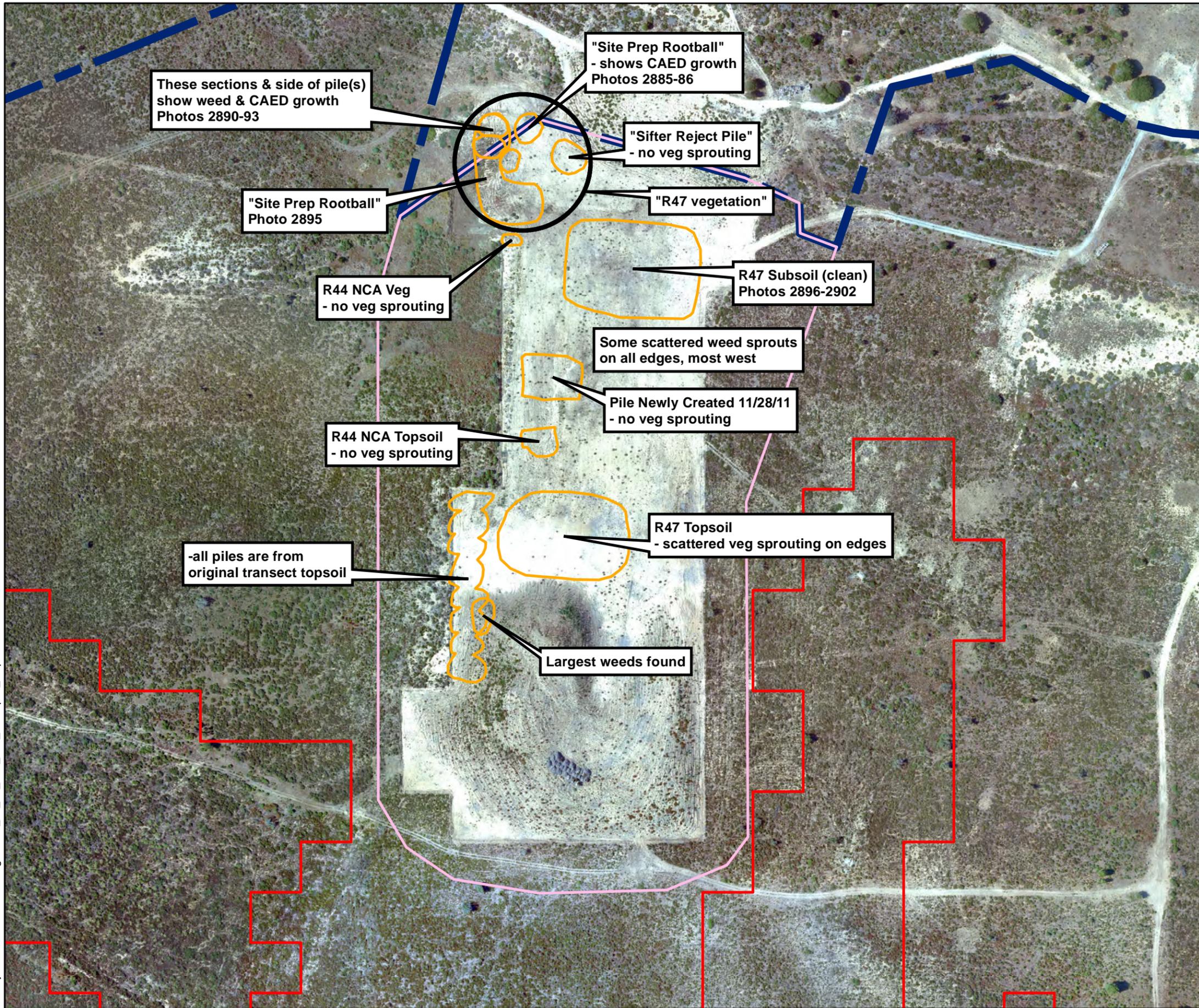
Reviewed by:

Phillip A. Lebednik, Ph.D.
ESCA RP Senior Qualified Biologist
1/6/12

ESCA Remediation Program Team

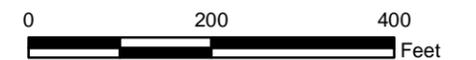
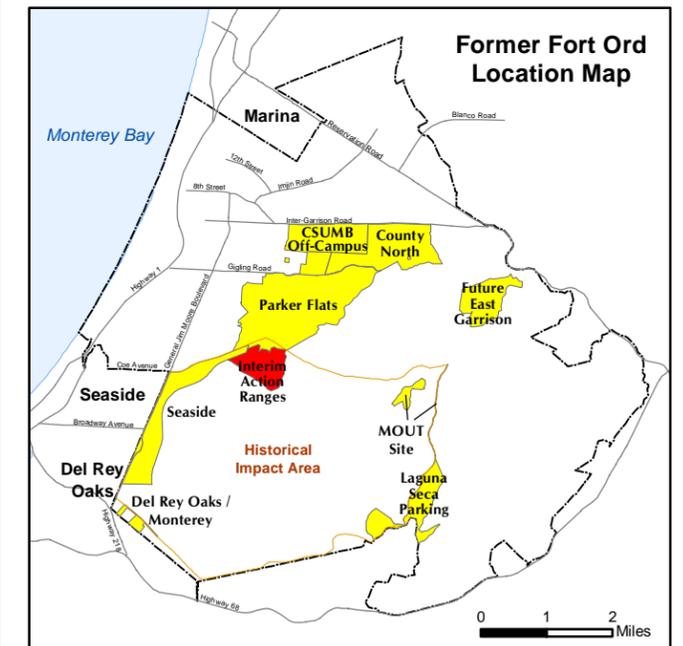


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Legend

-  Soil Stockpile Inspection Areas
-  SCA and NCA Boundaries
-  IAR Development Parcel
-  Munitions Response Area



**Interim Action Ranges MRA
2011 Weed Monitoring Report
Soil Stockpile Location and Observations
November 28, 2011**

FORA ESCA RP
Monterey County, California

Figure 1

ESCA RP

ESCA RP Weed Monitoring Report

Date: January 5, 2012

Prepared by: Carrie Hofer

MRA/Parcel and Specific Locations Monitored: Seaside MRA, old Weston Trailer compound area.

Monitoring Personnel: J. Tallis, C. Hofer

Date Monitored: June 23, 2011

Purpose: Ice plant material that was physically removed from nearby areas and stockpiled in the northeastern portion of the Seaside MRA in 2010 (see Figure 1) were monitored for survival and potential to recruit across the Natural Resource Management Area boundary ("borderland boundary" or "blue line").

Monitoring Protocol/procedure: J. Tallis estimated the physical dimension of the ice plant area by pacing the pile(s) and respective distance from the fence-line separating the Seaside and IAR MRAs. Conditions of the ice plant staged in the Seaside MRA was assessed for potential to migration into the IAR MRA. Photographs were taken and filed

Results: The ice plant was observed to be growing in-place; however, it showed no immediate signs of migration into the IAR MRA. Small separate, individual shoots of ice plant were observed to be growing in the 30-meter expanse between the ice plant stockpile and the MRA boundary fence.

Recommendations: None indicated by J. Tallis at the time of assessment.

Field Documentation: See Photograph Numbers 2267, 2678, 2683, 2684, 2675, 2676; and respective field note book scans for respective assessment date.

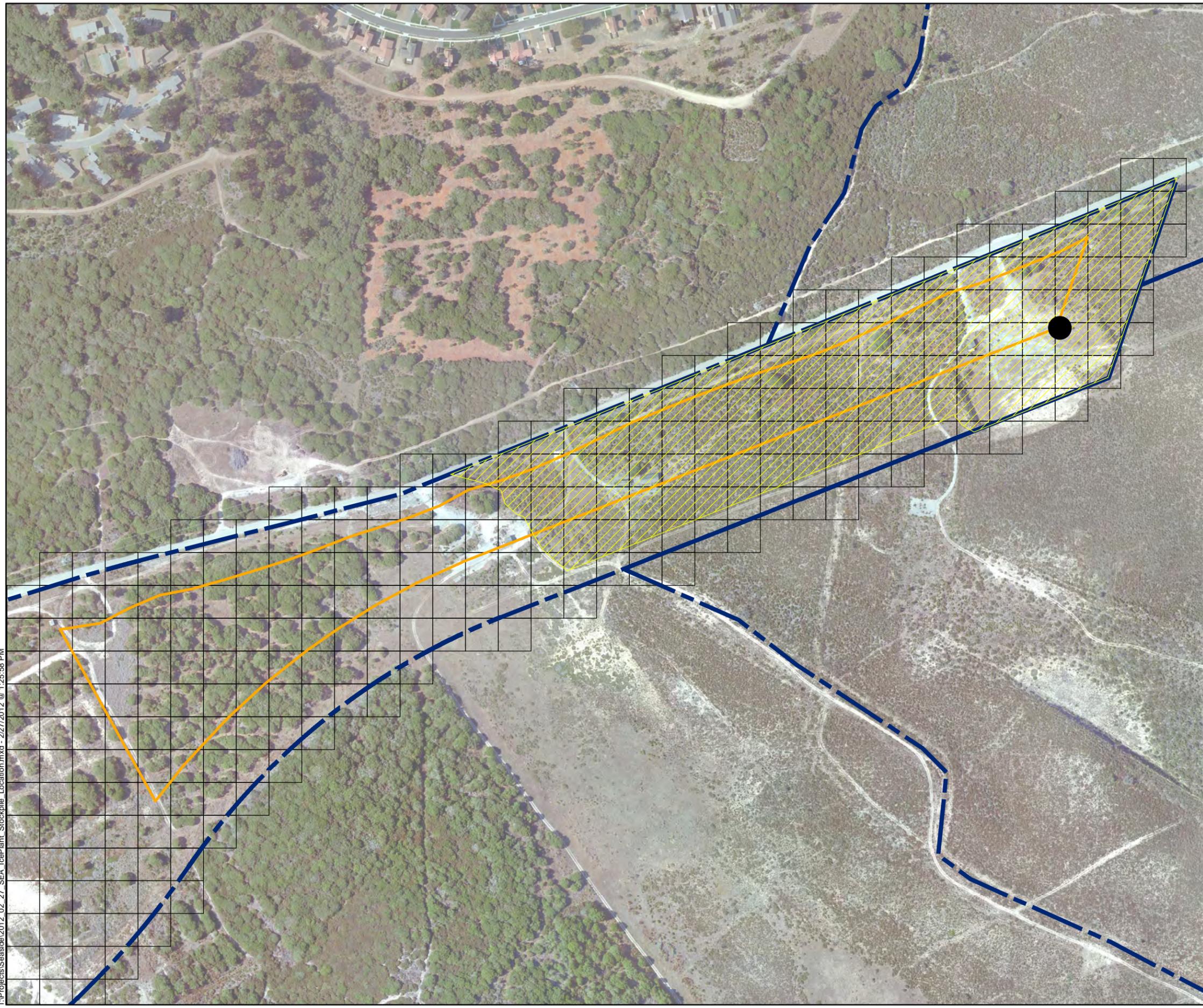
Reviewed by:

Phillip A. Lebednik, Ph.D.
ESCA RP Senior Qualified Biologist
1/5/12

ESCA Remediation Program Team

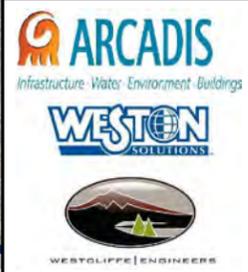
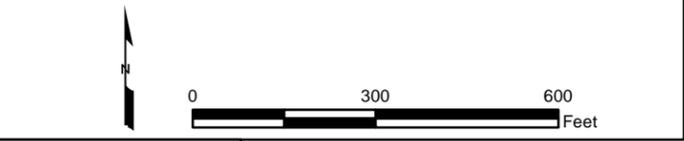
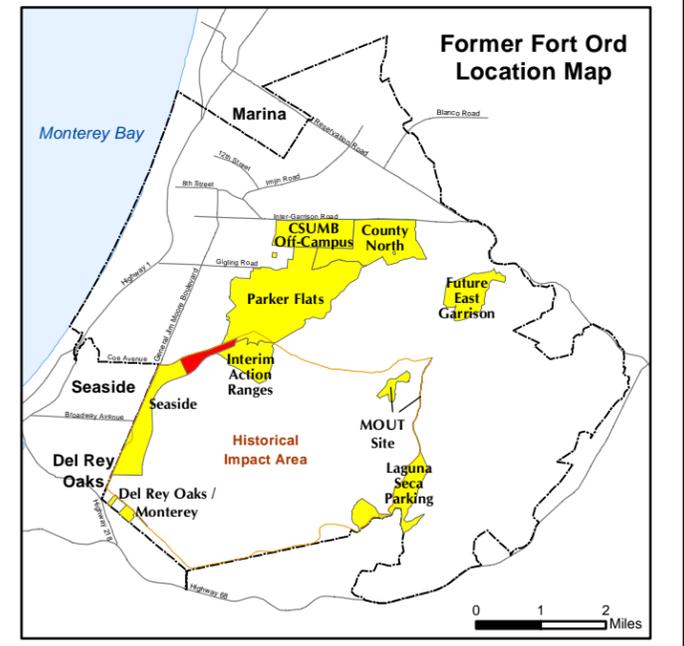


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Legend

-  MRS Boundary
-  SEA.4 RQA Area - 17.4 Acres
-  100-ft Grids
-  Iceplant Removal Action Completed - Approx. 20.4 ac.
-  Approximate Stockpile Location



Seaside MRA
2011 Weed Monitoring Report
Iceplant Stockpile Location
2007 Aerial Image

FORA ESCA RP
 Monterey County, California

Figure 1

APPENDIX F

Future East Garrison MRA Vegetation Mapping Report

2011 Annual Natural Resource Monitoring, Mitigation, and Management Report

FORA ESCA REMEDIATION PROGRAM

Appendix F. 2010-2011 Vegetation Mapping Report Future East Garrison Munitions Response Area

Former Fort Ord
Monterey County, California

May 25, 2012

Prepared for:

FORT ORD REUSE AUTHORITY

920 2nd Avenue, Suite A
Marina, California 93933



Environmental Services Cooperative Agreement
No. W9128F-07-2-01621
and
FORA Remediation Services Agreement (3/30/07)

Document Control Number: 09595-12-057-001

Prepared by:



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- F-7 Chamisal Areas
- F-8 Detailed Mapping Results
- F-9 Central Maritime Chaparral Map

APPENDIX

A Photolog

ACRONYMS AND ABBREVIATIONS

ARCADIS	ARCADIS U.S., Inc.
BO	Biological Opinion
ESCA	Environmental Services Cooperative Agreement
ESCA RP	Environmental Services Cooperative Agreement Remediation Program
FORA	Fort Ord Reuse Authority
ft	feet
GPS	global positioning system
HMP	Habitat Management Plan
m	meters
MCV	<i>A Manual of California Vegetation</i> , 2nd Edition
MEC	munitions and explosives of concern
MRA	Munitions Response Area
MRS	Munitions Response Site
USA	USA Environmental, Inc.
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service

1.0 INTRODUCTION

This 2010-2011 vegetation mapping report was prepared for the Fort Ord Reuse Authority (FORA) under the Environmental Services Cooperative Agreement (ESCA) by ARCADIS U.S., Inc. (ARCADIS), Weston Solutions, Inc. (Weston), and Westcliffe Engineers, Inc. (the ESCA Remediation Program [RP] Team). The report documents methods employed and results obtained from mapping vegetation in the Future East Garrison Munitions Response Area (MRA) in advance of the ESCA RP Team munitions and explosives of concern (MEC) investigation and remedial activities (hereinafter termed “MEC activities”), which began in the fourth quarter of 2010.

The Future East Garrison MRA is comprised of four parcels: two habitat parcels (E11b.6.1 and E11b.7.1.1) and two development parcels (Figure F-4). In the following report, references to “Future East Garrison MRA” refer to the habitat parcels unless otherwise indicated.

Reconnaissance fieldwork by ESCA RP biologists in late 2009 and early 2010 revealed that substantial portions of the MRA that previously had been mapped (on a coarse scale) as maritime chaparral were occupied by other types of vegetation. Accordingly, it was decided that the vegetation should be re-mapped in more detail to facilitate implementation of certain mitigation requirements.

1.1 Purpose

The purpose of vegetation mapping was to accurately identify and map areas of central maritime chaparral in the two habitat parcels. A number of mitigation measures described in the Installation-Wide Multispecies Habitat Management Plan (HMP; USACE 1997) and the 2005 United States Fish and Wildlife Service (USFWS) Biological Opinion (“2005 BO”; USFWS 2005) are specific to areas of central maritime chaparral vegetation (and certain associated species referred to as “HMP species”) within habitat parcels. Of these measures, the 2010-2011 mapping effort specifically facilitated the sampling design for baseline vegetation monitoring (those results are described in Appendix G of the 2011 Annual Natural Resource Report). As part of this mapping effort, other major landscape elements were also mapped in the area.

1.2 Site Description

The Future East Garrison MRA is located within the former Fort Ord in Monterey County, about 8 miles north of the City of Monterey, California (Figure F-1). The MRA encompasses approximately 251.8 acres in the northeastern portion of the former Fort Ord. The two habitat parcels combined encompass 177.7 acres.

Elevation in the MRA ranges from approximately 50 meters (m) to 147.5 m above mean sea level (Figure F-3). The terrain of the two habitat parcels in the MRA differs. The western parcel (E11b.6.1) is generally flat, with minor rises and depressions. The eastern parcel

(E11b.7.1.1) is steep in places, with plateaus, drainages and exposed mineral soil. In general, the land surface in the eastern parcel dips toward the north and east.

Surface soils are characterized as eolian (sand dune) and terrace (river deposits), which consist of unconsolidated materials of the Aromas and Old Dune Sand formations. The primary soil types are Arnold-Santa Ynez Complex and Dissected Xerorthents (Figure F-3).

1.3 Landscape Elements

In order to map the vegetation in the Future East Garrison MRA, the landscape was broken up into physical elements (e.g., roads) and plant community elements (e.g., coast live oak woodland). Most of these elements were identified or created as a result of the vegetation surveys.

1.3.1 Physical Elements

The physical elements of the Future East Garrison MRA landscape are roadways, maintained fuel breaks, development parcels, sandstone, and asphalt (see Section 3).

1.3.2 Plant Community Elements

The vegetation of the Future East Garrison MRA is heterogeneous and is comprised of several plant communities: central maritime chaparral, chamise chaparral, coast live oak woodland and small patches of grassland. Most of these communities were identified in a prior mapping effort (USACE/Jones & Stokes 1992) but chamise chaparral was first identified in the MRA during the 2011 survey (see Section 3). In addition to these major vegetation communities, less vegetated “open” areas were present where annual ephemeral species may occur seasonally. Some virtually unvegetated sandstone areas are also present, especially in the southwestern and northeastern portions of the MRA.

Results of the 1992 coarse-scale mapping survey of flora across the entire former Fort Ord (USACE 1992/Jones & Stokes; also incorporated into the HMP [USACE 1997]) indicated that the vegetation in the Future East Garrison MRA is comprised of grassland, (central) maritime chaparral, and inland coast live oak woodland (Figure F-2). Most of the MRA is (central) maritime chaparral, including the entire western habitat parcel. There is a patch of coast live oak woodland in the northeastern corner and in the development parcel. There is a patch of grassland in the southern portion. Each of these plant communities are described below.

During initial site visits in 2009-2010, ESCA RP biologists observed substantial apparent inaccuracies in the locations of maritime chaparral as mapped in the eastern parcel in 1992. There was no evidence of recent disturbance of the communities that might explain these inaccuracies. Rather, they were attributed to the coarse scale of the 1992 effort, which did not accommodate parsing of the complex vegetation patterns evident in much of the parcel. Descriptions of the community features employed by ESCA RP biologists during the 2011 mapping effort are presented in the following sections. These descriptions generally follow

those in *A Manual of California Vegetation* (MCV), 2nd edition (Sawyer et al. 2009), as it is considered to be an authoritative reference for plant communities in California.

1.3.2.1 Central Maritime Chaparral

Central maritime chaparral occurs along California's central coast where the climate and sandy soil conditions support sclerophyllous shrubs and associated herbs and subshrubs and are often dominated by regional endemic species of *Arctostaphylos* (manzanita) or *Ceanothus* (California lilac).

According to MCV, central maritime chaparral is:

“a habitat composed of shrublands involving the following alliances, special stands, and rare shrub species that grow between Mendocino and Santa Barbara counties, where chaparral stands experience a cool and foggy climate in the summer, and they appear restricted to certain nutrient-poor soils, such as weathered sandstone and shale outcrops.”

The above reference to “alliances, special stands, and rare shrub species” is listed in the tables in MCV on pages 32-33 (Sawyer et al. 2009). The alliances of central maritime chaparral that relate to species observed and/or reported to occur within the MRA are: *Arctostaphylos* (*crustacea*, *tomentosa*) alliance, *A. hookeri* provisional alliance, *A. montereyensis* provisional alliance, *A. pajaroensis* alliance, and *A. pumila* provisional alliance. The section ‘Rare Shrub Species Associated with Specific Alliances’ includes *A. tomentosa* ssp. *tomentosa* and *A. crustacea* ssp. *crustacea* in the *Arctostaphylos* (*crustacea*, *tomentosa*) alliance, both manzanita species are found in Future East Garrison MRA. *Ceanothus cuneatus* var. *rigidus* is another rare species indicative of central maritime chaparral and is found in Future East Garrison.

The HMP (USACE 1997), the authoritative environmental document for the former Fort Ord cleanup, describes maritime chaparral as:

“characterized by a wide variety of sclerophyllous shrubs occurring in moderate to high density. At Fort Ord, this community occupies sites that have sandy, well-drained substrates within the zone of coastal summer fog (Griffin 1978; [reference not reviewed]). Maritime chaparral intergrades with coastal scrub and coast live oak woodland... This community is primarily dominated by shaggy-barked manzanita. Other species found in the shrub layer include chamise, Toro manzanita, sandmat manzanita, toyon, blue-blossom ceanothus, Monterey ceanothus, dwarf ceanothus, black sage, bush monkey flower, coyote brush, poison oak, coast silk tassel, rush-rose, and California sagebrush.”

For the purpose of this mapping effort, ESCA RP biologists used the MCV definition, which describes central maritime chaparral as having the following five characteristics:

- 1) *Arctostaphylos* sp. and/or *Ceanothus* sp. is a component of the vegetation community;

- 2) Located within the summer fog zone;
- 3) Vegetation grows on nutrient poor relic dunes;
- 4) Vegetation is made up largely of sclerophyllous-leaved plants; and
- 5) There are structurally similar stands that repeat themselves on the landscape.

1.3.2.2 *Chamise Chaparral and Chamisal*

Chamise (*Adenostoma fasciculatum*) is a component of central maritime chaparral. However, chaparral stands that are dominated by chamise are variously referred to as chamise chaparral or chamisal (Hanes 1988, Holland 1986, Sawyer et al. 2009). Although these names are sometimes used interchangeably, Hanes (1988) indicated that “chamisal” is sometimes used to refer to stands where chamise constitutes 80% or more of the canopy. These chaparral types typically occur on hot, xeric sites and, when mature, form closed-canopy stands of low diversity (Hanes 1988, Holland 1986). Poor soil conditions are also considered to favor development of chamise chaparral/chamisal (Hanes 1988). Its presence may indicate relatively high fire frequency (Holland 1986). In this report, those stands where at least 80% of the canopy is chamise are labeled “chamisal” per Hanes (1988).

1.3.2.3 *Coast Live Oak Woodland*

The Flora and Fauna Baseline Study of Fort Ord, California (USACE/Jones & Stokes 1992), describes coast live oak woodland as having a partially open to mostly closed canopy of coast live oak (*Quercus agrifolia*) with grass or shrub understory. Three coast live oak communities were reported to occur on Fort Ord: 1) coastal coast live oak woodland, 2) inland coast live oak woodland and 3) coast live oak savanna. Within what is now labeled Future East Garrison MRA only inland coast live oak woodland was reported to be present although the MRA is adjacent to an area that was mapped as coastal coast live oak (see Figure F-2 in this report and Figure 8 in USACE/Jones & Stokes 1992). Inland coast live oak woodland normally occurs beyond the coastal salt spray and strong winds and is characterized by taller and less wind pruned trees (USACE/Jones & Stokes 1992).

In this report all oak woodland habitat observed within the Future East Garrison MRA is referred to as “coast live oak woodland” because the primary focus of the fieldwork was to differentiate locations where central maritime chaparral was present from locations where other types of plant communities occurred.

Coast live oak woodland intergrades with central maritime chaparral at some locations within the Future East Garrison MRA. Chaparral species are often found in the understory of coast live oak woodland and coast live oaks are commonly a small component of maritime chaparral.

1.3.2.4 Grassland

“Grasslands are herbaceous communities that support a variety of annual or perennial grasses with associated herbs” as described in the 1992 Flora and Fauna Baseline Study (USACE/Jones & Stokes 1992). There are annual grasslands that are dominated by non-native annual grasses and may contain annual and perennial native grasses and forbs. There are also perennial grasslands that contain native perennial grass species as the dominant species or significant component of the plant community.

The 1992 Flora and Fauna Baseline Study (Figure F-2) shows a patch of grassland in the southwestern part of the eastern habitat parcel. A quick reconnaissance in late 2009 and early 2010 showed that this must be an error because it is bare sandstone with a few shrubs and three small aquatic features. Perhaps the mapping was done remotely using aerial images, which makes the area look similar to grassland.

2.0 METHODS

Vegetation mapping was conducted from 2010 to 2011 in the Future East Garrison MRA, with most of the fieldwork occurring in early 2010 and mid-2011. The mapping consisted initially of five intermediate steps: 1) site history research, 2) remote sensing, 3) aerial image-based vegetation mapping, 4) field verification, and 5) chamisal mapping. As part of field verification, biologists made central maritime chaparral stand observations and focus species habitat observations to assist with vegetation baseline monitoring. This was followed by completion of the detailed results map and the central maritime chaparral map.

Initial fieldwork and planning for the vegetation mapping effort were conducted jointly by ESCA RP biologists Phillip Lebednik and Joshua Tallis. The mapping effort and data evaluation were primarily performed by Mr. Tallis who is the primary author of this report. Mr. Tallis was supported by Mr. Bryan Rees who provided GIS support. ESCA RP biologist Mitch Siemens assisted with the field surveys. Local consulting biologist Jon Detka assisted with field plant identification. ESCA RP botanist Mary Carroll reviewed an early draft of the report and provided comments.

2.1 Intermediate Mapping Steps

2.1.1 Site History Research

The first step of the mapping effort was to identify recent anthropogenic or natural disturbance or management activities in Future East Garrison MRA which could have affected vegetation patterns. This research focused on the past approximately 25 years. The primary topics investigated were fire history, munitions/range activities, remedial activities, mechanical/manual vegetation removal, construction/heavy equipment activities and recreational activities.

2.1.2 Remote Sensing

The second step involved a modified remote sensing approach. This was done by manipulating aerial imagery in graphics software with digital filters that simplify the landscape color palette into patches to display generalized patterns in the vegetation. “Patches” are relatively homogeneous areas that differ from their surroundings as seen on an aerial image. They may be related to the plant species, vegetation height, slope, soil type, anthropogenic use or other characteristics that make a particular area appear different from its surroundings.

2.1.3 Aerial Image-based Vegetation Mapping

In the third step, aerial images of the habitat parcels were examined to identify patches of vegetation with similar texture and/or color appearance. An aerial orthographic image was used for image-based vegetation mapping (Figure F-5). A polygon was drawn around each unique patch in the office and these patches were later verified (ground-truthed) in the field (see following section).

2.1.4 Field Verification

Biologists walked throughout the habitat parcels wherever it was safe to work. Vegetation patterns observed in the field were documented thoroughly. Patches previously identified in the office were ground-truthed to determine if species composition, vegetation structure, or other factors distinguished the patch, and whether patches that appeared on the map to be similar had the same field characteristics.

Observations were recorded using global positioning system (GPS) points and polygons, photographs, field notes and field map notes. ‘Field map notes’ are hand written notes made on high resolution 11-inch by 17-inch aerial images held on writing boards. Biologists surveyed roads, trails, and natural vegetation areas on foot. The areas of unsafe terrain were not surveyed (generally such areas were steep slopes [fall hazards] and densely vegetated areas that precluded ability to observe MEC on the surface). The western habitat parcel was largely inaccessible during the initial mapping work in early 2010 because of dense mature chaparral. Corridors were later cut through the dense vegetation in 2011 to allow biologists access to survey the vegetation.

Field biologists worked in pairs for safety and to be able to compare observations and discuss subtle difference in the vegetation community. Close attention was paid to signs of recent expansion or reduction in central maritime chaparral or associated communities, such as human disturbance, expansion of oak forest and woodland, and relic central maritime chaparral (e.g., dead manzanita plants below coast live oak canopy).

Ground truthing of mapped patches included examination of: 1) shrub species composition and quality, 2) vegetation density and height, and 3) physical conditions and past disturbance.

- 1) Shrub and tree species composition. The shrub species observed in a patch were recorded in field notes and maps. Special attention was focused on determining if

Ceanothus and *Arctostaphylos* were present. Observations were made on the relative abundance of soft-leaved and sclerophyllous-leaved shrubs. The health and vigor of shrubs and oaks was also noted.

- 2) Vegetation density and height. Shrub height and density were recorded as an index of stand age since previous cut or burn.
- 3) Physical conditions and past disturbance. Visual observations of soil appearance, erosion, and landform alternations were recorded. Past disturbance indications included signs of prior vegetation removal, remedial activity, grading, etc.

2.1.4.1 Central Maritime Chaparral Stand Observations

The vegetation monitoring protocol provides that the sampling design for shrub transects located within stands of central maritime chaparral should use a stratification procedure (Burlson 2009). Strata are based on stand structure and age, slope/aspect, and amount of herbaceous vegetation. During field verification, an ESCA RP biologist documented characteristics that differentiated stands of central maritime chaparral. Access corridors were cut through the dense chaparral in the western parcel that improved access for assessing stand structure and species composition.

2.1.4.2 Focus Species Habitat Observations

The vegetation monitoring protocol includes requirements for sampling focus species (HMP forbs, HMP annuals; Burlson 2009). Potential focus species habitat was identified and documented in field notes and maps during the vegetation mapping field surveys so that close inspection for species' populations could be accomplished subsequently during the peak flowering period. Access corridors were cut through the dense chaparral in the western parcel to improve the team's ability to identify potential focus species habitat and conduct surveys when conditions were right.

2.1.5 Chamisal Occurrence

Chamisal is defined in this report as a chamise-dominated chaparral which contains at least 80% chamise cover (Hanes 1988). Contiguous stands of chamisal in the northern portion of the western parcel were tentatively identified on aerial imagery. In 2011, corridors were cut in the dense vegetation of the western parcel to provide greater access for biologists so that the vegetation in these previously inaccessible areas could be examined directly. A key outcome of these field observations was confirmation of the chamisal patches that had been identified as distinct patches on aerial images. Biologists were able to walk directly through the chamisal patches and visually observe the overstory and understory species composition in different areas. This was particularly useful because most of the chamise was around 10 feet (ft) high.

2.2 Map Completion

After completion of the intermediate mapping steps, biologists created the detailed results map and a central maritime chaparral map.

2.2.1 Detailed Results Mapping

After several iterations of the aerial-based vegetation mapping followed by field verification, an initial map of landscape elements was drawn up. The species composition of each patch was noted. In many cases these patches were tiny landscape features that measured only 20 ft across. In other cases a clump of two oak trees stood out as a unique patch. In order to create a map that reflected a useful and realistic scale and accounted for some of the physical landscape elements, such as fire breaks and low recruitment areas, the following set of mapping rules was devised.

- 1) The minimum mapping scale was 10,000 square ft, comparable to a 100 ft x 100 ft grid cell used at the former Fort Ord for remediation purposes. This minimum “resolution” rule enabled mapping to identify major habitat elements to meet the goal of the mapping effort. As a result, small-scale variations within grid cells, such as individual plants or trails, were not recorded. The grid cell mapping unit was not interpreted literally such that each grid cell was mapped individually. What it meant was that landscape patches, in general, were not smaller than 10,000 square ft in total area.
- 2) Landscape patches (contiguous visually distinct areas) were mapped according to the vegetation type (or non-vegetated status) that occupied 50% or greater of the patch area. This rule was especially helpful in defining a boundary between coast live oak woodland (predominantly occurring on the valley floor in the eastern parcel) and central maritime chaparral (dominating the vegetation on adjacent slopes). An exception to this rule was made to accommodate potential for future vegetation development in areas where central maritime chaparral vegetation was sparse, thus not satisfying the minimum resolution rule. If such an area exhibited indications of past disturbance (i.e., surface soil scraping and frequent vehicle use) but was vegetated by *Arctostaphylos* and/or *Ceanothus* and was considered likely to possess a soil seed bank of these species, the area was deemed to have the potential to satisfy the minimum resolution rule in the future and it was labeled as central maritime chaparral.
- 3) Partially overgrown single track roads and narrower access routes (i.e., “trails”) were not distinguished from the adjacent vegetation type. If there was a different vegetation type on either side of the road the boundary line was drawn down the middle of the road.
- 4) Maintained fire breaks which are routinely cut were identified as such even if they could naturally contain vegetation. These areas could not be adequately surveyed because the lack of vegetation and a fire would not likely benefit seed germination in the fire break.

2.2.2 Central Maritime Chaparral Occurrence

Central maritime chaparral was mapped using the same mapping rules described above in Section 2.2.1 as well as the maritime chaparral characteristics outlined in Section 1.3.2.1. All the plant communities identified in the detailed results map were compared against the maritime chaparral characteristics to identify which plant community elements were also central maritime chaparral. All of these polygons were made into a single map of central maritime chaparral.

3.0 RESULTS

Vegetation mapping in the Future East Garrison MRA was performed within the two habitat parcels in 2010 and 2011. The results of the intermediate mapping steps and the map completion are described below.

3.1 Intermediate Mapping Steps

3.1.1 Site History Research

The western habitat parcel burned in the early 1990s according to local consulting botanist Jon Detka (Detka Pers. Comm. 2010). This is consistent with the relatively even height and density of the chaparral.

Much of the past remediation and related vegetation clearance occurred in the Munitions Response Sites (MRSs; Figure F-6). MRS-23 is located in a habitat parcel that contains mainly bare ground and herbs (Appendix A, Photo 3). MRS-42 is located in the development parcel, which was not included in the mapping area. Some of the remediation in MRS-42 EXP occurred in the middle part of the eastern habitat parcel. Piles of aged cut shrubs (likely deposited during past vegetation clearance activity) were observed in this area in aerial images and in the field. MRS-11 is located in the “grenade range” area in the southwestern portion of the eastern parcel. Piles of aged cut chaparral vegetation (likely deposited during past vegetation clearance activity) are present in this area. Many wood rat houses were found in the old cut vegetation. MRS-11 was cleared of above-ground vegetation except for large oaks between 1995 and 1998 (USA 2001; Appendix A, Photo 4).

The roadways and maintained fuel breaks either contained no vegetation or the vegetation was routinely cut at ground level. The development parcels were not surveyed because the mapping only focused on habitat parcels.

3.1.2 Remote Sensing

Evaluation of aerial imagery proved to be less effective for the mapping effort than expected. The substantial heterogeneity of vegetation and disturbance across the MRA in the image did not lend itself to mapping of major landscape elements. Therefore, after initial effort, use of the imagery as the primary basis for mapping was discontinued.

3.1.3 Vegetation Mapping

Patch identification was conducted in the office in January 2010. In many cases patches, which are visually distinct patterns in an aerial image that may or may not contain vegetation, were revised as field surveys and ground truthing progressed. This was an iterative process that helped refine our knowledge of the landscape.

3.1.4 Field Verification

Ground truthing and field vegetation surveys were performed initially from January to March 2010 in the western and eastern habitat parcels and completed in May 2011 after access corridors were cut through the vegetation in the western parcel.

3.1.4.1 Western Habitat Parcel

The vegetation of the western habitat parcel (Figure F-5) contained a nearly continuous canopy of 5 to 10 ft high chaparral that includes *Arctostaphylos* and *Ceanothus* species and is bisected by a dirt road. Stands of chamisal are present in the northern half of this parcel and are described below in Section 3.1.5.

The western habitat parcel includes several areas where decomposed granite and broken asphalt were deposited in the soil sometime in the past. Examination of archival aerial imagery from the past 20 years revealed that vegetation cover was generally static during the period. While maritime chaparral species were observed to be present in these areas during fieldwork, the vegetation was mixed and considered to be of low quality, such as containing mainly coyote brush (*Baccharis pilularis*). Furthermore, it is considered that the vegetation condition would not be improved by vegetation management actions because the vegetation quality was attributed to the modified substrate. For these reasons, these areas were designated as “low recruitment” areas (Figure F-8) and were excluded from designation as (high-quality) central maritime chaparral habitat.

A small portion of the western parcel adjacent to Barloy Canyon Road is occupied by coast live oak woodland.

Shrubs observed to be most abundant in the western habitat parcel included Hooker’s manzanita, toro manzanita, chamise, shaggy-barked manzanita, coyote brush, black sage (*Salvia mellifera*), poison oak (*Toxicodendron diversilobum*), blueblossom (*Ceanothus thyrsiflorus*), and Monterey ceanothus (*Ceanothus cuneatus* ssp. *rigidus*). Coast live oak is the most abundant tree species; however, few individuals are present in the parcel.

3.1.4.2 Eastern Habitat Parcel

The eastern habitat parcel (Figure F-5) contains an array of vegetation assemblages, many of which are not easily discernable using the image-based patch identification. There are several main drainages that dip to the east and northeast. The terrain is a combination of hilltop plateaus intersected by ravines. Many of the hilltops appear to have had surface soil removed in the past. Some hilltops are bare sandstone containing little or no chaparral vegetation, such

as in MRS-11 and MRS-23 (Figure F-6; Appendix A, Photo 3). Others have been anthropogenically altered (e.g., graded to make roads and other features) and are occupied by sparse shrub vegetation and grassland (e.g., see MRS-11, Appendix A, Photo 1). A web of roads and trails can be seen on aerial imagery, particularly in the south portion. Several of the roads and trails are now deep erosion gullies. This disturbance, where extensive, has produced breaks in the shrub canopy and is visible on aeriels.

The ravine floors generally support coast live oak woodland, which transitions to chaparral upslope (Appendix A, Photo 5). Many of the oaks appeared to be stressed, with considerable leaf loss in the coast live oak canopies, yielding a range of colors in the aerial images, from gray to pale green (Appendix A, Photo 2).

Shrubs observed to be most abundant in the eastern habitat parcel included Hooker's manzanita, toro manzanita, chamise, shaggy-barked manzanita, coyote brush, black sage, coast silk tassel (*Garrya elliptica*), sticky monkey flower (*Mimulus aurantiacus*), poison oak, and Monterey ceanothus. There are several stands of mature toro manzanita that are approximately 15 to 20 ft high (Appendix A, Photo 6). These toro manzanitas were retained as a mitigation measure to reduce the impact on non-stump sprouting HMP species. The photo was taken well after the initial vegetation surveys.

Coast live oak is the dominant tree species in the MRA. There is a grove of non-native blue gum (*Eucalyptus globulus*) located in the northeastern part of the eastern habitat parcel.

3.1.4.3 Central Maritime Chaparral Stand Observations

Unique but repeating stands of central maritime chaparral were observed and documented during the 2010 and 2011 surveys. The eastern parcel was particularly heterogeneous so several different stands were identified while as the central maritime chaparral in the western parcel was fairly heterogeneous and represented only one stand.

Vegetation height was an important characteristic for differentiating a stand, and was likely correlated with age since prior disturbance. Aspect was another important characteristic because species composition and density varied considerably based on aspect. Prior anthropogenic disturbance was also an important factor because disturbed areas had lower densities of shrubs and higher density of herbaceous and soft chaparral species. In most cases it was not specifically clear what the disturbance or combination of disturbances was/were.

Results of the surveys for vegetation transect placement are presented in Appendix G of the 2011 Annual Natural Resource Report.

3.1.4.4 Focus Species Habitat Observations

During field surveys, ESCA RP biologists looked for potential focus species (HMP annual or forb) habitat and documented it in field notes and maps. Since much of the chaparral vegetation is mature and dense, most of the focus species habitat occurred along roads and trails. Some roads and trails contained relatively hard sandstone and were marked as poor habitat. The western habitat contained few roads and trails and many of those were hard and

provided poor habitat. Many other roads and trails, especially in the eastern parcel, had a good combination of characteristics for focus species, most importantly loose sandy soil, and intermittent disturbance such as is found on the shoulder of many trails and roads. Results of the focus species surveys are presented in Appendix G of the 2011 Annual Natural Resource Report.

3.1.5 Chamisal Occurrence

Access corridors were cut through dense chaparral in 2011 in the west habitat parcel to allow access for inspection of the plant communities in these areas (Appendix A, Photo 7). These corridors, where vegetation was cut at ground level, were approximately 4 ft wide. In the northern part of the west parcel there are several patches of chamisal (Appendix A, Photo 8). The chamisal vegetation had a distinct signature on the aerial imagery. After field observations confirmed this fact, the areas were mapped using the imagery.

Our criterion for chamisal (see Section 1.3.2.2) used a higher value for chamise cover than the MCV used for its *Adenostoma fasciculatum* Shrubland Alliance (chamise chaparral; 50-60% cover for the MCV's chamise chaparral versus 80% for our definition of chamisal). Figure F-7 shows the extent of chamisal, all of which is located in the northwestern part of the habitat parcel. The patches were outlined on Figure F-7 to show how they look distinct from the surrounding central maritime chaparral.

3.2 Map Completion

3.2.1 Detailed Mapping Results

As shown on Figure F-8 and Table F-1, there were eight different plant community elements mapped in the MRA. These were 1) grassland, 2) black sage-California sage-chamise chaparral, 3) grassland and black sage-chamise-ceanothus-manzanita chaparral, 4) closed canopy manzanita dominated chaparral, 5) coast live oak woodland with less than 50% chaparral canopy 6) manzanita dominated chaparral with less than 50% coast live oak canopy 7) chamisal, and 8) disturbance areas including small patches of grassland, several aquatic features and ruderal vegetation. The different plant community elements were mapped based on distinct and repeating patches on aerials and in the field. This was done to capture what truly exists in the Future East Garrison MRA instead of trying to fit a vegetation type or association on what was observed. Table F-1 compares the plant community elements with likely comparable MCV alliances. The MRA had a high degree of intergrading because of the changes in soil, the topographical variation, and prior patchy disturbance. The following is a description of the species and structural characteristics of the different plant community elements:

- *Grassland*: This element was a minor component in the MRA and occurred generally as small patches between shrubs. It was often observed where there was prior top soil removal and where water ponds on thin soil over sandstone during winter and spring months. The grasses are a mix of annual and perennials. Many small wetland plants were common, like rushes and sedges.

- *Black sage-California sage-chamise chaparral*: This habitat was not very common in the MRA and was often on steep slopes with considerable sun exposure. *Ceanothus* and *Manzanita* were generally absent.
- *Grassland and black sage-chamise-ceanothus-manzanita chaparral*: This habitat contained small patches of grassland. Most of the habitat was a mix of black sage, chamise, Monterey ceanothus, and a manzanita species. This habitat was found on steep south facing slopes in the northeast part of the MRA and in the grenade range where there has been considerable past disturbance and recent vegetation removal.
- *Closed canopy manzanita dominated chaparral*: This habitat was predominantly a mix of different manzanita species with a closed canopy. The vegetation was not considerably tall (3 to 6 ft) and did not have many openings in the canopy unlike many other areas in the eastern habitat parcel. Other chaparral species were present but in low numbers or in scattered clumps.
- *Coast live oak woodland with less than 50% chaparral canopy*: The habitat type had a closed canopy generally along the valley floor and on many north facing slopes. The understory ranged from ferns and native blackberry in the moist areas to manzanita in the drier areas. Many of the manzanitas in the understory were dead skeletons. In drier areas there was grass or there were chaparral shrubs between and under the oaks. This habitat is comparable to *Quercus agrifolia* Woodland Alliance in MCV; however, many of the more mesic species, like California bay (*Umbellularia californica*), and California buckeye (*Aesculus californica*), were not present.
- *Manzanita dominated chaparral with less than 50% coast live oak canopy*: This habitat was often a transition from coast live oak woodland to chaparral. The oaks were generally individual or small clumps of trees surrounded by manzanitas, ceanothus, chamise and other species. Most of the vegetation canopy was chaparral shrubs. There was considerable bare ground and herbaceous vegetation in this habitat.
- *Chamisal*: This habitat contained >80% chamise. The stands were generally 6 to 12 feet high. Many areas were exclusively chamise.
- *Disturbance areas including small patches of grassland, several aquatic features and ruderal vegetation*: These areas contained vegetation associated with disturbance. They contained patches of grass on thin soil over sandstone. Some of these areas had wet meadow vegetation. Around the concrete-lined tank wash in the northeast corner of the eastern parcel there are a few oaks and large patches of non-native ice plant (*Carpobrotus edulis*) and rock-rose (*cistus creticus*). The aquatic features and the vegetation found in and around them are found in the 2011 Aquatic Feature Monitoring Report, Appendix C of the 2011 Annual Natural Resource Report.

The western habitat parcel includes several areas where decomposed granite and broken asphalt were deposited in the soil sometime in the past. Examination of archival aerial imagery from the past 20 years revealed that vegetation cover was generally static during the period. While maritime chaparral species were observed to be present in these areas during

fieldwork, the vegetation was mixed and considered to be of low quality. Furthermore, it is considered that the vegetation condition would not be improved by vegetation management actions because the vegetation quality was attributed to the modified substrate. For these reasons, these areas were designated as “low recruitment” areas and they were excluded from designation as (high-quality) central maritime chaparral habitat.

3.2.2 Central Maritime Chaparral Occurrence

A map of the occurrence of central maritime chaparral in Future East Garrison MRA (Figure F-9) was developed using the detailed results map of landscape elements as a starting point and applying the rules for central maritime chaparral described in Section 1.3.2.1. All plant community elements resulting from the detailed mapping were translated as best as possible to associations described in MCV (Table F-1). Three of these were considered to be maritime chaparral plant associations. These were 1) grassland and open canopy manzanita dominated chaparral, 2) closed canopy manzanita dominated chaparral, and 3) manzanita dominated chaparral with less than 50% coast live oak canopy. A fourth plant community element was also included as central maritime chaparral, “grassland and black sage-chamise-ceanothus chaparral”, because of the presence of *Ceanothus*, the small patch size and the proximity to adjacent central maritime chaparral. This patch, like the whole MRA, was located within the coastal fog zone, grows on relic dune soil and was made up largely of sclerophous-leaved shrubs.

All four plant community elements were then combined to make the central maritime chaparral map (Figure F-9).

4.0 FINDINGS

Mapping of major landscape elements was performed in the Future East Garrison MRA in 2010 and 2011 in advance of ESCA RP MEC activities. Mapping was done to accurately identify and map areas of central maritime chaparral in the two habitat parcels to support mitigation measures in the HMP and 2005 BO. As part of this effort, all major physical and plant community elements were mapped and potential focus species habitat and vegetation stands were identified for baseline monitoring. The mapping was performed partly in the office using site history research and map-based identification of landscape elements and partly in the field by visually observing, identifying and documenting vegetation along most trails and roads in the Future East Garrison MRA.

4.1 Technical Findings

The plant community elements identified during the mapping were 1) grassland, 2) black sage-California sage-chamise chaparral, 3) grassland and black sage-chamise-ceanothus-manzanita chaparral, 4) closed canopy manzanita dominated chaparral, 5) coast live oak woodland with less than 50% chaparral canopy, 6) manzanita dominated chaparral with less than 50% coast live oak canopy, 7) chamisal, and 8) disturbance areas including small patches of grassland, several aquatic features and ruderal vegetation. The physical landscape elements identified were 1) roadways and maintained fuel breaks, 2) development parcels, 3)

bare sandstone and 4) asphalt. Some of the plant community elements were determined to be central maritime chaparral based on the species composition. These areas were combined into the Central Maritime Chaparral Map (Figure F-9). Central maritime chaparral occurs in discontinuous stands within the Future East Garrison MRA. It is intermixed with oak woodland, chamisal, grassland, non-sclerophyllic leaved chaparral and previously disturbed areas with bare sandstone.

In the eastern parcel, central maritime chaparral is most common on slopes. Coast live oak woodland is generally more abundant on valley floors and on north-facing slopes. Many hilltops in the eastern parcel have been altered in the past by anthropogenic disturbance such as road building, which may have affected central maritime chaparral presence.

In the western parcel, where the terrain is relatively flat, most of the vegetation is central maritime chaparral. However, in the northern portion of this parcel, there are patches of chamisal. The western habitat parcel includes several areas where decomposed granite and broken asphalt were deposited in the soil sometime in the past.

4.2 Mitigation and Monitoring Findings

The central maritime chaparral mapping results enable accurate calculation of the amount of central maritime chaparral affected by MEC activities. This information also facilitates implementation of HMP mitigation measures to minimize impacts to central maritime chaparral.

Identification of mature (15 to 20 ft tall) stands of toro manzanita (also known as Monterey manzanita) during field surveys led to development of a mitigation measure that was incorporated into the Natural Resource Impact Mitigation checklist: retention of mature (>6 inches diameter at breast height) toro manzanitas during mechanical vegetation removal. This measure enables continuing augmentation of the toro manzanita soil seed bank.

The vegetation monitoring protocol provides that the sampling design for shrub transects located within stands of central maritime chaparral should use a stratification procedure (Burlinson 2009). Strata are based on stand structure and age, slope/aspect, and amount of herbaceous vegetation. The vegetation mapping information enabled efficient and accurate implementation of this design requirement during the baseline monitoring survey.

The vegetation monitoring protocol includes requirements for sampling focus species (HMP forbs, HMP annuals; Burlinson 2009). Potential focus species habitat was identified during the vegetation mapping effort so that close inspection for species' populations could be accomplished during the peak flowering period. Results of the baseline shrub transect and focus species monitoring surveys are presented in Appendix G of the 2011 Annual Natural Resource Report.

5.0 REFERENCES

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Table F-1
Vegetation Elements in Future East Garrison MRA
Former Fort Ord, Monterey, California

Common species and vegetation characteristics*	Comparable Manual of California Vegetation Alliances**	Vegetation Alliance Characterized as Maritime Chaparral**
Grassland	Unknown	
Black sage-California sage-chamise chaparral	<i>Adenostoma fasciculatum-Salvia melliferra Shrubland Alliance</i> <i>Chamise-black sage chaparral</i>	
Grassland and black sage-chamise-ceanothus chaparral	<i>Chamise-black sage chaparral</i> <i>Adenostoma fasciculatum-Salvia melliferra Shrubland Alliance</i>	***
Grassland and open canopy manzanita dominated chaparral	<i>Arctostaphylos (crustacea, tomentosa) Alliance, A. montereyensis Provisional Shrubland Alliance, or A. hookeri Provisional Shrubland Alliance</i>	X
Closed canopy manzanita dominated chaparral	<i>Arctostaphylos (crustacea, tomentosa) Alliance</i>	X
Coast live oak woodland with less than 50% manzanita canopy	<i>Quercus agrifolia</i> Woodland Alliance (Coast live oak woodland)	
Manzanita dominated chaparral with less than 50% coast live oak canopy	<i>Arctostaphylos (crustacea, tomentosa) Alliance</i>	X
Chamisal	<i>Adenostoma fasciculatum</i> Shrubland Alliance (Chamise chaparral)	

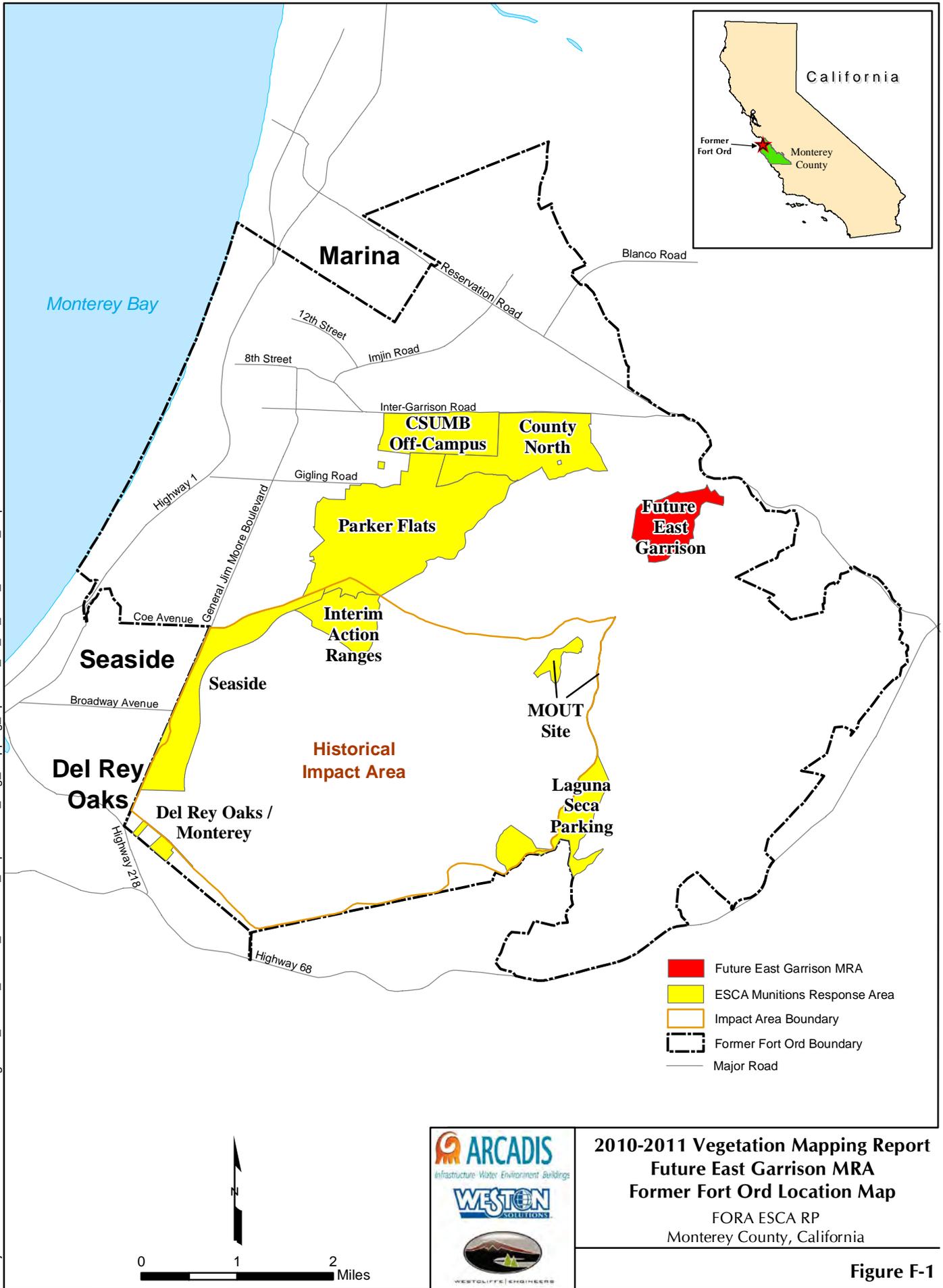
Notes:

* Vegetation patches shown on Figure F-8-Detailed Mapping Results

**A Manual of California Vegetation (Sawyer et al. 2009)

*** Because of the abundance of chamise and black sage this area wouldn't be characterized as maritime chaparral by MCV. It was mapped as maritime chaparral because of the reasonable (~20%) presence of ceanothus and nearby presence of central maritime chaparral.

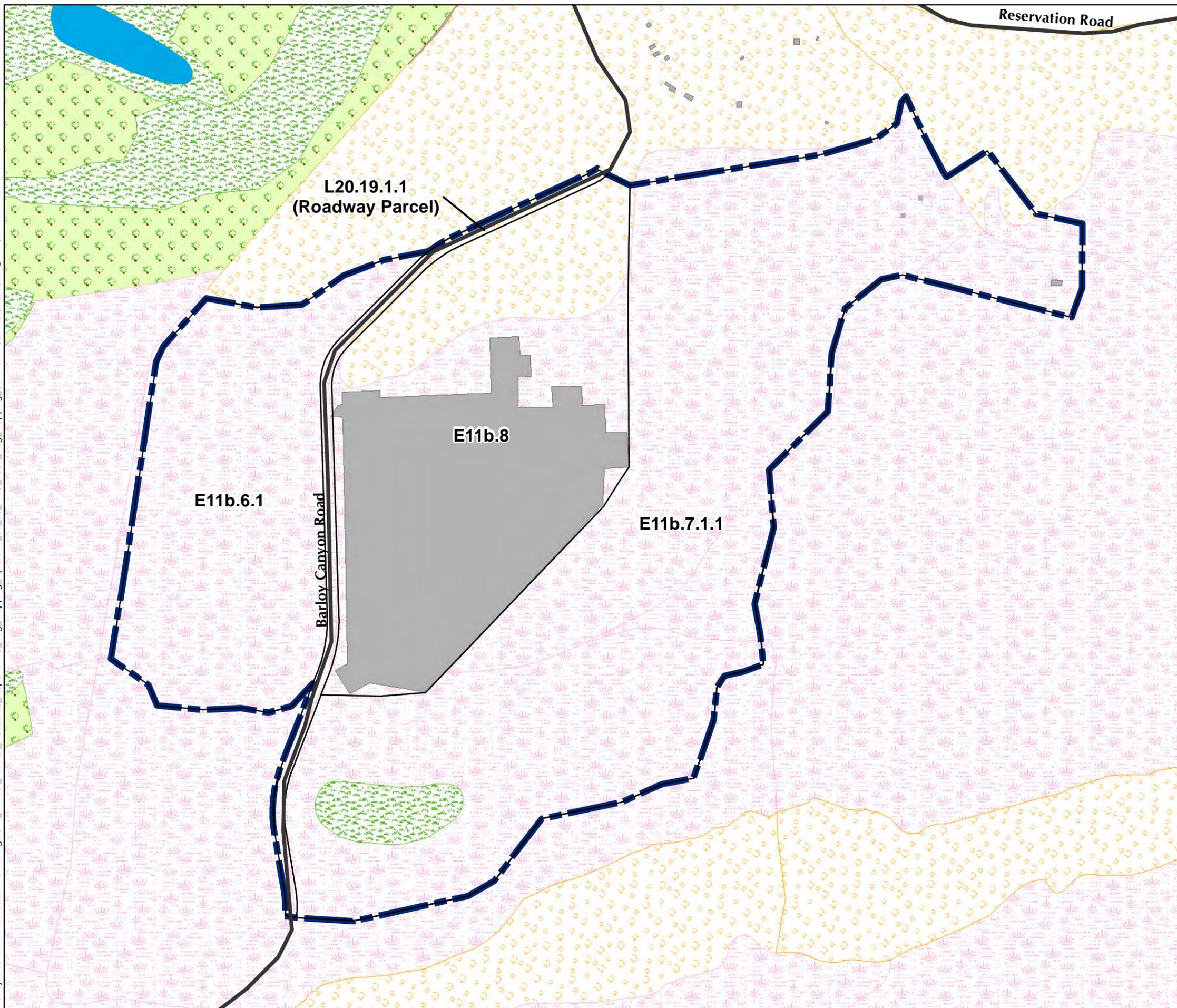
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**2010-2011 Vegetation Mapping Report
 Future East Garrison MRA
 Former Fort Ord Location Map
 FORA ESCA RP
 Monterey County, California**

Figure F-1

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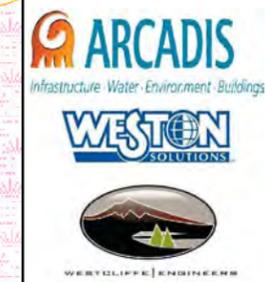
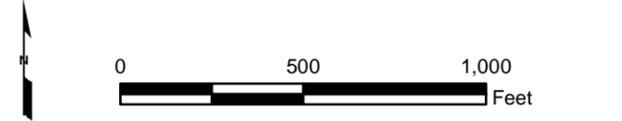
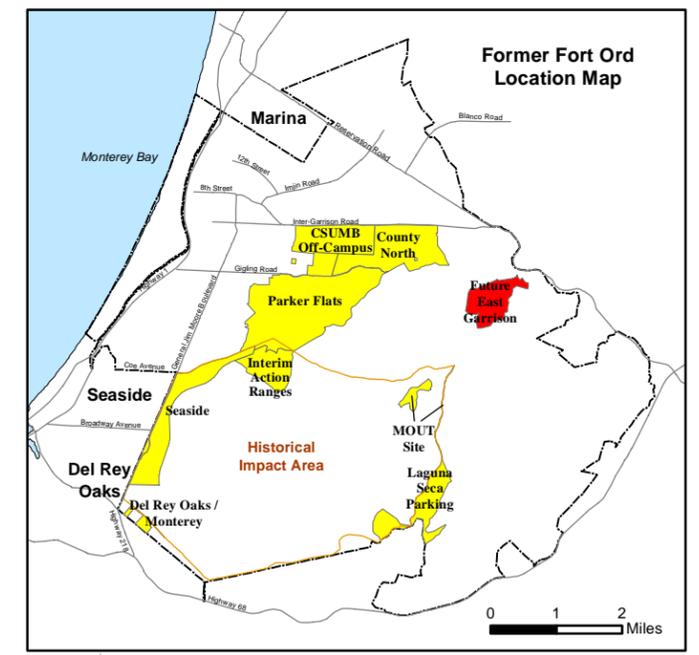
Legend

-  Munitions Response Area
-  Major Road
-  USACE Parcel

Vegetation Type

-  Grassland*
-  Maritime Chaparral*
-  Inland Coast Live Oak Woodland*
-  Coastal Coast Live Oak Woodland*
-  Aquatic Feature*
-  Developed / Disturbed*

*Source: Flora and Fauna Baseline Study of Fort Ord, California, Jones and Stokes Association Inc., December 1992.

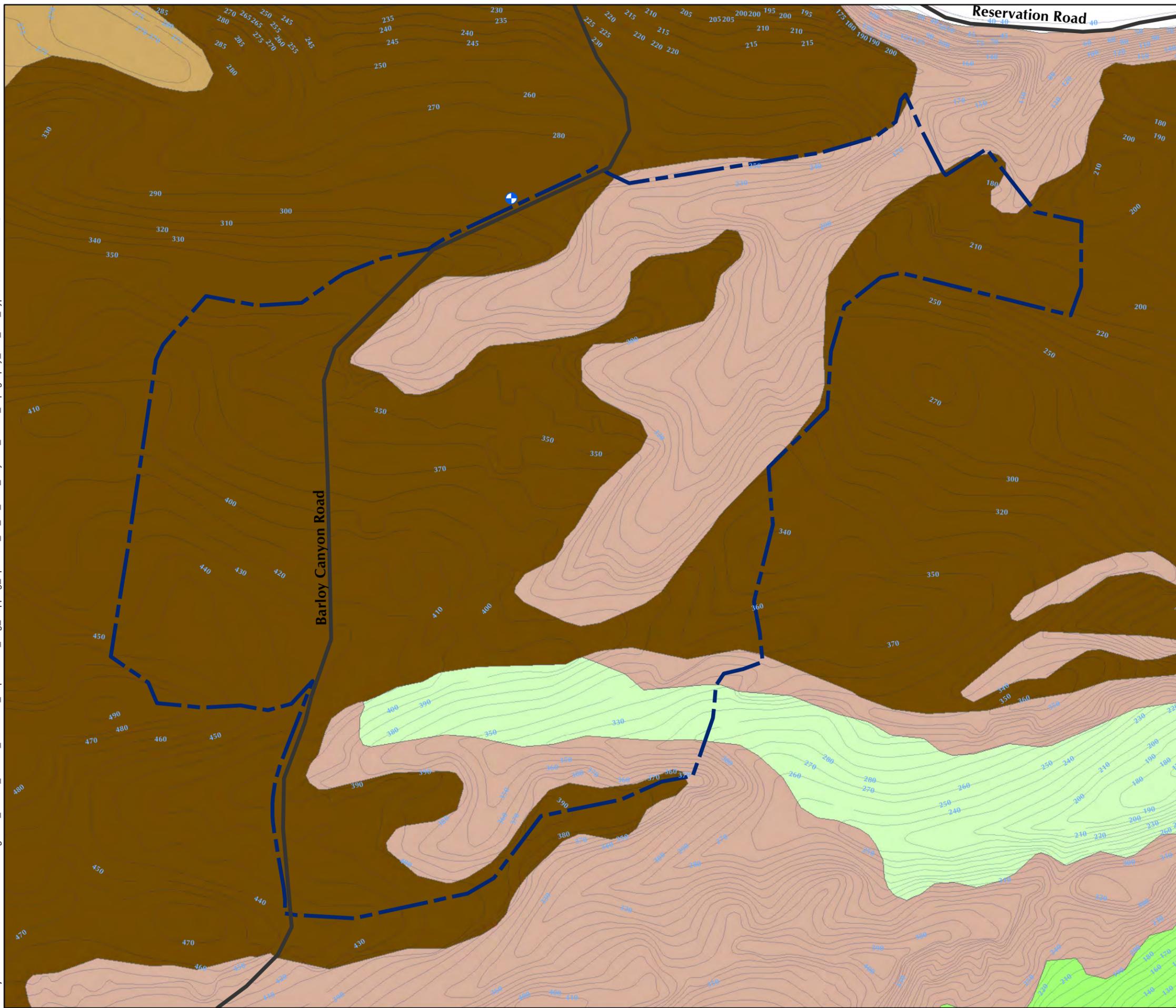


2010-2011 Vegetation Mapping Report
Future East Garrison MRA
Vegetation Communities
According to 1992 Mapping

FORA ESCA RP
 Monterey County, California

Figure F-2

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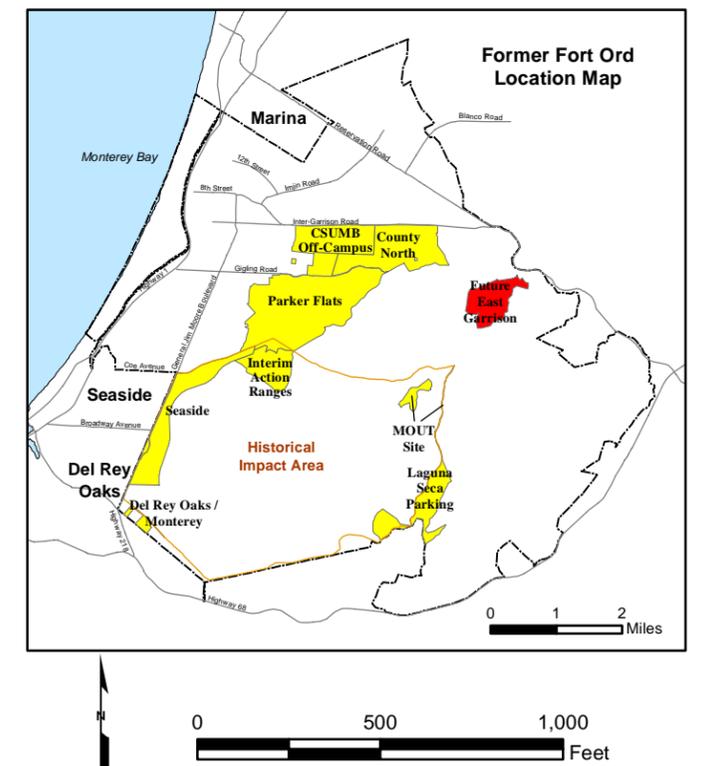


Legend

- Environmental Well
- Munitions Response Area
- Major Road
- Topography 10 ft

Soil Type

- Arnold-Santa Ynez Complex
- Xerorthents, Dissected
- Arnold Loamy Sand, 15 to 50 Percent Slopes
- Arnold Loamy Sand, 9 to 15 Percent Slopes
- Antioch Very Fine Sandy Loam, 2 to 9 Percent Slopes

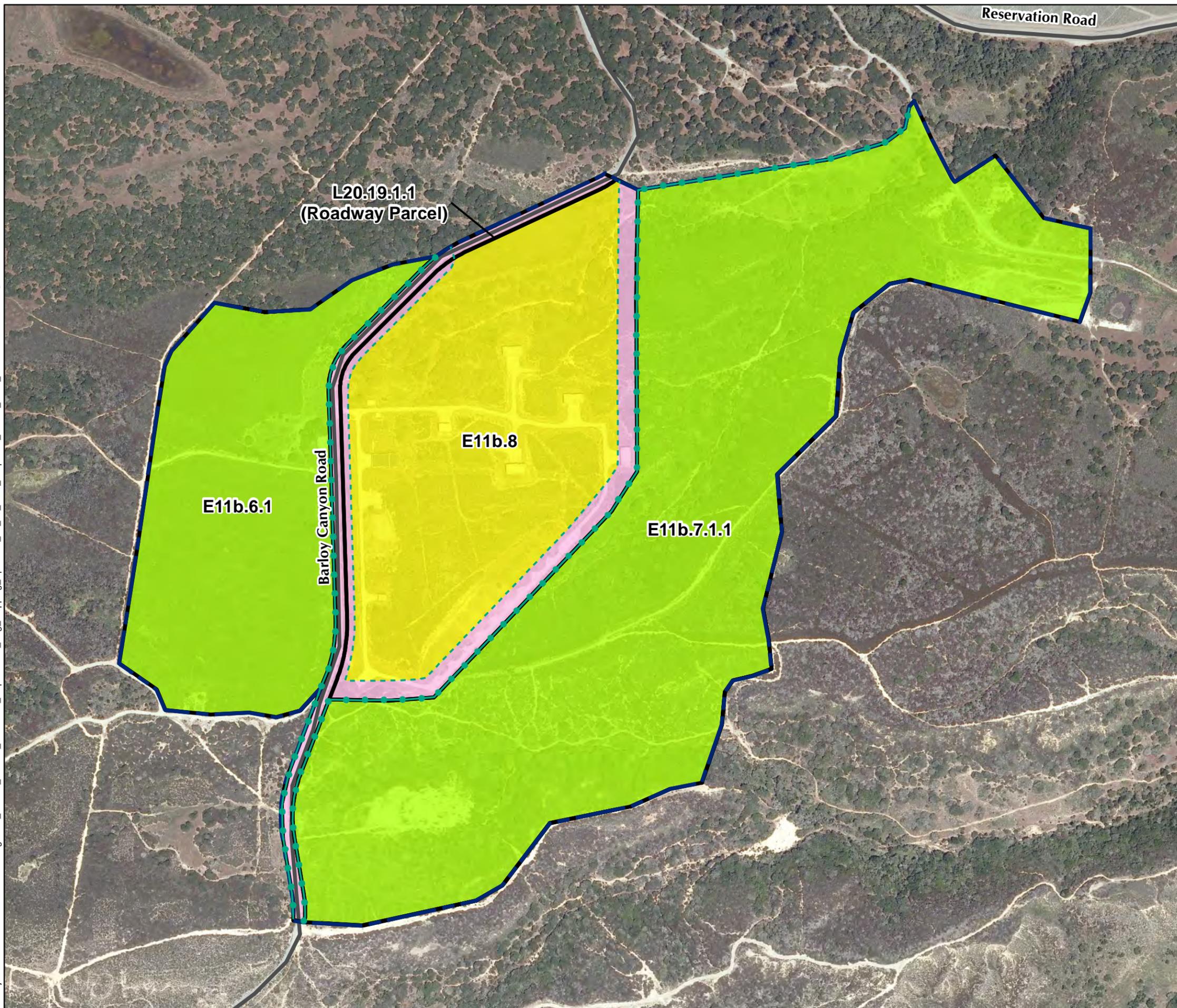


2010-2011 Vegetation Mapping Report
Future East Garrison MRA
Physical Profile
Topography and Soil Type

FORA ESCA RP
 Monterey County, California

Figure F-3

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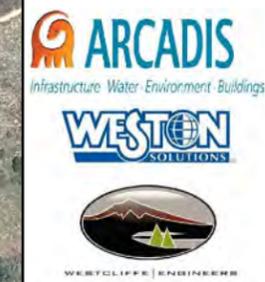
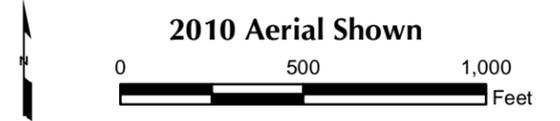
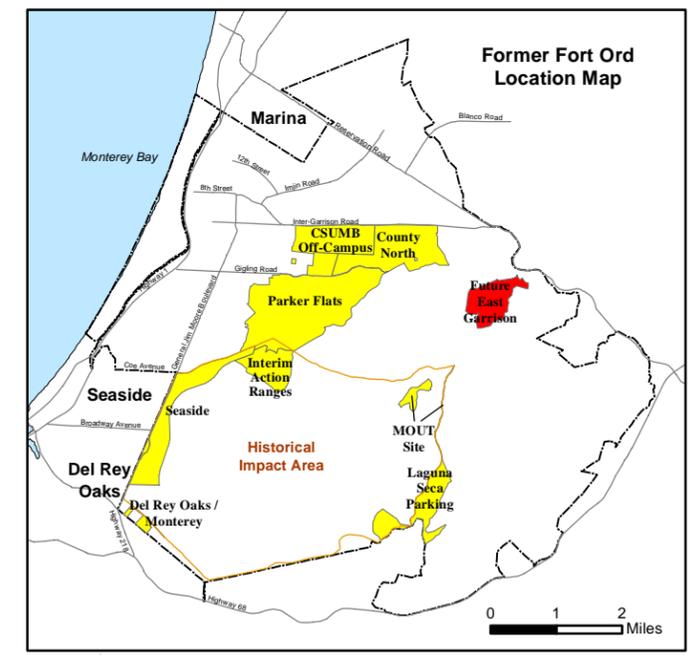


Legend

-  Munitions Response Area
-  Major Road
-  USACE Parcel
-  Borderland Interface
-  100-Foot Buffer from Borderland Interface

Proposed Future Land Use

-  Residential
-  Non-Residential
-  Habitat Reserve



2010-2011 Vegetation Mapping Report
 Future East Garrison NRA
 Proposed Future Land Use

FORA ESCA RP
 Monterey County, California

Figure F-4

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Legend

- Munitions Response Area
- Major Road
- USACE Parcel

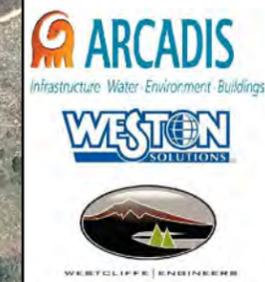
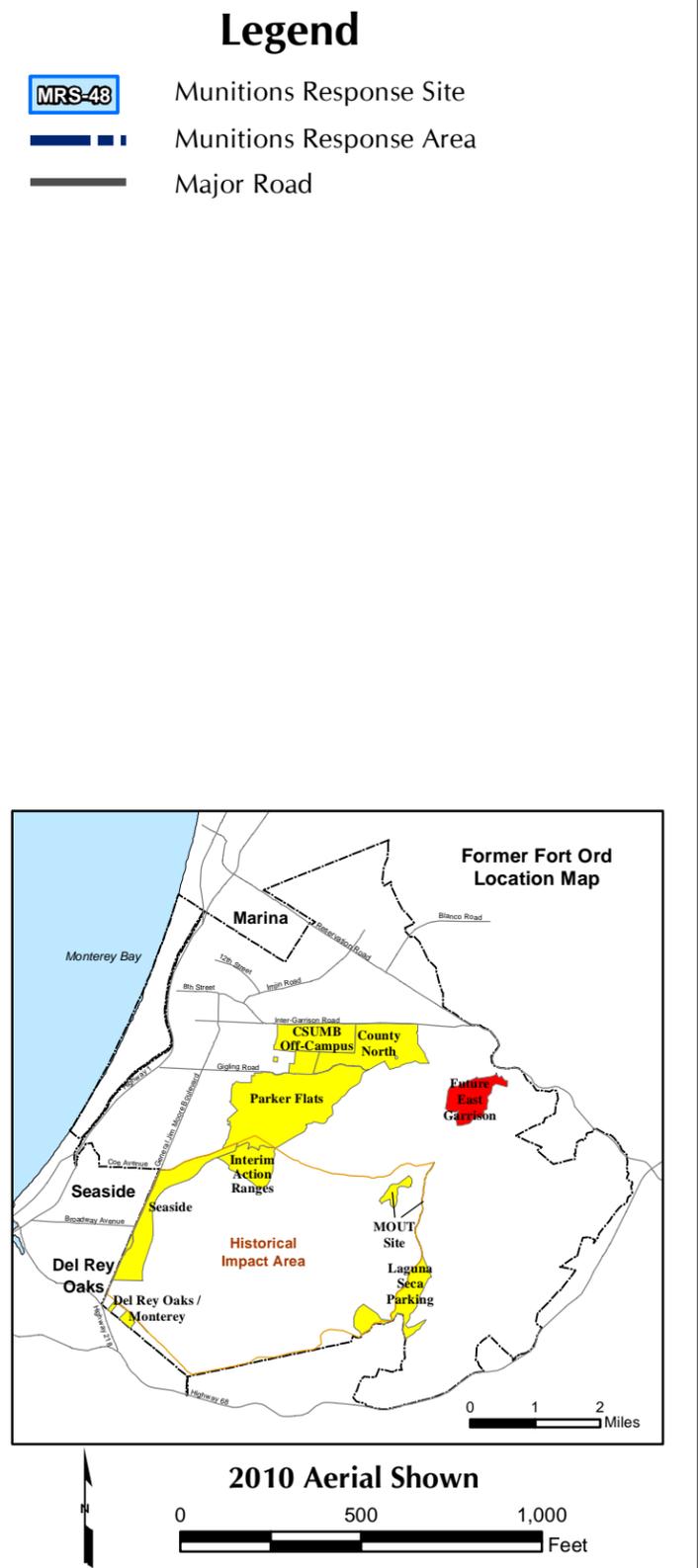
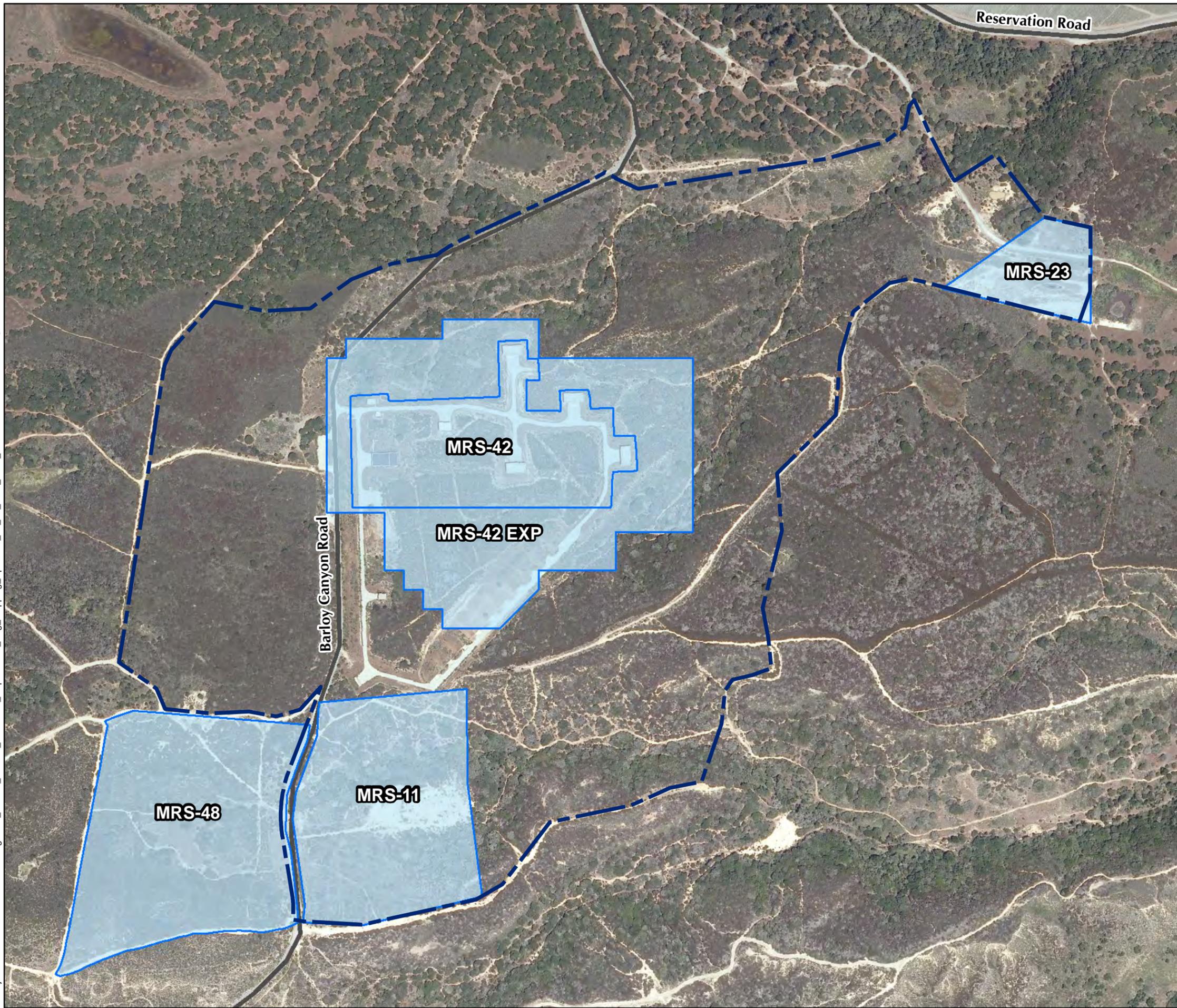
Former Fort Ord Location Map

2010 Aerial Shown

**2010-2011 Vegetation Mapping Report
Future East Garrison MRA
2010 Aerial Imagery**

FORA ESCA RP
Monterey County, California

Figure F-5

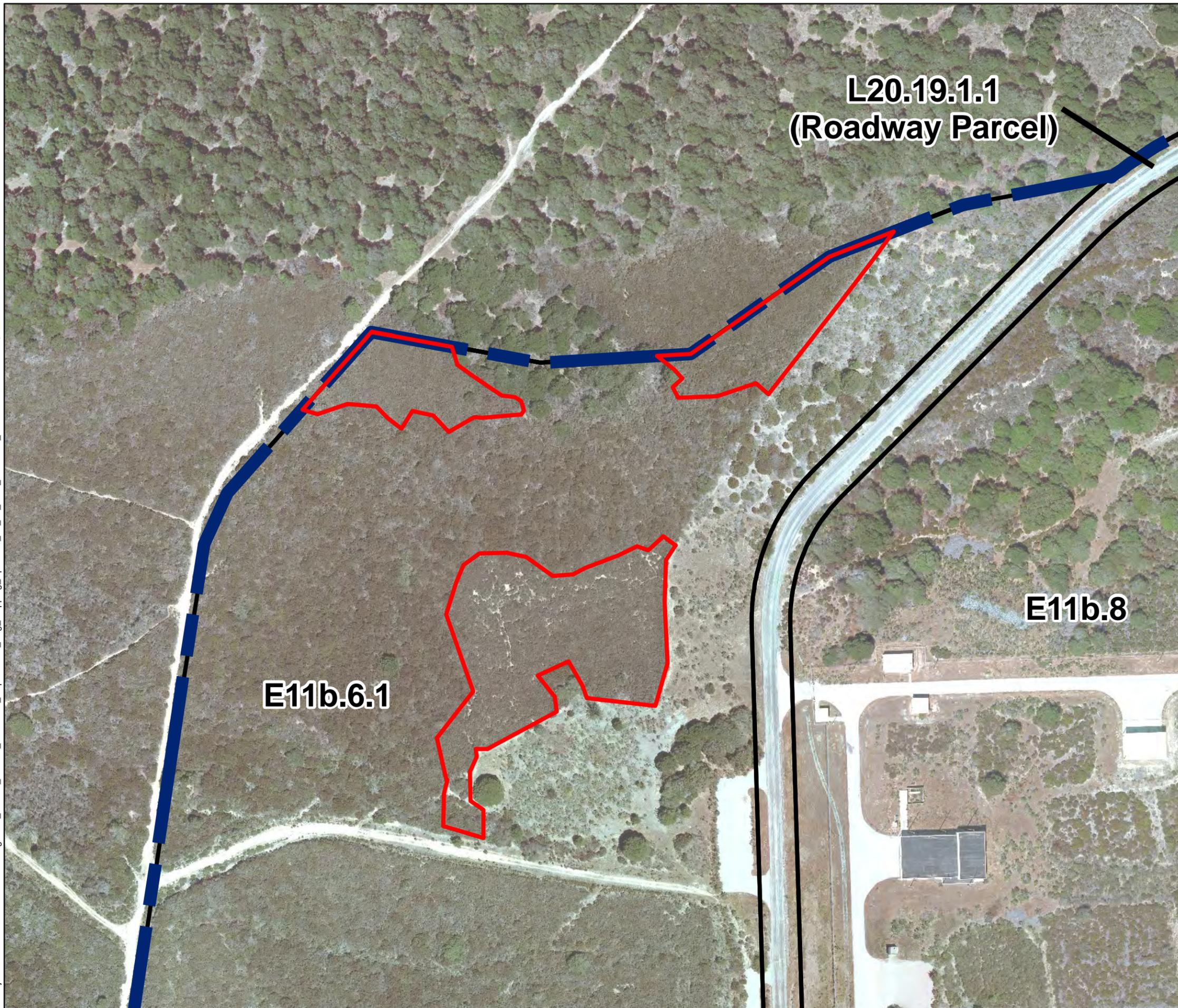


**2010-2011 Vegetation Mapping Report
Future East Garrison MRA
Munitions Response Site Boundaries**

FORA ESCA RP
Monterey County, California

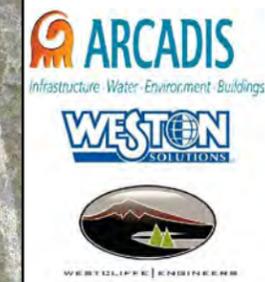
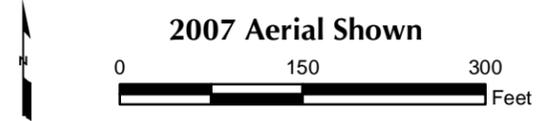
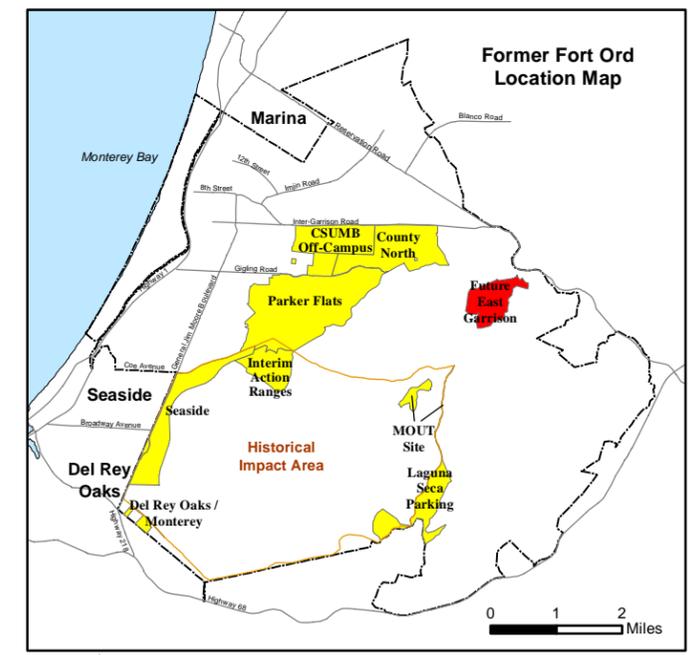
Figure F-6

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Legend

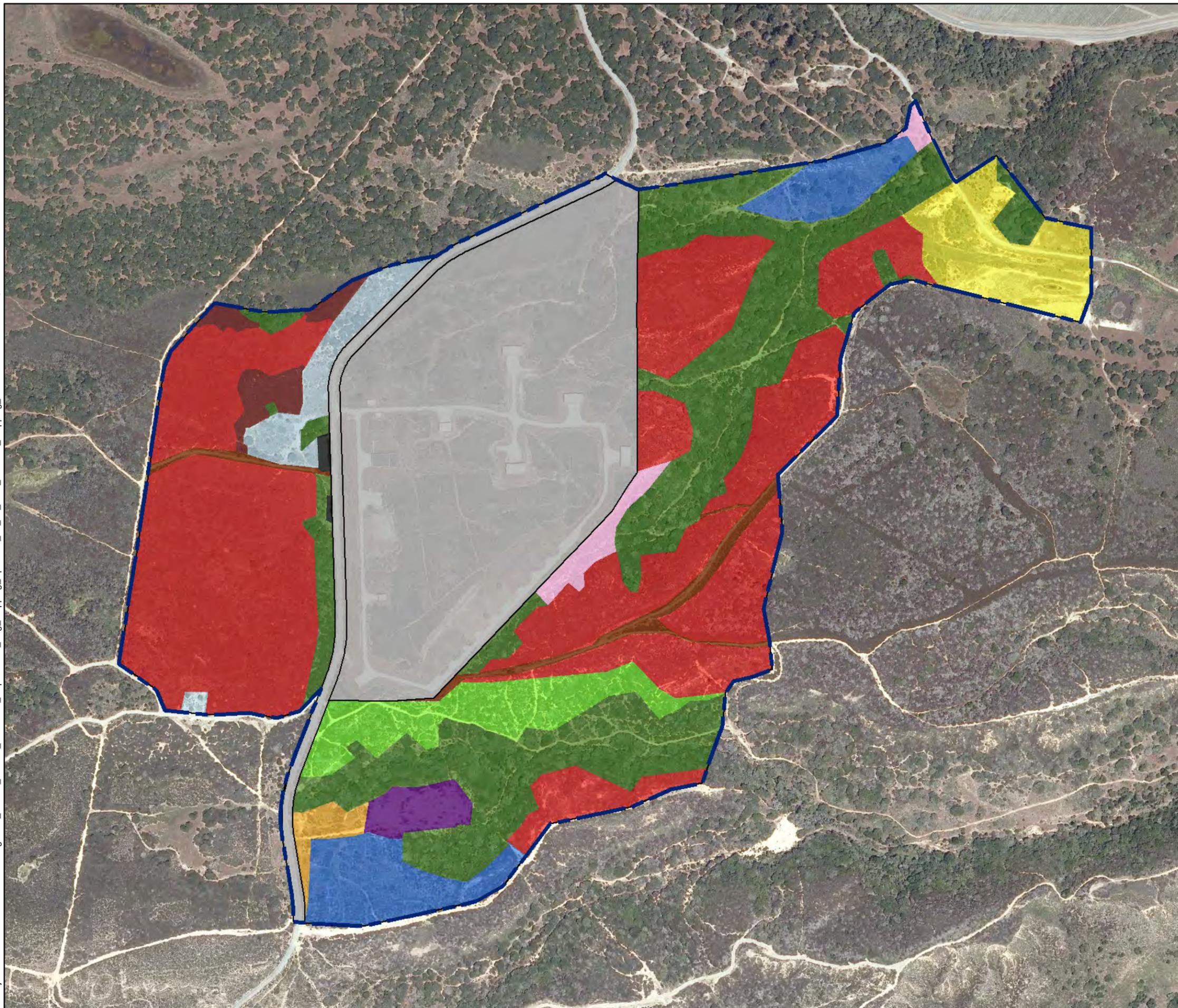
- Chamise (*Adenostoma fasciculatum*)
- Munitions Response Area
- E11b.8 USACE Parcel



2010-2011 Vegetation Mapping Report
Future East Garrison MRA
Chamisal Areas

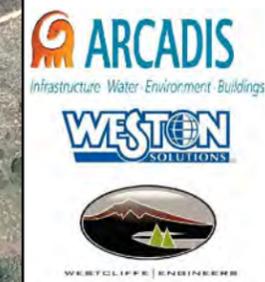
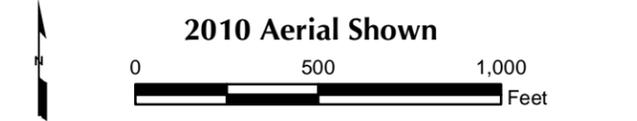
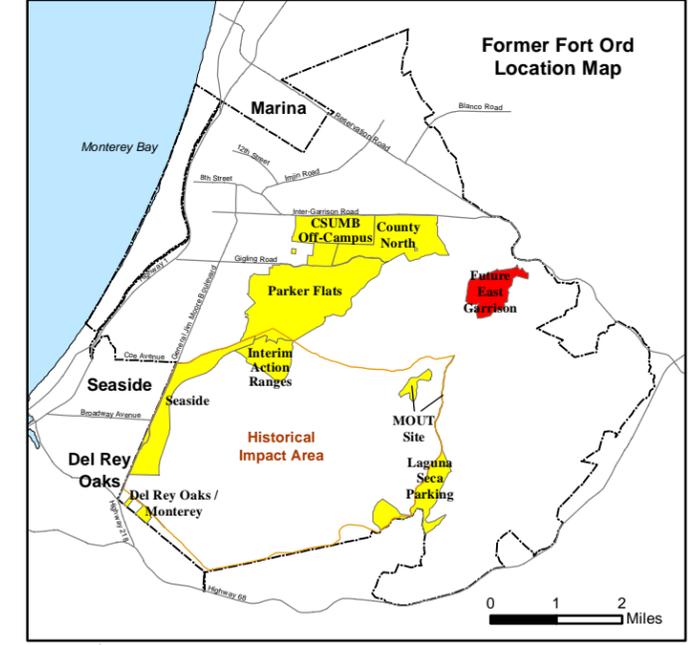
FORA ESCA RP
 Monterey County, California

Figure F-7



Legend

- Grassland
- Black Sage-California Sage-Chamise Chaparral
- Grassland and Black Sage-Chamise-Ceanothus-Manzanita Chaparral
- Closed Canopy Manzanita Dominated Chaparral
- Coast Live Oak Woodland with < 50% Chaparral Canopy
- Manzanita Dominated Chaparral with < 50% Coast Live Oak Canopy
- Chamisal
- Disturbance area including small patches of grassland, several aquatic features and ruderal vegetation
- Sandstone
- Low Recruitment Area
- Roadway / Maintained Fuel Break
- Development Parcel
- Asphalt
- Munitions Response Area

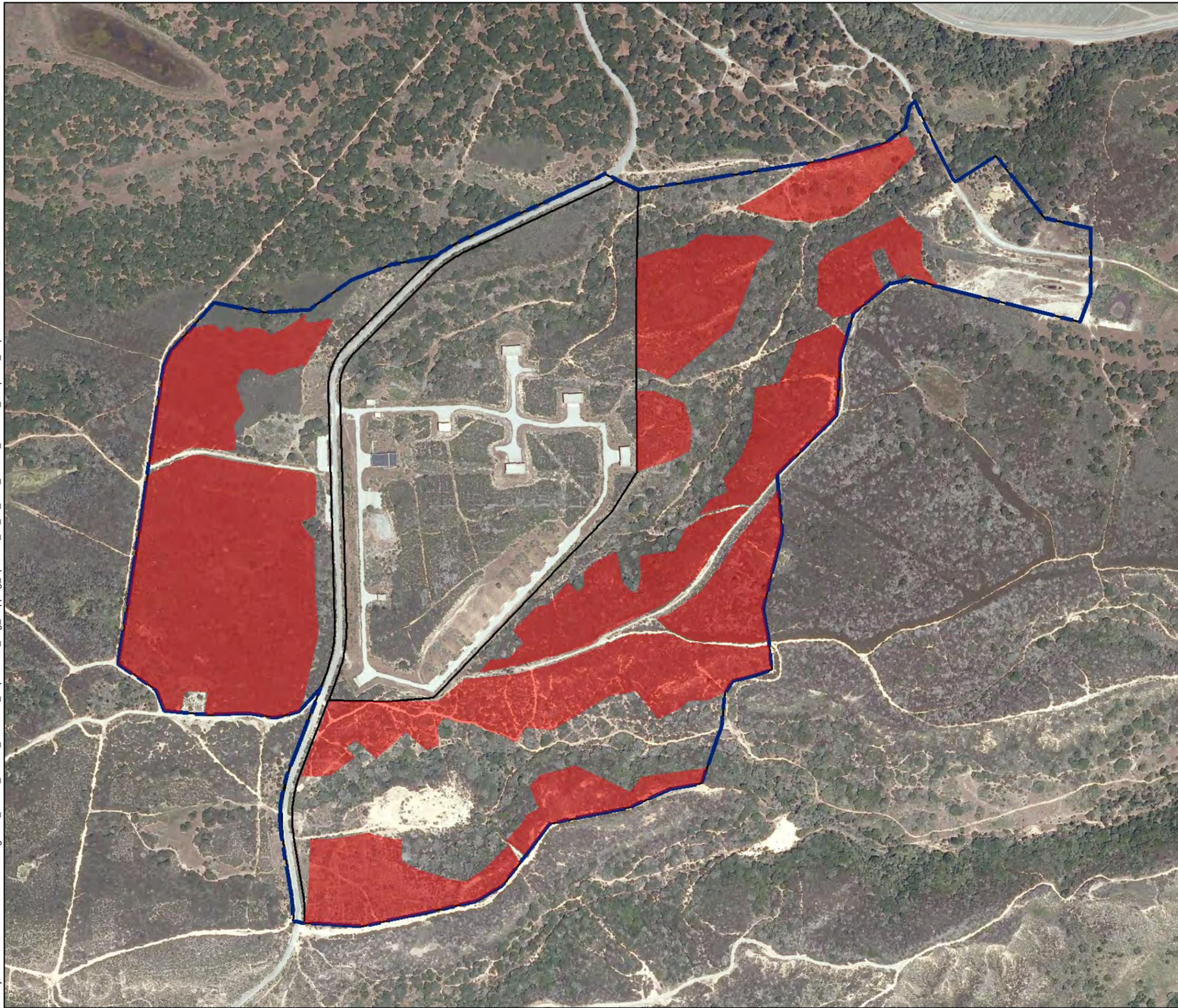


2010-2011 Vegetation Mapping Report Future East Garrison MRA Detailed Mapping Results

FORA ESCA RP
Monterey County, California

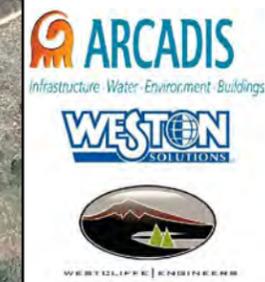
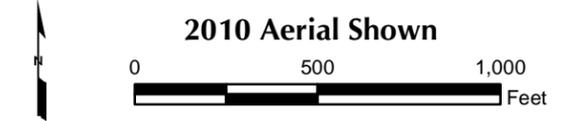
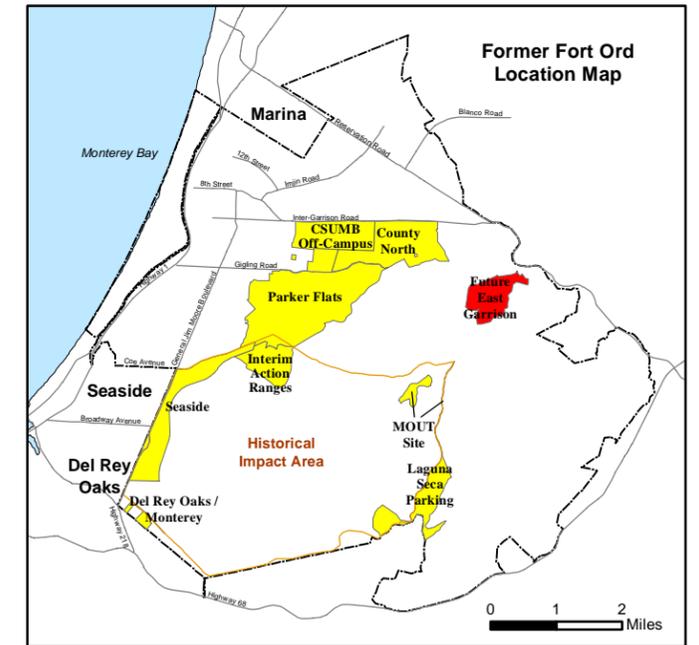
Figure F-8

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Legend

- Identified Central Maritime Chaparral Area
- USACE Parcel
- Munitions Response Area



**2010-2011 Vegetation Mapping Report
Future East Garrison MRA
Central Maritime Chaparral Map**

FORA ESCA RP
Monterey County, California

Figure F-9

APPENDIX A

Photolog

2010-2011 Vegetation Mapping Report
Future East Garrison Munitions Response Area



Photo 1. 2010. Grassland and individual chaparral shrubs in MRS-11 area of Future East Garrison MRA.



Photo 2. 2010. Looking south across the eastern habitat parcel of Future East Garrison MRA.



Photo 3. February 3, 2010. Senior Qualified Biologist Phil Lebednik documenting weedy conditions in northeast corner of Future East Garrison MRA (MRS-23).



Photo 4. January 10, 2010. Stockpiled vegetation from historical vegetation clearance below coast live oak woodland canopy in MRS-11 area in eastern habitat parcel (E11b.7.1.1).



Photo 5. Feb 8, 2010. Typical manzanita dominated maritime chaparral.



Photo 6. February 6, 2011. Large Monterey manzanitas (*Arctostaphylos montereyensis*) retained during vegetation clearance in the eastern habitat parcel (E11b.7.1.1).



Photo 7. May 13, 2011. Survey transects cut through chaparral in the western habitat parcel (E11b.6.1).



Photo 8. May 13, 2011. Chamisal chaparral in the foreground located in the western habitat parcel (E11b.6.1).

APPENDIX G

Future East Garrison MRA Vegetation Baseline Monitoring Report – Not Included

2011 Annual Natural Resource Monitoring, Mitigation, and Management Report

[Appendix G is not included as additional field effort is being conducted. Future East Garrison MRA Vegetation Baseline Monitoring results are expected to be provided in the 2012 Annual Natural Resource Report.]

APPENDIX H

Interim Action Ranges MRA Vegetation Monitoring Report

2011 Annual Natural Resource Monitoring, Mitigation, and Management Report

FORA ESCA REMEDIATION PROGRAM

Appendix H. 2010 Vegetation Monitoring Report Interim Action Ranges Munitions Response Area

Former Fort Ord
Monterey County, California

May 25, 2012

Prepared for:

FORT ORD REUSE AUTHORITY

920 2nd Avenue, Suite A
Marina, California 93933



Environmental Services Cooperative Agreement
No. W9128F-07-2-01621

and
FORA Remediation Services Agreement (3/30/07)

Document Control Number: 09595-12-057-001

Prepared by:



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- H-2 Results of Focus Species Surveys in 2010
- H-3 Species Frequency of Occurrence on Transects from 2000-2010
- H-4 Species, Bare Ground, and Vegetated Ground Percentage Cover Values on Transects of the 2010 Survey
- H-5 Summary Results from Herbaceous Vegetation Quadrats on One Transect from the 2010 Survey
- H-6 Focus Species Total Population Estimates or Counts for the Interim Action Ranges MRA

FIGURES

- H-1 Former Fort Ord Location Map
- H-2 2010 Orthophotos
- H-3 2010 Focus Species Plot Locations and Counts and Shrub Transect Locations

APPENDIX

- A Photolog

ACRONYMS AND ABBREVIATIONS

ARCADIS	ARCADIS U.S., Inc.
Army	U.S. Department of the Army
BO	Biological Opinion
CTS	California tiger salamander
DPS	distinct population segments
ESA	Endangered Species Act
ESCA	Environmental Services Cooperative Agreement
ESCA RP	Environmental Services Cooperative Agreement Remediation Program
FORA	Fort Ord Reuse Authority
ft	feet
GPS	Global Positioning System
HMP	Habitat Management Plan
IAR	Interim Action Ranges
km	kilometers
m	meter
m ²	square meter
MEC	munitions and explosives of concern
MRA	Munitions Response Area
MRS	Munitions Response Site
NOAA	National Oceanic and Atmospheric Administration
NRIM	Natural Resource Impact Mitigation
NTU	nephelometric turbidity units
NWSFO	National Weather Service, Fort Ord
QA/QC	quality assurance/quality control
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

1.0 INTRODUCTION

This 2010 monitoring report was prepared by ARCADIS U.S., Inc. (ARCADIS) on behalf of the Fort Ord Reuse Authority (FORA) under the Environmental Services Cooperative Agreement (ESCA). The report documents vegetation monitoring conducted in the Interim Action Ranges (IAR) Munitions Response Area (MRA). The monitoring was conducted to satisfy a requirement of the Installation-Wide Multispecies Habitat Management Plan (HMP; USACE 1997) and the “Protocol for Conducting Vegetation Monitoring in Compliance with the Installation-Wide Multispecies Habitat Management” (“protocol”; Burleson 2009).

Per the protocol, vegetation surveys are to be conducted in years 1, 3, 5, and 8 for HMP focus species (i.e., HMP plant species that are herbaceous and are also referred to as “HMP annuals,” “HMP herbaceous species” and “HMP forbs”) and in years 3, 5, 8 and 13 for shrub community (Burleson 2009). “HMP plant species” comprise herbaceous and shrub species that are federal Endangered Species Act (ESA)-listed or are of concern because of their limited distribution.

1.1 Purpose

The first purpose of the report is to present the results of HMP focus species and shrub surveys in the IAR MRA, which were conducted in 2010. The surveys were part of an ongoing monitoring program to document recovery of vegetation following a 2003 prescribed burn and disturbance associated with the subsequent munitions and explosives of concern (MEC) investigation and remedial activities (hereinafter termed “MEC activities”) conducted by the U.S. Department of the Army (Army) in 2003. Surveys prior to 2008 were conducted under the direct coordination of the Army. In 2008, the ESCA Remediation Program (RP) Team assumed responsibility for continuing this monitoring program in the IAR MRA (ESCA RP Team 2009). The surveys reported herein were performed seven years after the burn. The “baseline” conditions were established by surveys conducted in 1999-2000. Results of subsequent surveys have documented the extent to which HMP focus species populations and shrub community have recovered from the burn and MEC activities.

The second purpose of the report is to evaluate the information collected to date and to determine whether or not the populations and shrub community are recovering satisfactorily. “Recovery” of focus species involved in these surveys (most of which are annuals) is considered in the context of population dynamics that may be highly variable on an inter-annual time scale. For the shrub community, the overall purpose of the monitoring program is to determine whether or not the vegetation is progressing satisfactorily toward establishment of central maritime chaparral community. If the results of the post-disturbance shrub surveys reveal that recovery is proceeding satisfactorily (i.e., temporal changes generally coincide with an anticipated recovery toward the baseline condition, also referred to as progressing along the expected community recovery trajectory), no additional mitigation measures (e.g., restoration) may be required and additional monitoring surveys may not be necessary.

1.2 Site Description

The survey site is located at the former Fort Ord in Monterey County, about 8 miles north of the City of Monterey, California. The IAR MRA encompasses approximately 231 acres and is centrally located in the former Fort Ord, within what is termed the “historical impact area” (Figure H-1).

Prior to 2008, the area currently referred to as the IAR MRA was part of the Ranges 43-48 Munitions Response Site (MRS). The IAR MRA is designated for use as development (parcel E40) and habitat reserve (parcels E38, E39, E41, and E42; Figure H-2). The portion of the MRA included in this survey (“the survey area”) encompasses the habitat reserve parcels, which comprise approximately 206 acres. An aerial photograph of the IAR MRA taken in 2010 is shown on Figure H-2.

The survey area is within the “Northwest Pacific Coast” climate class, which is characterized by variable precipitation, cool summer temperatures, and mild winter temperatures (Major 1988). In the Monterey area, local climate is influenced by summer fog and predominant cool northwest winds. There is a sharp gradient in climate from the coast to inland areas, where summer temperatures may be much higher, especially during calm periods and/or in areas sheltered from the prevailing winds (Major 1988). The IAR MRA, just over 2 miles from the Monterey Bay coastline, is closer to the coastal portion of this gradient.

Terrain over most of the IAR MRA consists of rolling hills (2 to 15% slopes) with elevations ranging from 370 to 530 feet. The surface soils are characterized as eolian (sand dune) and terrace (river deposits), which consist of unconsolidated materials of the Aromas and Old Dune Sand formations. The soils are predominantly weathered dune sand: primarily Arnold-Santa Ynez Complex with Baywood Sand in the northwestern portion of the MRA.

The vegetation in the IAR MRA is primarily central maritime chaparral with patches of annual grasslands (Figure H-3). Central maritime chaparral is a vegetation type of particular concern in the HMP because of its association with a number of rare, threatened, and endangered species populations (i.e., “HMP species,” including HMP focus species).

1.3 Relevant Site History

Summaries of the relevant information available regarding disturbance and vegetation monitoring in the IAR MRA are presented in this section.

1.3.1 Site Disturbance

The IAR MRA is located within what is termed the “historical impact area” in the former Fort Ord. This area generally was subjected to disturbance over the decades when Fort Ord was involved in major military training activities.

In October 2003 the Army conducted a prescribed burn in the Ranges 43-48 MRS, which included the IAR MRA. After the burn, the Army performed surface and subsurface removal operations on MRS-Range 43-48 from November 2003 to December 2005 (Parsons 2007).

1.3.2 Vegetation Surveys

1.3.2.1 Base-wide Flora and Fauna Survey

A “baseline” or “existing condition” flora and fauna survey of the Fort Ord Military Reservation (i.e., former Fort Ord) was conducted in 1992 and reported in the Flora and Fauna Baseline Study of Fort Ord (USACE/Jones & Stokes 1992). The IAR MRA was included in this survey. For determination of major vegetation types or landscape elements (e.g., chaparral, oak woodland, grassland, open areas, etc.), survey methodology involved identifying types or elements on aerial images and examining these areas in the field (i.e., “ground-truthing”). Similarly for individual HMP plant species, “suitable habitat” was initially identified to the extent possible on the aerial images and more detailed “polygons” of abundance categories were determined for each of these species based on field observations. Abundance categories used were: uncommon or low density (one to hundreds of individuals), occasional or medium density (hundreds to thousands of individuals), and abundant or high density (many thousands of individuals; USACE/Jones & Stokes 1992, p.6). Areas outside of those initially determined to be “suitable habitat” for a species appear not to have been subjected to field observation for that species and they appear as un-shaded areas on the relevant figures. Assignment of an abundance category to an area was based on visual estimation by field biologists: no quantitative data were collected.

The 1992 survey results provided base-wide mapping of major vegetation types and HMP plant species’ abundance. Qualitative and semi-quantitative information was developed on a relatively coarse spatial scale and fieldwork primarily involved visual (non-numerical) observations. The results also indicated the presence of three focus species in high relative abundance: sand gilia (*Gilia tenuiflora* ssp. *arenaria*, also known as Monterey gilia; federal ESA-listed as endangered), Monterey spineflower (*Chorizanthe pungens* var. *pungens*; federal ESA-listed as threatened) and seaside bird’s-beak (*Cordylanthus rigidus* ssp. *littoralis*; not presently federal ESA-listed).

Subsequent vegetation surveys, described in the following section, are more time-relevant, quantitative and sample-location specific than the information in the 1992 survey. Accordingly, the 1992 survey results are not discussed further in this report.

1.3.2.2 HMP Vegetation Monitoring Protocol Surveys

Per the HMP, vegetation surveys are to be performed in areas planned for vegetation removal and subsequent munitions clearance. The HMP identifies a vegetation monitoring protocol, which has been revised periodically (Jones and Stokes 1995; Burleson 2006, 2009). Prior to disturbance of an area, the protocol indicates that a “baseline” survey should be performed. Upon completion of disturbance activities in an area, the survey is repeated during the following 1-13 years to evaluate plant species and community recovery of the area. Details of the methods are discussed in Section 2.0. Protocol surveys were initiated in anticipation of

the 2003 prescribed burn of the Ranges 43-48 MRS and the results are documented below. Note that prior to 2008, the IAR MRA was surveyed as part of the Ranges 43-48 MRS monitoring effort.

A summary of monitoring surveys that were conducted from 1999 through 2011 is presented below. A calendar of the surveys is presented in Table H-1. In the following descriptions, “Year X” refers to the calendar year elapsed since the 2003 burn.

- Baseline Shrub Transect Survey. Baseline shrub transects were established and sampled per the 1995 version of the protocol in 1999 and 2000 within the Ranges 43-48 MRS, including 12 in 1999 and 67 in 2000, to document baseline conditions (HLA 2001). In this report, the survey results reported by HLA (2001) are referred to as the “2000 survey” even though some of the data were collected in late 1999. Of the 79 transects established, 33 were placed within what is now the IAR MRA. The baseline survey established that there were three focus species present in the IAR MRA, namely sand gilia, Monterey spineflower and seaside bird’s-beak. This result was consistent with the 1992 survey.

Per the protocol then in effect, transects were placed by HLA into one of three chaparral stand groups based on examination of aerial photographs and fieldwork: disturbed, intermediate-age, or mature (HLA 2001, p. 2). They indicated that they perceived these groups as associations or successional stages (i.e., seral stages) that could be separated by fire or disturbance history. Disturbed habitat included areas that had been subjected to regular disturbance and was generally located in range fans with cleared rows along firing lines that were interspersed with patches of chaparral species. Intermediate-age stands were estimated to be 5-15 years old and ranged from 3-6 feet in height. Mature stands were composed of fully mature to senescent stands of shrubs that were estimated to be greater than 15 years old and from 6-15 feet in height. HLA stated that disturbed stands were transitional in species composition and cover between intermediate-age and mature chaparral.

- Baseline Focus Species Surveys. Baseline surveys were completed for three HMP focus species in April-May 2000 (sand gilia, Monterey spineflower, and seaside bird’s-beak; Parsons 2005) per the 1995 version of the protocol.
- Year 1 Focus Species Surveys. In the first spring following the burn (April-May 2004), a survey was conducted by MACTEC for three HMP focus species: Monterey spineflower, sand gilia and seaside bird’s-beak (MACTEC 2005) per the 1995 version of the protocol. No shrub (i.e., transect) sampling was conducted, because only a few months had elapsed since the burn, and there was insufficient regeneration of shrubs to provide adequate assessment of shrub recovery. Munitions removal work on the Ranges 43-48 MRS had barely begun at this time. (Note: Because the removal work was still underway, this survey was technically not “post-disturbance” but is considered in this report to be equivalent to a Year 1 post-disturbance survey as it occurred after the prescribed burn.)
- Year 2 Focus Species and Shrub Transect Surveys. Surveys were conducted for three HMP annuals in April-September 2005 per the 1995 version of the protocol: Monterey spineflower (unspecified time frame), sand gilia (April-May) and seaside bird’s-beak (June-July; Parsons 2005). Per the protocol, quantitative data were collected for sand gilia

and seaside bird's-beak; however, for Monterey spineflower, only presence/absence data (within 100- by 100-foot grid blocks) were collected, owing to lack of time. The first post-baseline shrub transect survey was conducted per the 1995 version of the protocol in August-September 2005. Transects were evaluated based on the three groupings employed by HLA (2001). Two of the transects occupied in 2005 were not among those occupied in the 1999-2000 baseline survey. Because there are no baseline data for these two transects, they are not discussed further in this report.

- Year 5 Focus Species and Shrub Transect Surveys. Surveys were conducted in 2008 per the 2006 draft version of the revised protocol. Three HMP focus species were surveyed: Monterey spineflower (April 28 through May 14), sand gilia (April 28 through May 14) and seaside bird's-beak (July 28 through July 30; ESCA RP Team 2009). The shrub transect survey was conducted from July 30 through August 7. The revised protocol primarily involved changes in the sampling design and methods associated with the focus species surveys. These changes are discussed in detail in the 2008 Annual Natural Resource Monitoring, Mitigation and Management Report (ESCA RP Team 2009).
- Year 7 Focus Species and Shrub Transect Surveys. Surveys were conducted in 2010 per the methods described in the protocol. As previously discussed, surveys are ordinarily performed in the eighth year after disturbance (2011 in the IAR MRA); however, in anticipation of disturbance associated with additional MEC investigation and remedial activities of the ESCA RP Team projected to begin in 2011, it was decided to conduct the survey in 2010. Details of this survey are presented below.

2.0 METHODS

The survey involved three data collection methods: 1) plant counts of focus species within pre-established plots, 2) line-intercept transect observations of shrubs and 3) quadrat-based observations of herbaceous vegetation associated with the transects, depending on the amount of herbaceous cover present.

2.1 Focus Species

For surveys of focus species following the baseline survey, the protocol requires re-sampling the plots established in the baseline survey. However, the sampling design in effect when the baseline survey was performed required 100% sampling of the populations in the survey area whereas the current protocol requires sampling of a subset of the locations. In 2008 (ESCA RP Team 2009), the sample subsets for each of the focus species were determined and those plots were re-sampled in 2010.

Monterey spineflower and sand gilia observations must be performed during the peak flowering period because plants are difficult to identify with certainty in the absence of flowers. Furthermore, both species are cryptic (particularly sand gilia, which often produces very small inconspicuous upright plants that occur in widely spaced, low density populations). For sand gilia, the peak flowering period typically occurs in April and lasts 3-6 weeks. Within the peak flowering period, flowers of sand gilia may open late or not at all on days when cold and/or overcast conditions persist. Monterey spineflower is generally less cryptic to field botanists trained to recognize it, as it frequently grows in prostrate clumps. Its

flowering period typically extends into June, July or later, depending on the year. In contrast to the baseline surveys, when specific locations of the populations are not previously known and large areas may need to be surveyed, subsequent surveys are limited to pre-defined plots, making it easier to locate cryptic plants. However, within the peak flowering period, flowers of sand gilia may open late or not at all on days when cold, foggy, and/or overcast conditions persist. To improve observational accuracy, reference (i.e., known) populations of sand gilia and Monterey spineflower in the IAR MRA or adjacent areas of the Parker Flats MRA were monitored periodically during the survey period for presence of open flowers prior to conducting that day's survey observations to confirm flower opening. The practice of using reference area observations to confirm suitable detection conditions minimizes the possibility of false-negative observations and provides additional confidence that cryptic plants were detected during the survey.

The Global Positioning System (GPS) locations of the plots sampled in 2008 were used to re-locate the plots for sampling. Per the protocol, the plot (= "observational unit") for focus species' surveys is a 5-meter diameter circular plot that is positioned within a cell of the 100-by 100-foot coordinate system established across former Fort Ord, if feasible. Each plot was positioned, if possible, to encompass a homogenous representative portion (based on visual determination) of the subpopulation. The observations were comprised of plant counts. Depending on the density of plants within a plot, either all the plants in the plot were counted or (if very dense, making accurate counts difficult and/or time-consuming) the plot was subdivided into quadrants and counts were made in one or two visually representative quadrants. If the plot was subdivided for counting, the value was adjusted appropriately to generate an estimate of the total number of plants in the plot. Plant counts were recorded in field notes and/or data sheets.

Sand gilia counts were made across the entire grid cell (100- by 100-foot area) within which a plot was located in addition to counts within the plots described above. This practice was adopted to provide expanded spatial information on the species. It was considered that the rarity and sometimes irregular local distribution of this annual species as well as plot positioning variability in the field could generate misleading results if only plot counts were made.

Quality assurance and quality control (QA/QC) of field-recorded information involved review before departing the survey site each day and another review upon return to the office. Data from field records were entered into a spreadsheet, which was validated (by independent comparison with field records) prior to data analysis. Formulae employed in the spreadsheet for tabulation or computation were checked for accuracy and completeness.

2.2 Shrub Community

Similar to the focus species surveys, line-intercept transects are re-sampled in surveys subsequent to the baseline survey. The revisions to the vegetation protocol did not involve substantial changes to the transect methodology so that the 2008 and 2010 transects and data generated from them are generally comparable to those of the pre-2008 surveys.

At each transect location, a 50-meter measuring tape was stretched tautly from starting point to endpoint, both of which were identical to those used in the 2008 survey. Beginning at the starting point, the observational method involved selecting a line segment that extended across bare ground, herbaceous vegetation or shrub vegetation. For the former two categories, the segment was recorded as 100% of that type. For segments with shrub vegetation, the presence of each shrub species within the segment was recorded. Presence of shrub species was determined by projected presence as well as sub-canopy presence.

The data recording conventions and requirements described in the protocol (Burleson 2009) were adhered to.

The same QA/QC process was employed as for the focus species data.

2.3 Herbaceous Vegetation

Quadrat sampling may be performed if “significant” herbaceous vegetation is present on a shrub transect. This method is intended to be applied to areas generally lacking in shrub cover, such as newly burned areas. Quadrats (0.5 by 0.5 meter) are positioned with one side on the transect line and alternated from left to right at 10-meter intervals for the length of the transect. Although this activity is termed “herbaceous monitoring,” all plant species (including shrubs) are recorded. For certain species, plant numbers are recorded and for all species, percentage cover is recorded.

If quadrat data were collected, the same QA/QC process was employed as for the focus species data.

3.0 RESULTS

The results of the 2010 vegetation survey in the IAR MRA are presented in this section. Between the 2008 and 2010 surveys, munitions safety restrictions were increased and biologists were not able to access certain locations that contained sampling sites. Also, high densities of poison oak prevented safe access to one of the transects. Therefore, as noted below, the number of sample locations in 2010 was slightly reduced from that in 2008.

3.1 Focus Species

As in previous years, surveys were performed for sand gilia, Monterey spineflower and seaside bird’s-beak. The results are summarized in Table H-2 and discussed in the following sections.

3.1.1 Monterey Spineflower

The Monterey spineflower survey was performed from April 14-23. Twenty-three plots were sampled for the species in 2010, three fewer than were sampled in 2008. The species occurred in 19 of the plots, a frequency of 82%. Counts within the plots ranged from 0 to 2,055, with a

mean value of 291.3 (see Table H-2). The standard deviation value for plot counts exceeded the mean value, indicating a high variance between the counts.

3.1.2 Sand Gilia

The sand gilia survey was performed from April 13-23. Twenty-one plots were sampled for the species in 2010, one less than were sampled in 2008. The species occurred in eight of the plots, a frequency of 38%. Counts within the plots ranged from 0 to 15, with a mean value of 3.0 (see Table H-2). As described in Section 4.1, counts were also made in the entire grid cell associated with each plot. These data revealed that the species was present in 15 of the grid cells, a frequency of 71%. Counts within the grid cells ranged from 0 to 303, with a mean value of 40.8 (see Table H-2). The standard deviation values for both plot and grid cell counts exceeded the mean value, indicating a high variance between the counts.

3.1.3 Seaside Bird's-beak

The seaside bird's-beak survey was performed from July 22-23. Nineteen plots were sampled for the species in 2010, three fewer than were sampled in 2008. The species occurred in all but one of the plots, a frequency of 94%. Counts within the plots ranged from 0 to 390, with a mean value of 106.9 (see Table H-2). The standard deviation value was slightly less than the mean value, indicating less variance between the counts for this species than for sand gilia or Monterey spineflower.

3.2 Shrub Community

Line-intercept transects in the shrub community were observed from July 3-13. A total of 19 transects were observed in 2010, seven fewer than in 2008.

During the 2000 baseline survey, transects were classified into disturbed, intermediate and mature categories. In the 2010 survey, two transects observed had been classified as disturbed, seven as intermediate and ten as mature.

Twenty-one shrub or shrub-like species were observed in one or more of the transects in 2010 (Table H-3). Three of these species, sandmat manzanita (*Arctostaphylos pumila*), Monterey ceanothus (*Ceanothus cuneatus* var. *rigidus*) and Eastwood's ericameria (*Ericameria fasciculata*), are HMP species.

Percentage cover values for shrub species, bare ground and herbaceous vegetation in the 2010 survey are presented in Table H-4. Overall, bare ground was present on 18.2% of the transects and (herbaceous) vegetated ground occupied 2.1%. The four most abundant species were: shaggy barked manzanita (*Arctostaphylos tomentosa*; 31.1%), California lilac (*Ceanothus dentatus*; 20.5%), Monterey ceanothus (*Ceanothus cuneatus* var. *rigidus*; an HMP species; 14.7%), and chamise (*Adenostoma fasciculatum*; 8.7%).

3.3 Herbaceous Vegetation

Only one of the transects was observed to have significant amounts of herbaceous vegetation such that quadrat sampling was implemented. Of the six quadrats observed, the mean percentage cover of bare ground was 54% (Table H-5). The most abundant species were unidentified grasses (19.3%), two species of tarweed (*Hemizonia* spp.; 5.3 and 6%), and *Rumex acetosella* (6%; a non-native species). Monterey spineflower (an HMP focus species) was present in three of the quadrats with a mean percentage cover value of 4.7%.

4.0 EVALUATION OF VEGETATION RECOVERY

This section includes a review and evaluation of species population and vegetation recovery during the seven years that have elapsed since the 2003 burn and MEC activities. The results of monitoring surveys completed during the period are compared with data from the baseline surveys conducted in 1999-2000. The baseline transects were assigned to three vegetation/disturbance categories (i.e., disturbed, intermediate-age, or mature [HLA 2001, p. 2]). HLA (2001) stated that intermediate-age chaparral was composed of 5-15 year old plants and mature chaparral was composed of shrubs that were older than 15 years.

According to MACTEC (2005), the 2003 burn eradicated the central maritime chaparral and grassland vegetation in the IAR MRA; therefore, live above-ground vegetation is considered to have been absent immediately after the burn. Accordingly, the 2010 vegetation would be expected to be just entering the intermediate-age stage of central maritime chaparral.

4.1 Focus Species

As described in the 2008 report (ESCA RP Team 2009), changes to the protocol associated with methods for surveying focus species required computation of a common metric to facilitate comparison of the data sets. The metric selected was an estimate of the total populations of the species in the IAR MRA. Using that metric, an evaluation of the results through the 2008 survey was performed. This section updates those results with the 2010 data. The methodology for computation of population estimates is described in detail in the 2008 report (ESCA RP Team 2009). The 2010 estimates were calculated using the same formulae as for the 2008 data sets. However, because the sample sizes in 2010 were lower than those in 2008, it was necessary to adjust the factor associated with relative sample size in the formulae employed in 2008 to calculate the 2010 total population estimates. As discussed in detail in Appendix C of the 2008 report (ESCA RP Team 2009), the methods used to compute population estimates for focus species are subject to a number of assumptions.

4.1.1 Monterey Spineflower

For Monterey spineflower, the 26 plots observed in 2008 represented a 5% sample of the total number of grid cells where the species was reported in the 2005 survey; therefore, to compute a comparable population estimate, the total population of the observed plots was increased by a factor of 20 (see formula A in Appendix C of the 2008 report; ESCA RP Team 2009). In

2010, 23 plots were observed; therefore, the factor was increased to 22.6 for the 2010 Monterey spineflower calculation.

As shown in Table H-6, the Monterey spineflower population estimate for 2010 was more than three times the estimate for 2008 and greater than in 2004, the year after the burn. The 2010 population estimate was more than seven times that of the baseline survey and the highest value of the four surveys. Because this species is an annual, its population may be expected to fluctuate from year to year. Furthermore, if the plants do not have strong fidelity to the plots where the observations are made, this would also contribute to inter-annual variation in population size estimates. On the other hand, the similarities in Monterey spineflower/sand gilia ratios in 2000, 2008 and 2010 indicate that these variations may not arise from random spatial variability.

4.1.2 Sand Gilia

For sand gilia, 22 plots observed in 2008 represented a 5% sample of the total number of grid cells where the species was reported in the 2005 survey; therefore, to compute a total population estimate comparable to that of the 2005 survey, the total population of the observed plots was increased by a factor of 20 (see formula D in Appendix C of the 2008 report; ESCA RP Team 2009). In 2010, 21 plots were observed; therefore, the factor was increased to 21.

As shown in Table H-6, the sand gilia population estimate for 2010 was about three times the estimate for 2008. The 2010 population estimate was more than six times that of the baseline survey. Similar to Monterey spineflower, the population of sand gilia may be expected to fluctuate from year to year and lack of fidelity to the plots would similarly contribute to inter-annual variation in population size estimates. However, as discussed above, ratios of Monterey spineflower/sand gilia indicate that these variations may not arise from random spatial variability. The data presented in Table H-6 indicate that the estimates have ranged over more than two orders of magnitude during the eleven year period of observations.

4.1.3 Seaside Bird's-beak

For seaside bird's-beak, the 2008 sample size of 22 represented approximately 23.66% of the total area occupied by the species in 2005; therefore, a factor of 4.227 was used in the formula to scale the value to the total habitat area (see formula G in Appendix C of the 2008 report; ESCA RP Team 2009). In 2010, 19 plots were observed and the factor was increased to 4.895 to account for this difference. The "best estimate" was considered to be a value midway between the minimum and maximum estimates for the species (see Section 4.1.3 in Appendix C of the 2008 report; ESCA RP Team 2009). The same approach was used to determine the 2010 total population estimate. For 2010, the minimum estimate was 9,942, the maximum was 650,674 and the "best estimate" was 240,452.

As shown in Table H-6, the seaside bird's-beak population estimate for 2010 was about 1.2 times higher than the estimate for 2008. From 2004 through 2010, the population estimate for this species has consistently increased. The 2010 population estimate was nearly 140 times

that of the baseline survey. The 2008 and 2010 estimates indicate that population increases are declining and the species population may be approaching a plateau.

4.2 Shrub Community

As discussed previously, above-ground live vegetation was removed as a result of the 2003 burn. The 2010 data, collected 7 years after the burn, would be expected to indicate shrub recovery that is just entering the intermediate-age phase (as characterized by HLA [2001]). Because the baseline data were obtained from stands ranging in age from 7-20+ years, the 2010 results would not be expected to be fully comparable to the baseline data, but would be expected to exhibit substantial progress along the recovery trajectory.

The overall presence and spatial distribution of shrub species, based on frequency of occurrence (Table H-3), appear to have changed little based on a comparison between the baseline and 2008-2010 results. Accordingly, species presence and spatial distribution in 2010 was comparable to that of the baseline survey.

Shrub species richness on transects (Table H-3) was 16 in the baseline survey and 21 in the 2010 survey. All of the species recorded in the baseline survey were present in 2010. Eastwood's ericameria (an HMP shrub species) was not recorded in the baseline survey but was recorded in 2008 and 2010. Thus, 7 years after the burn, all species recorded in the baseline survey had returned and species richness had increased over that in the baseline survey.

The abundance data (Table H-4) indicate that bare ground decreased from 100% following the 2003 burn (dead vegetation is recorded as bare ground per the protocol) to 22.2% in 2008 and 18.2% in 2010. This compares with more than 9% in the baseline survey. Overall shrub cover increased from 0% following the 2003 burn to 104.8% in 2008 and 95.0% in 2010. The baseline value was 106.6%, indicating that shrub cover had nearly returned to the baseline level after only 7 years. These results demonstrate substantial overall shrub recovery and indicate that the vegetation has recovered more quickly than had been expected based on the number of years of recovery.

Five species had more than 5% cover in the baseline survey: shaggy barked manzanita (54.0%), sandmat manzanita (an HMP species; 18.7%), chamise (11.3%), black sage (8.9%) and Monterey ceanothus (an HMP species; 6.2%). Of the two HMP species, Monterey ceanothus was higher in 2010 (6.2% in baseline versus 14.8% in 2010) and sandmat manzanita was lower (18.7% in baseline versus 1.5% in 2010). The other three species were present at somewhat lower cover levels in 2010 versus the baseline. One relatively minor species in the baseline survey, California lilac, was higher (3.1% in baseline compared to 20.5% in 2010). Comparison of the 2008 versus the 2010 data reveal mixed changes in percentage cover of the species, indicating either a plateau of shrub cover trend or transition to an incremental increase in shrub cover. These differences in species abundance are consistent with recovery of species populations to the initial intermediate-age phase of community maturation.

The only target weed species recorded on the transects (iceplant) was present on 40% of the transects in 2008 in low abundance ($\leq 5.8\%$). By 2010, frequency on transects had dropped to 20%, all percentage cover values had decreased, and the maximum percentage cover value on a transect was 3.8%.

4.3 Recovery Evaluation

As discussed in detail in Appendix C of the 2008 report (ESCA RP Team 2009), the methods used to compute population estimates for focus species are subject to a number of assumptions. Notwithstanding the uncertainties associated with these total population estimates, the results represent a common metric across surveys that used different methods thereby providing insights as to the trends and health of the species' populations in the IAR MRA from 2000-2010. As presented in Table H-6, the populations of Monterey spineflower, sand gilia and seaside bird's-beak in the IAR MRA were higher than the baseline values after disturbance (from 2004 through 2010, except for seaside bird's-beak in 2004). These results indicate that the species' populations are in a healthy and self-sustaining condition. The transect results support this conclusion. The presence of suitable bare ground indicates that there is ample habitat favorable for sustainability of populations of the three focus species. The ratio of Monterey spineflower/sand gilia population estimates is remarkably similar (106-121) for 2000, 2008 and 2010 while substantial variation occurred in their populations. However, the ratio for 2004 is an order of magnitude lower (8), which may be attributable to the fact that the 2004 population estimate was based on estimated densities per acre of occupied habitat (ESCA RP Team 2009). These results indicate that the two species' populations show a strong tendency to co-vary on an inter-annual interval in habitats where they co-occur.

The overall results of the shrub community surveys (stable spatial occurrence, no loss of species, increased species richness, and increase in HMP species) indicate that the shrub community has recovered satisfactorily since the 2003 burn that removed essentially all above-ground live vegetation. As noted above, the amount of bare ground in 2010 provides ample habitat for the three focus species. The abundance data indicate that the vegetation has reached and by some parameters exceeded the expected early intermediate-age phase of recovery and is thus progressing toward development of a mature shrub community. The similarity of the 2008-2010 data indicate that shrub percentage cover values reached a relatively stable state and that continued progress to mature-age phase may involve incremental changes in shrub cover. These results indicate that the central maritime chaparral community in the IAR MRA has recovered appropriately and is on a self-sustainable trajectory.

5.0 FINDINGS

The Army conducted a prescribed burn in the IAR MRA in 2003, followed by MEC clearance activities. The burn removed essentially all live above-ground vegetation. The Army's pre-burn baseline survey established sampling locations and generated baseline data for areas of central maritime chaparral. After the burn and cleanup activity disturbances, monitoring surveys were conducted to document the recovery of the shrub community as well

as populations of species of concern (HMP species). The baseline data were used to assess the progress of vegetation recovery in the area.

The ESCA RP Team assumed responsibility for the monitoring program in the IAR MRA in 2008 (ESCA RP Team 2009). The monitoring survey was repeated in 2010.

Surveys of herbaceous HMP focus species were conducted 1, 2, 5 and 7 years after the 2003 burn and MEC cleanup. Populations of two of the species (sand gilia and Monterey spineflower) increased by approximately 1-2 orders of magnitude over baseline values within 1-2 years after the burn. By 2010, the most recent survey, populations of both species were reduced from their peaks, but were still nearly one order of magnitude larger than in the baseline survey. The consistency of population ratios of these species indicates that factors influencing annual population fluctuations similarly affect the populations of the two species. The third HMP focus species present in the survey area, seaside bird's-beak (a hemi-parasite), exhibited a different trend. One year after the burn, this species had a moderately reduced population but in the second year post-burn its population had increased by an order of magnitude over that in the baseline survey. By 2008, its population had increased to two orders of magnitude above that of the baseline. In 2010, the data revealed a slightly increased population compared with 2008, indicating that the species' population trend may have plateaued.

Central maritime chaparral shrub monitoring surveys using line-intercept transects were conducted 2, 5 and 7 years after the 2003 burn and MEC cleanup. Based on the generally known community development trajectory for this vegetation type, natural recovery during the 7-year period would produce a stand of initial intermediate-age central maritime chaparral; overall, a younger stand than that observed during the baseline survey (7-20+ year stands). Species richness of shrub and shrub-like plants on the transects in 2008-2010 was 31% higher compared with the baseline survey. All of the species recorded during the baseline survey had returned to the area by 2008 and 2010. In addition to the two (non-focus) HMP species recorded in 2000, a third (Eastwood's ericameria) was reported in 2008 and 2010. Species frequency of occurrence values revealed little change in 2008 and 2010 from those of the baseline survey, indicating that species presence and spatial distribution in 2010 had returned to that of the baseline survey. Bare ground decreased from 100% immediately after the burn to 22.2% in 2008 and 18.2% in 2010, indicating the steady maturation of the shrub canopy while maintaining ample amounts of habitat favorable for sustainability of populations of HMP focus species such as sand gilia and Monterey spineflower. The abundance data indicate that the vegetation has reached and by some parameters exceeded the expected early intermediate-age phase of recovery and is thus progressing satisfactorily toward development of a mature shrub community. The abundance in 2010 of two HMP shrub species had increased compared with the baseline, while one (sandmat manzanita) had decreased.

The only target weed species recorded on the transects (iceplant) was present on 40% of the transects in 2008 in low abundance ($\leq 5.8\%$). By 2010, frequency on transects had dropped to 20%, all percentage cover values had decreased, and the maximum percentage cover value on a transect was 3.8%. Therefore, although an exotic species invaded (or may already have

been present), its population is in decline and no adverse impacts on native plant recovery are expected.

The disturbance caused by the 2003 prescribed burn mimicked that of a wild land fire event which is considered to be a natural element in the ecology of most chaparral vegetation. Virtually all live above-ground vegetation was removed during the burn, most importantly large-statured shrub canopy. The post-disturbance vegetation changes described above are consistent with the anticipated natural ecological processes and plant community responses following such disturbances. Initial opportunistic expansion of native herbaceous and subshrub populations was followed by decreasing abundance of opportunistic species as the plant community matured. Concomitantly, shrub cover has increased. Seven years after the disturbance, ample amounts of bare ground (i.e., “open” habitat) provide sufficient habitat for sustaining healthy populations of herbaceous HMP species. These results indicate that the native plant community and associated species populations have recovered appropriately, are sustainable, and that habitat values have not been adversely affected by the burn or the post-burn MEC clearance activities performed by the Army. The survey findings indicate that the plant community of the IAR MRA has recovered as expected to (and in some respects progressed beyond) the initial intermediate-age phase of community development and is on an appropriate and sustainable trajectory associated with high quality habitat. No further monitoring related to this disturbance is proposed.

6.0 REFERENCES

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Table H-1
Dates of Protocol Vegetation Surveys in the Interim Action Ranges MRA
2010 Vegetation Monitoring Report IAR MRA

Year Surveyed	Surveys Completed	Program Year
2000*	Shrub Transects	0
	Focus Species	
2004*	Focus Species	1
2005*	Shrub Transects**	2
	Focus Species	
2008*	Shrub Transects	5
	Focus Species	
2010	Shrub Transects	7
	Focus Species	

**Surveys performed using protocol versions different from Burlison (2009)*

***Shrub Transects in 2005 were not surveyed by Line-Intercept methods but with quarter-meter quadrats. Data is not comparable to previous or subsequent data collection*

Table H-2
Results of Focus Species Surveys in 2010
2010 Vegetation Monitoring Report IAR MRA

Species Plots	Observation Dates	No. of Plots or Grid Cells Sampled*	Frequency of Occurrence	Plant Counts			
				Mean	Maximum	Minimum	Standard Deviation
Sand Gilia Plots	April 13th - 23rd 2010	21	38%	3.0	15.0	0.0	5.2
Sand Gilia Grid Cells	April 13th - 23rd 2010	21	71%	40.8	303.0	0.0	70.0
Monterey Spineflower	April 14th - 23rd 2010	23	82%	291.3	2055.0	0.0	530.9
Seaside Bird's-Beak	July 22nd - 23rd 2010	19	94%	106.9	390.0	0.0	101.6

**For Sand Gilia, individuals were surveyed throughout the remainder of a grid cell in which a historical plot occurred. The plot count and grid cell counts were kept separate.*

Table H-3
 Species Frequency of Occurrence on Transects from 2000-2010
 2010 Vegetation Monitoring Report IAR MRA

	Frequency and Change in Frequency from 2000 Baseline																											
	Disturbed (n =2)				Intermediate (n =7)				Mature (n =10)				All Transects															
	2000 Baseline Frequency	2008 Frequency	Change* - = +		2010 Frequency	Change* - = +		2000 Baseline Frequency	2008 Frequency	Change* - = +		2010 Frequency	Change* - = +		2000 Baseline Frequency	2008 Frequency	Change* - = +		2010 Frequency	Change* - = +								
HMP Species																												
<i>Arctostaphylos pumila</i>	2	2			1			5	4			3			3	4			5			10	10			9		
<i>Ceanothus cuneatus var. rigidus</i>	2	2			2			6	7			7			7	10			10			15	19			19		
<i>Ericameria fasciculata</i>	0	0			0			0	1			2			0	1			2			0	2			4		
Other Native Species																												
<i>Acmispon glaber [Lotus scoparius]</i>	1	0			2			0	3			5			1	9			9			2	12			17		
<i>Adenostoma fasciculatum</i>	2	2			2			6	7			7			10	9			9			18	18			18		
<i>Arctostaphylos tomentosa</i>	2	2			2			7	7			7			10	10			10			19	19			19		
<i>Baccharis pilularis</i>	1	0			0			1	1			1			6	2			2			8	3			3		
<i>Ceanothus dentatus</i>	1	2			2			4	7			6			4	10			10			9	19			18		
<i>Croton californicus</i>	0	1			1			0	0			0			0	0			0			0	1			1		
<i>Ericameria ericoides</i>	1	1			1			1	2			2			0	1			1			2	4			4		
<i>Eriophyllum confertiflorum</i>	0	2			2			1	6			7			2	5			5			3	13			14		
<i>Frangula [Rhamnus] californica</i>	1	1			1			3	3			4			0	0			1			4	4			6		
<i>Garrya elliptica</i>	0	0			0			0	1			2			0	0			0			0	1			2		
<i>Helianthemum scoparium</i>	0	2			2			0	7			7			0	10			9			0	19			18		
<i>Lepechinia calycina</i>	1	0			0			0	0			3			0	0			1			1	0			4		
<i>Lupinus chamissonis</i>	0	0			1			1	2			0			0	0			0			1	2			1		
<i>Mimulus aurantiacus</i>	1	1			1			1	0			1			5	3			4			7	4			6		
<i>Quercus agrifolia</i>	0	0			0			1	1			1			1	2			1			2	3			2		
<i>Salvia mellifera</i>	1	1			1			3	4			4			7	7			8			11	12			13		
<i>Symphoricarpos mollis</i>	0	0			0			0	1			1			0	0			1			0	1			2		
<i>Toxicodendron diversilobum</i>	0	0			0			0	0			0			1	1			1			1	1			1		

*Change from baseline frequency

Table H-4
Species, Bare Ground, and Vegetated Ground Percentage Cover Values on Transects of the 2010 Survey
2010 Vegetation Monitoring Report IAR MRA

Percentage Cover or Change from Baseline

Element	Disturbed (n =2)									Intermediate (n =7)								
	2000		2003 ^a		2008		2010			2000		2003 ^a		2008		2010		
	Percentage Cover		Percentage Cover		Percentage Cover		Change from 2003	Percentage Cover		Change from 2003	Percentage Cover		Percentage Cover		Change from 2003	Percentage Cover		Change from 2003
	Mean (%)	S.D	Mean (%)	Mean (%)	S.D	Mean (%)		S.D	Mean (%)		S.D	Mean (%)	S.D	Mean (%)		S.D	Mean (%)	
bare ground	10.4%	5%	100.0%	29.8%	27.4%	-70.2%	20.5%	16.0%	-79.5%	10.1%	6.4%	100.0%	20.2%	9.1%	-79.8%	19.9%	9.1%	-80.1%
vegetated ground	2.3%	3.2%	0.0%	3.6%	3.4%	3.6%	2.5%	3.5%	2.5%	1.1%	1.3%	0.0%	1.8%	1.2%	1.8%	3.6%	5.1%	3.6%
HMP Species																		
<i>Arctostaphylos pumila</i>	45.3%	14.4%	0.0%	5.3%	5.5%	5.3%	1.7%	2.4%	1.7%	35.3%	33.4%	0.0%	1.6%	1.7%	1.6%	2.5%	3.5%	2.5%
<i>Ceanothus cuneatus var. rigidus</i>	7.2%	3.9%	0.0%	16.9%	14.3%	16.9%	18.6%	13.6%	18.6%	12.0%	13.5%	0.0%	12.9%	9.1%	12.9%	11.6%	9.5%	11.6%
<i>Ericameria fasciculata</i>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.6%	0.2%	0.4%	0.8%	0.4%
Other Native Species																		
<i>Acmispon glaber [Lotus scoparius]</i>	0.3%	0.4%	0.0%	0.0%	0.0%	0.0%	0.3%	0.1%	0.3%	0.0%	0.0%	0.0%	5.8%	8.1%	5.8%	1.1%	1.4%	1.1%
<i>Adenostoma fasciculatum</i>	7.6%	9.1%	0.0%	10.7%	8.0%	10.7%	12.6%	7.4%	12.6%	8.5%	9.4%	0.0%	8.7%	7.0%	8.7%	8.3%	6.6%	8.3%
<i>Arctostaphylos tomentosa</i>	30.4%	22.4%	0.0%	25.6%	24.0%	25.6%	28.9%	18.2%	28.9%	37.3%	29.7%	0.0%	26.9%	10.4%	26.9%	25.6%	12.7%	25.6%
<i>Baccharis pilularis</i>	0.9%	1.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	1.4%	0.0%	0.1%	0.3%	0.1%	0.03%	0.1%	0.0%
<i>Ceanothus dentatus</i>	5.6%	7.8%	0.0%	12.3%	3.9%	12.3%	17.4%	1.1%	17.4%	5.2%	6.4%	0.0%	23.3%	13.7%	23.3%	25.2%	17.1%	25.2%
<i>Croton californicus</i>	0.0%	0.0%	0.0%	0.2%	0.3%	0.2%	0.4%	0.6%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
<i>Ericameria ericoides</i>	0.5%	0.7%	0.0%	1.9%	2.7%	1.9%	1.1%	1.6%	1.1%	0.1%	0.3%	0.0%	0.1%	0.3%	0.1%	0.4%	0.8%	0.4%
<i>Eriophyllum confertiflorum</i>	0.0%	0.0%	0.0%	3.4%	3.6%	3.4%	1.8%	0.0%	1.8%	0.1%	0.3%	0.0%	2.4%	2.3%	2.4%	2.3%	2.0%	2.3%
<i>Frangula [Rhamnus] californica</i>	3.4%	4.7%	0.0%	0.9%	1.3%	0.9%	1.1%	1.6%	1.1%	2.1%	2.8%	0.0%	1.5%	2.4%	1.5%	2.1%	2.3%	2.1%
<i>Garrya elliptica</i>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.3%	0.1%	0.5%	1.3%	0.5%
<i>Helianthemum scoparium</i>	0.0%	0.0%	0.0%	3.8%	3.6%	3.8%	1.4%	1.4%	1.4%	0.0%	0.0%	0.0%	18.9%	10.6%	18.9%	9.7%	10.2%	9.7%
<i>Lepechinia calycina</i>	0.8%	1.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.5%	0.4%
<i>Lupinus chamissonis</i>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%	1.1%	0.8%	0.4%	1.1%	0.0%	0.6%	1.1%	0.6%	0.0%	0.0%	0.0%
<i>Mimulus aurantiacus</i>	0.4%	0.6%	0.0%	0.7%	0.9%	0.7%	1.1%	1.6%	1.1%	0.8%	2.0%	0.0%	0.0%	0.0%	0.0%	0.04%	0.1%	0.0%
<i>Quercus agrifolia</i>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.3%	0.0%	0.1%	0.3%	0.1%	0.3%	0.7%	0.3%
<i>Salvia mellifera</i>	2.1%	3.0%	0.0%	1.9%	2.6%	1.9%	2.5%	3.5%	2.5%	9.4%	16.2%	0.0%	2.0%	3.1%	2.0%	3.2%	3.8%	3.2%
<i>Symphoricarpos mollis</i>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.03%	0.1%	0.0%	0.5%	1.2%	0.5%
<i>Toxicodendron diversilobum</i>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total Shrub Cover	104.2%		0.0%	83.6%			89.8%			111.9%		0.0%	105.3%			94.0%		

^a Values based on removal of all live above-ground vegetation immediately following the 2003 prescribed burn.

Table H-4
Species, Bare Ground, and Vegetated Ground Percentage Cover Values on Transects of the 2010 Survey
2010 Vegetation Monitoring Report IAR MRA

Percentage Cover or Change from Baseline

Element	Mature (n =10)									All Transects								
	2000		2003 ^a		2008		2010		Change from 2003	2000		2003 ^a		2008		2010		Change from 2003
	Percentage Cover		Percentage Cover		Percentage Cover		Percentage Cover			Percentage Cover		Percentage Cover		Percentage Cover		Percentage Cover		
	Mean (%)	S.D	Mean (%)	Mean (%)	S.D	Mean (%)	S.D	Mean (%)	S.D	Mean (%)	S.D	Mean (%)	Mean (%)	S.D	Mean (%)	S.D	Mean (%)	S.D
bare ground	9.0%	5.7%	100.0%	22.2%	10.1%	-77.8%	16.6%	8.8%	-77.4%	9.5%	5.6%	100.0%	22.2%	11.3%	-77.8%	18.2%	9.1%	81.8%
vegetated ground	0.1%	0.3%	0.0%	0.9%	1.3%	0.9%	0.9%	1.3%	0.9%	0.7%	1.3%	0.0%	1.5%	1.7%	1.5%	2.1%	3.4%	2.1%
HMP Species																		
<i>Arctostaphylos pumila</i>	1.9%	3.22%	0.0%	0.7%	1.5%	0.7%	0.8%	1.4%	0.8%	18.7%	27.0%	0.0%	1.5%	2.4%	1.5%	1.5%	2.5%	1.5%
<i>Ceanothus cuneatus var. rigidus</i>	1.9%	2.3%	0.0%	15.3%	9.6%	15.3%	16.2%	9.8%	16.2%	6.2%	9.4%	0.0%	14.6%	9.3%	14.6%	14.7%	9.8%	14.7%
<i>Ericameria fasciculata</i>	0.0%	0.0%	0.0%	0.02%	0.1%	0.0%	0.3%	0.6%	0.3%	0.0%	0.0%	0.0%	0.1%	0.4%	0.1%	0.3%	0.6%	0.3%
Other Native Species																		
<i>Acmispon glaber [Lotus scoparius]</i>	0.2%	0.6%	0.0%	6.9%	6.5%	6.9%	2.1%	2.2%	2.1%	0.1%	0.5%	0.0%	5.8%	6.9%	5.8%	1.6%	1.8%	1.6%
<i>Adenostoma fasciculatum</i>	14.1%	10.3%	0.0%	6.1%	4.2%	6.1%	8.1%	6.2%	8.1%	11.3%	9.8%	0.0%	7.5%	5.6%	7.5%	8.7%	6.2%	8.7%
<i>Arctostaphylos tomentosa</i>	70.4%	12.6%	0.0%	40.1%	16.9%	40.1%	35.3%	17.7%	35.3%	54.0%	26.9%	0.0%	33.7%	16.1%	33.7%	31.1%	15.8%	31.1%
<i>Baccharis pilularis</i>	1.7%	3.0%	0.0%	1.3%	2.8%	1.3%	0.9%	2.3%	0.9%	1.2%	2.4%	0.0%	0.7%	2.1%	0.7%	0.5%	1.7%	0.5%
<i>Ceanothus dentatus</i>	1.1%	2.5%	0.0%	21.1%	18.4%	21.1%	17.9%	16.9%	17.9%	3.1%	5.0%	0.0%	21.0%	15.6%	21.0%	20.5%	15.9%	20.5%
<i>Croton californicus</i>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.02%	0.1%	0.0%	0.0%	0.2%	0.0%
<i>Ericameria ericoides</i>	0.0%	0.0%	0.0%	0.2%	0.5%	0.2%	0.4%	1.1%	0.4%	0.1%	0.3%	0.0%	0.3%	0.9%	0.3%	0.5%	1.0%	0.5%
<i>Eriophyllum confertiflorum</i>	0.2%	0.4%	0.0%	1.2%	1.9%	1.2%	0.3%	0.4%	0.3%	0.1%	0.3%	0.0%	1.9%	2.2%	1.9%	1.2%	1.5%	1.2%
<i>Frangula [Rhamnus] californica</i>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.2%	0.1%	1.1%	2.4%	0.0%	0.6%	1.6%	0.6%	0.9%	1.7%	0.9%
<i>Garrya elliptica</i>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.00%	0.0%	0.0%	0.0%	0.0%	0.0%	0.04%	0.2%	0.0%	0.2%	0.8%	0.2%
<i>Helianthemum scoparium</i>	0.0%	0.0%	0.0%	7.4%	5.4%	7.4%	5.3%	7.1%	5.3%	0.0%	0.0%	0.0%	11.3%	9.5%	11.3%	6.5%	8.2%	6.5%
<i>Lepechinia calycina</i>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.3%	0.1%	0.1%	0.4%	0.0%	0.0%	0.0%	0.0%	0.2%	0.4%	0.2%
<i>Lupinus chamissonis</i>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.6%	0.0%	0.2%	0.7%	0.2%	0.1%	0.4%	0.1%
<i>Mimulus aurantiacus</i>	1.1%	1.4%	0.0%	0.9%	1.6%	0.9%	0.6%	0.8%	0.6%	0.9%	1.6%	0.0%	0.6%	1.2%	0.6%	0.5%	0.8%	0.5%
<i>Quercus agrifolia</i>	0.1%	0.2%	0.0%	0.9%	2.8%	0.9%	0.8%	2.5%	0.8%	0.1%	0.2%	0.0%	0.5%	2.0%	0.5%	0.5%	1.8%	0.5%
<i>Salvia mellifera</i>	9.8%	11.5%	0.0%	4.7%	5.0%	4.7%	6.5%	8.0%	6.5%	8.9%	12.7%	0.0%	3.4%	4.3%	3.4%	4.8%	6.4%	4.8%
<i>Symphoricarpos mollis</i>	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	1.6%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	1.3%	0.4%
<i>Toxicodendron diversilobum</i>	1.0%	3.1%	0.0%	1.8%	5.7%	1.8%	1.1%	3.5%	1.1%	0.5%	2.2%	0.0%	1.0%	4.1%	1.0%	0.6%	2.5%	0.6%
Total Shrub Cover	103.4%		0.0%	108.8%			97.1%			106.6%		0.0%	104.8%			95.0%		

^a Values based on removal of all live above-ground vegetation immediately following the 2003 prescribed burn.

Table H-5
Summary Results from Herbaceous Vegetation Quadrats on One Transect from the 2010 Survey
2010 Vegetation Monitoring Report IAR MRA

Genus/Species	Cover		Frequency*
	Mean %	Standard Deviation	
Bare ground	54.0%	26.4	6
HMP Species			
<i>Chorizanthe pungens pungens</i>	4.7%	6.4	3
Other Species			
<i>Castilleja densiflora</i>	0.7%	1.6	1
<i>Croton californicus</i>	2.0%	3.3	2
<i>Deinandra [Hemizonia] corymbosa</i>	5.3%	11.2	2
<i>Deinandra [Hemizonia] increscens</i>	6.0%	4.9	5
<i>Frangula [Rhamnus] californica</i>	0.7%	1.6	1
<i>Galium californicum</i>	0.7%	1.6	1
Grass species	19.3%	23.4	4
Herb unidentifiable	0.7%	1.6	1
<i>Rumex acetosella</i>	6.0%	12.8	2

*Frequency out of 6 quadrats total

Table H-6
Focus Species Total Population Estimates or Counts and Ratios for the
Interim Action Ranges MRA
2010 Vegetation Monitoring
Report IAR MRA

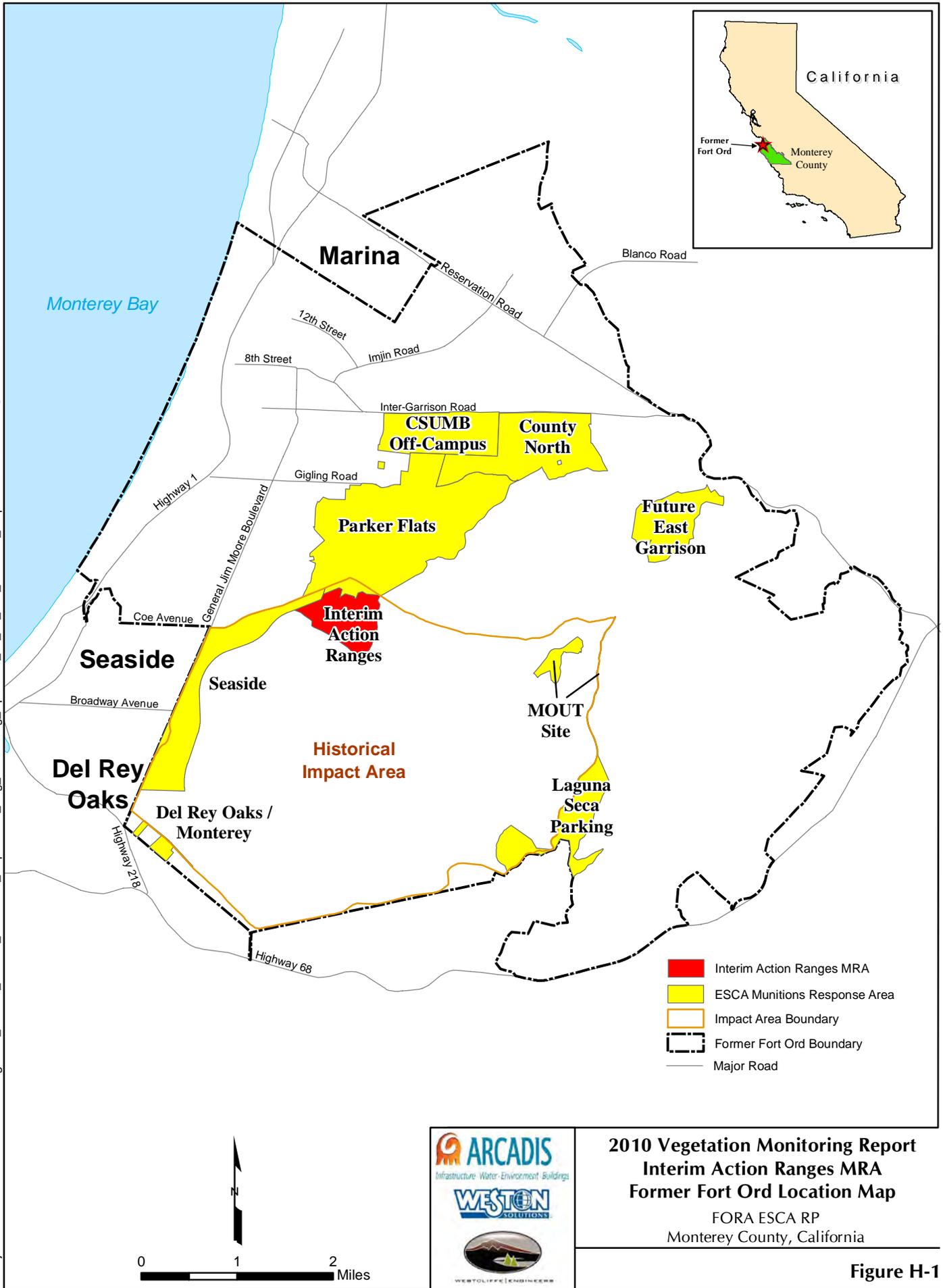
Species	2000 Estimate, Count or Ratio	2004 Estimate, Count or Ratio	2005 Estimate or Count	2008 Estimate or Ratio	2010 Estimate or Ratio
Monterey spineflower	20,500	138,275	nd	49,655	160,654
Sand gilia	193	17,128	96,958	440	1,323
Spineflower/gilia ratio	106	8	na	112	121
Seaside bird's-beak	1,729	1,058	17,563	197,906	240,452

Notes:

nd = no data

na = not applicable

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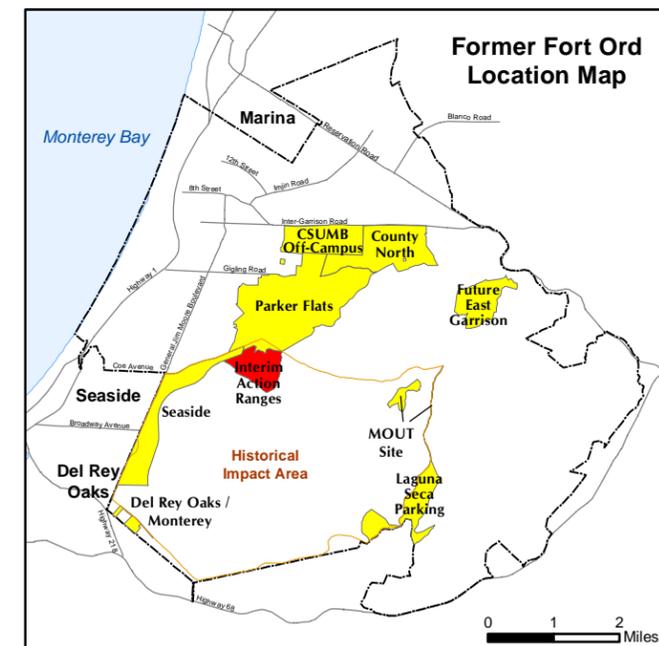


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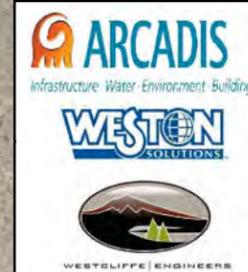


Legend

-  Munitions Response Area
-  USACE Parcel
-  Structure
-  Borderland Interface



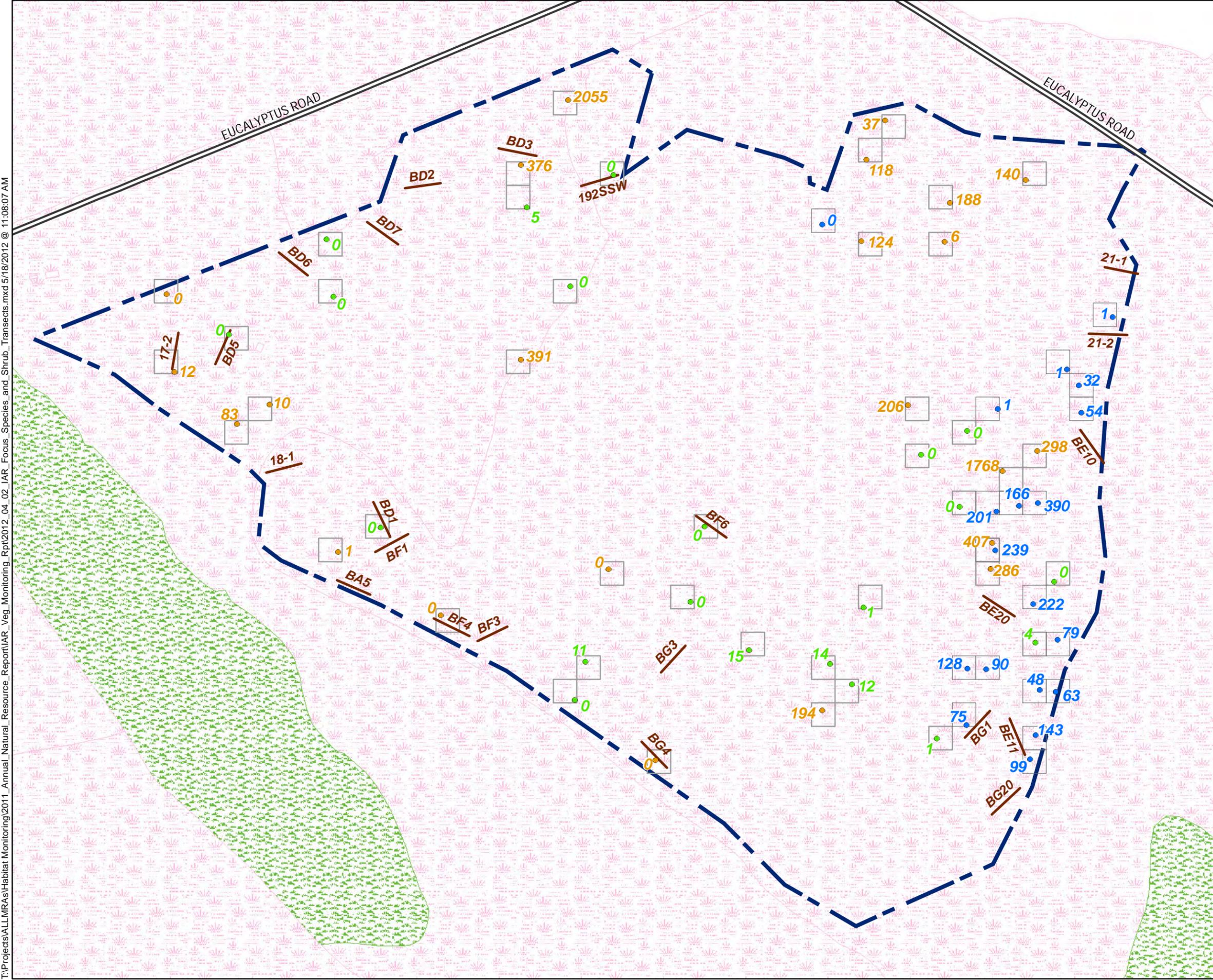
2010 Aerial Shown



2010 Vegetation Monitoring Report Interim Action Ranges MRA 2010 Orthophotos

FORA ESCA RP
Monterey County, California

Figure H-2



Legend

- 5 Sand Gilia Plot Location and Count
- 83 Monterey Spineflower Plot Location and Count
- 102 Seaside Bird's - Beak Plot Location and Count
- == Major Road
- BF3** 2010 Transect
- 100-foot Grid Boundary
- ▭ MRA Boundary

Vegetation Types

- Grassland
- Maritime Chaparral
- Inland Coast Live Oak Woodland

Source: Flora and Fauna Baseline Study of Fort Ord, California, Jones and Stokes Association Inc., December 1992.



Sand Gilia



Monterey Spineflower



Seaside Bird's - Beak



2010 Vegetation Monitoring Report
Interim Action Ranges MRA
2010 Focus Species Plot Locations
and Counts and Shrub
Transect Locations
 FORA ESCA RP
 Monterey County, California

Figure H-3

T:\Projects\ALL MRAs\Habitat Monitoring\2011_Annual_Natural_Resource_Report\AR_Veg_Monitoring_Rpt\2012_04_02_IAR_Focus_Species_and_Shrub_Transects.mxd 5/18/2012 @ 11:08:07 AM

APPENDIX A

Photolog

2010 Vegetation Monitoring Report
Interim Action Ranges Munitions Response Area

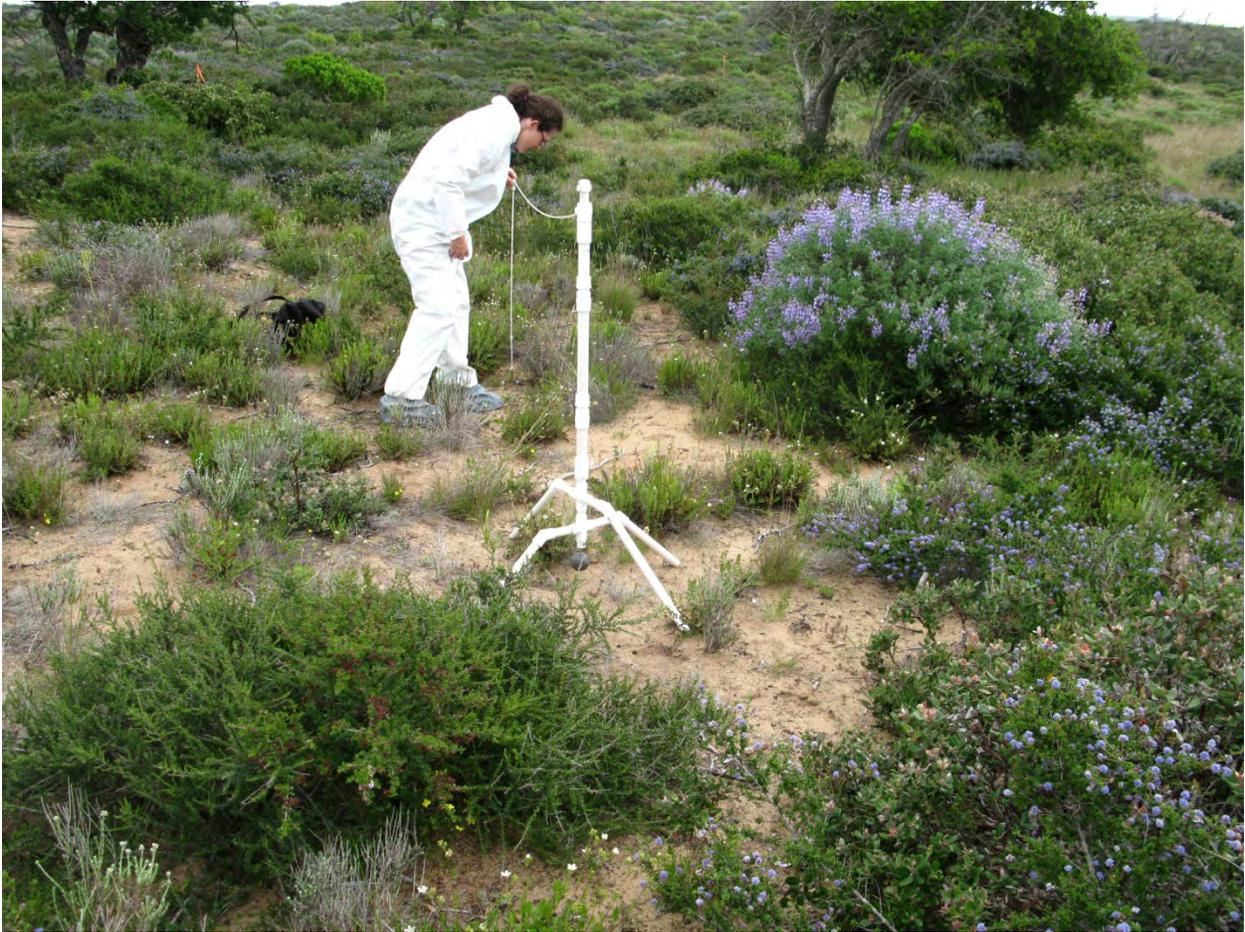


Photo #1: IAR historical Focus Species Monitoring. April 2010.



Photo #2: IAR historical Focus Species Monitoring. April 2010.



Photo #3: IAR historical Focus Species Monitoring. April 2010.



Photo #4: IAR historical Focus Species Monitoring. April 2010.



Photo #5: IAR historical Focus Species Monitoring. April 2010.



Photo #6: IAR historical transect surveys. July 12, 2010. Transect 192SSW with herbaceous cover.



Photo #7: IAR historical transect surveys. July 2010.



Photo #8: IAR historical transect surveys. July 2010.



Photo #9: IAR Shrub Transect Surveys – (Baseline). October 2010.

APPENDIX I

Parker Flats MRA Focus Species Monitoring Report

2011 Annual Natural Resource Monitoring, Mitigation, and Management Report

FORA ESCA REMEDIATION PROGRAM

Appendix I. 2010 Reconnaissance and 2011 Vegetation Monitoring Report

Parker Flats Phase II Munitions Response Area

Former Fort Ord
Monterey County, California

May 25, 2012

Prepared for:

FORT ORD REUSE AUTHORITY

920 2nd Avenue, Suite A
Marina, California 93933



Environmental Services Cooperative Agreement
No. W9128F-07-2-01621

and
FORA Remediation Services Agreement (3/30/07)

Document Control Number: 09595-12-057-001

Prepared by:



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Spineflower

APPENDIX

- A Photolog

ACRONYMS, ABBREVIATIONS, AND DEFINITIONS

ARCADIS	ARCADIS U.S., Inc.
baseline	For Parker Flats MRA, established vegetative conditions prior to ESCA RP Team MEC investigation and remedial activities; data to which subsequent monitoring results will be compared
EAT	Environmental Awareness Training
ESA	Endangered Species Act
ESCA	Environmental Services Cooperative Agreement
FORA	Fort Ord Reuse Authority
GPS	Global Positioning System
HMP	Habitat Management Plan
MEC	munitions and explosives of concern
MRA	Munitions Response Area
NRIM	Natural Resource Impact Mitigation
RP	Remediation Program
Survey area	Habitat parcels E19a.2 and E19a.4 located within the Parker Flats MRA
USACE	U.S. Army Corps of Engineers

1.0 INTRODUCTION

This 2010 Reconnaissance and 2011 Vegetation Monitoring Report was prepared by ARCADIS U.S., Inc. (ARCADIS) on behalf of the Fort Ord Reuse Authority (FORA) under the Environmental Services Cooperative Agreement (ESCA) Remediation Program (RP). The report documents vegetation reconnaissance conducted in 2010 and vegetation monitoring conducted in 2011 in the habitat parcels (parcels E19a.2 and E19a.4) situated within the Phase II portion of the Parker Flats Munitions Response Area (MRA) following completion of ESCA RP Team munitions and explosives of concern (MEC) investigation and remedial activities (hereinafter termed “MEC activities”). Reconnaissance and monitoring of vegetation were conducted to satisfy requirements described in the Installation-Wide Multispecies Habitat Management Plan (HMP; United States Army Corps of Engineers [USACE] 1997) and the “Protocol for Conducting Vegetation Monitoring in Compliance with the Installation-Wide Multispecies Habitat Management Plan” (“the Protocol”; Bursleson 2009). Vegetation monitoring is performed when impacts to central maritime chaparral habitat and HMP plant species could occur during MEC activities. Following completion of these activities in a habitat parcel, vegetation surveys are to be conducted in years 1, 3, 5, and 8 for HMP focus species (i.e., HMP plant species that are herbaceous and are also referred to as “HMP annuals,” “HMP herbaceous species,” and “HMP forbs”) and in years 3, 5, 8, and 13 for shrub communities (Bursleson 2009). “HMP plant species” comprise herbaceous and shrub species that are Federal Endangered Species Act (ESA)-listed or are of concern because of their limited distribution.

1.1 Purpose

The purpose of this report is to present the results of the first post-baseline/post-disturbance survey of HMP focus species in the habitat parcel of the Parker Flats MRA, which was conducted in the spring of 2010. Post-MEC activity monitoring data are intended to be compared with “baseline” data to determine whether or not HMP focus species and shrubs are recovering and progressing toward re-establishment of the pre-disturbance baseline community (see Section 2.2). If the results of the post-MEC activity surveys reveal that recovery is proceeding satisfactorily (i.e., temporal changes generally coincide with an anticipated recovery toward the baseline condition), no additional mitigation measures (e.g., restoration) would be required. If recovery is deemed unsatisfactory, additional monitoring and/or mitigation measures may be proposed.

1.2 Site Description

Former Fort Ord is located about 8 miles north of the City of Monterey and within the County of Monterey, California (Figure I-1). The Phase II portion of the Parker Flats MRA is located near the central portion of the former Fort Ord. MEC investigative and remedial work in the Phase I portion was performed in prior years by the U.S. Army. The survey area (i.e., habitat parcels E19a.2 and E19a.4, labeled as “Phase II Habitat Area” on Figure I-2) is situated in the northeast portion of the MRA and encompasses approximately 167.2 acres.

Terrain over most of the Parker Flats MRA consists of rolling hills (2 to 15% slopes) with elevations ranging from 280 to 490 feet. The surface soils are characterized as eolian (sand dune) and terrace (river deposits), which consist of unconsolidated materials of the Aromas and Old Dune Sand formations. The primary soil type present in the MRA is Oceano Loamy Sand with smaller areas of Arnold-Santa Ynez complex and Baywood Sand. Soil conditions at the MRA consist predominantly of weathered dune sand.

Vegetation in the survey site is primarily coastal live oak woodland with an area of maritime chaparral in the eastern portion of parcel E19a.4 (Figure I-3). Unmapped stands of coastal scrub are present within the area labeled as maritime chaparral. A small area of annual grassland has been mapped in parcel E19a.2. Maritime chaparral is a vegetation type of particular concern in the HMP because of its association with a number of rare, threatened, and endangered species populations (the “HMP species”).

1.3 Compliance with Employee Training Requirement

The Environmental Awareness Training (EAT) module for the Parker Flats MRA included descriptions of the habitat types and HMP species that are reported from or may occur in the MRA and the mitigation measures that are included in the Natural Resource Impact Mitigation (NRIM) Checklist No. 4 Revision 1. ESCA RP biologists provided EAT training to field personnel and supervisors before the start of MEC activities.

1.4 MEC Investigation and Remedial Activities

The ESCA RP Team conducted MEC activities only within the Phase II (i.e., northern) portion of the Parker Flats MRA (Figure I-4). Brush cutting was completed in the habitat parcels in the latter part of 2008. MEC fieldwork in the Phase II area began in December 2008, continued through 2009, and was completed in September 2010. MEC activity involved primarily “mag and dig” work (i.e., excavations of small areal extent [typically employing hand tools but occasionally requiring backhoe operation] to investigate specific targets). Mitigation procedures employed during the work in habitat parcels included segregating topsoil (including putative seed bank) and replacing it during backfill. In known locations (from the 2008 baseline survey) of Monterey spineflower (*Chorizanthe pungens* var. *pungens*) a biologist was typically present during backfill to confirm proper replacement of topsoil.

2.0 PRIOR VEGETATION SURVEYS

2.1 Basewide 1992 Survey

The vegetation of the former Fort Ord as a whole (including the survey site addressed in this report) was surveyed in 1992 (19 years prior to the 2011 survey) and documented in the “Flora and Fauna Baseline Study of Fort Ord, California” (USACE 1992). These results were summarized in the HMP (USACE 1997).

2.1.1 Methods

Areas of “suitable habitat” were identified for various species on aerial photographs and these areas were examined in the field. Within suitable habitat, “polygons” of abundance categories were determined for each of the HMP plant species. Abundance categories used were: uncommon or low density (one to hundreds of individuals), occasional or medium density (hundreds to thousands of individuals), and abundant or high density (many thousands of individuals; USACE 1992, p.6). The methods discussion appears to indicate that a species’ “survey areas” were pre-selected from aerial images based on assumed habitat occurrence, that only those areas were field surveyed for those species, and that all such areas were assigned a (non-zero) category (USACE 1992, p. 6). According to the report, “Botanists in the field identified the habitat type and scored the abundance of all special-status plant species for each polygon” (USACE 1992, p. 6). Although field surveys were conducted during appropriate peak flowering periods for HMP “annuals,” the report does not describe how the scores were arrived at. We have concluded (based on the information in the report as well as field experience in the categorized areas) that these categories represent “potentially suitable habitat” in reality. The polygon boundaries do not appear to consistently coincide with the boundaries of extant species populations. Also, areas outside of “suitable habitat” for a species that were not surveyed for that species (i.e., unshaded and unlabeled areas on the relevant figures that were not discussed in the text) represent “potentially unsuitable habitat.”

2.1.2 Results

The HMP species reported to be present within the survey area in 1992 are listed in Table I-1. Of the focus species, only Monterey spineflower was reported to be present and it occurred in low abundance in the western three-fourths of the Parker Flats MRA habitat parcels (Figure I-5; USACE 1992). Two other focus species commonly co-occur with Monterey spineflower: sand gilia (*Gilia tenuiflora* sp. *arenaria*) and seaside bird’s-beak (*Cordylanthus rigidus* ssp. *littoralis*). However, neither species was recorded in the Parker Flats Phase II habitat parcels in 1992.

2.2 2008 Baseline Survey

The 2008 baseline survey was conducted using the Draft Protocol in effect at that time (Burlison 2006). The survey involved two data collection methods: 1) census (reconnaissance mapping) and plot counts of populations for focus species, and 2) transect observations for shrub using a line-intercept procedure and for associated herbaceous vegetation using a quadrat procedure. Details of the 2008 survey were reported by the ESCA RP Team (ESCA RP Team 2009).

Because the first post-disturbance shrub transect survey will not be performed until 2013 (year 3 post-disturbance), shrub transect data are not discussed further in this report.

2.2.1 Methods

The Draft Protocol (Burlerson 2006) specified that baseline surveys for focus species initially involved reconnaissance observations (i.e., “meandering transects”) within the survey area that involved close inspection of all locations appearing to be suitable habitat for the species, to determine the locations of subpopulations. Suitable habitat for Monterey spineflower and Monterey gilia includes open, bare, and sandy appearing areas, trails, roads, and pathways (USACE 1997). For some species, such as Monterey spineflower and Monterey gilia, these observations must be performed during the peak flowering period because plants may be too cryptic and/or difficult to identify in the absence of flowers. The peak flowering period varies from year to year and the period for Monterey gilia is short, typically lasting 3-6 weeks. Within the peak flowering period, flowers of Monterey gilia may open late or not at all on days when cold and/or overcast conditions persist. Accordingly, reference populations of Monterey gilia and Monterey spineflower in the Interim Action Ranges MRA were monitored, sometimes daily, for presence of flowers prior to conducting the reconnaissance observations in the Parker Flats MRA. The practice of using reference area observations to enhance observational accuracy provides additional confidence that cryptic populations were detected during the reconnaissance observations.

All of the plants present within the survey area at the time of the survey are considered to be the population to be sampled. In the 2008 Parker Flats MRA focus species survey, subpopulations were defined as a group of plants none of which is farther than 5 meters from the next closest plant of the subpopulation. Once the presence and occurrence of the species is determined, a subsample of the population is obtained by appropriate positioning of circular plots. The number and location of the plots is influenced by the abundance, distribution, and spatial extent of the subpopulations observed within the survey area. The Draft Protocol describes a procedure for determining plot number (sample size or n) and positioning (Burlerson 2006); however, the number and extent of subpopulations in the 2008 Parker Flats survey was so small that it was decided to use an alternative approach. Plots were positioned in all subpopulations and more than one plot was positioned in subpopulations of relatively large extent.

The observational unit for focus species’ surveys is a 5-meter-diameter circular plot that is positioned within the 100- by 100-foot coordinate system established across former Fort Ord. Each plot was positioned to include a homogenous representative of the subpopulation per Burlerson (2006). Plot center locations were recorded using a Global Positioning System (GPS) unit (to the nearest approximately 0.1 meter). Depending on the density of plants within a plot, either all the plants in the plot were counted or (if very dense) the plot was subdivided into quadrants and counts were made in one or two quadrants. If the plot was subdivided for counting, the value was adjusted appropriately to generate an estimate of the total number of plants in the plot. Plant counts were recorded in field notes and/or data sheets. Review/quality control of data was performed in the field and repeated upon return to the office. Data were entered into a spreadsheet, which was validated (by independent comparison with field records) prior to data evaluation.

2.2.2 Results

Surveys for Monterey spineflower and Monterey gilia were performed between May 15 and May 23, 2008 following daily confirmation by field staff that flowers were open in both species. The survey detected populations of Monterey spineflower and potentially suitable microhabitat for Monterey gilia (Figure I-3). A survey was also conducted for seaside bird's-beak. However, neither Monterey gilia nor seaside bird's-beak was observed during the survey (ESCA RP Team 2009).

Monterey spineflower subpopulations were observed in 10 locations, most of which were outside of the area of the species' habitat as reported in the 1992 study (compare Figures I-3 and I-5). The 2008 populations occurred in "open" areas (i.e., where soil was disturbed and/or vegetation was sparse, mostly along or near roads/trails). A plot was located in each of the 10 locations (n = 10). Plant counts ranged from 2 to 503 and all but three of the locations were within maritime chaparral vegetation. Although there were differences between the 1992 and 2008 results, both surveys support the conclusion that the species occurred in low abundance in the area overall (ESCA RP Team 2009).

3.0 POST-DISTURBANCE MONITORING

3.1 2010 Reconnaissance

In early 2010, it appeared likely that the wet season would be more favorable for growth of annual species than the 2008 wet season. Therefore, even though the MEC fieldwork was still in progress and the protocol survey would not be performed until 2011, it was decided to conduct a reconnaissance search for Monterey spineflower and Monterey gilia populations to determine if they occurred in additional locations (Monterey spineflower) or were newly present (Monterey gilia) in the survey area. This search was conducted on March 1, April 19, and May 13 of 2010. Neither Monterey spineflower nor Monterey gilia were observed in potential habitat locations additional to those observed in 2008.

3.2 2011 Survey

Post-disturbance surveys involve re-sampling the plots and transects established in the baseline survey.

3.2.1 Methods

The 2011 survey for Monterey spineflower was conducted following confirmation by field staff that flowering had begun using the same reference area protocol that was employed in 2008. Plot center points established in 2008 were re-located using a global positioning unit that contained the point coordinates recorded in the 2008 survey.

3.2.2 Results

The 2011 post-disturbance survey for Monterey spineflower was performed on April 26, 2011. Plants were recorded in four of the 10 plots established in 2008, mostly in the eastern portion of the survey area, along roadsides (Table I-2, Figure I-3). Photographs of the plots are shown in the photolog presented in Appendix A. Spineflower plants in grid cell C3G6E5 could not be identified with certainty because their flowers had not matured. Mature flowers are needed to distinguish Monterey spineflower from diffuse spineflower (*C. diffusa*). An attempt was made to re-sample the plot in June but the flowering period had already passed. As a result, the identity of the 91 spineflower plants in this plot is somewhat uncertain. However, because diffuse spineflower plants were not detected in the 2008 survey, it is assumed in this report that the plants in this plot were Monterey spineflower.

Three plots contained fewer than 100 individuals and one plot contained 231 individuals. The mean number of plants in the 10 plots in 2011 was 40.7 with a standard deviation of 75.6.

3.2.3 Temporal Change in Population

The frequency of occurrence of Monterey spineflower in the Parker Flats MRA sample plots decreased from 100% in 2008 to 40% in 2011. The total number of plants in the plots decreased from 1,369 to 407 (a 70% decrease). Populations of this annual species may be sensitive to annual rainfall patterns; however, this factor likely would not explain the decrease observed because the 2011 wet season was not unusually dry. Field biologists noted that mulch (masticated vegetation from brush clearing conducted in 2008-2009) was variably layered across plots. Based on the semi-quantitative information on presence of mulch recorded in field notes, mulch levels were quantified by the proportion of plot area covered with mulch. Five of 10 plots contained some level of mulch. In those plots where mulch was reported (at any quantity), there was a reduction in Monterey spineflower. In three plots where mulch was not observed, Monterey spineflower increased, while in the other two plots where mulch did not occur, Monterey spineflower decreased (Table I-2).

4.0 FINDINGS

The first year post-disturbance survey of Monterey spineflower populations in the habitat parcels of the Parker Flats Phase II MRA was performed in April 2011. Monterey spineflower was the only HMP focus species detected in the baseline survey in 2008. No additional focus species were identified during the 2011 survey in or near the sample plots established in 2008 for Monterey spineflower. Compared to the 2008 baseline data, Monterey spineflower exhibited a 60% decrease in frequency and a 70% decrease in abundance in sample plots. The 2011 wet season (October 2010 to September 2011) had a rainfall total of 14.57 inches. The rainfall total for the 2008 wet season was 12.42 inches (ESCA RP 2009). Thus, difference in annual rainfall totals between the 2008 and 2011 wet seasons does not explain the population differences that were recorded. However, masticated plant litter (“mulch”) from brush removal in 2008-2009 was present in some plots and may have affected Monterey spineflower recruitment. To evaluate this possible causative factor, mulch presence was quantified by visual estimations of cover in the plots. Five of the 10 plots contained mulch. In those plots where mulch was present, Monterey spineflower populations

were lower in 2011 than in 2008. In three plots where mulch was not present, Monterey spineflower populations were higher in 2011 than in 2008, while in the other two plots where mulch was not present, Monterey spineflower populations were lower in 2011 than in 2008 (Table I-2). Overall, the results of the evaluation were inconclusive regarding a relationship between mulch cover and population differences. Nevertheless, removal of litter from the plots by hand raking prior to substantial rainfall in the 2012 wet season will be implemented as a corrective measure.

5.0 REFERENCES

- Burleson Consulting Inc. (Burleson). 2006. Draft Protocol for Conducting Vegetation Monitoring in Compliance with the Installation-Wide Multispecies Habitat Management Plan at Former Fort Ord. Folsom, California. October 25.
- Burleson Consulting Inc. (Burleson). 2009. Protocol for Conducting Vegetation Monitoring in Compliance with the Installation-Wide Multispecies Habitat Management Plan at Former Fort Ord. Folsom, California. March.
- Environmental Services Cooperative Agreement Remediation Program Team (ARCADIS U.S., Inc., Weston Solutions, Inc., and Westcliffe Engineers, Inc.; collectively “the ESCA RP Team”). 2009. 2008 Annual Natural Resource Monitoring, Mitigation, and Management Report, Former Fort Ord, Monterey County, California. June 12.
- U.S. Army Corps of Engineers (USACE). 1992. Flora and Fauna Baseline Study of Fort Ord, California. Sacramento District. Sacramento, California.
- U.S. Army Corps of Engineers (USACE). 1997. Installation-Wide Multispecies Habitat Monitoring Plan for Former Fort Ord, California. April. Sacramento, California.

Table I-1
Habitat Management Plan Species Presence/Absence
2011 Parker Flats Vegetation Monitoring Report
FORA ESCA RP

Plant Type	Common Name	Scientific Name	1992 Survey^{a,b}	2008 Baseline Survey^b	2011 One-year Post-disturbance Survey^b
Focus Species	Sand Gilia	<i>Gilia tenuiflora</i> ssp. <i>arenaria</i>	NR	NR	NR
Focus Species	Monterey Spineflower	<i>Chorizanthe pungens</i> var. <i>pungens</i>	X	X	X
Focus Species	Seaside Bird's Beak	<i>Cordylanthus rigidus</i> ssp. <i>littoralis</i>	NR	NR	NR
Focus Species	Coast Wallflower	<i>Erysimum ammophilum</i>	NR	NR	NR
Focus Species	Yadon's Pipena	<i>Piperia yadonii</i>	NR	NR	NR
Shrub	Toro Manzanita	<i>Arctostaphylos montereyensis</i>	NR	NS	NS
Shrub	Sandmat Manzanita	<i>Arctostaphylos pumila</i>	X	NS	NS
Shrub	Hooker's Manzanita	<i>Arctostaphylos hookeri</i> ssp. <i>hookeri</i>	X	NS	NS
Shrub	Monterey Ceanothus	<i>Ceanothus cuneatus</i> var. <i>rigidus</i>	X	NS	NS
Shrub	Eastwood's Ericameria	<i>Ericameria fasciculata</i>	NR	NS	NS

Notes:

^a Data extracted from United States Army Corps of Engineers (1997)

^b NR = not reported

NS = not sampled

Reference:

U.S. Army Corps of Engineers (USACE). 1997. Installation-Wide Multispecies Habitat Monitoring Plan for Former Fort Ord, California. April. Sacramento, California.

Table I-2
Focus Species Data Summary
2011 Parker Flats Vegetation Monitoring Report
FORA ESCA RP

Grid Cell	Plot #	# Monterey Spineflower Individuals 2008	# Monterey Spineflower Individuals 2011	Change in Population	Notes	Photo #	Other Species	% Mulch ¹
C3G4 B6	2011 PF-MS-03	236	0	-236	Open and grassy; mulch nearby but not on plot	2423	<i>Erodium, Bromus, Salvia, Baccharus, Mimulus, Lastarrea</i>	0
C3G4 B7	2011-PF-MS-02	112	0	-112	Open and grassy	2422	<i>Erodium, Mimulus, Salvia, Baccharus, Toxicodendron</i>	0
C3G5 A5	2011 PF-MS-04	11	0	-11	Edge of road; Oak litter and duff	2424	<i>Trifolium, ripgut brome, plantago erecta, Lotus, Castalella</i>	50
C3G5 A6	2011 PF-MS-06	71	231	160	Open sandy; old road junction	2426	<i>Chorizanthe</i> observed outside of plot	0
C3G5 A6	2011 PF-MS-05	503	80	-423	Plot adjacent to road	2425	40% of plot is vegetated by <i>Lotus</i>	10
C3G5 A6	2011 PF-MS-07	144	0	-144	Full of mulch; adjacent to road	2427	<i>Lotus, Quercus, Toxicodendron</i>	66
C3G5 B9	2011 PF-MS-08	2	5	3	Half of plot in road	2428	<i>Lotus, Baccharus</i>	0
C3G5 C9	2011 PF-MS-09	9	0	-9	Woody Debris	2429	<i>Chamise, Lotus, Baccharus, Ira grass</i>	10
C3G6 E5	2011 PF-MS-10	78	91*	13	Road junction; frequently used	2430	<i>Manzanita, Quercus, grass</i>	0
C3H3 A5	2011 PF-MS-01	203	0	-203	Mulch on one side; NE facing slope; half of plot in road	2421	NR	33
Totals		1369	407	-962				

Notes:

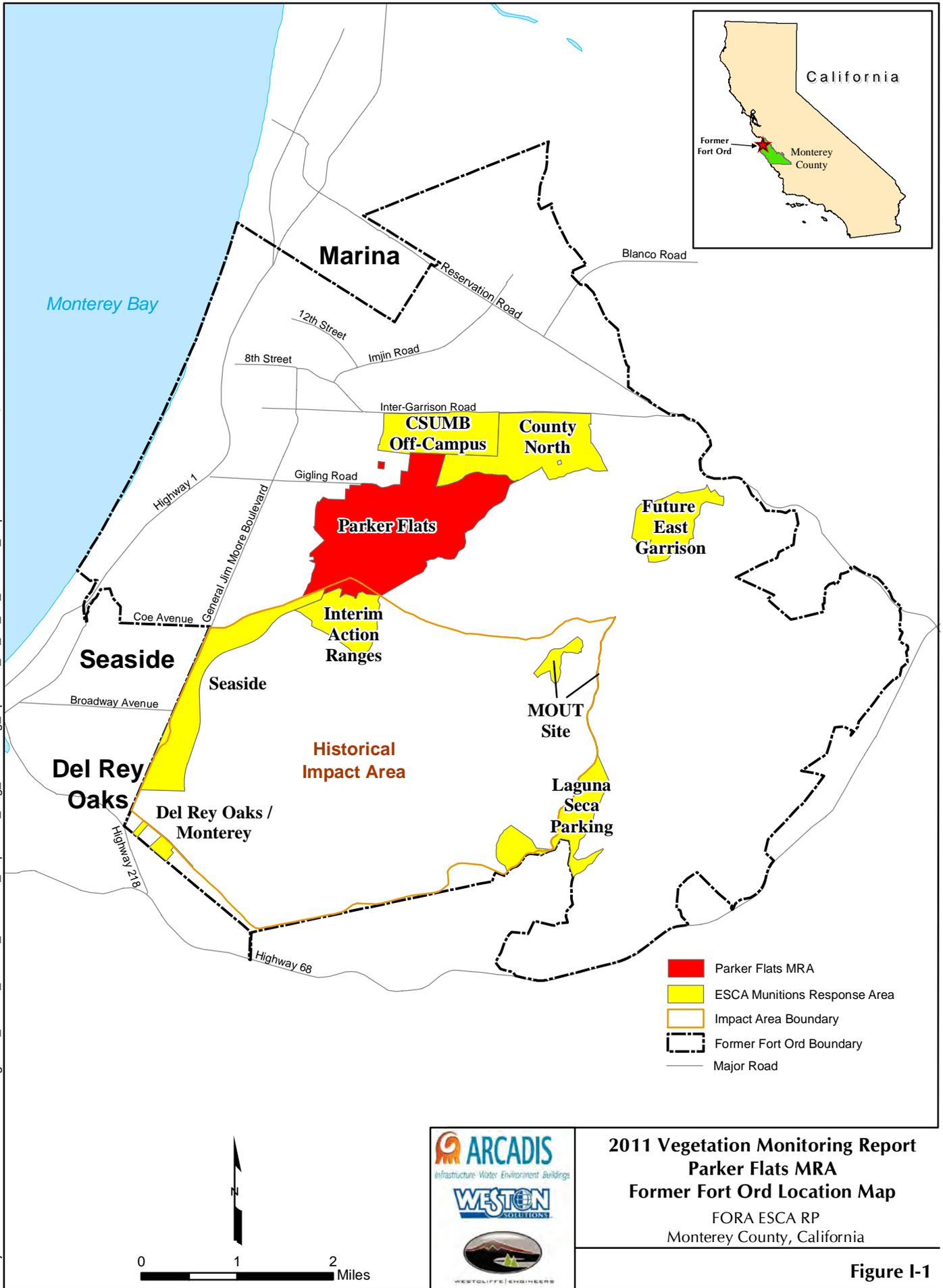
*Species identified as *Chorizanthe* sp.; however, flowers were absent or immature, precluding species identification at time of observation.

¹ Based on field notes and photos

GPS File: 2011-04-026 PF MS Surveys

NR - not reported

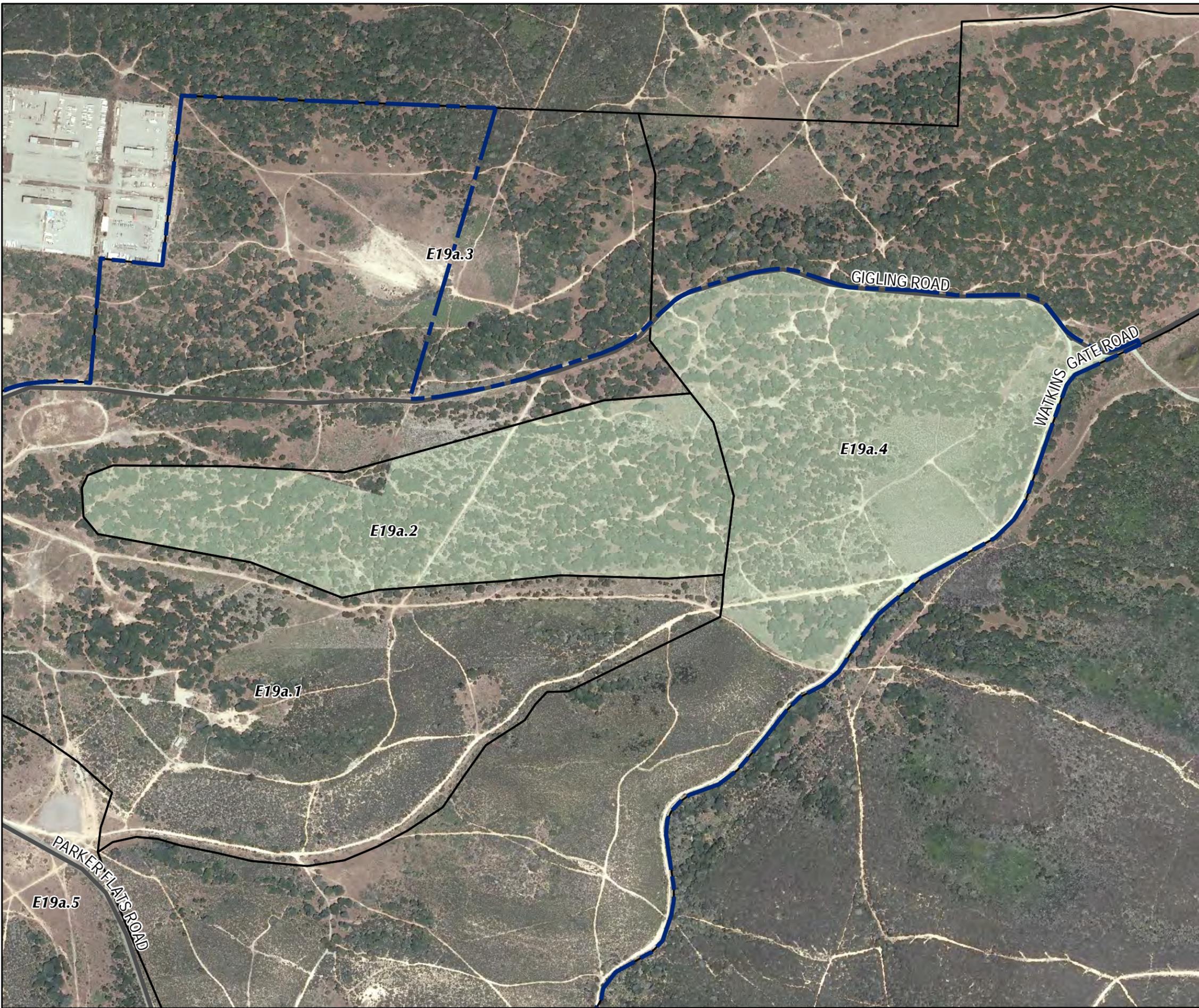
T:\Projects\ALL\MRAs\Habitat Monitoring\2011_Annual_Natural_Resource_Report\PF_Veg_Monitoring_Report\PF_Veg_Monitoring_Report\2012_03_08_PF_Location_Map.mxd - 5/16/2012 @ 8:56:17 AM



**2011 Vegetation Monitoring Report
Parker Flats MRA
Former Fort Ord Location Map**
FORA ESCA RP
Monterey County, California

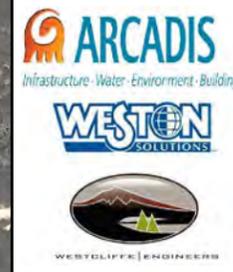
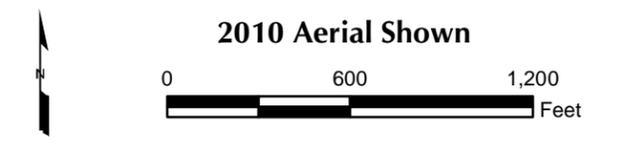
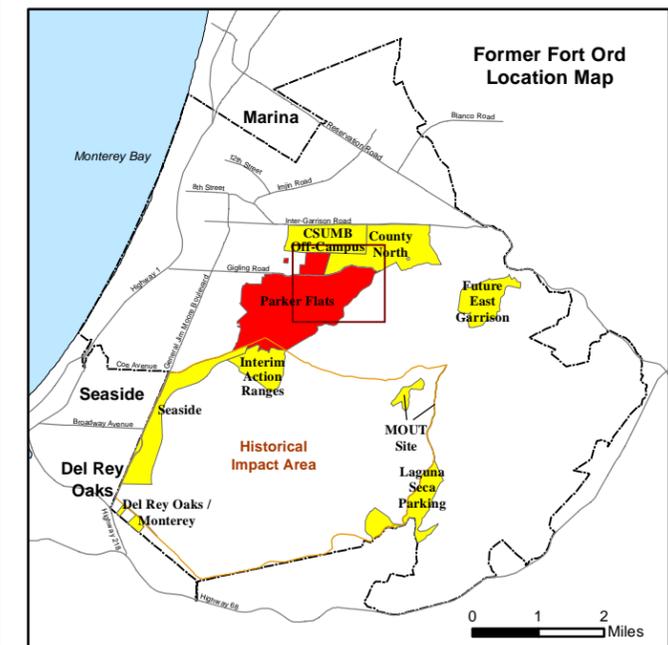
Figure I-1

T:\Projects\ALLMRAs\Habitat Monitoring\2011_Annual_Natural_Resource_Report\PF_Veg_Monitoring_Rpt\2012_02_27_PF_PhaseII_Habitat_Area.mxd 5/16/2012 @ 8:58:11 AM



Legend

- Phase II Habitat Area
- Munitionis Response Area
- Major Road
- USACE Parcel

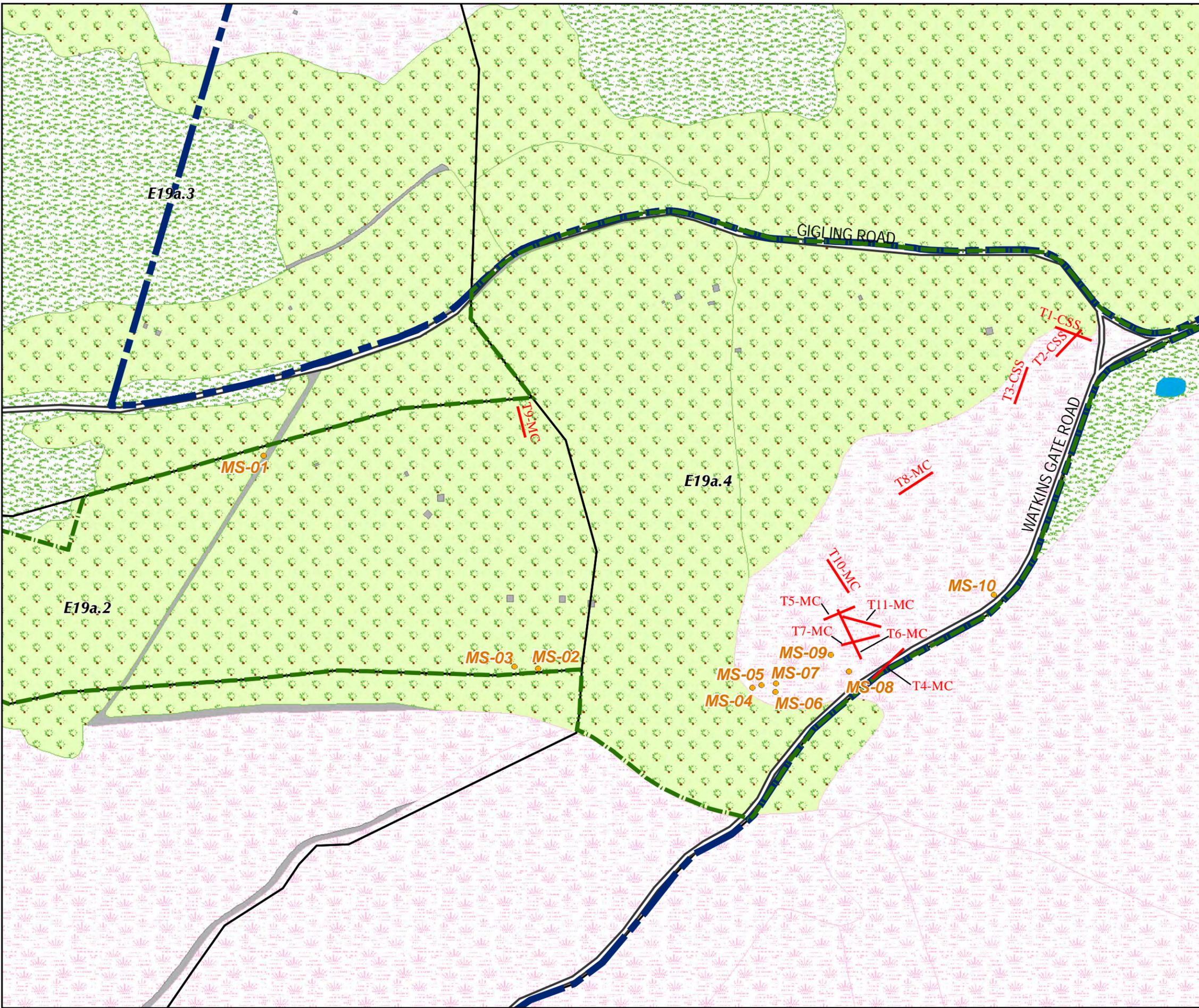


**2011 Vegetation Monitoring Report
Parker Flats MRA
Phase II Habitat Area
2010 Orthophotos**

FORA ESCA RP
Monterey County, California

Figure I-2

T:\Projects\ALLMRAS\Habitat Monitoring\2011_Annual_Natural_Resource_Report\PF_Veg_Monitoring_Report\2012_02_22_PF_Monitoring_Locations.mxd 5/16/2012 @ 9:03:17 AM



Legend

- MS-"X" Spineflower Plot Location and Code
- T9-MC Survey Transects (MC = Maritime Chaparral, CSS = Coastal Sage Scrub)
- Phase II Habitat Area
- Munitionis Response Area
- E19a.4 USACE Parcel
- Major Road

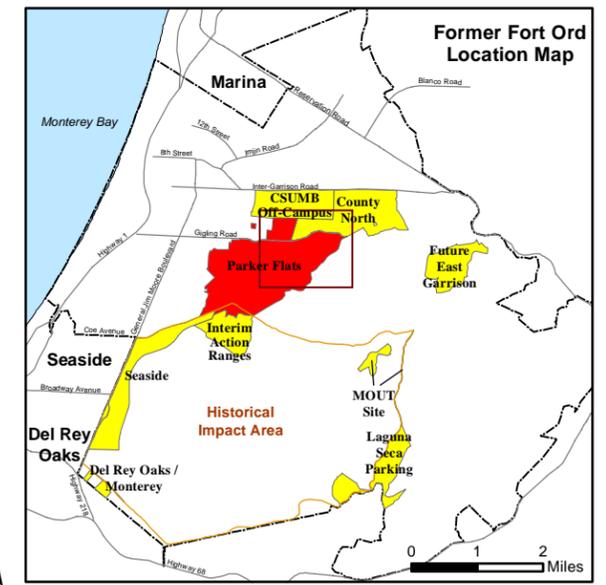
Vegetation Type

- Grassland*
- Maritime Chaparral*
- Coastal Coast Live Oak Woodland*
- Aquatic Feature*
- Developed / Disturbed

*Source: Flora and Fauna Baseline Study of Fort Ord, California, Jones and Stokes Association Inc., December 1992.



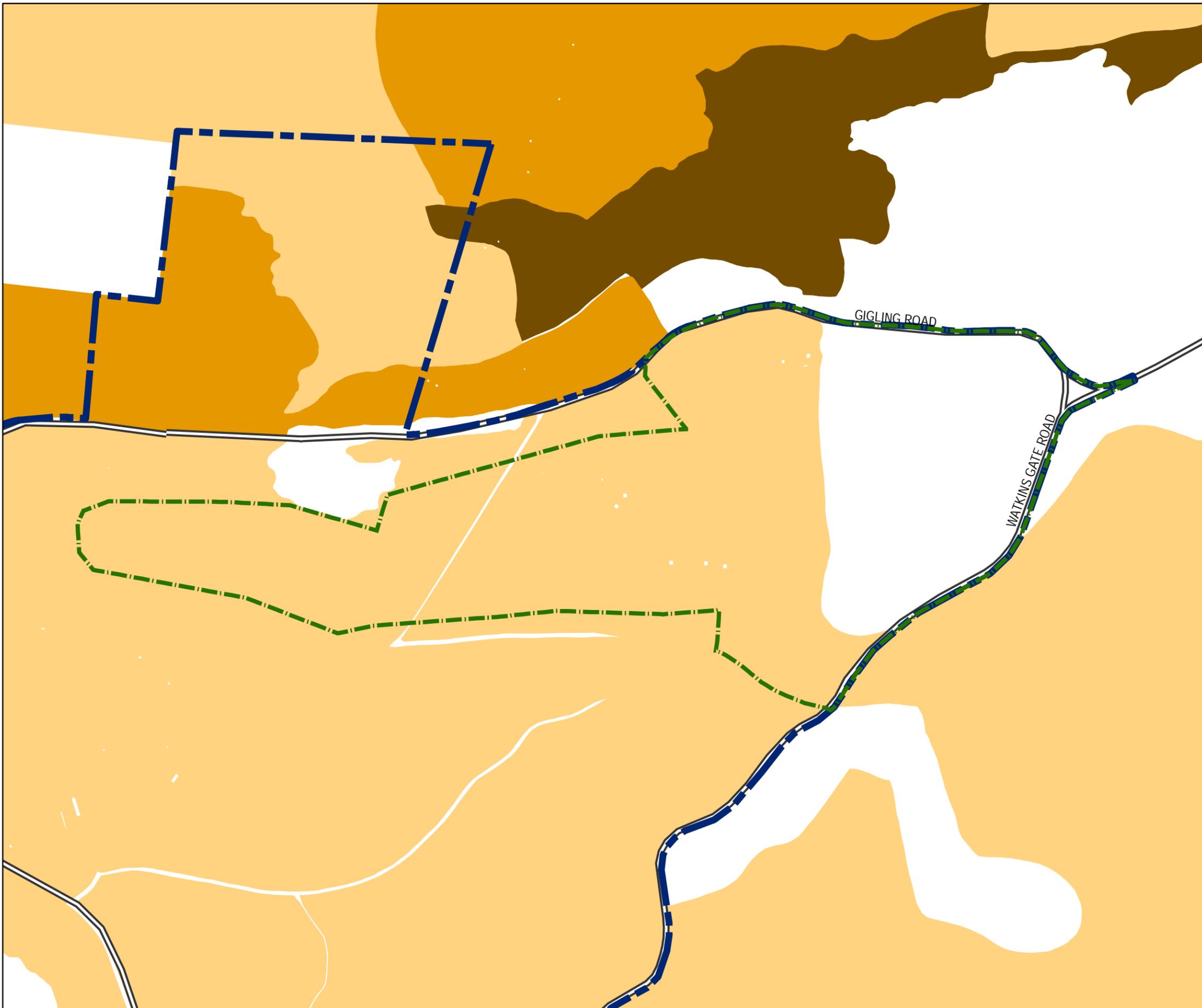
Monterey Spineflower



**2011 Vegetation Monitoring Report
Parker Flats MRA Phase II Habitat Area
Monitoring Locations Established
in 2008 Baseline Survey**

FORA ESCA RP
Monterey County, California

Figure I-3



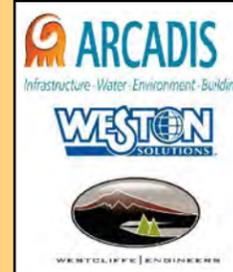
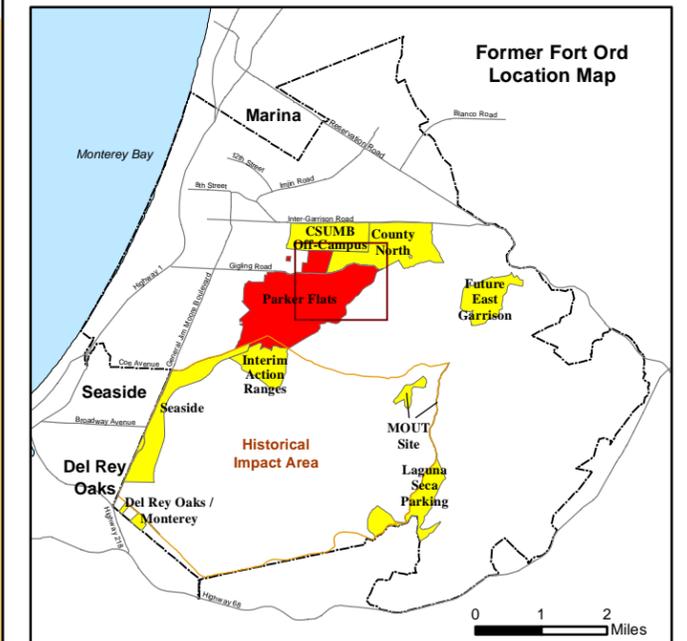
Legend

-  Phase II Habitat Area
-  Munitions Response Area
-  Major Road

Monterey Spineflower Density Categories

-  Low*
-  Medium*
-  High*

*Source: Flora and Fauna Baseline Study of Fort Ord, California, Jones and Stokes Association Inc., December 1992.



**2011 Vegetation Monitoring Report
Parker Flats MRA
Baseline Study - Known 1992
Distribution of Monterey Spineflower**

FORA ESCA RP
Monterey County, California

Figure I-5

APPENDIX A

Photolog

2010 Reconnaissance and 2011 Vegetation Monitoring Report
Parker Flats Phase II Munitions Response Area



Photograph 1 (2423): Monterey Spineflower was not observed in Plot # 2011 PF-MS-03.



Photograph 2 (2422): Monterey Spineflower was not observed in Plot # 2011 PF-MS-02.



Photograph 3 (2424): Monterey Spineflower was not observed in Plot # 2011 PF-MS-04.



Photograph 4 (2426): Monterey Spineflower was observed in Plot # 2011 PF-MS-06.



Photograph 5 (2425): Monterey Spineflower was observed in Plot # 2011 PF-MS-05.



Photograph 6 (2427): Monterey Spineflower was not observed in Plot # 2011 PF-MS-07.



Photograph 7 (2428): Monterey Spineflower was observed in Plot # 2011 PF-MS-08.



Photograph 8 (2429): Monterey Spineflower was not observed in Plot # 2011 PF-MS-09.



Photograph 9 (2430): Monterey Spineflower was observed in Plot # 2011 PF-MS-10.



Photograph 10 (2421): Monterey Spineflower was not observed in Plot # 2011 PF-MS-01.