2010 Annual Natural Resource Monitoring, Mitigation, and Management Report

Covering Activities Conducted from October 16, 2009 through October 15, 2010

Environmental Services Cooperative Agreement Remediation Program Munitions Response Areas

Former Fort Ord
Monterey County, California

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FORT ORD REUSE AUTHORITY

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ACRONYMS AND ABBREVIATIONS

AOC	Administrative Order on Consent
Army	U.S. Department of the Army
BLM	Bureau of Land Management
BMP	best management practice
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
DRO	Del Rey Oaks
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
FOSET	Finding of Suitability for Early Transfer
FVF	field variance form
GIS	Geographic Information System
HMP	Habitat Management Plan
MEC	munitions and explosives of concern
MOUT	Military Operations in Urban Terrain
MRA	Munitions Response Area
MRS	Munitions Response Site
msl	mean sea level
NCA	Non-Completed Area
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.)
OE	ordnance and explosives

QB	Qualified Biologist
RQA	Residential Quality Assurance
RWQCB	Regional Water Quality Control Board
SCA	Special Case Area
SQB	Senior Qualified Biologist
TCRA	Time-Critical Removal Action
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
UXO	unexploded ordnance

GLOSSARY

2010 Reporting Period
October 16, 2009 through October 15, 2010 (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.

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).

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, 2009 through October 15, 2010. 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).

This report is the third in a series of annual natural resource reports produced for the ESCA RP. The two previous reports covered the 2008 and 2009 reporting periods (ESCA RP Team 2009, 2010a).

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 Environmental Services Cooperative Agreement (ESCA) with the Army for 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 (FOSET). 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 eight MRAs: County North, Del Rey Oaks (DRO)/Monterey, Future East Garrison, Interim Action Ranges, Laguna Seca Parking, Parker Flats, and Seaside (ESCA RP Team 2009, 2010a). During the period covered by this report, ESCA RP MEC clearance and related non-biological field activities were performed in six MRAs: County North, CSUMB Off-Campus, Future East Garrison, Interim Action Ranges, Parker Flats, and Seaside.

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 the MRAs that have been subjected to ESCA RP activities since the inception of the project. The Military Operations in Urban Terrain (MOUT) Site MRA, also included in the ESCA RP, is not described below because no ESCA RP field activity has occurred to date in this MRA.

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. 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 County North MRA

The County North MRA (previously known as Bureau of Land Management [BLM] North or Development North MRA) is located in the north-central portion of the former Fort Ord, bordered by Inter-Garrison Road to the north, the CSUMB Off-Campus MRA to the west, Gigling Road and the Parker Flats MRA to the southwest, and a portion of Watkins Gate Road and additional former Fort Ord property to the south and east (Figures 1 and 2). The County North MRA is wholly contained within the jurisdictional boundaries of Monterey County. The County North MRA encompasses approximately 506 acres and fully contains U.S. Army Corps of Engineers (USACE) parcels L5.7 and L20.2.1 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 Parker Flats MRA. Of the 506 acres within this MRA, one 134-acre parcel is designated as habitat reserve. The line where the two development parcels abut the habitat reserve parcel in the middle of the County North MRA is referred to as the borderland interface and is subject to the requirements identified as borderland boundary condition.

The terrain of the County North MRA is primarily rolling hills. The elevation ranges from approximately 210 to approximately 370 feet mean sea level (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 County North MRA is Oceano Loamy Sand. Soil conditions at the MRA consist predominantly of weathered dune sand.

Vegetation in the County North MRA consists primarily of coastal coast live oak woodland with smaller areas of maritime chaparral and grassland (USACE/Jones & Stokes 1992). Vegetation varies from sparsely vegetated areas to heavy brush. Parcels in the eastern portion of the MRA are designated as critical habitat for Monterey spineflower.

1.3.2 CSUMB Off-Campus MRA

The CSUMB Off-Campus MRA (previously named CSUMB MRA) is located in the north-central portion of the former Fort Ord, bordered by Inter-Garrison Road to the north, the County North MRA to the east and southeast, Parker Flats MRA to the south, and CSUMB campus property to the west and southwest (Figures 1 and 3). The CSUMB Off-Campus MRA is wholly contained within the jurisdictional boundaries of Monterey County. The CSUMB Off-Campus MRA encompasses approximately 333 acres and contains USACE parcel S1.3.2. Of the 333 acres within this MRA, 283 acres are designated as non-residential – open space park. The line where the development parcel abuts the habitat reserve parcel at the southeastern corner of the CSUMB Off-Campus MRA is referred to as the borderland interface and is subject to the requirements identified as borderland boundary condition.

The terrain of the CSUMB Off-Campus MRA is primarily rolling hills. The elevation ranges from approximately 240 to approximately 375 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 CSUMB Off-Campus MRA is Oceano Loamy Sand. Soil conditions at the MRA consist predominantly of weathered dune sand.

Similar to the County North MRA, vegetation in the CSUMB Off-Campus MRA consists primarily of coastal coast live oak woodland with smaller areas of maritime chaparral and grassland (USACE/Jones & Stokes 1992). Vegetation varies from sparsely vegetated areas to heavy brush.

1.3.3 Del Rey Oaks/Monterey MRA

The DRO/Monterey MRA is located in the southwestern portion of the former Fort Ord, along South Boundary Road (Figures 1 and 4). The DRO/Monterey MRA is contained within

the jurisdictional boundaries of the City of Del Rey Oaks and the City of Monterey. The DRO/Monterey MRA encompasses approximately 29 acres of undeveloped land and 5.245 acres of a portion of the existing South Boundary Road and associated right-of-way. The DRO/Monterey MRA contains the following four USACE parcels: E29.1, L6.2, L20.13.1.2, and L20.13.3.1.

The terrain of the DRO/Monterey MRA is hilly and sloping from the southwest to the northeast, while relatively flat along the roadway. The elevation ranges from approximately 150 to 260 feet msl with 0 to 30 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 types present in the DRO/Monterey MRA are Baywood Sand and Arnold-Santa Ynez Complex. Soil conditions at the MRA are predominantly weathered dune sand.

Vegetation consists primarily of maritime chaparral in the DRO/Monterey MRA (USACE/Jones & Stokes 1992). The area south of South Boundary Road consists of dense brush. The area along South Boundary Road transitions from sparse vegetation adjacent to the roadway to more dense vegetation to the south.

1.3.4 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 1 and 5), and is wholly contained within the jurisdictional boundaries of Monterey County. This MRA encompasses approximately 244 acres and contains the following four 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 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 (see Figure 14).

1.3.5 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 1 and 6). 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 (see Figure 14).

1.3.6 Laguna Seca Parking MRA

The Laguna Seca Parking MRA is located in the southeastern portion of the former Fort Ord adjacent to the Laguna Seca Raceway (Figures 1 and 7). The MRA is bordered by Barloy Canyon Road and the former impact area to the west, South Boundary Road and Laguna Seca Raceway to the south, and additional former Fort Ord property to the east and north. The Laguna Seca Parking MRA is wholly contained within the jurisdictional boundaries of Monterey County. The MRA encompasses approximately 276 acres and contains the following six USACE parcels: L20.3.1, L20.3.2, L20.5.1, L20.5.2, L20.5.3, and L20.5.4. Access into Laguna Seca Parking MRA is currently restricted by fencing, barricades, gates, and warning signs. Locked gates and barricades across South Boundary Road restrict access to the MRA from the south. Barricades across Barloy Canyon Road at the intersection with Eucalyptus Road restrict access into the MRA from the north. The western side of the Laguna

Seca Parking MRA, along Barloy Canyon Road, is bounded by barbed-wire fencing. The eastern boundary of the MRA is not restricted by fencing. Warning and no trespassing signs are posted on the gates, barriers, and fencing.

The terrain of the Laguna Seca Parking MRA varies from flat to very steep terrain with slopes ranging from 15 to 50 percent. The elevation ranges from approximately 470 feet msl in the northern portion of the MRA to approximately 950 feet msl in the southern portion of the MRA. The geology includes deposits from the Paso Robles Formation and sand and gravel deposits of Aromas Sandstone. Soil conditions in the Laguna Seca Parking MRA are predominantly weathered dune sand.

The vegetation of the Laguna Seca Parking MRA consists primarily of grassland and maritime chaparral. Smaller areas of coast live oak woodland, coast live oak savanna, and coastal scrub are also present (USACE/Jones & Stokes 1992). The MRA is characterized as open grassland and dense vegetation. A number of MEC sampling and removal actions have been performed by the Army at the Laguna Seca Parking MRA, which required vegetation removal. Vegetation removal has been performed with burning and both manual and mechanical methods. The western portion of the MRA is designated as critical habitat for Monterey spineflower (see Figure 14).

1.3.7 Parker Flats MRA

The Parker Flats MRA is located in the central portion of the former Fort Ord, bordered by the 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 1 and 8). 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 remediation effort 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 Phase I area of the Parker Flats MRA.

1.3.8 Seaside MRA

The Seaside MRA is located in the southwestern portion of the former Fort Ord, bordered by the City of Seaside to the west and the impact area to the east (Figures 1 and 9). The Seaside MRA runs along General Jim Moore Boulevard south of Eucalyptus Road and is wholly contained within the jurisdictional boundaries of the City of Seaside.

The Seaside MRA includes the USACE parcels E24, E34, E23.1, and E23.2, which are roughly coincident with (and include all of) four Munitions Response Sites (MRSs), MRS-15SEA.1, MRS-15SEA.2, MRS-15SEA.3, and MRS-15SEA.4, respectively. This MRA does not include habitat reserve parcels. The eastern edge of the Seaside MRA abuts the NRMA and this boundary is referred to as the borderland interface. Development parcels such as those comprising the Seaside MRA that abut the borderland interface are subject to the requirements referred to as the borderland boundary condition.

The terrain of the Seaside MRA varies from flat to moderately rolling hills. The elevation ranges from approximately 210 to approximately 520 feet msl with 2 to 15 percent slopes. Old dune deposits up to 250 feet thick cover most of the area. Soil conditions at the MRA are predominantly weathered dune sand.

Prior to 2008, vegetation consisted primarily of maritime chaparral with patches of non-native grassland and scattered stands of coastal and inland coast live oak woodlands (USACE/Jones & Stokes 1992). In 2003, as part of the Army's Time-Critical Removal Action (TCRA) for MEC, vegetation clearance was conducted on 398 acres of the Seaside MRA so that it would be accessible for MEC removal actions. Additional vegetation clearance occurred in support of the Non-Time-Critical Removal Action.

1.4 Overview of ESCA RP Activities

The 2008 and 2009 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 2008 and 2009 (through October 15), respectively. This section includes an overview of the ESCA RP activities

performed from October 16, 2009 through October 15, 2010 ("the 2010 reporting period"). Table 1 presents an overview of acreages subjected to field activities conducted by the ESCA RP Team during the 2010 reporting period.

1.4.1 County North MRA

No vegetation clearance activities were conducted in the County North MRA during the 2010 reporting period.

No MEC-related work was conducted in the County North MRA performed during the 2010 reporting period. A minor (i.e., de minimis) amount of fieldwork related to the installation of sign posts and trail markers was conducted.

No natural resource monitoring or mitigation work was performed during the 2010 reporting period.

1.4.2 CSUMB Off-Campus MRA

No vegetation clearance activities were conducted in the CSUMB Off-Campus MRA during the 2010 reporting period.

No MEC-related work was conducted in the CSUMB Off-Campus MRA in 2010. As described in the 2009 annual report, a portion of the CSUMB Off-Campus MRA was a part of the Residential Quality Assurance (RQA) Pilot Study that was completed in August 2009. In early November 2009, the footprint of the RQA Pilot Study area in the CSUMB Off-Campus MRA was sprayed with a weed-free Hydroseed mixture as an erosion control measure. Other field work conducted in the MRA included installing sign posts and trail markers and conducting brief surveys for erosion and invasive plants. These activities are classified as de minimis.

No natural resource monitoring or mitigation work was performed during the 2010 reporting period.

1.4.3 Del Rey Oaks/Monterey MRA

No vegetation clearance was conducted in the DRO/Monterey MRA during the 2010 reporting period.

No MEC-related work was conducted in the DRO/Monterey MRA during the 2010 reporting period.

Initial reconnaissance monitoring for HMP focus species (Monterey spineflower and sand gilia) habitat was conducted in the DRO/Monterey MRA on March 1, 2010. No further monitoring was performed after it was determined that MEC clearance work would not commence in this MRA in 2010 or 2011.

1.4.4 Future East Garrison MRA

Site preparation activities for MEC investigation of the Future East Garrison MRA roads, trails, and select grids within the habitat areas began in early October 2010. Preparatory work included manual limbing of trees greater than 6 inches diameter at breast height (DBH) and mechanical vegetation cutting of undergrowth. As of October 15, 2010, approximately 3 acres of vegetation had been cut. Site preparation activities are expected to continue into 2011.

Analog MEC investigation within the habitat area was initiated on October 13, 2010. As of October 15, 2010, approximately 0.25 acre of MEC investigation had been completed. MEC investigation is expected to continue into 2011. 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.

Vegetation monitoring 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) was initiated during and was ongoing as of the end of the 2010 reporting period.

Monitoring of aquatic features (i.e., "vernal pools" and ponds) was performed in the spring of 2010. Several unmapped aquatic features in addition to aquatic features previously mapped were monitored during three surveys.

1.4.5 Interim Action Ranges MRA

No vegetation clearance activities were conducted in the Interim Action Ranges MRA during the 2010 reporting period.

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 for the Interim Action Ranges MRA. During the site reconnaissance, two MEC items were found on the ground surface requiring disposal. The items were detonated in place on December 29, 2009. No other MEC-related work was conducted in the Interim Action Ranges MRA in 2009 or 2010.

Vegetation monitoring 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) was initiated during and was ongoing as of the end of the 2010 reporting period.

1.4.6 Laguna Seca Parking MRA

No field activities were performed within the Laguna Seca Parking MRA during the 2010 reporting period.

1.4.7 Parker Flats MRA

The majority of MEC-related field activities in the 2010 reporting period were conducted in the Parker Flats MRA (shown on Figure 10). Site preparation activities for MEC investigation within the Parker Flats MRA began in 2008. Site preparation activities for the surface MEC investigation within the habitat areas began in 2008 and were complete in September 2009. Site preparation activities for the MEC removal activities in the development areas of the Parker Flats MRA began in 2009 and were completed in September 2010. Site preparation work in the development areas included limited vegetation clearance, manual limbing of trees greater than 6 inches DBH, and mechanical vegetation cutting. Mowers were occasionally used in support of the MEC fieldwork to minimize the exposure of unexploded ordnance (UXO) field teams to poison oak.

Digital geophysical mapping (DGM) data collection and associated target investigation operations on the habitat area trails were completed in August 2009; however, analog and DGM data collection and target investigation were conducted in the development areas throughout 2010. Digging of anomalies included both near-surface digs using hand tools and subsurface removal using either hand tools or backhoes.

As described in the field variance form (FVF) Number G1WP-001, soil screening operations were initiated in the DGM survey areas where the soil contained a high density of small metallic debris (e.g., ammunition links, wire shards, etc.), which could not feasibly be individually removed from the soil. The screened soil generated during the soil screening operations was stockpiled in four individual locations within the Parker Flats MRA development area (labeled “Current Soil Pile Locations” on Figure 11), which covered approximately 0.1 acre in total of the development parcel. Two additional locations within the Parker Flats MRA development areas (labeled “Proposed Future Soil Lay Down Area” on Figures 11 and 12), which cover approximately 0.5 acre in total of development parcels, were identified for possible future use.

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.

Because the above work was performed in development parcels, vegetation monitoring was not performed in that portion of the Parker Flats MRA during the 2010 reporting period. A Spring 2010 reconnaissance survey for focus species populations (i.e., Monterey spineflower and sand gilia) was performed in the habitat parcel. No further monitoring work was performed after it was determined that MEC-clearance-related work would not be completed in this MRA until early 2011.

1.4.8 Seaside MRA

No vegetation clearance activities were conducted in the Seaside MRA in 2010.

As described in the 2009 Annual Natural Resource Report, a portion of the Seaside MRA was a part of the Residential Quality Assurance (RQA) Pilot Study that was completed in August

2009. In early November 2009, the footprint of the RQA Pilot Study area in the Seaside MRA was sprayed with a weed-free Hydroseed mixture comparable to that used by BLM as an erosion control measure.

In fall of 2010, additional investigation was required in a small portion of MRS15-SEA.2 due to FORA contractor activity (Figure 13). A verification survey was conducted which included DGM data collection and target investigation in a portion of future residential development area. Investigation of anomalies included subsurface removal using hand tools.

Other fieldwork conducted in the MRA included inspecting previously installed erosion control measures including dams, channels, and waddles along the borderland interface, grading the access road referred to as 'blue line road' to allow access to the inland range gates and site access within the MRA, and conducting brief surveys for erosion.

Weed abatement was performed as described in Section 4.7.3.

1.4.9 Cumulative Vegetation Clearance in Habitat Parcels

Annual and cumulative to date (i.e., as of October 15, 2010) acreages of habitat parcels subjected to vegetation clearance by the ESCA RP are shown in Table 2.

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 section 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), removal of MEC (formerly referred to as ordnance and explosives [OE]) 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 investigation removal/remediation 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 involved substantial excavation and occasionally exceeded 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, 2010, 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. Removal of MEC "could occur in areas supporting approximately 75% of the occupied habitat of sand gilia (*Gilia tenuflora* spp. *arenaria*) and Monterey spineflower (*Chorizanthe pungens* var. *pungens*) 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 clearance 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 removal was to reestablish 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 removal including avoidance where feasible of known sensitive plant populations, a vegetation burning and restoration program planned to coordinate with ordnance 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 removal 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 maritime chaparral habitat in different stages of succession, 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 removal 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 remediation 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 clearance) 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"; Burleson 2009) was issued.

Vegetation monitoring is required in habitat parcels if vegetation is disturbed as a result of ESCA RP MEC clearance 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 seral stage and/or plant association, sampled with line-intercept transects and adjacent quadrat sampling.

The focus species surveys generally are conducted during the flowering period (April through September, depending on the species) and are intended to document population changes of the species after MEC investigation and removal activities. The 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 removal 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 (Burleson 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 written three BOs for the former Fort Ord that apply to the project. The BOs were issued by the USFWS to the Army, and the ESCA RP Team (particularly the Qualified Biologists [QBs]) act as the Army's agent to implement relevant requirements of the BOs while conducting fieldwork within ESCA RP MRAs.

The first of these BOs was dated March 30, 1999, and titled "Biological and Conference Opinion on the Closure and Reuse of Fort Ord, Monterey County, California (1-8-99-F/C-39R)" (USFWS 1999). This BO 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. Army Geographic Information System (GIS) data indicate that of the species included in this BO, only sand gilia (*Gilia tenuiflora* spp. *arenaria*) is currently listed and known to occur in the ESCA RP MRAs.

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 (Figure 14).

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 (Figure 15), but that critical habitat for Contra Costa goldfields does not occur within any 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 removal 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 grass [*Cortaderia selloana* (Schultes) Asch. & Graebner]

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, Base Realignment and Closure (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 AND MEC CLEARANCE ACTIVITIES

The ESCA RP Team MEC investigation activities during the 2010 reporting period were conducted to complete the evaluation of the nature and extent of MEC potentially present in the MRAs prior to conducting a risk assessment and proposing a preferred remedial alternative as part of a Remedial Investigation/Feasibility Study pursuant to CERCLA. Work in the Seaside MRA was conducted in support of a verification DGM survey.

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, 2010, approximately 3 acres of vegetation had been cut.

Analog MEC investigation within the trails, roads and select grids within the habitat area of the Future East Garrison MRA was initiated on October 13, 2010. Digging of anomalies included both near-surface digs using hand tools and subsurface removal using hand tools. As of October 15, 2010, approximately 0.25 acre of MEC investigation had been completed.

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 for the Interim Action Ranges MRA. In 2010, no MEC-related work was conducted in the Interim Action Ranges MRA as of October 15, 2010. No vegetation was cut or removed within the MRA to conduct this work.

3.3 Parker Flats MRA

Site preparation activities for the surface removal within the habitat areas began in 2008 and were complete in September 2009. Site preparation activities for the MEC removal activities in the development areas of the Parker Flats MRA began in 2009 and were complete in September 2010. Site preparation work in the development areas included limited vegetation clearance, manual limbing of trees greater than 6 inches DBH, and mechanical vegetation cutting.

DGM data collection and associated removal operations on the habitat area trails were completed in August 2009; however, analog and DGM data collection and target investigation was conducted in the development areas throughout 2010. Digging of anomalies included both near-surface digs using hand tools and subsurface removal using either hand tools or backhoes. The areas of MEC remediation are shown on Figure 10 and involved 0 acre of habitat and 226 acres of development parcels in the Parker Flats MRA.

As described in the field variance FVF Number G1WP-001, soil screening operations were initiated in the DGM survey areas where the soil contained a high density of small metallic debris (e.g., ammunition links, wire shards, etc.), which could not feasibly be individually removed from the soil. The screened soil generated during the soil screening operations was stockpiled in two locations within the Parker Flats MRA development areas (labeled "Current Soil Pile Locations" on Figure 11), which covered approximately 0.1 acre in total of the development parcel.

3.4 Seaside MRA

In the summer of 2010, a FORA contractor used a small portion of MRS15-SEA.2 located outside the General Jim Moore Boulevard alignment (and within the residential development area) as a construction lay down area to stage materials and equipment related to the paving of General Jim Moore Boulevard. As a result, a DGM survey and target investigation were performed over the lay down area located outside of the roadway alignment in September 2010 to verify that MEC items had not been unintentionally transported to the residential development area. The verification survey included DGM data collection and target investigation in a portion of the future residential development area. Investigation of anomalies included subsurface removal using hand tools. The area of the MRA affected by the DGM survey is shown on Figure 13 and involved approximately 2 acres of development parcels. No vegetation cutting or removal was required to conduct this work.

3.5 Cumulative Areas of Vegetation Clearance in Habitat Parcels

Table 2 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, and cumulative totals as of October 15, 2010, are shown in Table 2. 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, 2010, habitat parcels in four MRAs had experienced vegetation clearance. There had been a de minimis amount of clearance in the County North and Interim Action Ranges MRAs. A total of 168 acres of vegetation had been cleared in the Parker Flats MRA to facilitate MEC clearance activity. A small amount of vegetation (0.25 acre) was cleared in the Future East Garrison MRA (this work began only a few days before the end of the 2010 reporting period).

4.0 SUMMARY OF MONITORING AND MITIGATION MEASURES

Habitat monitoring, management, and mitigation activities performed by the ESCA RP Team during late 2007, 2008, and 2009 (before October 16) were documented in the 2008 and 2009 Annual Natural Resource Monitoring, Mitigation, and Management Reports (ESCA RP Team 2009, 2010a).

This section summarizes the habitat monitoring, management, and mitigation activities performed by the ESCA RP Team during the period from October 16, 2009 through October 15, 2010.

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 2010 reporting period, no QB Memoranda were finalized; QB Memoranda addressing initial recovery of vegetation in the habitat parcel of the Parker Flats MRA and mitigation measures for focus species in the habitat parcels of the Future East Garrison MRA were in progress and will be included in the 2011 annual report.

4.2 Natural Resource Impact Mitigation Checklists

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 checklist, for its activities. The following checklists were developed and implemented during this reporting period.

4.2.1 Future East Garrison MRA

A Natural Resource Impact Mitigation checklist was developed for the vegetation and MEC clearance work in the habitat parcels of the Future East Garrison MRA that commenced just before the end of the 2010 reporting period. The checklist addressed all relevant mitigation measures, including location-specific measures to minimize impacts on aquatic features and sand gilia and Monterey spineflower populations. A copy of the checklist is included as Appendix A.

4.2.2 Parker Flats MRA

An October 15, 2009 revision to an earlier Natural Resource Impact Mitigation checklist was developed for the vegetation and MEC clearance work in the habitat parcels of the Parker Flats MRA Phase II that commenced just before the end of the 2009 reporting period. The revision updated parcel numbers, parcel ownership, and locations of Monterey spineflower populations. A copy of the checklist is included as Appendix B.

4.3 CTS Mitigation Measures Implemented

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. In early October 2010 (as in early 2009) at the beginning of the nominal wet season, a QB conducting environmental awareness training of field personnel prior to initiation of work in the Future East Garrison MRA, placed special emphasis on CTS

awareness, requirements, and mitigation measures. This training was performed as an additional protective measure in advance of the period when CTS are most likely to be encountered and because several aquatic features (potential breeding habitats for CTS) are present in the Future East Garrison MRA. 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. 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 such encounters occurred during the 2010 reporting period.

4.3.1 Aquatic Feature Monitoring in the Future East Garrison MRA

In advance of MEC clearance work planned for fall of 2010, reconnaissance for aquatic features (i.e., "vernal pools" and ponds) was conducted in the Future East Garrison MRA in early 2010. The detailed report on aquatic feature monitoring is included in Appendix D. A summary of results and findings extracted from the detailed report are included in this section.

4.3.1.1 Summary of Results

In addition to the three aquatic features mapped in the northeast portion of the MRA in the 1992 surveys (some of which were subdivided by ESCA RP QBs into numbered basins), ESCA RP QBs detected one unmapped feature in the area (a concrete lined vehicle wash structure) and three unmapped aquatic features (i.e., depressions where water ponded for an extended period of time) in the southwest portion of the MRA.

In spring of 2010, these aquatic features were monitored per the protocols described in Section 2.3Habitat quality (for CTS) appeared low for most of the aquatic features based on landscape position, depth, size, short ponding duration, and vegetation characteristics in contrast to characteristics of classic vernal pool habitats. However, as CTS may be opportunistic spawners, all aquatic features were considered to be potential breeding habitat. To collect accurate depth information, semi-permanent water level gages were installed in the lowest point at each aquatic feature. Depth and extent of ponding was recorded at intervals related to rainfall events and ponding duration. Water quality data were collected per the protocols. Three biological surveys for aquatic fauna (including CTS larvae) were conducted by a USFWS-approved QB in March, April, and May in all aquatic features. Visual observations, dip nets, and a seine were used for sampling. No CTS larvae or adults were captured or observed during these surveys.

Other species commonly encountered during the spring surveys included pacific tree frog (*Hyla regilla*) eggs, larvae, and adults; primarily sub-adult bullfrogs (*Rana catesbeiana*); and numerous invertebrate species, most commonly damselfly (suborder Zygotera) naiads; water

boatman (family Corixidae); diving beetles (order Coleoptera); midge larvae (family Chromomidae); and mosquito larvae (family Culicidae).

4.3.1.2 Findings

Based on the absence of CTS observed during the 2010 aquatic surveys and the generally isolated location of the potential suitable upland CTS habitat, there is little expectation that HMP species (specifically CTS) will be affected during the currently planned ESCA RP remediation work in Future East Garrison MRA. The only aquatic feature that was included in the current MEC investigation footprint was AF68-AB. Standing vegetation in this location was so sparse that no mowing or vegetation clearance was needed. An ESCA RP QB coordinated with the MEC clearance personnel when they scanned the location. No targets were detected and therefore no disturbance occurred in the feature.

4.4 Other Wildlife

Several other encounters with wildlife were recorded by the ESCA RP Team in 2010, including rattlesnakes and a legless lizard (see below). Relatively few wildlife were encountered because construction equipment usage (other than for vegetation clearance) was minimal and most of the work was performed in the Parker Flats MRA Phase II development parcels, which had most of its vegetation clearance performed early in the 2010 reporting period.

Rattlesnakes have been encountered by ESCA RP personnel. Safety precautions for encounters with rattlesnakes have included the use of snakebite resistant chaps, snake tongs, and the conversion of a cooler into a snake transport device. No snake removals were performed during the 2010 reporting period.

On September 13, 2010, a putative legless lizard was injured in the Parker Flats MRA Phase II development parcel during seed bank salvage operation. The legless lizard is an HMP species, but has no federal status. The individual's tail was severed by a flat shovel that was used by ESCA RP personnel but the rest of the animal's body could not be located. The Field Observation Form and associated location map for this incident are located in Appendix C.

4.5 Vegetation 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 establish roads and paths, limiting vegetation clearance to the extent required to conduct MEC clearance, and limiting soil disturbance.

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 will be 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 February 18, 2010, after substantial rainfall events, ESCA RP QBs conducted a survey of the borderland boundary in the Seaside MRA. No erosion toward or across the boundary was observed except immediately north of Watkins Gate Road, where gullying had occurred in the development parcel, producing a small area (maximum of 25 square feet) of thin sedimentation within the NRMA (ESCA RP personnel did not have access to NRMA property and so could not directly measure the sediment thickness). The affected area is part of the shoulder of Watkins Gate Road. The vegetation in this disturbed area did not exhibit any indication of deleterious effects from the sedimentation. It was concluded by the ESCA RP QB that there was no effect of the sedimentation on undisturbed vegetation within the NRMA.

ESCA RP Team installed erosion control best management practices (BMPs) between the erosional area and the borderland boundary shortly after these observations were made.

4.7 Weed Management

Consistent with the requirements of the HMP (USACE 1997) and BOs relevant to ESCA RP activities (USFWS 1999, 2002, and 2005), weed management activities will be 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.

The ESCA RP is responsible for monitoring weed infestations that occur as a result of surface soil disturbances that are a consequence of activities related to MEC investigation and removal 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 are taken as described in the Weed Management Plan which was finalized in May 2010.

4.7.1 Areas of Soil Disturbance

ESCA RP activities that substantially disturb surface soils (i.e., subsurface MEC clearance, grading, and/or removal of surface soils) create potential sites for weed recruitment and population establishment. In development parcels with a borderland condition, locations where such activities occur are documented so that they can be monitored for weeds.

No major areas of soil were disturbed by ESCA RP activities in the ESCA RP MRAs with a borderland condition in the 2010 reporting period.

4.7.2 Monitoring Activities

The 2010 weed monitoring plan was being drafted per the Weed Management Plan as of the end of the 2010 reporting period and was anticipated to be finalized and implemented after October 15 (i.e., after the 2010 reporting period); therefore, this activity will be reported upon in the next annual report.

4.7.3 Abatement Activities

Abatement of iceplant populations in the northeastern portion of the Seaside MRA near the borderland boundary was conducted in the summer of 2010. A dense population of iceplant was removed from an area near the borderland boundary. The work produced approximately 12 haul bins of iceplant (20x8x8 feet). The plant material was placed on a nearby existing gravel pad for drying. The dried material will be disposed of appropriately. This effort substantially reduced the local population of this target weed and reduced the potential for iceplant to recruit into the adjacent NRMA.

5.0 VEGETATION MONITORING

Vegetation monitoring is required in habitat parcels if vegetation is disturbed as a result of ESCA RP MEC clearance activity. “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 (Burleson 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 3. As of the end of the current reporting period, ESCA RP has completed or initiated twelve surveys in four munitions response areas (County North, Future East Garrison, Interim Action Ranges, and Parker Flats MRAs). Six of the surveys have been for focus species and six for HMP shrubs.

5.2 Vegetation Monitoring Performed During the Reporting Period

Vegetation monitoring in the habitat parcels of the Future East Garrison MRA was begun in March 2010. Focus species sampling was completed in the spring. A notable result of this sampling effort was discovery of Monterey spineflower populations. This species had not previously been reported within the Future East Garrison MRA. Transect sampling for shrubs began in the fall and was ongoing as of the end of the 2010 reporting period. Vegetation monitoring in the habitat parcels of the Interim Action Ranges MRAs also began in March 2010 and was ongoing as of the end of the 2010 reporting period. Results of these monitoring efforts will be presented in the next annual 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.

6.0 RESTORATION PLANNING AND BIOLOGICAL MATERIAL ACQUISITION ASSOCIATED WITH MEC CLEARANCE WORK IN THE INTERIM ACTION RANGES MRA

In early 2010, the ESCA RP Team determined that surface soil scraping would be needed in a small portion 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 still in progress in 2010; therefore, technical details were not available in 2010 to prepare a restoration plan for this activity. The ESCA RP QBs conducted initial conceptual planning in 2010 to identify post-MEC clearance restoration activity.

7.0 REFERENCES

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Table 1
Approximate Areas Subjected (in Acres) to Field Activities Conducted by ESCA RP from October 16, 2009 through October 15, 2010
2010 Annual Habitat Monitoring Report
FORA/ESCA

MRA	Activity	Habitat Parcels	Development Parcels
County North	Minor	DM	DM
	Vegetation clearance	0	0
	MEC clearance	0	0
	Vegetation monitoring	0	NA
CSUMB Off-Campus	Minor	NP	DM
	Vegetation clearance	NP	0
	MEC clearance	NP	0
	RQA	NP	0
	Soil Stockpile	NP	2[a]
Del Rey Oaks/Monterey	Minor	0	0
	Vegetation clearance	0	0
	MEC clearance	0	0
	Vegetation monitoring	6	NA
Future East Garrison	Vegetation clearance	3	0
	MEC clearance	0.25	0
	Vegetation monitoring	170	NA
	RQA	NA	0
Interim Action Ranges	Minor	DM	DM
	Vegetation clearance	0	0
	MEC clearance	0	0
	Vegetation monitoring	206	25[c]
Parker Flats (Phase I)	Minor	DM	DM
	Vegetation clearance	0	0
	MEC clearance	0	0
	RQA	NA	0
Parker Flats (Phase II)	Minor	DM	DM
	Vegetation clearance	0	193
	MEC clearance	0	226
	Vegetation monitoring	0	NA
	RQA	NA	0

Table 1
Approximate Areas Subjected (in Acres) to Field Activities Conducted by ESCA RP from October 16, 2009 through October 15, 2010
2010 Annual Habitat Monitoring Report
FORA/ESCA

MRA	Activity	Habitat Parcels	Development Parcels
	Soil Stockpile	0	0.1
Seaside [b]	Vegetation clearance	NP	0
	MEC clearance	NP	2
	RQA	NP	0
	Soil Stockpile	NP	5[a]

Notes:

CSUMB = California State University Monterey Bay
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
NA = not applicable
NP = not present in MRA
RQA = total vegetation clearance within Residential Quality Assurance pilot test area

[a] Stockpile was generated in 2009, but is still present on the MRA.

[b] Seaside acreages do not include the footprint of General Jim Moore Boulevard except for MEC clearance

c Vegetation monitoring in the development parcel of the Interim Action Ranges MRA was in support of restoration planning for the habitat parcels.

Table 2
Cumulative Areas of Habitat Parcels (in Acres) Subjected to Vegetation Clearance
Performed by the ESCA RP
2010 Annual Habitat Monitoring Report
FORA/ESCA

MRA	2008	2009 [a]	2010 [b]	Cumulative Total
County North	0	DM	0	DM
Future East Garrison	0	0	0.25	0.25
Interim Action Ranges	0	DM	DM	DM
Parker Flats (Phase II)	81	87	0	168

Notes:

DM = de minimis
MRA = Munitions Response Area

[a] From January 1 through October 15, 2009

[b] From October 16, 2009 through October 15, 2010

Table 3
Status of ESCA RP Vegetation Monitoring Activities [a]
2010 Annual Habitat Monitoring Report
FORA/ESCA

MRA [b]	2008	2009	2010	2011	2012	2013	2014
County North [c]		F					
Future East Garrison [d]			F,T	T	F		F,T
Interim Action Ranges (historical) [e]	F,T		F,T	F,T			
Interim Action Ranges (ESCA RP) [f]			F,T		F		F,T
Parker Flats	F,T		F		F,T		F,T

[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.

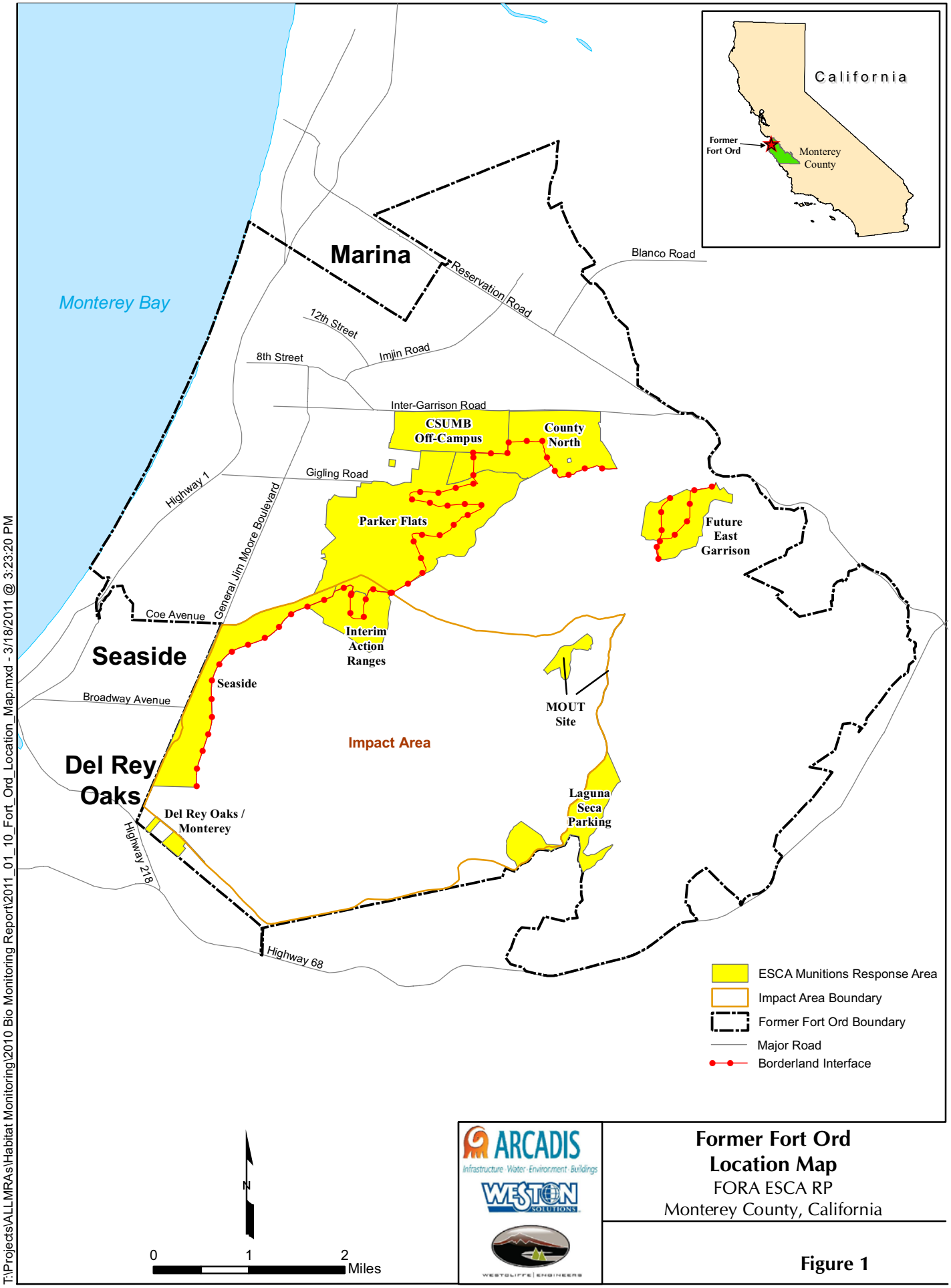
[c] Vegetation monitoring in the County North MRA was discontinued after focus species sampling was completed in 2009 because no further MEC investigation was deemed necessary. No parcel-wide vegetation clearance was performed in this MRA.

[d] The post-2010 monitoring schedule for the Future East Garrison MRA assumes that MEC clearance work in the habitat portion of the MRA will be completed after April 2011 and prior to March 2012.

Table 3
Status of ESCA RP Vegetation Monitoring Activities [a]
2010 Annual Habitat Monitoring Report
FORA/ESCA

[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 field work. The ESCA RP portion of the Ranges 43-48 MRA is denominated the Interim Action Ranges MRA.

[f] ESCA RP's monitoring in the Interim Action Ranges MRA (ESCA RP) relates to ESCA RP MEC clearance work to be performed in 2011. The schedule assumes all MEC clearance work is completed prior to March, 2012. This table does not include vegetation monitoring required by the restoration plan for the Interim Action Ranges MRA, which is under development.



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Former Fort Ord Location Map

FORA ESCA RP

Monterey County, California

Figure 1

ABRAMS DR

INTER-GARRISON RD

L5.7

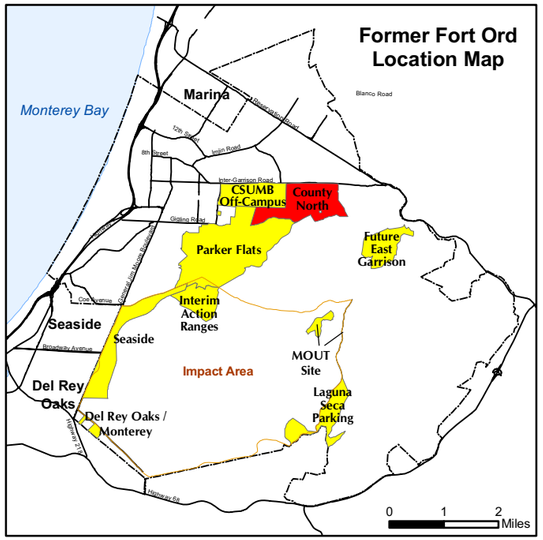
L20.2.1

E19a.4

E19a.3

Legend

- Munitions Response Area
- Major Road
- L20.2.1 USACE Parcel



N

0 800 1,600 Feet

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County North MRA

FORA ESCA RP
Monterey County, California

Figure 2

T:\Projects\ALLMRAs\Habitat Monitoring\2010 Bio Monitoring Report\2011_01_10_County_North_MRA.mxd - 3/18/2011 @ 3:26:24 PM

INTER-GARRISON ROAD

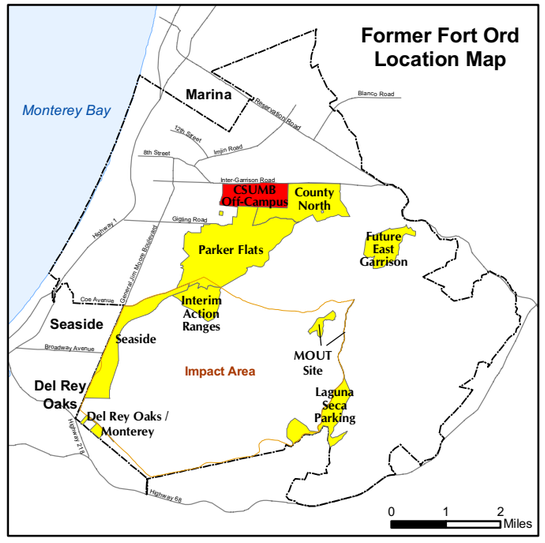
ABRAMS ROAD

S1.3.2

GIGLING ROAD

Legend

- Munitions Response Area
- Major Road
- S1.3.2 — USACE Parcel
- RQA Pilot Study - CSUMB Boundary



N

0 600 1,200 Feet

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CSUMB Off-Campus MRA

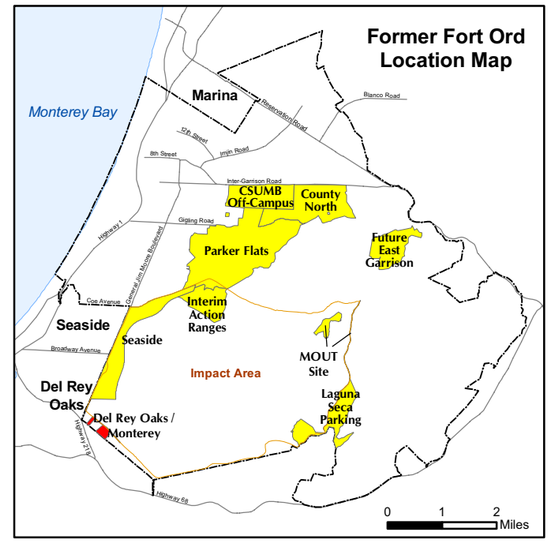
FORA ESCA RP
Monterey County, California

Figure 3

T:\Projects\ALLMRAs\Habitat Monitoring\2010 Bio Monitoring Report\2011_01_10_CSUMB_Off-Campus_MRA.mxd - 3/18/2011 @ 3:31:48 PM

Legend

- Gate
- Entry Forbidden Sign
- Former Fort Ord Boundary
- Munitions Response Area
- Major Road
- Electrical Line
- Fence
- E23.1 USACE Parcel



N

0 300 600 Feet

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DRO/Monterey MRA

FORA ESCA RP
Monterey County, California

Figure 4

T:\Projects\ALLMRAs\Habitat Monitoring\2010 Bio Monitoring Report\2011_01_11_DRO_Facility_Profile.mxd - 3/18/2011 @ 4:17:31 PM

T:\Projects\ALLMRAs\Habitat Monitoring\2010 Bio Monitoring Report\2011_01_10_Future_East_Garrison_MRA.mxd - 3/18/2011 @ 4:08:26 PM

L20.19.1.1
(Roadway Parcel)

E11b.6.1

Barloy Canyon Road

E11b.8

Former
Ammunition
Supply
Point

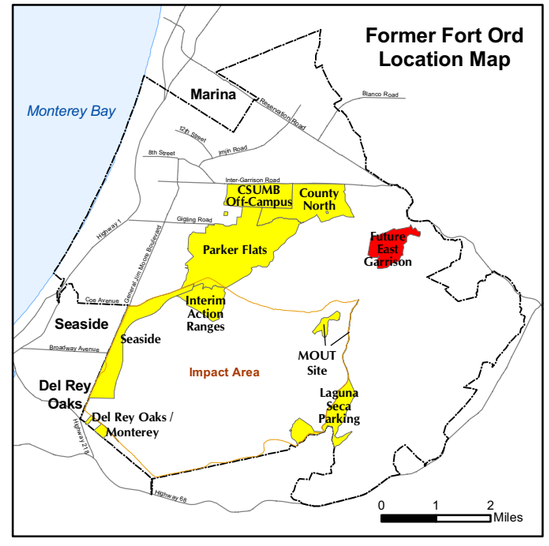
E11b.7.1.1

610

725
727
730
735
740
741
742
744
745
746
747
750
752
760
761
762
763
764
765
766
767
768
769

Legend

- Munitions Response Area
- Major Road
- Electrical Line
- Fence
- Gas Line
- Storm Line
- Telephone Line
- Water Line
- Sewer Line
- R9211 — Structure
- E23.1 — USACE Parcel



N

0 500 1,000 Feet

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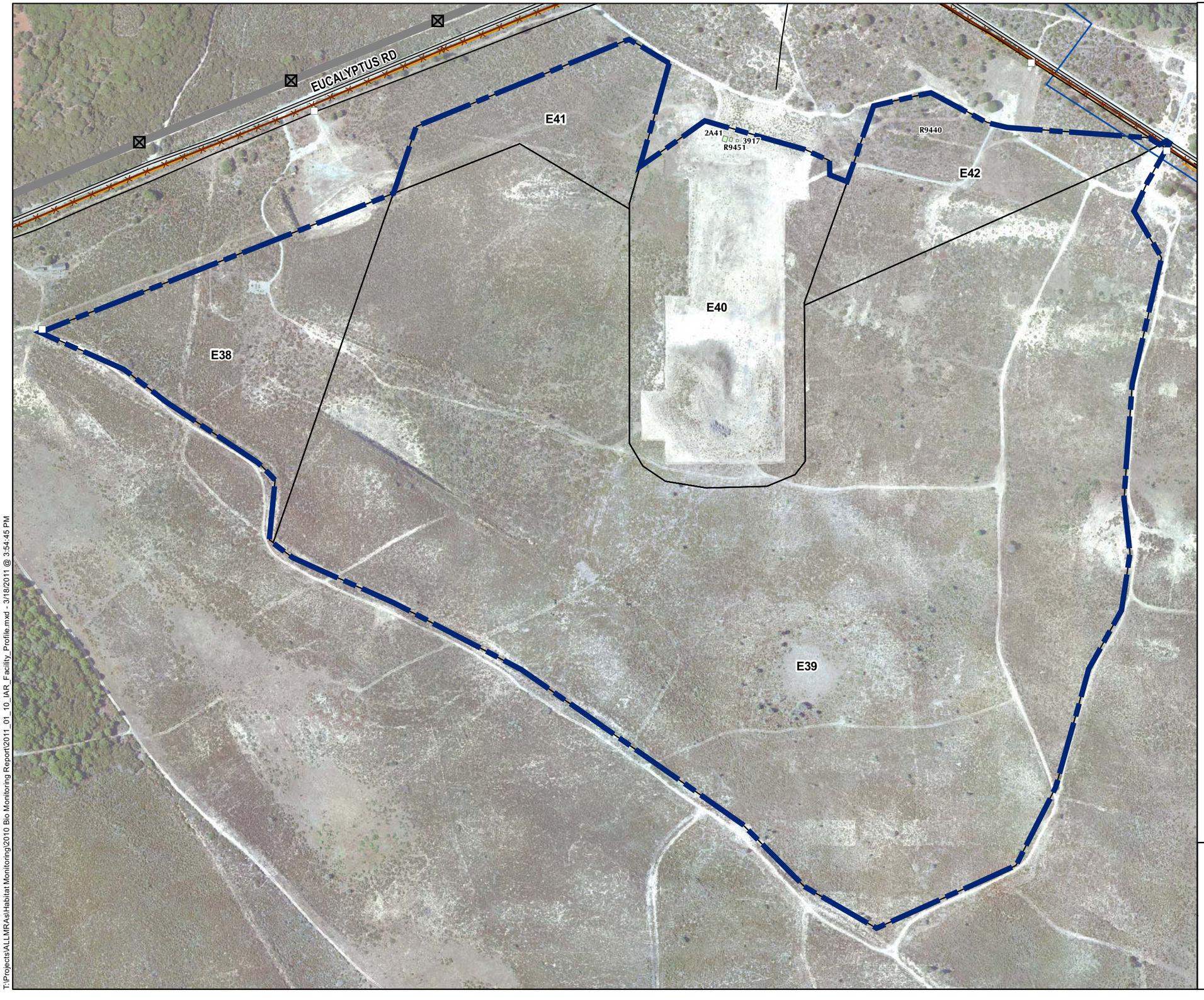
Future East Garrison MRA

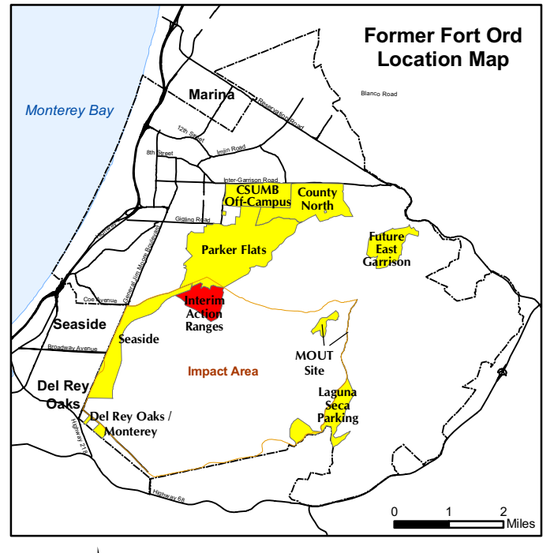
FORA ESCA RP
Monterey County, California

Figure 5



Legend

- Gate
- Electrical Line Pole
- Former Fort Ord Boundary
- Munitions Response Area
- Major Road
- Electrical Line
- Fence
- Telephone Line
- Water Line
- High-Power Transmission Line and Right of Way
- R9211 — Structure
- E23.1 — USACE Parcel



N

0 400 800 Feet

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Interim Action Ranges MRA

FORA ESCA RP
Monterey County, California

Figure 6

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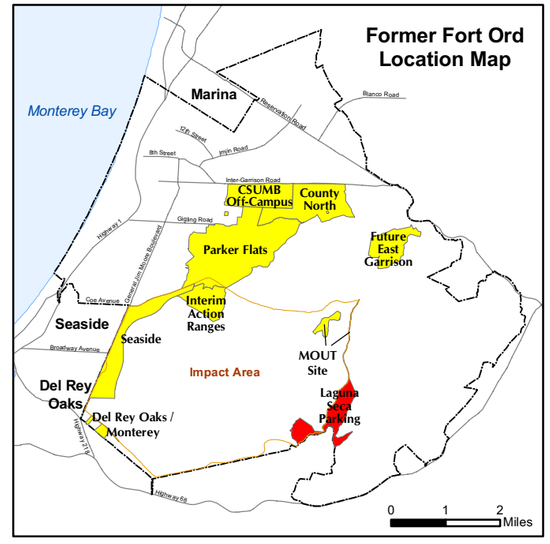
T:\Projects\ALLMRAs\Habitat Monitoring\2010 Bio Monitoring Report\2011_01_10_Laguna_Seca_Parking_MRA.mxd - 3/18/2011 @ 4:21:58 PM

Legend

- Gate
- Entry Forbidden Sign
- Sign
- Former Fort Ord Boundary
- Munitions Response Area
- Major Road
- Electrical Line
- Fence
- R9211 Structure
- E23.1 USACE Parcel



N

0 750 1,500
Feet

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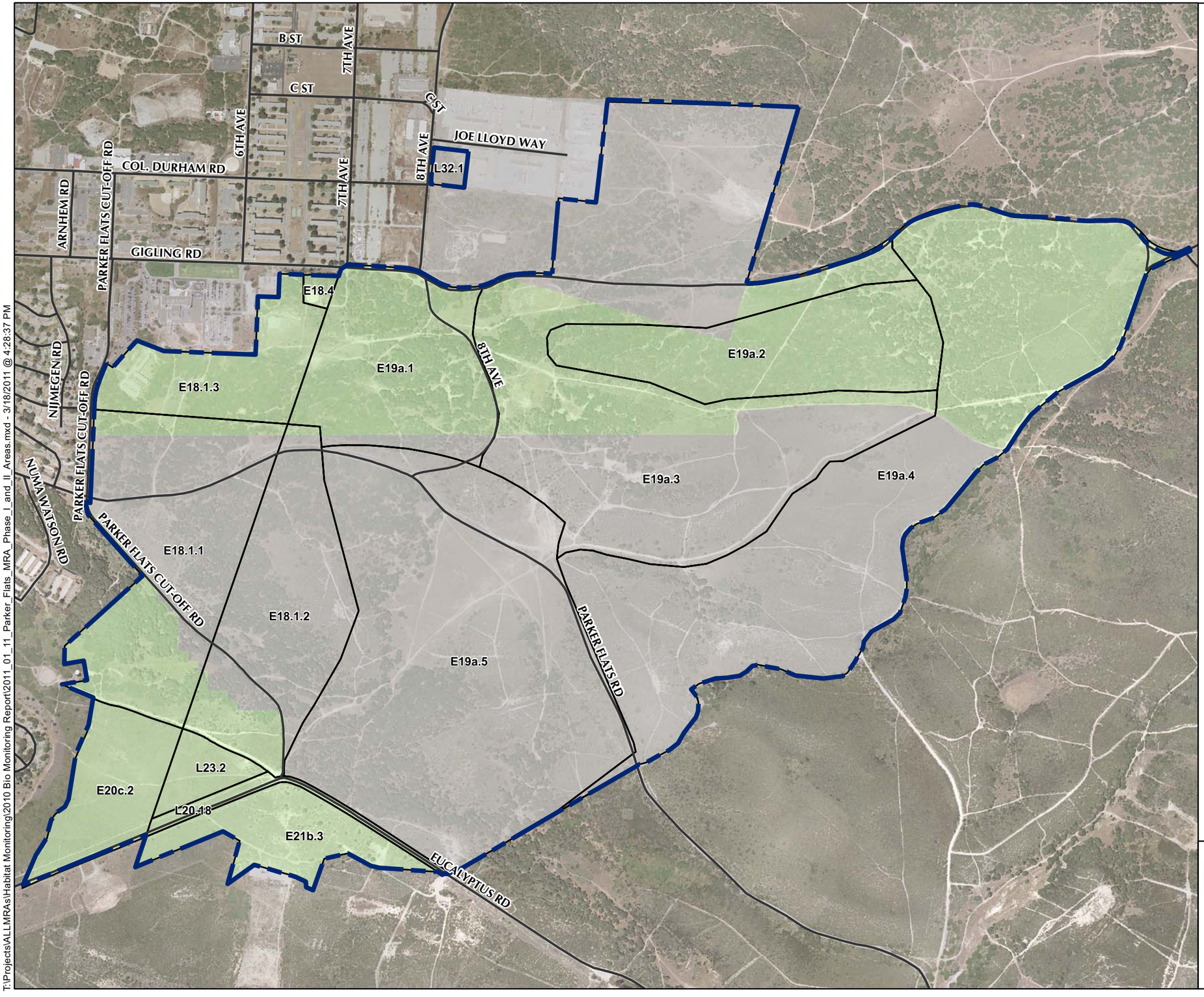
Laguna Seca Parking MRA

FORA ESCA RP
Monterey County, California

Figure 7



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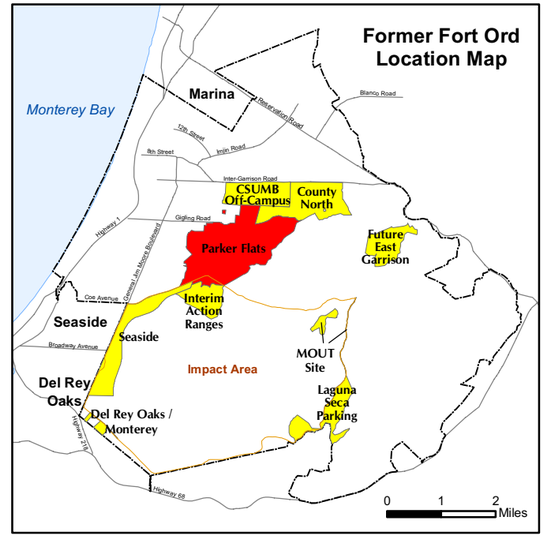
Legend

- Parker Flats MRA
- Major Road
- E23.1 USACE Parcel
- Phase I Remedial Investigation Area
- Phase II Remedial Investigation Area



N

0 1,000 2,000 Feet

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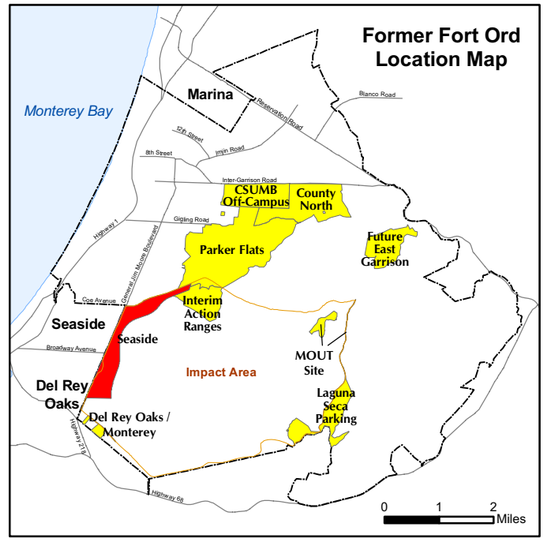
Parker Flats MRA

FORA ESCA RP
Monterey County, California

Figure 8

Legend

- Seaside MRA
- Major Road
- E23.1 USACE Parcel
- Special Case Area Point
- Special Case Area
- RQA Pilot Study - Seaside Boundary



N

0 1,200 2,400 Feet

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Seaside MRA

FORA ESCA RP
Monterey County, California

Figure 9

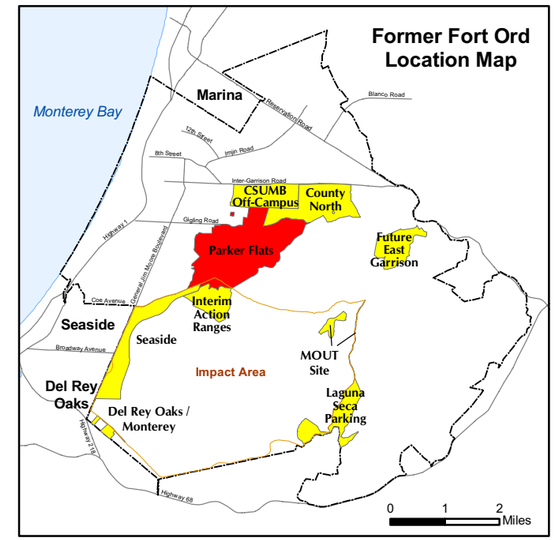
T:\Projects\ALLMRAs\Habitat Monitoring\2010 Bio Monitoring Report\2011_01_10_Seaside_MRA.mxd - 3/18/2011 @ 4:22:04 PM

MRS-18:MRS-31
MRS-31
8TH AVE
COL. DURHAM RD
GIGLING RD
MRS-13C
MRS-13B
MRS-45
GIGLING RD
MRS-57
MRS-27C
MRS-04A
8TH AVE
WATKINS GATE RD
MRS-27B
MRS-27A
MRS-55:MRS-27B
MRS-55:MRS-27A
MRS-27A:MRS-53 EXP
MRS-55
MRS-50 EXP
MRS-53 EXP
MRS-04B
HAY RAKE RD
MRS-56
PARKER FLATS CUT-OFF RD
MRS-37
PARKER FLATS RD
MRS-50
MRS-52:MRS-53 EXP
MRS-49
MRS-03
MRS-54 EDC
MRS-40:MRS-50/50 EXP
MRS-40:MRS-50 EXP
MRS-53
MRS-54
MRS-24B
MRS-44 EDC
MRS-44 PBC
MRS-53:MRS-27G
MRS-09
MRS-27G:MRS-53 EXP
MRS-53 BLM
MRS-41
MRS-53 BLM:MRS-27G
MRS-27G
MRS-15 MOCO 02
EUCALYPTUS RD
MRS-Ranges 44-48
MRS-58
EUCALYPTUS RD
MRS-15 SEA 04
MRS-Ranges 43-48
MRS-27H
MRS-16:MRS-27H
MRS-16
MRS-BLM
MRS-10A

Legend

- Area of Parker Flats MEC Clearance Activites
- ESCA Future Land Use - Habitat Reserve
- Parker Flats Phase I Area
- Parker Flats MRA Boundary
- MRS Boundary
- Paved Primary Road
- Minor or Unpaved Road

Former Fort Ord Location Map



N

0 1,000 2,000 Feet

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Parker Flats MRA
MEC Activities
October 16, 2009 to
October 15, 2010

FORA ESCA RP
Monterey County, California

Figure 10

T:\Projects\ALL\MRAs\Habitat Monitoring\2010 Bio Monitoring Report\2011_01_06_PF_MEC_Removal_Activity_101609_thru_101510.mxd - 3/18/2011 @ 4:01:50 PM

MRS-13B

Pile 4
N:2,129,002.226
E:5,744,832.845

Pile 3
N:2,128,979.890
E:5,744,871.485

Pile 2
N:2,128,944.594
E:5,744,874.695

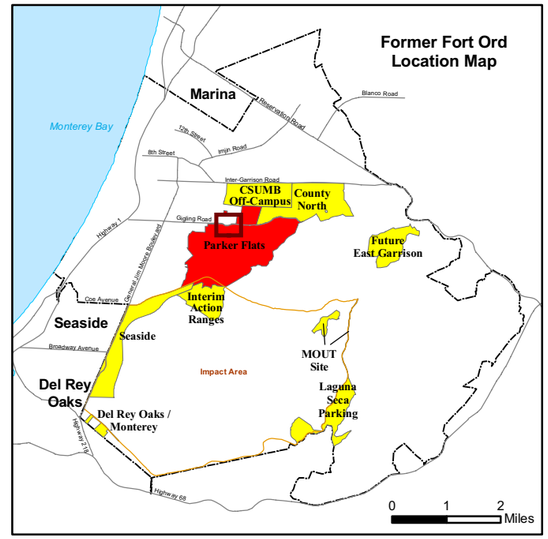
Pile1
N:2,128,965.781
E:5,745,056.240

Legend

- Munitions Response Area
- Major Road
- Propposed Future Soil Lay down Area - Approx. 0.3 ac. (Within Proposed Eastside Road Alignment)
- Current Soil Pile Locations
- Proposed Eastside Road Alignment
- MRS-13B — Munitions Response Site

Future Land Use

- Residential
- Non-Residential
- Habitat Reserve



N

0 200 400 Feet

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Parker Flats MRA
North Soil Lay Down Area

FORA ESCA RP
Monterey County, California

Figure 11

T:\Projects\ALLMRAs\Habitat Monitoring\2010 Bio Monitoring Report\2011_01_11_PF_North_Soil_Laydown_Area.mxd - 3/18/2011 @ 3:58:54 PM

MRS-44 EDC

MRS-50 EXP

MRS-44 PBC

MRS-15 MOCO 02

MRS-15 SEA 04

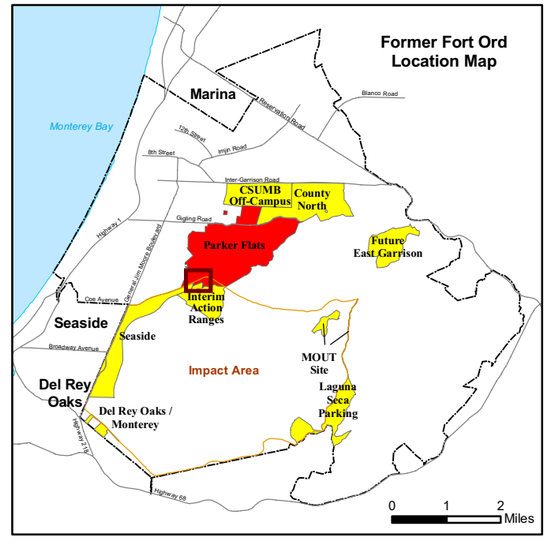
MRS-Ranges 43-48

Legend

- Munitions Response Area
- Major Road
- Proposed Future Soil Lay down Area - Approx. 0.2 ac. (Within Proposed Eucalyptus Extension / Eastside Road Alignment)
- Proposed Eucalyptus Extension / Eastside Road Alignment
- MRS-44 PBC — Munitions Response Site

Future Land Use

- Residential
- Non-Residential
- Habitat Reserve



N

0 200 400 Feet

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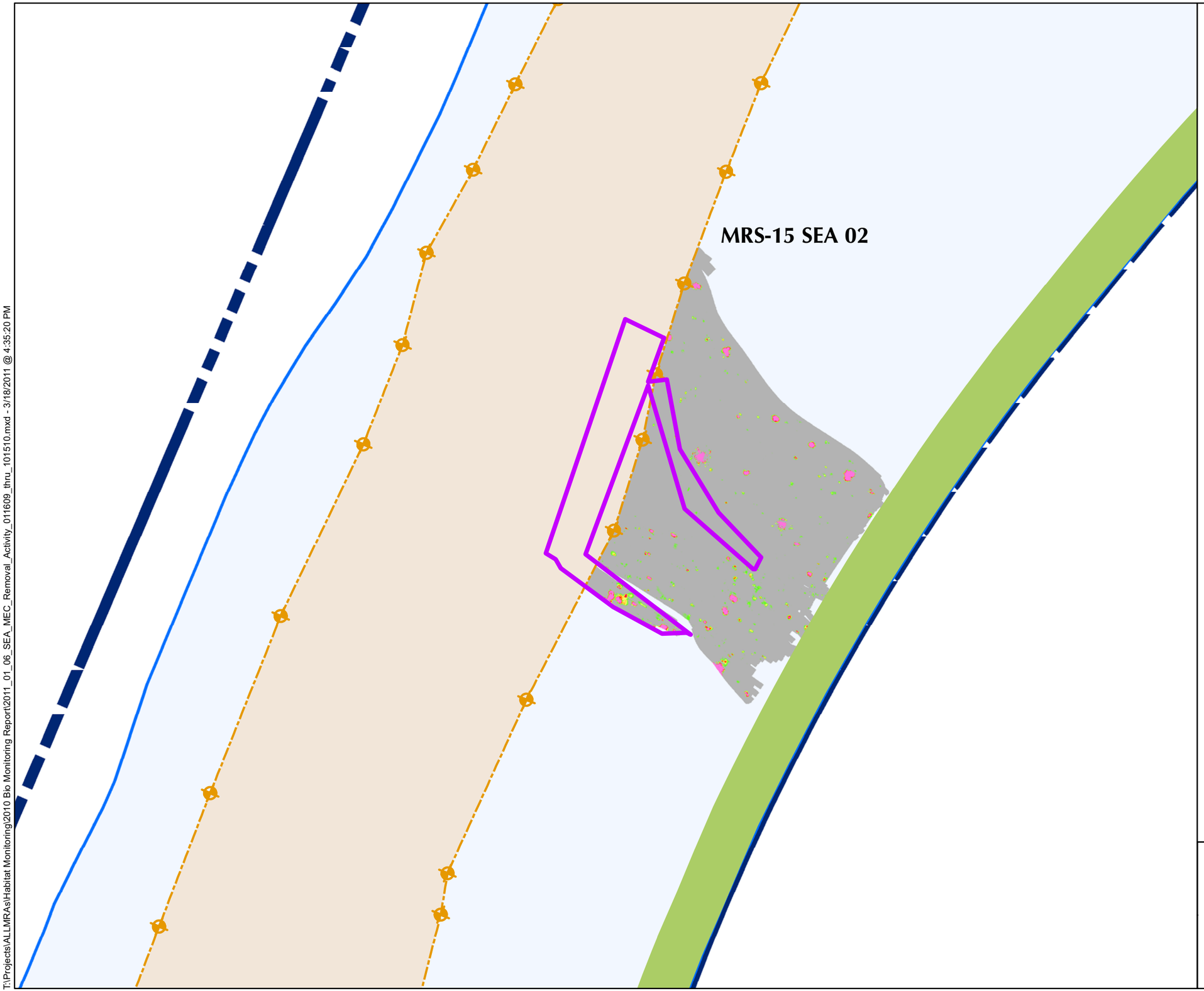
Parker Flats MRA
South Soil Lay Down Area

FORA ESCA RP
Monterey County, California

Figure 12

T:\Projects\ALLMRAs\Habitat Monitoring\2010 Bio Monitoring Report\2011_01_11_PF_South_Soil_Laydown_Area.mxd - 3/18/2011 @ 4:34:53 PM

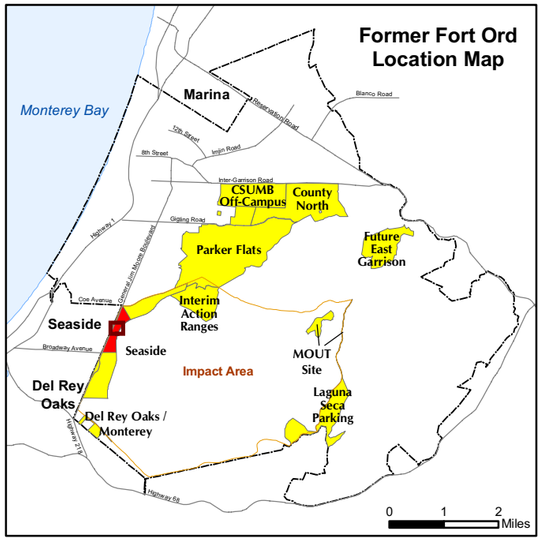


Legend

- Top Grade Activity Areas
- Seaside MRA Boundary
- Roadway Alignment
- Area within Roadway Alignment
- Utility Corridor
- MRS Boundary

Response (Sum-Stack)
mV
2.6 12.8 25.6 38.5 51.3 64.1 76.9 89.7

Note: Survey boundaries were estimated based on a visual inspection of the site. Small gaps in coverage due to terrain issues and vegetation.



N

0 100 200
Feet

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Seaside MRA
MEC Activities
October 16, 2009 to
October 15, 2010
FORA ESCA RP
Monterey County, California

Figure 13

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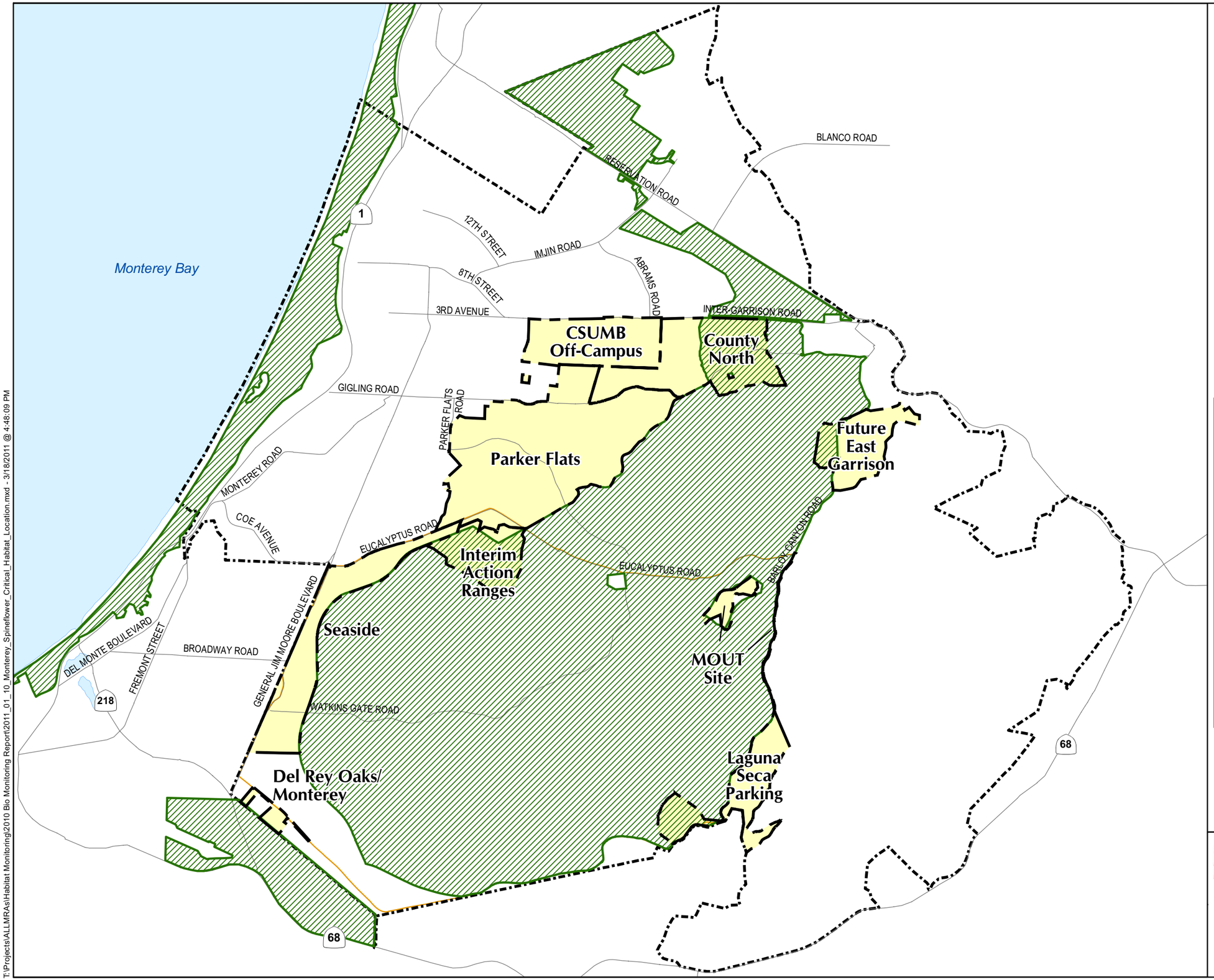
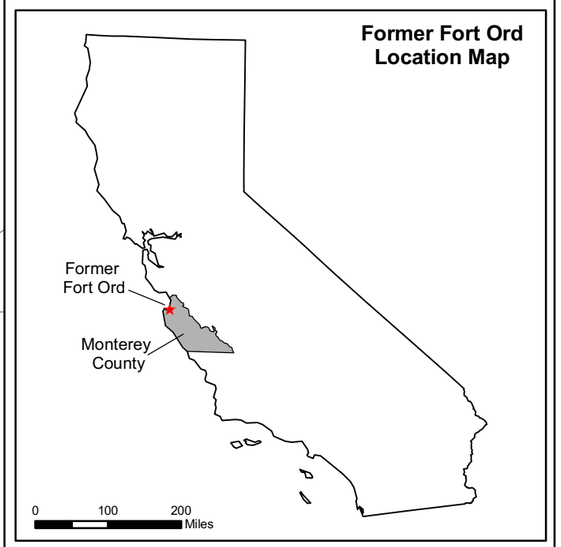


Legend

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



N

0 4,500 9,000 Feet

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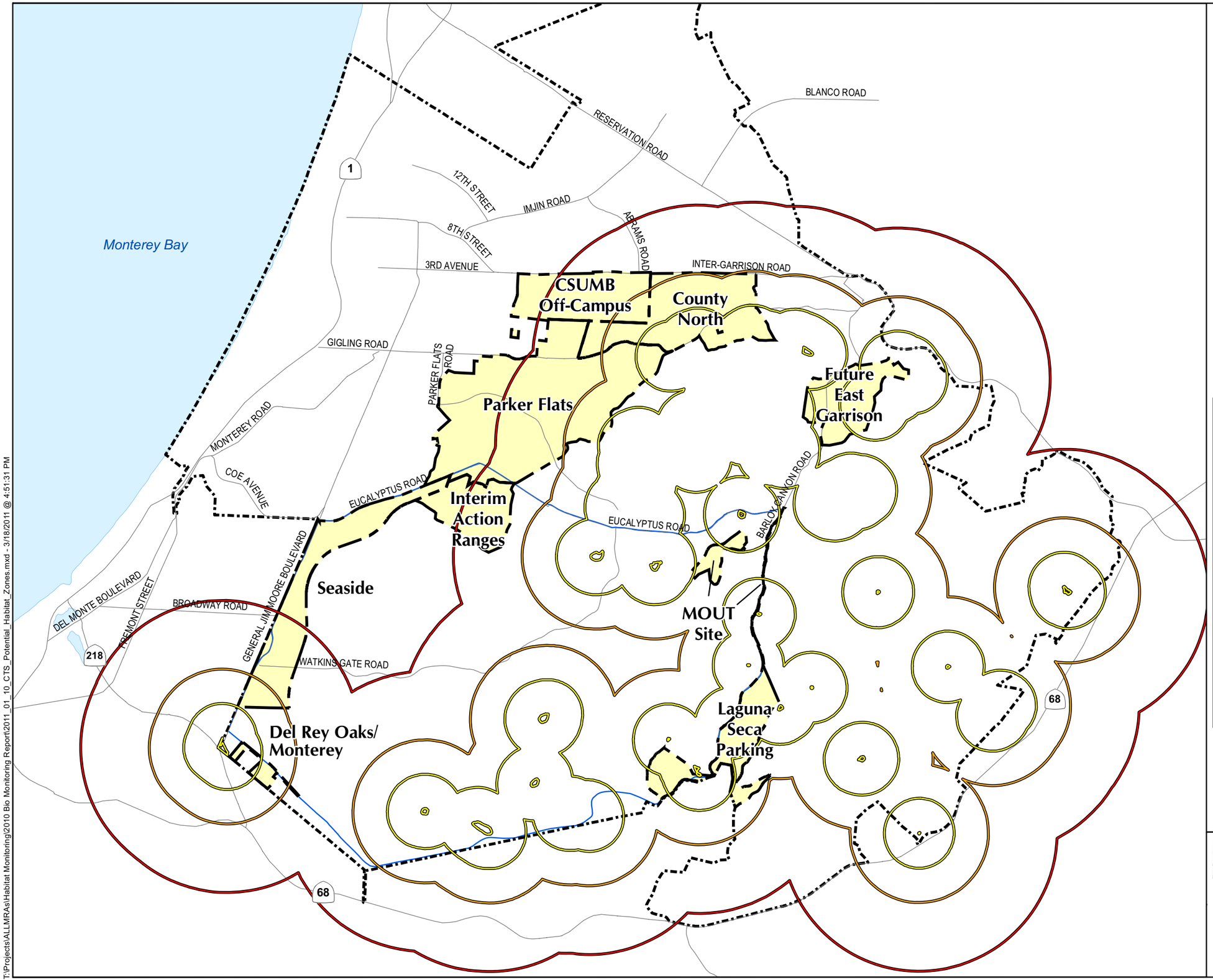
Former Fort Ord Monterey Spineflower Critical Habitat Location

FORA ESCA RP
Monterey County, California

Figure 14

T:\Projects\ALLMRAs\Habitat Monitoring\2010 Bio Monitoring Report\2011_01_10_Monterey_Spineflower_Critical_Habitat_Location.mxd - 3/18/2011 @ 4:48:09 PM



Legend

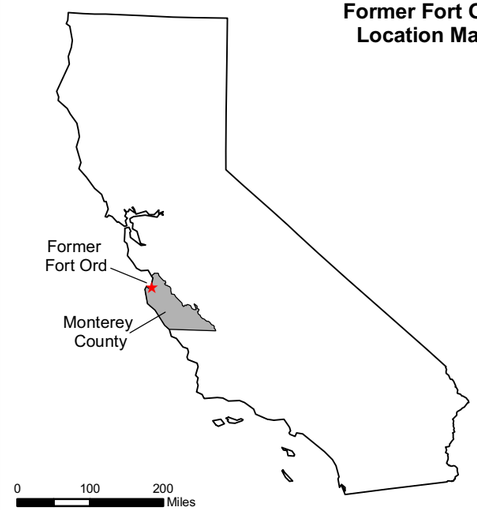
- Major Roads
- Former Fort Ord Boundary
- Impact Area Boundary

U.S. Fish and Wildlife Designated California Tiger Salamander Habitat Zones

- 500 M
- 1 KM
- 2 KM

- Munitions Response Areas

Former Fort Ord Location Map



N

0 4,500 9,000 Feet

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WESTCLIFFE | ENGINEERS

Former Fort Ord California Tiger Salamander Potential Habitat Zones

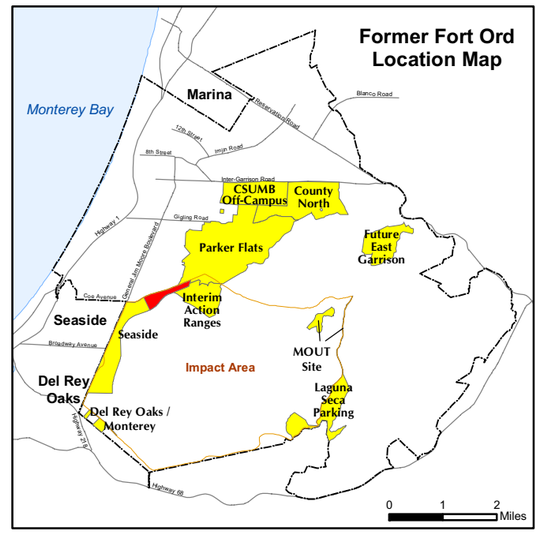
FORA ESCA RP
Monterey County, California

Figure 15

T:\Projects\ALLMRAs\Habitat Monitoring\2010 Bio Monitoring Report\2011_01_10_CTS_Potential_Habitat_Zones.mxd - 3/18/2011 @ 4:51:31 PM

Legend

- MRS Boundary
- SEA.4 RQA Area - 17.4 Acres
- 100-ft Grids
- Iceplant Removal Action Completed - Approx. 20.4 ac.
- Stockpile Location - Approx. 0.6 ac.



N

0 300 600 Feet

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Iceplant Abatement in the Seaside MRA Near the Borderland Boundary

FORA ESCA RP
Monterey County, California

Figure 16

T:\Projects\ALLMRAs\Habitat Monitoring\2010 Bio Monitoring Report\2010_11_17_SEA_Iceplant_Work_Area.mxd - 3/18/2011 @ 4:42:02 PM

APPENDIX A

Natural Resource Impact Mitigation Checklist for Habitat Parcels in the Future East Garrison MRA

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:	☒ **Habitat Reserve**		**Development** ☐ **Non-Residential** ☐ **Residential**	☐ **Other (specify):**
2. LAND OWNER:	☐ **Army**	**Parcel No(s). and/or Location:**		
	☒ **FORA**	**Parcel No(s). and/or Location::**	E11b.6.1, E11b.7.1.1, L20.19.1.1 (See Figure 1)	

3. FEDERAL ESA SPECIES REPORTED IN PARCEL(S):	☒ **Yes**	☐ **No**	☐ **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:	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.		

4. AQUATIC FEATURES (i.e., VERNAL POOLS/PONDS) PRESENT:	☒ **Yes**	☐ **No**	☐ **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		

Work can proceed in pools/ponds?:	☒ **Yes**	☐ **No**
Restrictions:	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. 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. 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.	

5. VEGETATION REMOVAL		
☐ **None**	**Location(s):**	
☒ **Manual Removal**	**Location(s):**	Area B on Figure 1.
Restrictions:	To the extent feasible, only manual vegetation removal should be used in Area B.	
☒ **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.	

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:** 10/04/10

ESCA Remediation Program Manager _____ **Date:** 10/11/2010

Received:

FORA ESCA Program Manager: _____ **Date:** 9/30/10

Wildlife Biologist BRAC Fort Ord: _____ **Date:** _____

Roadway Parcel
L20.19.1.1

Parcel
E11b.6.1

Parcel
E11b.8

Parcel
E11b.7.1.1

A

B

C

D

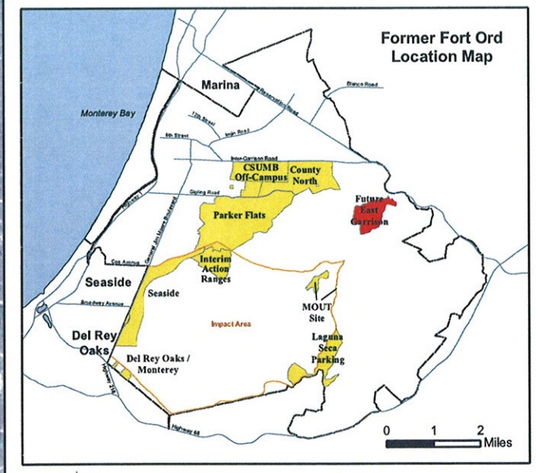
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26

Legend

- Munitions Response Area Boundary
- MRS Bounday
- 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-Transects - Approx. 0.5 ac.
- USACE Parcel
- 1 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



N

0 500 1,000
Feet

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

FORA ECSA RP
Monterey County, California

DRAFT **Figure 1**

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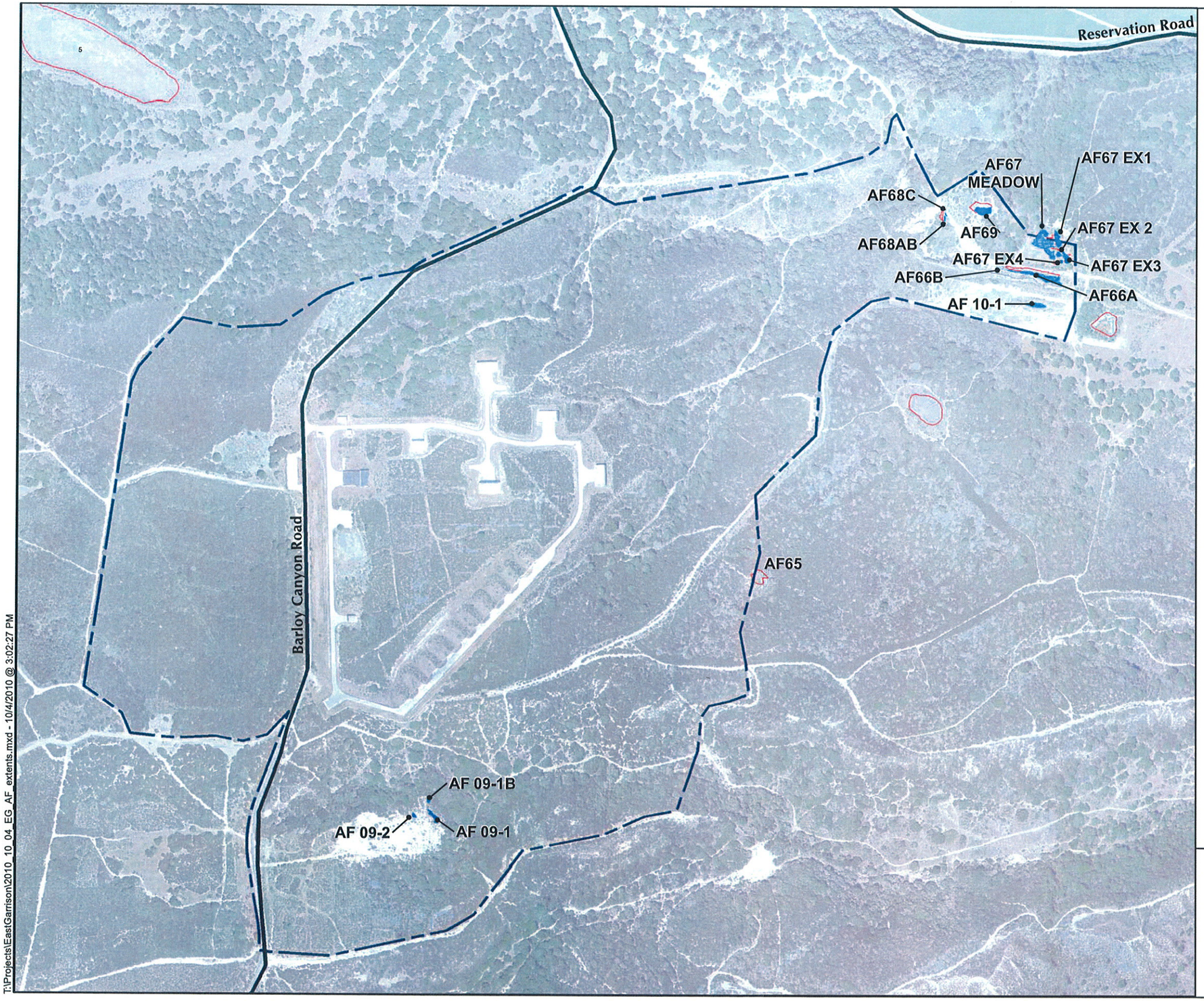
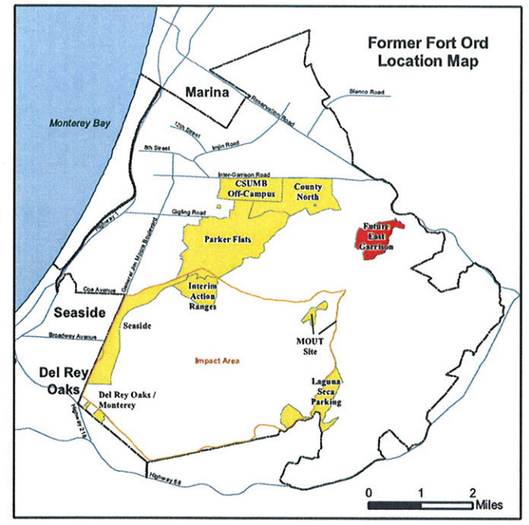


Legend

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



N

0 500 1,000 Feet

LFR

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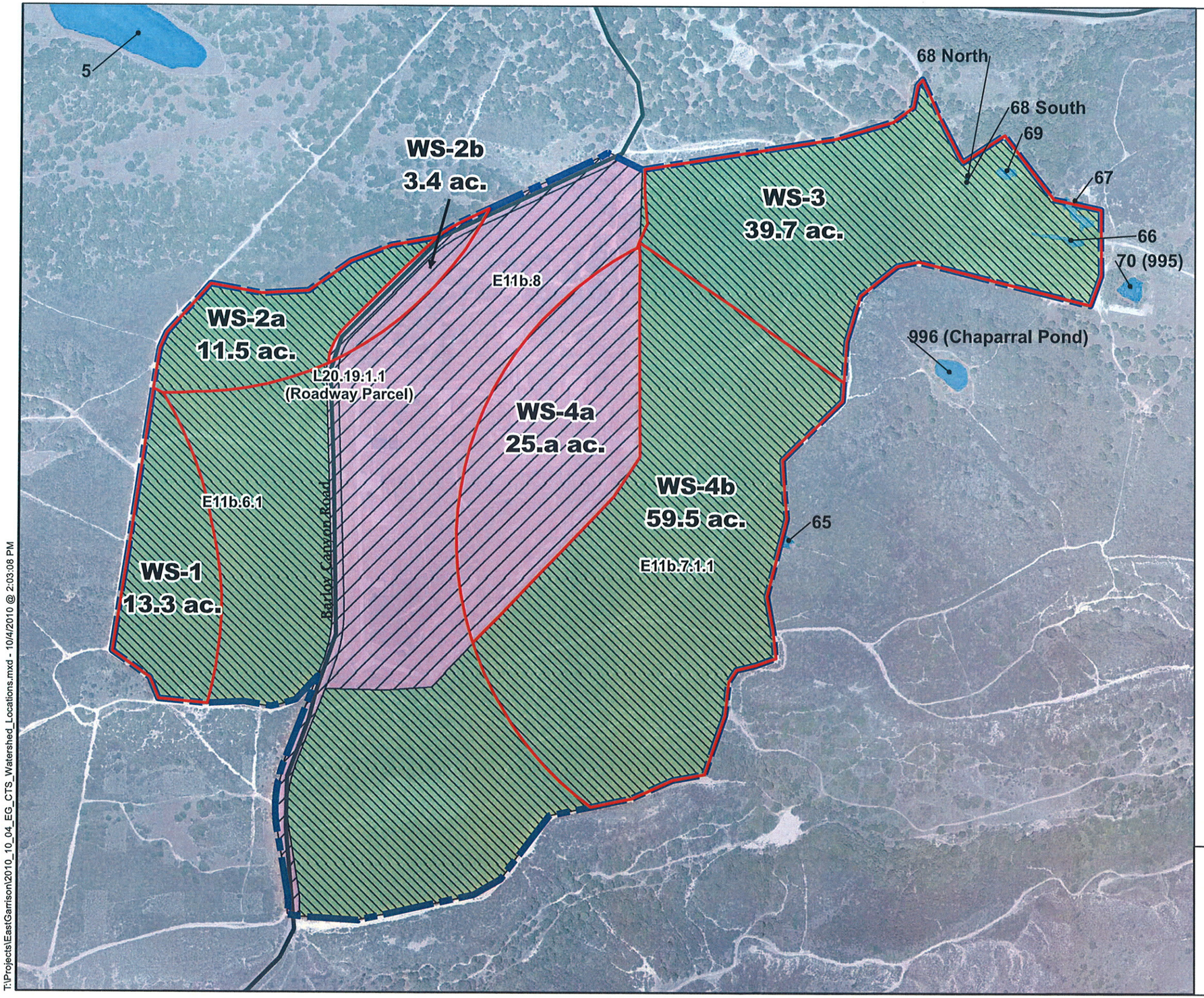
Future East Garrison MRA
Aquatic Feature Locations

FORA ESCA RP
Monterey County, California

DRAFT

Figure 2

T:\Projects\EastGarrison\2010_10_04_EG_AF_extents.mxd - 10/4/2010 @ 3:02:27 PM

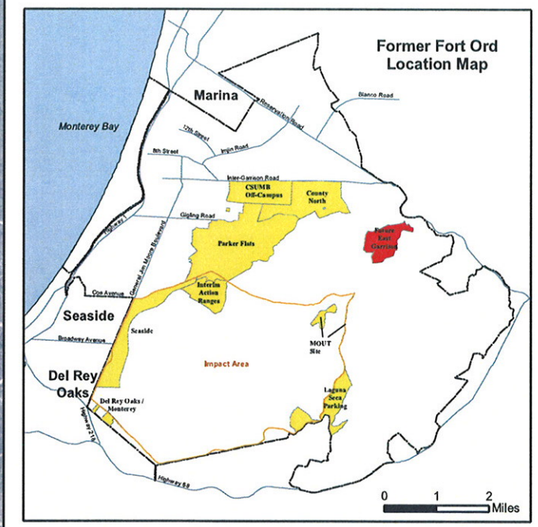


Legend

- 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



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0 500 1,000 Feet

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Future East Garrison MRA
CTS Watershed Locations

FORA ESCA RP
Monterey County, California

DRAFT

Figure 3

T:\Projects\EastGarrison\2010_10_04_EG_CTS_Watershed_Locations.mxd - 10/4/2010 @ 2:03:08 PM

AF68C

AF68AB

AF69

AF67 MEADOW

AF67 EX1

AF67 EX2

AF67 EX4

AF67 EX3

AF66B

AF66A

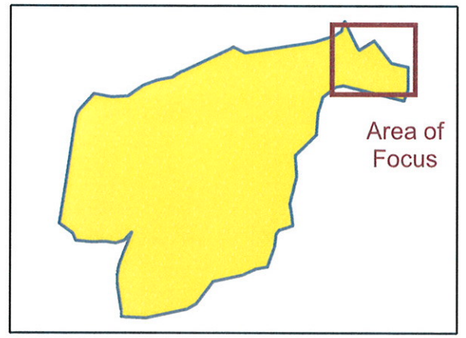
AF10-1
Tank Wash

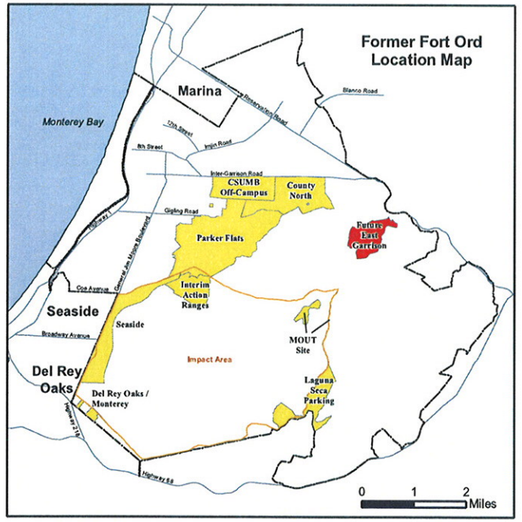
Legend

Munitions Response Area

Aquatic Feature Extents on March 8, 2010

10-ft Off of Edge of Road





N

0 100 200 Feet

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WESTCLIFFE ENGINEERS

Future East Garrison MRA
Location of Aquatic Features
in Investigation Corridor

FORA ESCA RP
Monterey County, California

DRAFT

Figure 4

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APPENDIX B

Natural Resource Impact Mitigation Checklist for Habitat Parcels in the Parker Flats MRA Phase II (revision)

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:	☒ **Habitat Reserve**	**Development** ☐ **Non-Residential** ☐ **Residential**		☐ **Other (specify):**
2. LAND OWNER:	☐ **Army**	**Parcel No(s). and/or Location:**		
	☒ **FORA**	**Parcel No(s). and/or Location::**	Parker Flats MRA; E19a.2 and E19a.4 (See Figure)	

3. FEDERAL ESA SPECIES REPORTED IN PARCEL(S):	☒ **Yes**	☐ **No**	☐ **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:	☐ **Yes**	☒ **No**	☐ **Flagged/Marked**
Location(s):			
Grid Number(s):			
Work can proceed in pools/ponds?:	☐ **Yes**	☐ **No**	
Restrictions:			

5. VEGETATION REMOVAL		
☐ **None**	**Location(s):**	

☐ **Manual Removal**	**Location(s):**	
Restrictions:		
☒ **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.

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 Montery Spineflower Sample Locations.mxd - 11/14/2008 @ 11:35:00 AM

2 km
1 km
500 m
2 km
E19a.3
Gigling Road
E19a.4
E19a.2
E19a.1
1 km
500 m
E19a.5

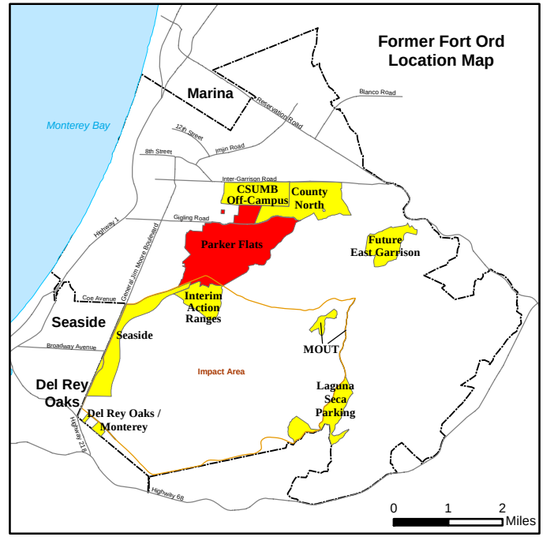
Legend

- Known Monterey Spineflower Location
- California Tiger Salamander Buffer
- E19a.4 — 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



N

0 600 1,200 Feet

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Known Locations of HMP Listed Species

FORA ESCA RP
Monterey County, California

DRAFT

Figure 1

APPENDIX C

Legless Lizard Observation Form and Location Map

LFR

Field Observation Form
Black Legless Lizard & California Tiger Salamander

If these species are discovered, please call Mr. William Collins of the Army Base Realignment and Closure Office at 831-242-7920. Fill out this form and attach a map showing the location of the sighting, and return to:

Mr. William Collins
BRAC – Environmental Office
Building 4463, Gigling Road, Room 209
Monterey, CA 93944-5004

Photograph the specimen if possible.

Location PARKER FLATS MRA. **Date/Time** 9/13/10 15:04
(GPS Coordinates, IR Site, MRS #, Range #, etc.) Focused Species Reference Area #1 .19

Grid # C2B6H8 **Northing/Easting or Approx. Coordinates (ft)** 2123776/5741220.51

Type of Activity (check one or write in)

- ☐ Surface clearance activity (non-intrusive)
- ☐ Vegetation clearance
- ☐ Excavation/UXO removal
- ☐ Geophysical
- ☒ Other Seed bank salvage

Weather: Air Temp. ~68° F Wind minimal Sunny/Cloudy clear

Depth if known ~ 1-2"

Habitat Description (e.g. Maritime chaparral, oak woodland, grassland, vegetation height, presence of surface litter/debris, soil type, plant species where specimen found, etc) :
Maritime chaparral that has been cleared for MEC removal and has grown back to max 1ft height. Minimal surface litter. Animal found around base of small shaggy bark manzanita.

Description of animal (live/ injured/ dead, color, condition, behavior etc.):
Only tail of animal found. It was presumed be be from a black legless lizard but was not confirmed. The rest of the animal could not be located. The tail was brown/black on top and yellow green below. The tail was moving.

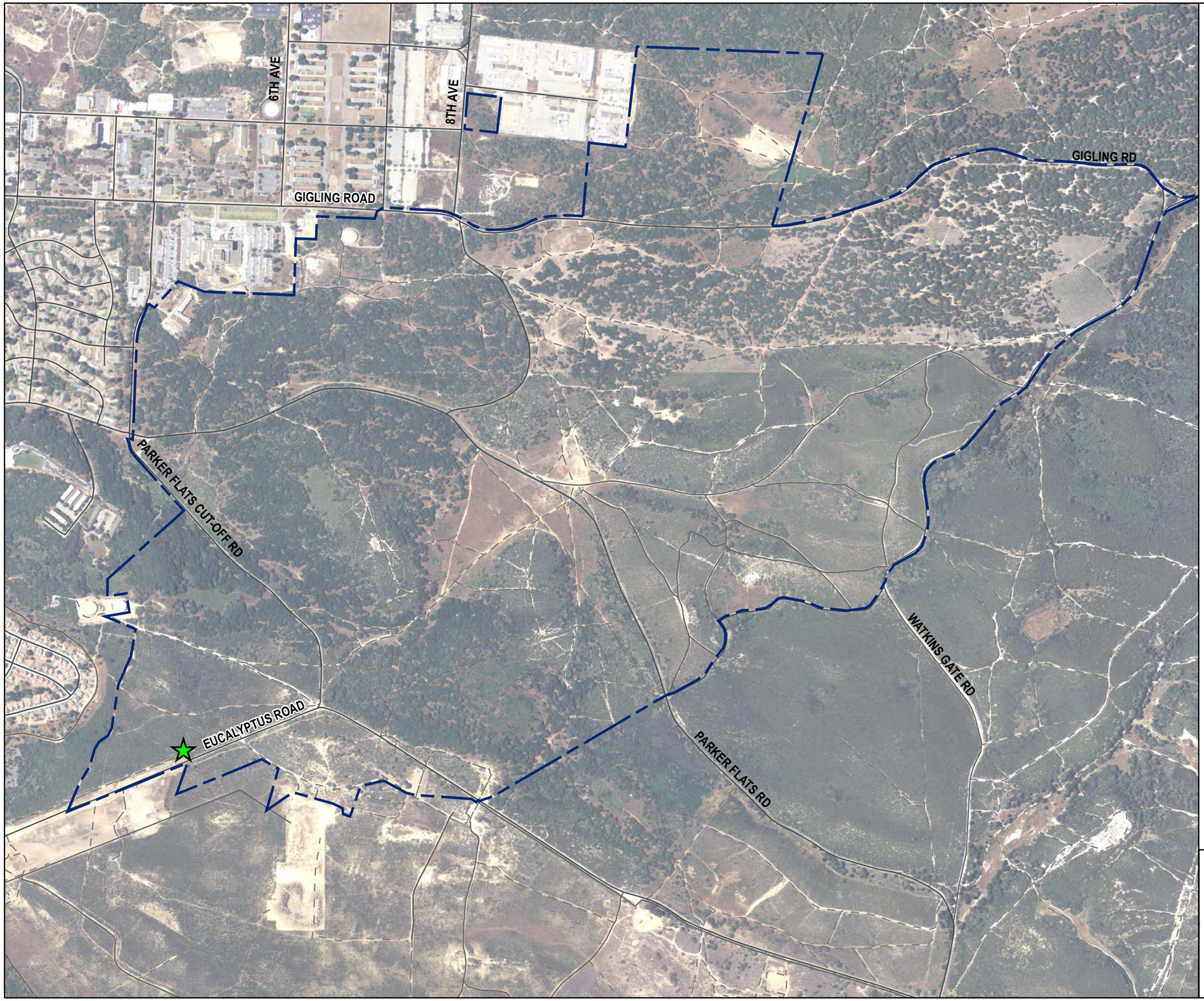
Length (inches) 1"

Other Notes _____

Disposition: Found by: Joshua Tallis (ARCADIS/ESCA RP Qualified Biologist)

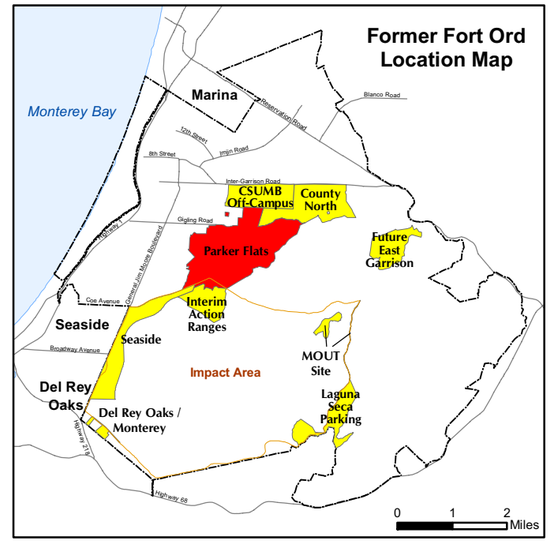
- ☐ Observed, released to same location or adjacent habitat
- ☐ Observation form completed by: _____
- ☐ Injured or killed (placed in a Ziploc or plastic bag, and refrigerated)
- ☒ Other A piece of the animal found. The rest was not located.

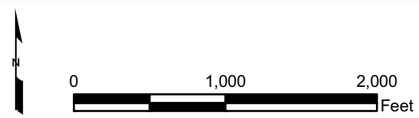
Attachments: ☒ Location map ☒ Photograph (specimen and habitat in which found)



Legend

- Approximate Location of Black Legless Lizard (Presumed) Sighting
- Parker Flats MRA Boundary
- Paved Road





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Park Flats MRA Black Legless Lizard (Presumed) Sighting 13 September 2010

FORA ESCA RP
Monterey County, California

DRAFT

Figure 101110 - B1

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Side A

Side B

APPENDIX D

2010 Aquatic Feature Monitoring Report for the Future East Garrison MRA

FORA ESCA REMEDIATION PROGRAM

2010 Aquatic Feature Monitoring Report for the Future East Garrison Munitions Response Area

Former Fort Ord
Monterey County, California

March 29, 2011

Prepared for:

FORT ORD REUSE AUTHORITY

100 12th Street, Building 2880
Marina, California 93933

Prepared Under:

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

Document Control Number: 09595-11-057-001

Prepared by:

ARCADIS

WESTON SOLUTIONS

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CONTENTS

TABLES

FIGURES

APPENDICES

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
ft	feet
HMP	Habitat Management Plan
km	kilometers
m	meter
m^2	square meter
MEC	munitions and explosives of concern
MRA	Munitions Response Area
NOAA	National Oceanic and Atmospheric Administration
NRIM	Natural Resource Impact Mitigation
NTU	nephelometric turbidity units
NWSFO	National Weather Service, Fort Ord
USACE	U.S. Army Corps of Engineers
USFWS	United States Fish and Wildlife Service

1.0 INTRODUCTION

This 2010 aquatic feature 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 aquatic feature monitoring conducted in the Future East Garrison Munitions Response Area (MRA) in advance of munitions and explosives of concern (MEC) fieldwork planned to begin 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 "ponds."

Aquatic feature monitoring is required when there is possibility of impacting aquatic feature habitat or wetland HMP species of concern during MEC investigative and remedial activities as described in the HMP and the "Wetland Monitoring and Restoration Plan for Munitions and Contaminated Soil Remedial Activities at the 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 surveys in the Future East Garrison MRA that were conducted in the spring of 2010 in advance of MEC field activities in the area. One key goal of these surveys was to determine whether or not the HMP species California tiger salamander (*Ambystoma californiense*; CTS) and California fairy shrimp (*Linderiella occidentalis*) are present in the aquatic features in the Future East Garrison MRA. A second goal was to document physical and chemical characteristics of these features. The study design and implementation was based on the HMP, the Wetland Monitoring and Restoration Plan, and the USFWS survey protocols detailed in the October 2003 document titled "Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander" (Appendix A).

The surveys were conducted to establish baseline conditions for potential special status species habitat and special status species (CTS and California fairy shrimp). Surveys were conducted in the Future East Garrison MRA due to the possibility that prospective MEC investigative and remedial 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 habitat for adult CTS (i.e., suitable upland habitat), and the historical presence of CTS in nearby aquatic features are used to determine suitability.

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), no further surveys for CTS are required for that feature even if MEC field activities are conducted after the second year of surveys. If MEC field activities are conducted in the 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.

1.2 Site Description

The survey sites are located at the former Fort Ord in Monterey County, about 8 miles north of the City of Monterey, California. The Future East Garrison MRA encompasses approximately 251.8 acres in the northeastern portion of the former Fort Ord (Figure 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 are 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 Figure 2. Additional details regarding the aquatic features in the Future East Garrison MRA are presented in Section 3.

Vegetation surrounding the areas aquatic features consists primarily of maritime chaparral and coastal coast live oak woodland (Figure 3; USACE/Jones & Stokes 1992). The density of this vegetation varies from sparse (i.e., early seral stage) to dense (i.e., late-seral stage). Vegetation within the aquatic features is typically herbaceous and includes wetland indicator species. Elevation ranges from approximately 50 meters (m) to 147.5 m above mean sea level. 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.

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 2010 wet season spans the period October 1, 2009 through September 30, 2010). The average rainfall in Monterey during the past 15 years is 17.72 inches.

1.3 Species of Special Interest in Surveys of Aquatic Features

While the aquatic feature survey protocol includes identification of wetland plants and animals observed in the features, several 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.

1.3.1 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 distinct population segment 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 resampled. 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 (Burleson Consulting Inc 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 (US 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 records of CTS breeding activity and/or larvae from the Future East Garrison MRA to our knowledge. The documented CTS breeding sites that are closest to the Future East Garrison MRA are shown on Figure 2.

1.3.2 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. The species was not previously reported in the aquatic features sampled during this survey.

1.3.3 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 (*Rana draytonii*), southwestern pond turtle (*Actinemys marmorata)*, and Contra Costa goldfields (*Lasthenia conjugens*). At the time the HMP was completed (1997), these three species had not been reported to occur on the former Fort Ord, although the HMP indicates that the area is potential habitat for California red-legged frog.

After 1997, populations of Contra Costa goldfields were detected on a small portion of the former Fort Ord, none of which were located within the Future East Garrison MRA. To our knowledge, neither the California red-legged frog nor the southwestern pond turtle have 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 investigation and remedial activities could result in impacts.

In accordance with the regulatory requirements, ARCADIS, teamed with Weston Solutions, Inc., and Westcliffe Engineers, Inc. (collectively "the ESCA Remediation Program [RP] Team"), has implemented environmental training and monitoring of MEC investigation and remedial activities specific to aquatic features. As described in the 2010 Annual Natural Resource Monitoring, Mitigation, and Management Report, this activity was implemented in coordination with MEC investigation and remediation activities, which began in October 2010.

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 California tiger salamander and Contra Costa goldfields (*Lasthenia conjugens*). 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. The ESCA RP Senior Qualified Biologist provided this training to field personnel and supervisors before the start of work. The NRIM checklist 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 AF68-AB, 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 performed most of the CTS larval survey work in all of the surveys in the Future East Garrison MRA. Assisting Mr. Siemens were Joshua Tallis and Phillip Lebednik, who were 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 advance notification of survey work. Accordingly, Mr. Siemens submitted a "courtesy notification" letter to the permit contact at USFWS on March 10, 2010 (ARCADIS 2010) regarding the prospective ESCA RP CTS larval surveys.

2.2 Monitoring Protocol

Aquatic feature surveys performed by ESCA RP biologists are based on the "Wetland Monitoring and Restoration Plan and the Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander" (Appendix A). The Wetland Monitoring and Restoration Plan incorporates requirements in the HMP and the 2005 BO. The Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander, October 2003, was the basis for CTS larval sampling. Detailed survey methods are described in Section 4.

3.0 AQUATIC FEATURES IN THE FUTURE EAST GARRISON MRA

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 no E11b.7.1.1 (Figure 3). 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 2). Aquatic features in the southwestern portion of the Future East Garrison MRA are less than 1 kilometer (km) from an aquatic feature where CTS previously had been observed but which is positioned outside the Future East Garrison MRA boundary.

3.1 Surveys Conducted in 1992

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 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.

AF65 is an aquatic feature that was mapped in 1992 and is positioned on the eastern boundary of the MRA. 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 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 2010 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 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 4, AF66-A flows into AF66-B. AF67 was subdivided into four excavations (AF67-EX1, AF67-EX2, AF67-EX3 and AF67-EX4) and includes a large meadow that flooded and contained wetland 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 (see Appendix D, Photos 1-6, 11, and 14). AF68 (N and S units) appeared to be too small for CTS breeding (see Appendix D, Photo 7). Notwithstanding these observations, the ESCA RP biologists decided that all of the 1992 aquatic features would be monitored in 2010 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

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 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. AF10-1 is a concrete impoundment formerly used for washing vehicles (Appendix D, Photo 13). Although AF10-1 contains potential suitable breeding habitat the area surrounding this aquatic feature, largely comprised of exposed sandstone and maritime chaparral, appears to be unsuitable upland habitat for CTS.

In the southwestern portion of Future East Garrison MRA three new aquatic features, AF09-1, AF09-1B and AF09-2 (Figure 5), were identified (Appendix D, Photos 9-10). These features are surrounded by upland habitat, consisting of mostly maritime chaparral and exposed sandstone that is likely unsuitable for CTS.

3.3 Aquatic Features Identified for Monitoring in 2010

In total, 11 aquatic features comprising fourteen “units” were identified for monitoring in the northeastern (Figure 4) and 3 in southwestern (Figure 5) portions 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.

4.0 METHODS

The monitoring protocol employed by ESCA RP biologists in the 2010 surveys is based primarily on the Wetland Monitoring and Restoration Plan and the Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander (2003). The method details for each monitoring parameter are briefly described in this section.

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 and immediate supervision of a USFWS-approved biologist.

4.2 Monitoring Parameters

The following monitoring parameters are to be recorded for each surveyed aquatic feature.

4.2.1 Duration of inundation, Surface Area and Depth

Records of ponding in aquatic features are to include duration of inundation, surface area of standing water and water depth at the deepest point. These data should be recorded during each survey visit, at a minimum.

4.2.2 Turbidity

Turbidity of water in the aquatic features is to be measured twice during the aquatic surveys.

4.2.3 Hydrogen Ion Concentration (pH)

Hydrogen ion concentration or pH (a measure of acidity/alkalinity) of water in the aquatic features is to be measured twice during the aquatic surveys.

4.2.4 California Tiger Salamander

CTS aquatic surveys are to be conducted in accordance with the “Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander” (Appendix A). This document was referenced in the 2005 BO.

4.2.5 California Fairy Shrimp

Surveys for adults of HMP species California fairy shrimp (*Linderiella occidentalis*) are to be conducted during CTS surveys as described in the preceding section.

4.2.6 Other Aquatic Species

Dominant invertebrates and all invertebrate species are to be documented during aquatic surveys.

4.2.7 Vegetation

Emergent aquatic plant species cover around the margins of the aquatic feature is to be measured and a list of dominant aquatic plant species is to be recorded.

5.0 RESULTS

Aquatic feature monitoring in the Future East Garrison MRA was conducted between December 2009 and May 2010. All 14 aquatic feature units were monitored for extent, duration and depth of ponding; turbidity; pH; presence of CTS larvae or adults; and presence of California fairy shrimp adults.

The results for each monitoring parameter are described below. Aquatic survey field data sheets are presented in Appendix B and water quality monitoring data sheets are presented in Appendix C. Representative photographs of the aquatic features and monitoring activities are presented in Appendix D.

5.1 Personnel

Aquatic feature monitoring conducted in the spring of 2010 within the Future East Garrison MRA was coordinated by the ESCA RP Senior Qualified Biologist Dr. Phillip Lebednik. Mr. Mitchell Siemens, the ESCA RP biologist approved by USFWS to perform CTS larval surveys at the former Fort Ord, conducted the CTS surveys and supervised other biologists who assisted him. Monitoring of extent of ponding, water depth, water quality and wetland vegetation were also performed by ESCA RP Qualified Biologists.

5.2 Monitoring Parameters

5.2.1 Duration of Inundation, Surface Area and Depth

During the beginning of the wet season biologists periodically visited the 14 aquatic features in the Future East Garrison MRA to determine approximately when the aquatic features became inundated. At least one staff gauge was installed in each aquatic feature to measure water depth at the lowest point (Appendix D, Photos 1-11, and 15). Two exceptions are AF10-1 and AF67-meadow. In AF10-1 the gauge was installed at the deepest location that was accessible to personnel at the time of installation. The gauge in this location is estimated to be 1 to 2 feet (ft) shallower than the deepest point in the feature. The second exception is the gauge at AF67-meadow. This location was difficult to establish the lowest point (Appendix D, Photo 5). The gauge in AF67-Meadow was installed in the lowest point based on visual estimation. The staff gauges were designed to remain in place for a minimum of

two years. Depth was recorded in field books once per month during March, April and May 2010.

Extent of ponding was documented at least twice during the 2010 wet season and is presented as the surface area of each aquatic feature (Table 2) as well as polygons on maps (Figures 4 and 5). Standing water began to be observed in the aquatic features beginning in December 2010 as shown in Table 1. Some of the smaller ponded areas dried out between rain events in the early part of the 2010. On the last day of monitoring (May 11, 2010) there was no standing water in the smaller features and all but one of the larger features were substantially drawn down; feature AF10-1 still retained substantial water at this time. Water depth varied greatly from one aquatic feature to the next based on site-specific conditions. Depths are presented in Table 1. The maximum depth recorded was 4.48 ft. Extent of ponding (i.e., surface areas of standing water) is presented in Table 2. On March 8, 2010, ponded areas in individual features ranged from 8.3 to 878.2 square meters (m^2).

5.2.2 Turbidity

Turbidity was measured twice, on April 2 and April 15, 2010, 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 LaMotte 2020e Turbidimeter. 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.

Results are presented in Table 1 and Appendix C. Samples from April 2, 2010 were overall less turbid than samples from April 15, 2010. On April 2, the least turbid sample measured 1.46 NTU and was collected from AF10-1, which is a concrete-lined basin with little source of sediment or chance of re-suspension of sediment. The most turbid aquatic feature measured 566 NTU at AF69, which is surrounded by eroding sandstone hills (Appendix D, Photo 14). On April 15, the least turbid aquatic feature was AF10-1, which measured 2.26 NTU. The most turbid aquatic feature was AF66-B, which measured 1190 NTU. AF66-B is a roadside drainage ditch and carries water flowing out of AF66-A on its way toward a nearby ephemeral stream.

5.2.3 Hydrogen Ion Concentration (pH)

Hydrogen ion concentration or pH was measured twice, on April 2 and April 15, 2010, during the aquatic surveys. Water samples were collected in wide-mouth 4 ounce Teflon seal screw-top glass sample jars and pH was determined in the laboratory using a HACH Sension 1 unit with a Thermo Scientific semi-micro pH probe. The calibration procedure recommended by the manufacturer (including use of pH standard solutions bracketing the pH range of the samples) was implemented prior to measurements on each batch of samples. Data were recorded on data sheets. pH results are recorded in Table 1 and Appendix C. There was little variation in pH between the sample days. On April 2, the pH ranged from 6.2 to 6.7. On April 15, the pH ranged from 5.99 to 6.87.

5.2.4 California Tiger Salamander

CTS aquatic surveys were conducted in accordance with the "Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander" (Appendix A). Visual searches for CTS on January 13 and February 3, 2010 resulted in no observations of the species in the features.

Larval sampling for CTS employed dip-nets and a small-mesh 20x4 ft beach seine (Appendix D, Photos 11, 13, 14, and 16). The guidance document (Appendix A) indicates that surveys should be conducted once each month in March, April and May with no less than 10 days between each survey effort. Survey work took place on clear days, typically between 0900 and 1400, on March 17 to 18, April 14 to 15, and May 10 to 11, 2010. 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 the bank for several minutes in an effort to detect CTS activity prior to the start of dip-netting. Following initial observations dip-netting ensued over a representative portion of the feature. In all but one of the aquatic features surveyed, dip-netting occurred in 90% or more of the surface area of the feature. The seine was used to survey three aquatic features (AF67-EX1, AF67-EX2 and AF69) that were greater than 4 ft deep in some locations and whose depth impeded sufficient survey coverage by use of a dip-net (Appendix D, Photos 11 and 14). The seine was not deployed in the smaller and shallower aquatic features because sufficient 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 sufficient 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 D, Photo 13). 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* spp.). 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 precisely maneuver the boat and fix its position as necessary, while a second biologist conducted dip-net sampling. The dip net handle was long enough to enable sweeps of near-bottom areas from the boat. This arrangement proved to be highly successful, providing a safe work environment for the biologists while enabling thorough dip-net sampling across the entire feature.

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 4). After completion of survey work at these units, hands, gear 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 against the potential spread of disease vectors between

amphibian populations in the aquatic features in the southwestern and northeastern portions of the MRA (Figure 2).

No CTS adults or larvae were captured or observed in the Future East Garrison MRA during the 2010 aquatic surveys. The 2010 wet season (October 2009 to September 2010) had a recorded precipitation of 13.78 inches (National Oceanic and Atmospheric Administration [NOAA] weather station Fort Ord#2 MRTGC1, see Figure 6), which is 116% of the average during the past 15 years for Monterey County (Monterey, California NWSFO weather station).

5.2.5 California Fairy Shrimp

Surveys for adults of HMP species California fairy shrimp (*Linderiella occidentalis*) were conducted during CTS surveys. After each dip or sweep, the net or seine was visually inspected for California fairy shrimp adults. Presence of fairy shrimp was recorded on data sheets (Appendix B). Specimens were brought back to the laboratory to confirm identification using an Olympus SZ4045 zoom stereo microscope (0.67-4X zoom) and a transilluminator (i.e., substage illuminator) base. The key "Fairy Shrimps of California's Puddles, Pools and Playas" was used to confirm the identity of California fairy shrimp (Eriksen and Belk 1999).

California fairy shrimp were captured in three aquatic features during the Spring 2010 aquatic surveys. Catch was consistently low (one to few animals). On March 17, 2010 California fairy shrimp were captured in AF09-1, AF09-1B (both located in the southwestern area) and AF67-EX1 (located in the northeastern area). On April 15 they were only captured in AF67-EX1 (Appendix D, Photo 12). No California fairy shrimp were captured on May 10 to 11, 2010.

5.2.6 Other Aquatic Species

Other aquatic species commonly encountered during the spring surveys included Pacific tree frog (*Hyla regilla*) eggs, larvae and adults; primarily sub-adult bullfrogs (*Rana catesbeiana*); and numerous invertebrate species, most commonly damselfly (suborder *Zygotera*) naiads; water boatman (Family *Corixidae*); diving beetles (Order *Coleoptera*); midge larvae (Family *Chromomidae*); and mosquito larvae (Family *Culicidae*).

5.2.7 Vegetation

Emergent aquatic vegetation cover measurements were made by visual observation on three occasions in conjunction with the aquatic sampling. Cover of aquatic vegetation around the margins of each feature was estimated to be either 0%, 1-25%, 25-50%, or >50%. Actual vegetation cover varied widely from feature to feature as seen in Table 3. Vegetation cover was affected by depth of water on the day of sampling, turbidity of water (visibility), and maturity of the vegetation. Vegetation cover was not documented if the aquatic feature had already dried. Throughout the wet season plant species were documented and a plant list generated. These data are grouped by aquatic features located close together because species were generally similar in a geographic area. Willow (*Salix* sp.) was recorded as emergent because it generally grew on the margin of the aquatic feature. AF10-1 was grouped

separately because it is a concrete-lined basin that may remain ponded year-round, as indicated by the presence of cattails.

6.0 FINDINGS

6.1 Summary of Results

The Senior Qualified Biologist provided environmental awareness training to field personnel and supervisors prior to the beginning of MEC investigative and remedial activities.

Reconnaissance surveys of the Future East Garrison MRA in late 2009 and early 2010 located the four aquatic features that were mapped in 1992 and identified three additional aquatic features. The features comprised two clusters: one in the northeastern portion of the MRA and one in the southwestern portion. Some of the features were subdivided into basins or "units" resulting in 14 units. In Spring 2010 the aquatic features were monitored per the relevant protocols. No CTS larvae or adults were captured or observed during these surveys. California fairy shrimp were recovered (in low abundance) in three aquatic features (AF09-1, AF09-1B and AF67-EX1). Other species commonly encountered during the spring surveys included Pacific tree frog (eggs, larvae and adults), bullfrogs (primarily sub-adults), and numerous invertebrate species, most commonly damselfly naiads, water boatman, diving beetles, midge larvae and mosquito larvae. Water extent and depth, water quality parameters and vegetation were also monitored in the features.

The 2010 spring aquatic surveys recorded no CTS in the potentially suitable CTS breeding sites despite the fact that the 2010 wet season rainfall was above average.

A pond located within 50 m of the northeastern cluster of surveyed aquatic features (but outside of the Future East Garrison MRA) where CTS breeding had been reported in the past was observed in 2010 to support bullfrog tadpoles, sub-adults and adults. Bullfrogs are an efficient predator of CTS. Bullfrogs were also observed at two of the surveyed aquatic features in the Future East Garrison MRA. The presence of a large bullfrog population in the known breeding site, which is the most likely CTS recruitment source for the northeastern cluster of aquatic features, may explain the absence of CTS in this cluster.

6.2 Potential Effects of ESCA RP Fieldwork on HMP Aquatic Species

CTS breeding populations and larvae were not observed during the 2010 Future East Garrison MRA aquatic surveys. Potentially suitable upland CTS habitat is spatially limited. The only aquatic feature that is included within the current MEC investigation footprint is AF68-AB. Standing vegetation in this location was so sparse that no mowing or vegetation clearance was performed. A Qualified Biologist coordinated with the MEC field personnel when they scanned the location. No targets were detected and therefore no disturbance occurred in the feature. Based on the results of the 2009 to 2010 survey and current work plans, it is unlikely that there will be impacts to CTS from ESCA RP MEC investigation and remedial activities in the Future East Garrison MRA.

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Table 1

Water Quality and Depth in Aquatic Features

FORA ESCA RP

Monterey County, California

	Inundated?	Depth (ft)					Turbidity (NTU)		pH	
Aquatic Features	13-Jan-2010	12-Feb-2010	8-Mar-2010	12-Mar-2010	15-Apr-2010	10-11-May-2010	2-Apr-2010	15-Apr-2010	2-Apr-2010	15-Apr-2010
AF66-A	Y		2.18	2.16	2.14	1.71	270	252	6.7	6.87
AF66-B	Y			0.45	0.42	dry		1190		6.00
AF67 Meadow	N		0.83	0.77	0.71	dry		16.1		6.35
AF67-EX1	Y			4.48	4.3	3.7	207	250	6.5	6.12
AF67-EX2	Y		3.4	3.36	3.29	2.9	235	225	6.5	6.38
AF67-EX3	Y		2.49	2.46	2.46	2.2	318	313	6.4	6.32
AF67-EX4	Y		1.72	1.68	1.65	0.98	282	300	6.2	6.30
AF68-AB	N		3.75	3.75	0.33	dry		272		5.99
AF68-C	N		5.05	5	0.4	0.15		278		6.27
AF69	Y		no gauge yet	4.02	4.18	3.82	566	511	6.4	6.46
AF10-1			no gauge yet	3.64	3.80	3.48	1.46	2.26	6.4	6.29
AF09-1	Y	1.05	0.98	0.94	0.96	0.49		69.0		6.36
AF09-1B		0.42	0.42	0.34	0.44	dry		165		6.36
AF09-2	Y	1.05	1.1	1.08	1.06	dry		181		6.07

Notes:

Cells are left blank when data were not collected due to the fieldwork schedule.

Staff gauges in AF10-1 and AF67-Meadow are not at the lowest point in their respective aquatic features.

Table 2

Aquatic Feature Surface Areas

FORA ESCA RP

Monterey County, California

Aquatic Feature #	3-Feb-2010	2-Mar-2010	8-Mar-2010
AF66-A	11	*	604.1
AF66-B	0.7	*	8.3
AF67 Meadow	*	*	878.2
AF67-EX1	75.4	*	218
AF67-EX2	44.5	*	63.1
AF67-EX3	54.5	*	140
AF67-EX4	10.8	*	30.5
AF68-AB	*	*	15.3
AF68-C	*	*	12
AF69	14.1	*	289.2
AF 10-1	*	206.7	*
AF09-1	58.7	122.3	*
AF09-1B	*	14.5	18.3
AF09-2	28.1	30.6	33.9

Notes:

All surface areas represented in square meters.

* Extent of water not surveyed on these days.

Table 3

Emergent Aquatic Vegetation

FORA ESCA RP

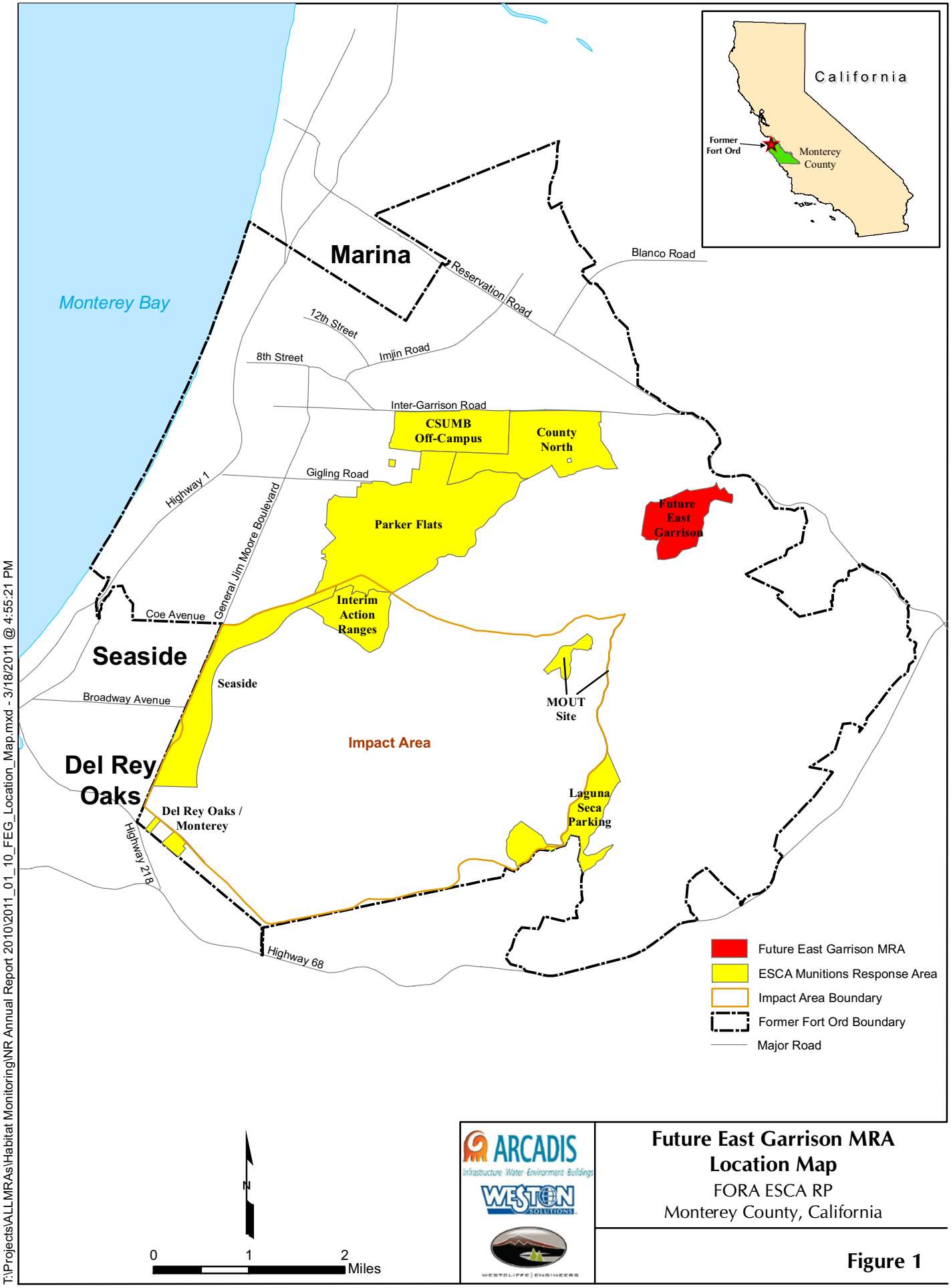
	Percentage Aquatic Feature Margin with Emergent Aquatic Vegetation***				
Aquatic Feature #	17-18 March 2010	14-15 April 2010	10-11 May 2010	Notes	Wetland Species Recorded
AF66-A	>50	25-50	>50		** *Eleocharis macrostachya, Rumex crispus, Salix* sp., *Juncus xipoides, Juncus* spp., *Bromus diandrus*
AF66-B	*	25-50	dry		
AF67 Meadow	>50	>50	dry		
AF67-EX1	1-25	1-25	>50	contain dead branches	
AF67-EX2	*	1-25	>50		
AF67-EX3	*	1-25	>50		
AF67-EX4	*	1-25	25-50		
AF68-AB	*	1-25	dry		
AF68-C	*	1-25	dry		
AF69	1-25	1-25	25-50		
AF 10-1	>50	25-50	1-25	Feature is a concrete basin	*Typha latifolia*
AF09-1	*	25-50	>50		** *Juncus* sp., *Rumex crispus, R. acetocella, Gnaphalium* sp.
AF09-1B	*	1-25	dry		
AF09-2	>50	1-25	dry	Algae abundant	

Notes:

* Data not collected for sub-basin or data collected for a group of sub-basins which is not specific to this sub-basin.

** One or more of these species occur in each aquatic feature in the group.

*** Based on the following percentage categories: 0, 1-25, 25-50, and >50.



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Future East Garrison MRA Location Map

FORA ESCA RP

Monterey County, California

Figure 1

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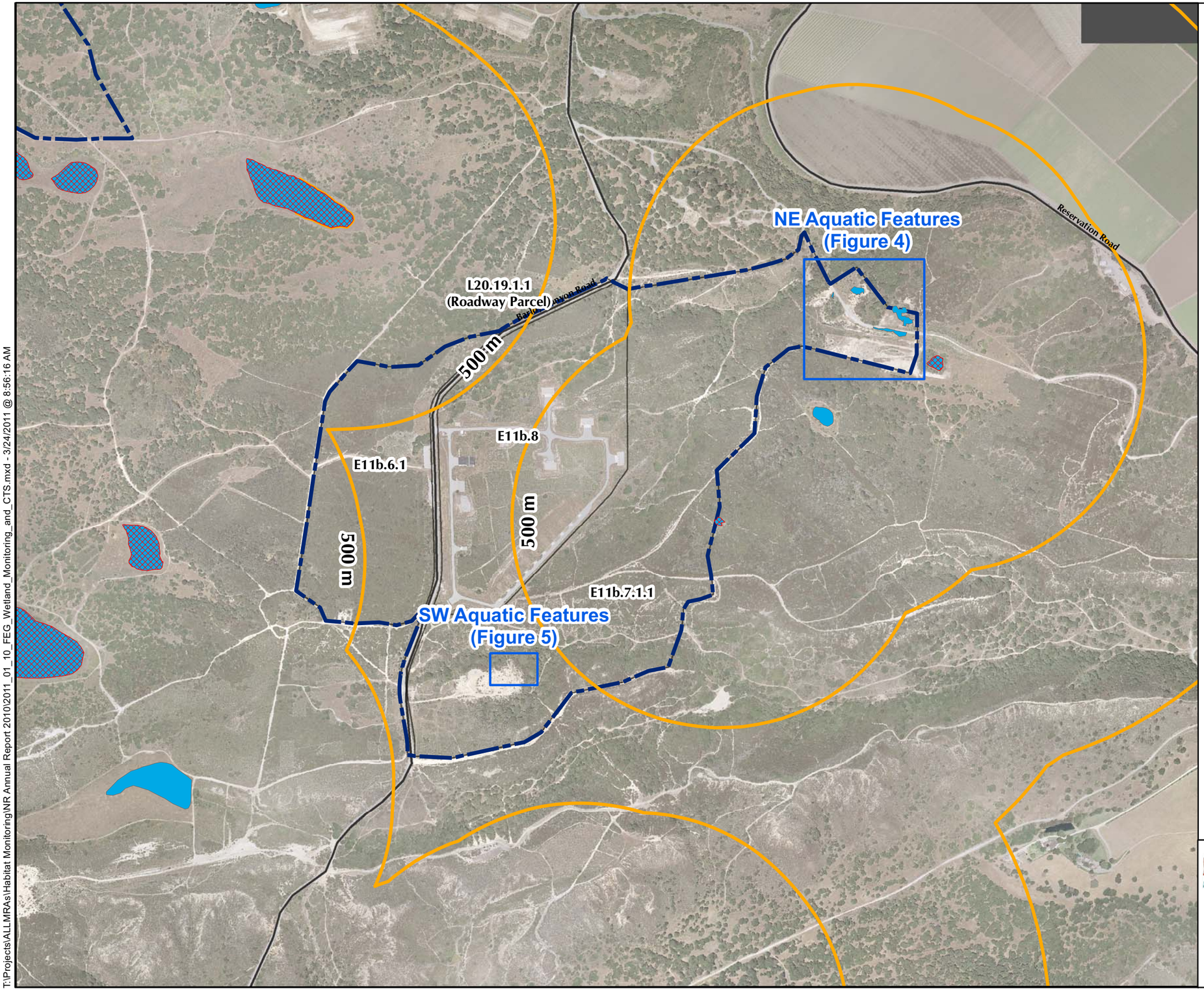
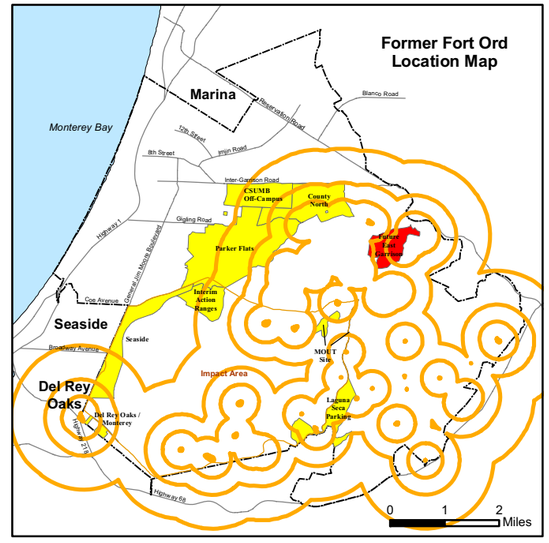


Legend

- Munitions Response Area
- California Tiger Salamander (CTS) Buffer
- Major Road
- Aquatic Features
- Aquatic Feature with Documented CTS Presence
- E11b.8 — USACE Parcel Boundary



N

0 800 1,600 Feet

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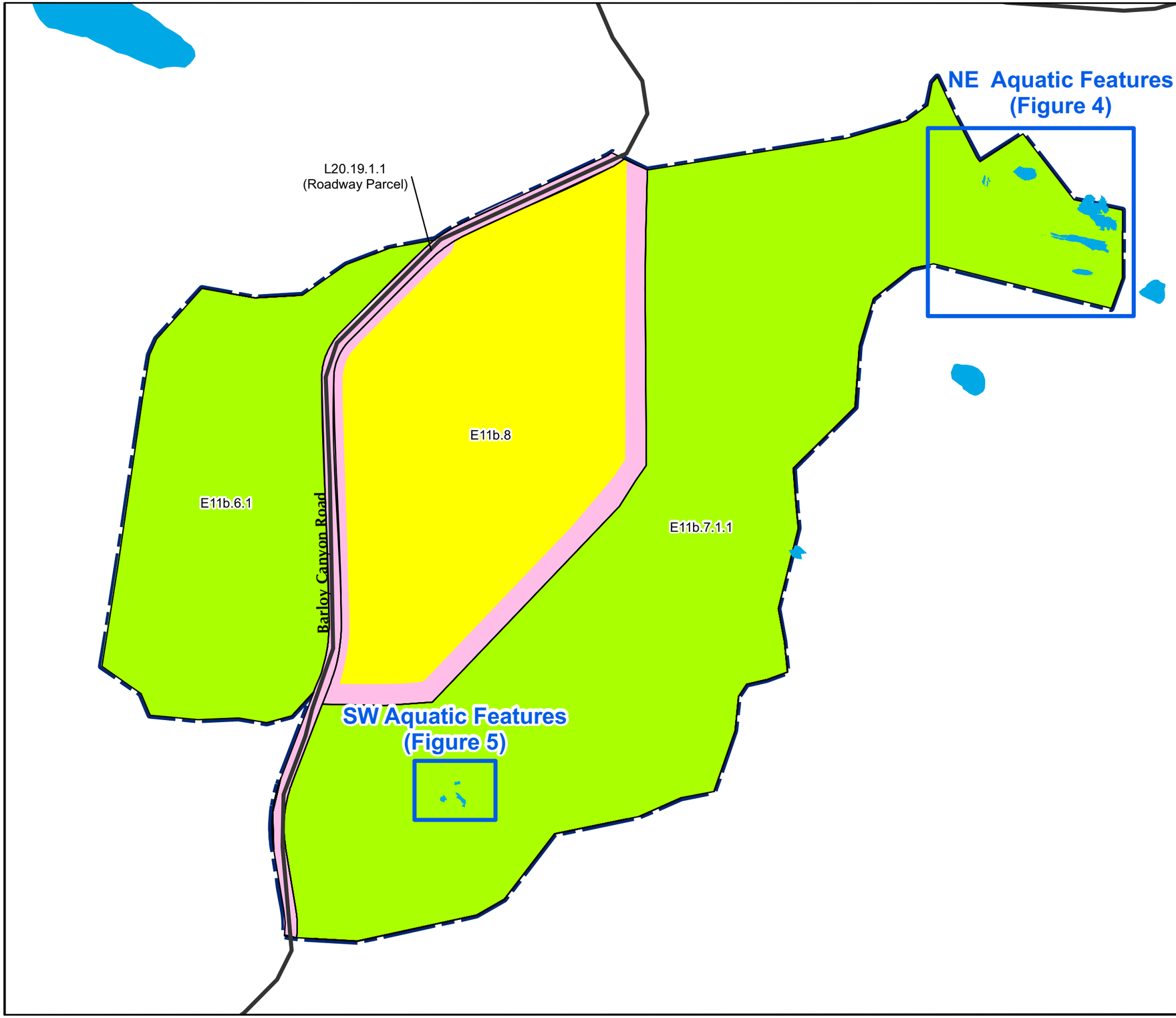
2010 Wetland Monitoring Report
Documented CTS Presence
Future East Garrison MRA

FORA ESCA RP
Monterey County, California

Figure 2

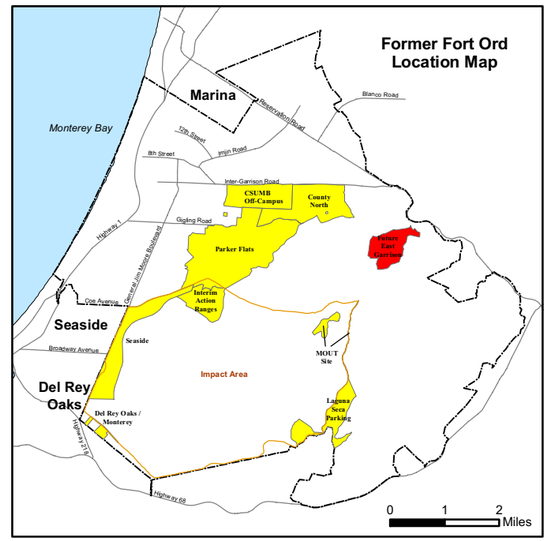


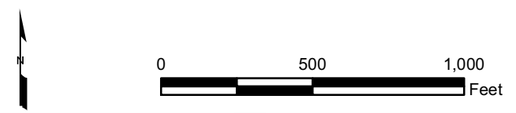
Legend

- Munitions Response Area
- Major Road
- E11b.8 USACE Parcel

Future Land Use

- Residential
- Non-Residential
- Habitat Reserve





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2010 Wetland Monitoring Report
Locations of Aquatic Features
Future East Garrison MRA

FORA ESCA RP
Monterey County, California

Figure 3

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AF68C

AF68AB

AF69

AF67
MEADOW

AF67-EX1

AF67-EX2

AF67-EX4

AF67-EX3

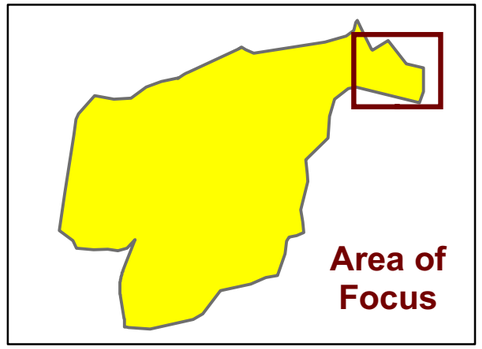
AF66B

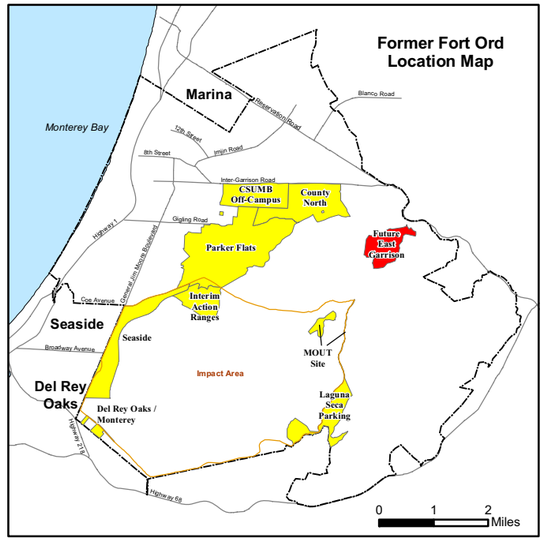
AF66A

AF 10-1

Legend

- Munitions Response Area
- Major Road
- Aquatic Feature Extents on February 3, 2010
- Aquatic Feature Extents on March 2, 2010
- Aquatic Feature Extents on March 8, 2010





N

0 100 200 Feet

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2010 Wetland Monitoring Report
NE Aquatic Features
Extent of Ponded Water

FORA ESCA RP
Monterey County, California

Figure 4

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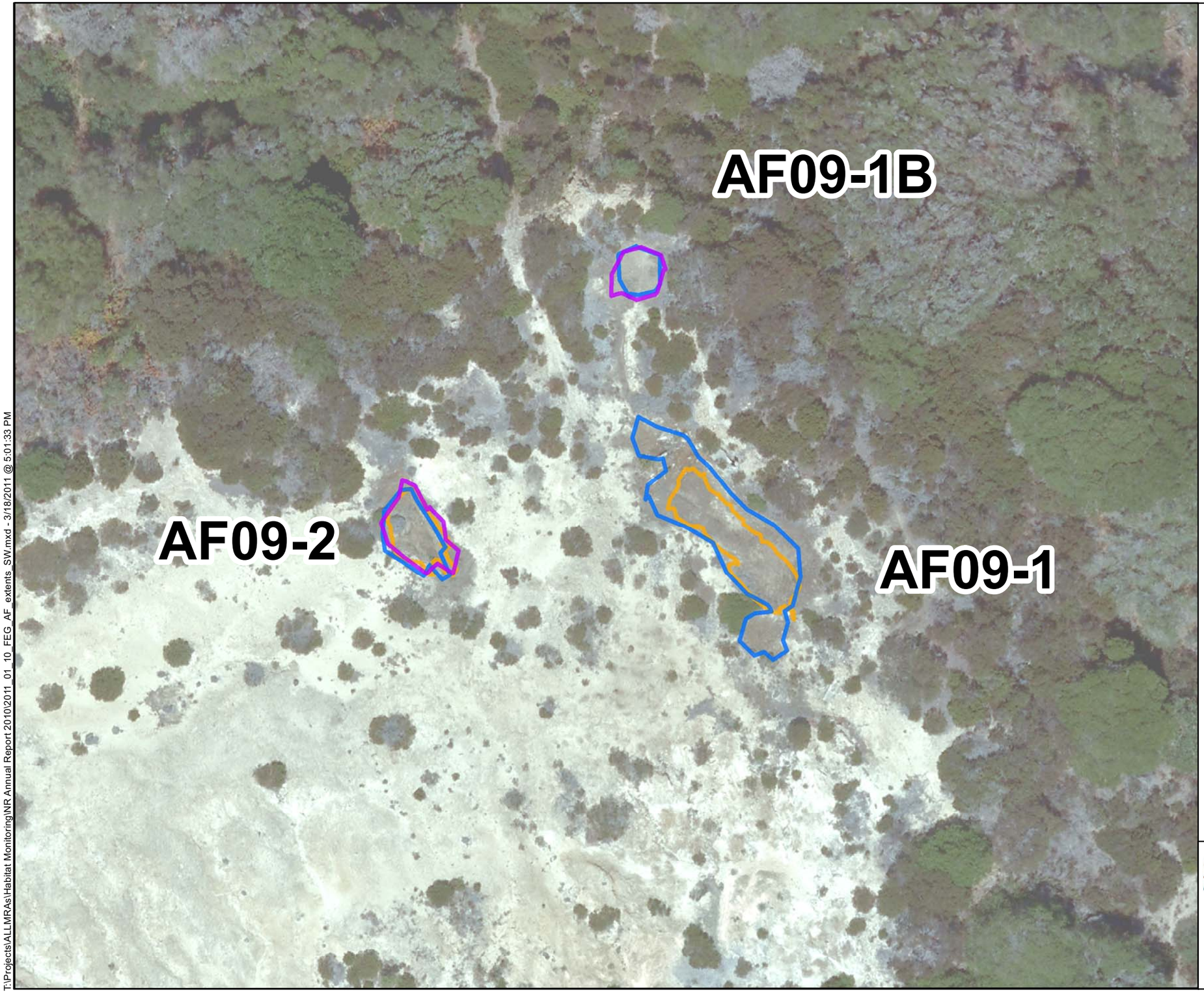
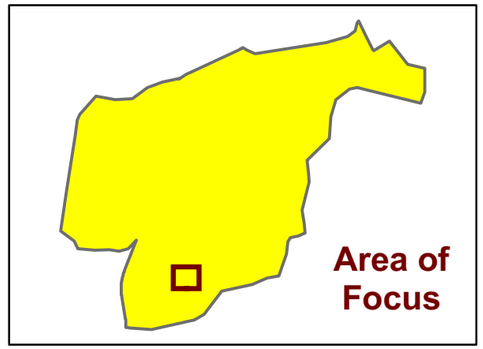
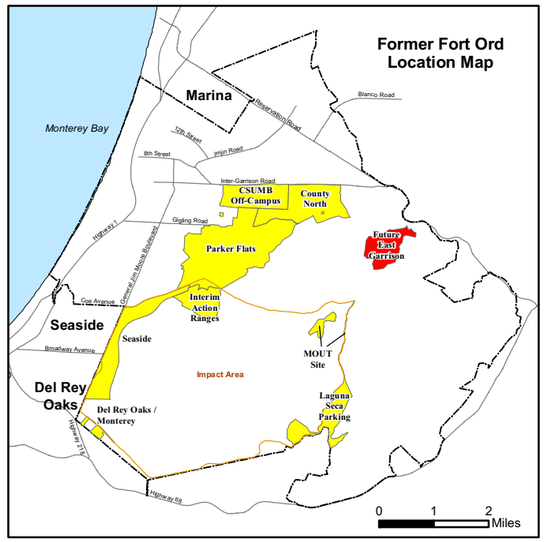
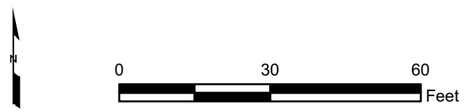


Legend

- Munitions Response Area
- Major Road
- Aquatic Feature Extents on February 3, 2010
- Aquatic Feature Extents on March 2, 2010
- Aquatic Feature Extents on March 8, 2010







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2010 Wetland Monitoring Report
SW Aquatic Features
Extent of Ponded Water

FORA ESCA RP
Monterey County, California

Figure 5

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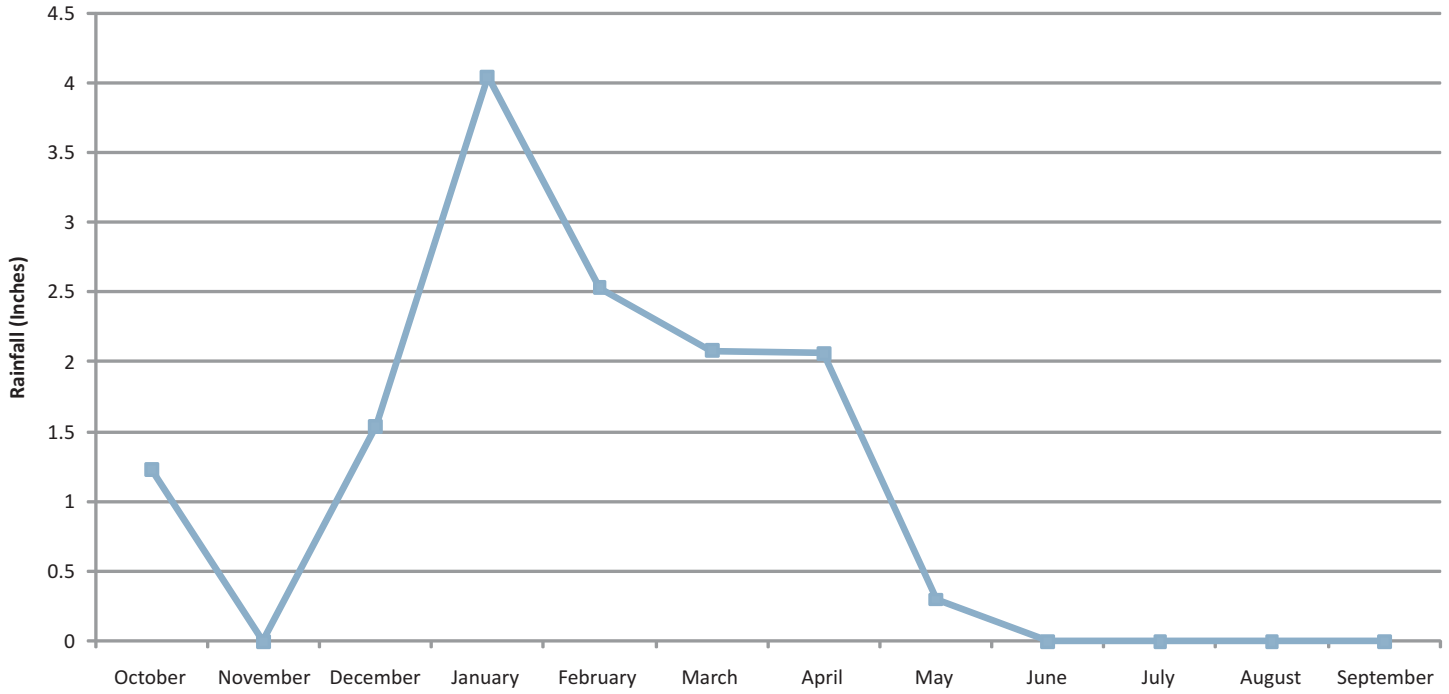

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2010 Wet Season Rainfall

FORA ESCA RP
Monterey County, California

Figure 6

APPENDIX A

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

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 (CNDDB) 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 CNDDB 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/fg1547.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/fg1476.pdf (Scientific Collecting Regulations)

http://www.dfg.ca.gov/licensing/pdffiles/fg1379e.pdf (Scientific Collecting Permit Attachment)

APPENDIX B

Aquatic Survey Field Data Sheets

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date	Begin Time:	End Time:	Observer(s):
3/17/10	1400	1457	P. Lebednik, J. Tullis, M. Stevens

Locality:	County:	State/Province:
Fort Ord	Monterey	CA.

MRA:	Aquatic Feature #:	UTM North	UTM East
East Garrison	Tank Wash AF 10-1	—	—

Weather:	Wind:	Water Temp:	Air Temp:
Clear, (Pt. Cloudy), Overcast, Rain	Calm, (Light) ≈ 3-10↑, Strong		≈ 68°

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 ≈ 30 small Larvae	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
bullfrog	Juv	Y (N)	—	—	(Visual), Trapped, Aural, Hand Collected, Dip net/Seine, Voucher Collected? Yes No

Origin:	Drainage	Average Depth:
Natural, (Man-made)	(Permanent), Occasional	<1M, 1-2 M, (>2 M)

Description	Primary Substrate:
Permanent Lake, Temporary Lake/Pond, Marsh/Bog, Stream, Spring/Seep, Other Tank Wash	(Silt/Mud), Bedrock, Sand/Gravel, Cobble

Color: Clear, (Stained) **Turbidity:** (Clear), Cloudy

% AF margin with Emergent Veg: 0, 1-25, 25-50, (>50)

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

Comments: ≈ 20 Juv. bullfrogs observed/one caught in dip-net & photographed

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date	Begin Time:	End Time:	Observer(s):
3/17/10	1510	1615	J. Tallis, M. Stevens
Locality: Fort Ord	**County:** Monterey		**State/Province:** CA.
MRA: East Garrison	**Aquatic Feature #:** 67	**UTM North** —	**UTM East** —

Weather:	Wind:	Water Temp:	Air Temp:
Clear, (Pt. Cloudy), Overcast, Rain	Calm, (Light) ~ 8-10, Strong		~ 67°

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	1/0	Y N	Yes	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:	Drainage	Average Depth:
Natural, (Man-made)	Permanent, (Occasional)	<1M, (1-2 M), >2 M

Description	Primary Substrate:
Permanent Lake, Marsh/Bog, Spring/Seep Temporary Lake/Pond, Stream, Other – Excavation	(Silt/Mud), Bedrock Sand/Gravel, Cobble

Color: Clear, (Stained) **Turbidity:** Clear, (Cloudy)

% AF margin with Emergent Veg: 0, (1-25), 25-50, >50

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

Comments: Ex-4 & Ex-3 dip-netted / Ex-2 dip-netted & Seine used.
Lots of dead branches in AF make it difficult to seine

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date	Begin Time:	End Time:	Observer(s):	
3-18-10	1400	1435	P. Lebednik M. Siemens	
Locality: Fort Ord	**County:** Monterey		**State/Province:** CA.	
MRA: East Garrison	**Aquatic Feature #:** 09-1 & 09-1b	**UTM North** —	**UTM East** —	

Weather: (Clear) Pt. Cloudy Overcast Rain	**Wind:** (Calm) Light Strong	**Water Temp:**	**Air Temp:** ≈ 67°

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	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
Fairy shrimp	adults	Y N	—	—	Visual Trapped Aural Hand Collected (Dip net/Seine) Voucher Collected? Yes No

Origin: Natural (Man-made)	**Drainage** Permanent (Occasional)	**Average Depth:** (<1M) 1-2 M >2 M	
Description Permanent Lake, Temporary Lake/Pond, Marsh/Bog, Stream, Spring/Seep, Other V.P		**Primary Substrate:** (Silt/Mud), Sand/Gravel, Bedrock, Cobble	
Color: (Clear) Stained	**Turbidity:** Clear (Cloudy)		
% AF margin with Emergent Veg: 0 1-25 (25-50) >50			
Fish Present: Yes (No)	**Fish Species:**	**Bullfrogs Present:** Yes (No)	

Comments:

* Fairy shrimp present (Likely Linderiella, will check ID)
  - Found in 09-1
  - Found in both ~~09-1 & 09~~ 09-1 & b

Observed in Low numbers within pool

Annotation by MCS on 1/5/11: Linderiella confirmed to be L. occidentalis

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date	Begin Time:	End Time:	Observer(s):	
3/18/10	1400	1435	P. Lebednik M. Siewert	
Locality: Fort Ord		**County:** Monterey	**State/Province:** CA.	
MRA: East Garrison		**Aquatic Feature #:** AF 09-3	**UTM North** —	**UTM East** —

Weather:		Wind:		Water Temp:	Air Temp:
(Clear)	Overcast	Calm	Strong		
Pt. Cloudy	Rain	(Light) ~5 mph			70°

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	150	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:		Drainage		Average Depth:			
Natural	(Man-made)	Permanent	(Occasional)	(<1M)	1-2 M	>2 M	
Description	Permanent Lake	Marsh/Bog	Spring/Seep	**Primary Substrate:**	(Silt/Mud)	Bedrock	
	Temporary Lake/Pond	Stream	Other V.P.		Sand/Gravel	Cobble	

Color: (Clear) Stained **Turbidity:** Clear (Cloudy)

% AF margin with Emergent Veg: 0 1-25 25-50 (>50)

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

Comments: Algae thick making it difficult to dip-net

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date	Begin Time:	End Time:	Observer(s):	
3.18.10	1200	1240	P. Lebednik M. Siemens	
Locality: Fort Ord	**County:** Monterey		**State/Province:** CA.	
MRA: East Garrison	**Aquatic Feature #:** AF-66	**UTM North** —	**UTM East** —	

Weather: (Clear) Pt. Cloudy Overcast Rain	**Wind:** (Calm) Light Strong	**Water Temp:**	**Air Temp:** ~68°

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	no	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
bullfrog	—/1	Y N	—	—	(Visual) Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: (Natural) Man-made	**Drainage** Permanent (Occasional)	**Average Depth:** (<1M) 1-2 M >2 M	
Description Permanent Lake Temporary Lake/Pond	Marsh/Bog Stream	Spring/Seep Other V. P.	**Primary Substrate:** (Silt/Mud) Sand/Gravel Bedrock Cobble

Color: Clear (Stained) **Turbidity:** Clear (Cloudy)

% AF margin with Emergent Veg: 0 1-25 25-50 (>50)

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

Comments: Clam shrimp observed

One bullfrog seen surfacing at end of survey (juv.)

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date	Begin Time:	End Time:	Observer(s):	
3-18-10	1100	~~1430~~ 1200	P. Lebednik, M. Siemens	
Locality: Fort Ord		**County:** Monterey	**State/Province:** CA.	
MRA: East Garrison		**Aquatic Feature #:** AF 67-EX1	**UTM North** —	**UTM East** —

Weather: (Clear) Pt. Cloudy Overcast Rain	**Wind:** (Calm) Light Strong	**Water Temp:**	**Air Temp:** ~ 66°

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 - small	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
Fairy shrimp	adults	Y (N)	—	—	Visual Trapped Aural Hand Collected (Dip net/Seine) Voucher Collected? Yes No

Origin: Natural (Man-made)	**Drainage** Permanent (Occasional)	**Average Depth:** <1M	1-2 M	(>2 M)
Description Permanent Lake, Temporary Lake/Pond, Marsh/Bog, Stream, Spring/Seep, Other excavation		**Primary Substrate:** (Silt/Mud), Sand/Gravel, Bedrock, Cobble		
Color: Clear (Stained)		**Turbidity:** Clear (Cloudy)		
% AF margin with Emergent Veg:	0	(1-25)	25-50	>50
Fish Present: Yes (No)	**Fish Species:**	**Bullfrogs Present:** Yes (No)		

Comments:

* Fairy shrimp present (Look like Linderiella but will key if possible)
  Water >5' in depth
- difficult to seine due to depth
- Fairy shrimp found in deep pool with cold water / not observed in meadow area that extends out from 67 EX1
- Found in low numbers within pool

- Meadow area also checked with dip-net

Annotation by MCS on 1/5/11:
Linderiella were confirmed to be L. occidentalis

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date	Begin Time:	End Time:	Observer(s):
3-18-10	1300	1335	P. Lebednik, M. Siemens

Locality:	County:	State/Province:
Fort Ord	Monterey	CA.

MRA:	Aquatic Feature #:	UTM North	UTM East
East Garrison	69	—	—

Weather:	Wind:	Water Temp:	Air Temp:
(Clear) Pt. Cloudy Overcast Rain	(Calm) Light Strong		~ 71°

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	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
<Lam shrimp	adults	Y N	—	—	Visual Trapped Aural Hand Collected (Dip net/Seine) Voucher Collected? Yes No

Origin:	Drainage	Average Depth:
Natural (Man-made)	Permanent (Occasional)	<1M (1-2 M) >2 M

Description				Primary Substrate:		
Permanent Lake	Marsh/Bog	Spring/Seep		(Silt/Mud)	Bedrock	
Temporary Lake/Pond	Stream	Other	excavation	Sand/Gravel	Cobble	

Color: (Clear) Stained **Turbidity:** Clear (Cloudy)

% AF margin with Emergent Veg: 0 (1-25) 25-50 >50

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

Comments:

Looked at A.F. 68 N+S but determined they were too small, shallow to support CTS. Both Full of Mosquito Larvae & water quality very poor. ↓ ≈5"

- Clam shrimp and HyLa commonly observed in A.F. 69

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date 4-15-10	Begin Time: 1310	End Time: 1330	Observer(s): M. Siemens M. Siemens P. Lebednik
Locality: Fort Ord		County: Monterey	State/Province: CA.
MRA: East Garrison		Aquatic Feature #: 09-2	UTM North —	UTM East —

Weather: (Clear) Pt. Cloudy Overcast Rain	Wind: Calm (Light) Strong 1-3 mph	Water Temp: —	Air Temp: ~68°

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, 1	—	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)	Average Depth: (<1M) 1-2 M >2 M
Description: Permanent Lake, Temporary Lake/Pond, Marsh/Bog, Stream, Spring/Seep, Other Exc. depression		Primary Substrate: (Silt/Mud) Bedrock, Sand/Gravel, Cobble
Color: (Clear) Stained	Turbidity: Clear (Cloudy)	
% AF margin with Emergent Veg: 0 (1-25) 25-50 >50		
Fish Present: Yes (No)	Fish Species: —	Bullfrogs Present: Yes (No)

Comments: Depth gauge at 1.0' / Only one Hyla found in net / Less algae present compared with last visit.

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date	Begin Time:	End Time:	Observer(s):	
4-15-10	1310	1308	P. Lebeduik J. Tallis M. Siemens	
Locality: Fort Ord		**County:** Monterey	**State/Province:** CA.	
MRA: East Garrison		**Aquatic Feature #:** 091-13	**UTM North** —	**UTM East** —

Weather:	Wind:	Water Temp:	Air Temp:
(Clear) Pt. Cloudy Overcast Rain	Calm Light 2-4 mph Strong	—	~68

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:	Drainage	Average Depth:	
Natural (Man-made)	Permanent (Occasional)	(<1M) 1-2 M >2 M	
Description Permanent Lake, Temporary Lake/Pond, Marsh/Bog, Stream, Spring/Seep, Other Exc. depression		**Primary Substrate:** (Silt/Mud), Bedrock, Sand/Gravel, Cobble	
Color: Clear (Stained)		**Turbidity:** Clear (Cloudy)	
% AF margin with Emergent Veg: 0 (1-25) 25-50 >50			
Fish Present: Yes (No)	**Fish Species:** —	**Bullfrogs Present:** Yes (No)	

Comments: Depth gauge at 0.44 / No hyla Larvae & no Linderiella observed during this survey event.

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date	Begin Time:	End Time:	Observer(s):	
4.15.10	1256	1310	J. Tallis P. Lebednik M. Siemens	
Locality: Fort Ord	**County:** Monterey		**State/Province:** CA.	
MRA: East Garrison	**Aquatic Feature #:** 09-1A	**UTM North** —	**UTM East** —	

Weather: (Clear) Pt. Cloudy Overcast Rain	**Wind:** (Calm) Light Strong	**Water Temp:** —	**Air Temp:** 56 8°

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 100's	—	(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)	**Average Depth:** (<1M) 1-2 M >2 M
Description Permanent Lake Temporary Lake/Pond	Marsh/Bog Stream	Spring/Seep Other Exc. depression
Primary Substrate: (Silt/Mud) Sand/Gravel	Bedrock Cobble	
Color: (Clear) Stained	**Turbidity:** Clear (Cloudy)	
% AF margin with Emergent Veg: 0	1-25 (25-50)	>50
Fish Present: Yes (No)	**Fish Species:** —	**Bullfrogs Present:** Yes (No)

Comments: Depth gauge reads 0.95 / Water somewhat milky clear / No Linderiella found during this survey event

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date	Begin Time:	End Time:	Observer(s):	
4.15.10	1220	1225	P. Lebednik, J. Tallis, M. Siemens	
Locality: Fort Ord	**County:** Monterey		**State/Province:** CA.	
MRA: East Garrison	**Aquatic Feature #:** 68	**UTM North** —	**UTM East** —	

Weather: (Clear) Pt. Cloudy Overcast Rain	Wind: (Calm) Light Strong	Water Temp:	Air Temp: ~ 68°

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: Natural (Man-made)	Drainage: Permanent (Occasional)	Average Depth: (<1M) 1-2 M >2 M	
Description: Permanent Lake, Temporary Lake/Pond, Marsh/Bog, Stream, Spring/Seep, Other Roadside depression		Primary Substrate: (Silt/Mud) Sand/Gravel Bedrock Cobble	
Color: (Clear) Stained		Turbidity: Clear (Cloudy)	
% AF margin with Emergent Veg: 0 (1-25) 25-50 >50			
Fish Present: Yes (No)	Fish Species: —	Bullfrogs Present: Yes (No)	

Comments: Dirty, rust colored water. Depth gauge shows 4.34"
Mosquito Larvae present
- Feature not suitable habitat for CTS.

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date	Begin Time:	End Time:	Observer(s):
4.15.10	1215	1220	P. Lebednik, J. Tallis, M. Siemens

Locality:	County:	State/Province:
Fort Ord	Monterey	CA.

MRA:	Aquatic Feature #:	UTM North	UTM East
East Garrison	68 A,B	—	—

Weather:	Wind:	Water Temp:	Air Temp:
(Clear) Pt. Cloudy Overcast Rain	(Calm) Light Strong		~ 68°

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:	Drainage	Average Depth:	Primary Substrate:
Natural (Man-made)	Permanent (Occasional)	(<1M) 1-2 M >2 M	(Silt/Mud) Bedrock
Description: Permanent Lake, Temporary Lake/Pond, Marsh/Bog, Stream, Spring/Seep, Other Ruts depression			Sand/Gravel Cobble

Color: (Clear) Stained **Turbidity:** Clear (Cloudy)

% AF margin with Emergent Veg: 0 (1-25) 25-50 >50

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

Comments: Very shallow, rust colored water with mosquito larvae present. depth gauge reads 4.0"
- Feature not suitable habitat for CTS

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date	Begin Time:	End Time:	Observer(s):
4-15-10	11:40	12:10	P. Lebednik J. Tallis M. Siemens

Locality:	County:	State/Province:
Fort Ord	Monterey	CA.

MRA:	Aquatic Feature #:	UTM North	UTM East
East Garrison	69	—	—

Weather:	Wind:	Water Temp:	Air Temp:
(Clear) Pt. Cloudy Overcast Rain	(Calm) Light Strong	—	≈ 68°

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 1000's	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
clam shrimp	adults	Y N	—	no	Visual Trapped Aural Hand Collected (Dip net/Seine) Voucher Collected? Yes No

Origin:	Drainage	Average Depth:	Primary Substrate:
Natural (Man-made)	Permanent (Occasional)	<1M 1-2 M (>2 M)	(Silt/Mud) Bedrock
Description: Permanent Lake, Temporary Lake/Pond, Marsh/Bog, Stream, Spring/Seep, Other Exc. depression			Sand/Gravel Cobble

Color: (Clear) Stained **Turbidity:** Clear (Cloudy)

% AF margin with Emergent Veg: 0 (1-25) 25-50 >50

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

Comments: clam shrimp present in large numbers. Water depth gauge shows 4.18'
No CTS observed but conditions seem suitable.

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date	Begin Time:	End Time:	Observer(s):	
4/15/10	10:00	11:00	P. Lebednik, J. Tallis, M. Stevens	
Locality: Fort Ord	**County:** Monterey		**State/Province:** CA.	
MRA: East Garrison	**Aquatic Feature #:** 10-1 Tank Wash	**UTM North** —	**UTM East** —	

Weather: (Clear) Pt. Cloudy Overcast Rain	**Wind:** Calm Strong (Light) 3-6 mph	**Water Temp:**	**Air Temp:** 65°

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 100's	—	(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
bullfrogs	Juv	Y (N)	—	—	(Visual) Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin: Natural (Man-made)	**Drainage** (Permanent) (Occasional)	**Average Depth:** <1M 1-2 M (>2 M)
Description Permanent Lake, Temporary Lake/Pond, Marsh/Bog, Stream, Spring/Seep, Other cement basin		**Primary Substrate:** (Silt/Mud) Bedrock, Sand/Gravel, Cobble
Color: Clear (Stained)	**Turbidity:** (Clear) Cloudy	
% AF margin with Emergent Veg: 0 1-25 (25-50) >50		
Fish Present: Yes (No)	**Fish Species:**	**Bullfrogs Present:** (Yes) No

Comments: More than 30 bullfrogs observed but no bullfrog larvae seen. 100's of Hyla larvae present. All bullfrogs appear as sub-adults. Depth gauge reads 3.8'.

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date	Begin Time:	End Time:	Observer(s):	
4/14/10	1448	1530	J. Tallis M. Siemens	
Locality: Fort Ord	**County:** Monterey		**State/Province:** CA.	
MRA: East Garrison	**Aquatic Feature #:** 67 EX1	**UTM North** —	**UTM East** —	

Weather: (Clear) Pt. Cloudy Overcast Rain	**Wind:** Calm Strong (Light) 4-6 mph	**Water Temp:** —	**Air Temp:** ~ 66°

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 ~100	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
Linderiella	Yes/—	Y N	—	♀s with eggs	Visual Trapped Aural Hand Collected (Dip net/Seine) Voucher Collected? (Yes) No

Origin: Natural (Man-made)	**Drainage** Permanent Occasional	**Average Depth:** <1M (1-2 M) >2 M	
Description Permanent Lake, Temporary Lake/Pond, Marsh/Bog, Stream, Spring/Seep, Other Exc. depression		**Primary Substrate:** (Silt/Mud) Bedrock, Sand/Gravel, Cobble	
Color: (Clear) Stained	**Turbidity:** Clear (Cloudy)		
% AF margin with Emergent Veg: 0 (1-25) 25-50 >50			
Fish Present: Yes (No)	**Fish Species:** —	**Bullfrogs Present:** (Yes) No	sob- One adult observed

Comments: Depth gauge at 4.30'. • Two ♀ Linderiella found in dip-net; one collected. Annotation by MCS on 1/5/11: Linderiella were confirmed to be L. occidentalis.
• Found in low numbers within pool

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date	Begin Time:	End Time:	Observer(s):	
4-14-10	1427	1445	J. Tallis M. Siemens	
Locality: Fort Ord		**County:** Monterey	**State/Province:** CA.	
MRA: East Garrison		**Aquatic Feature #:** AF 67 - Meadow	**UTM North** —	**UTM East** —

Weather: (Clear) Pt. Cloudy Overcast Rain	**Wind:** Calm Strong (Light) 5-8 mph	**Water Temp:**	**Air Temp:** ≈ 66°

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	~13	Y (N)	Yes 100's	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)	**Average Depth:** (<1M) 1-2 M >2 M
Description Permanent Lake Marsh/Bog Spring/Seep Temporary Lake/Pond Stream Other depression		**Primary Substrate:** (Silt/Mud) Bedrock Sand/Gravel Cobble
Color: (Clear) Stained	**Turbidity:** Clear (Cloudy)	
% AF margin with Emergent Veg: 0 1-25 25-50 (>50)		
Fish Present: Yes (No)	**Fish Species:** —	**Bullfrogs Present:** Yes (No)

Comments: A few juvenile Hyla observed along with many larvae of same. Depth gauge reads 8.7" but this gauge not in deepest part of A.F. Deepest area is more like 12" at north end of feature.

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date	Begin Time:	End Time:	Observer(s):
4/14/10	1412	1425	J. Tallis, M. Siemens

Locality:	County:	State/Province:
Fort Ord	Monterey	CA.

MRA:	Aquatic Feature #:	UTM North	UTM East
East Garrison	AF67 EX2	—	—

Weather:	Wind:	Water Temp:	Air Temp:
(Clear) Pt. Cloudy Overcast Rain	Calm Strong (Light) 3-6 mph	—	~ 66°

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 100s	—	(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
Clam shrimp	adults	Y (N)	—	—	Visual Trapped Aural Hand Collected (Dip net/Seine) Voucher Collected? Yes (No)

Origin:	Drainage	Average Depth:	Primary Substrate:
Natural (Man-made)	Permanent (Occasional)	<1M (1-2 M) >2 M	(Silt/Mud) Bedrock
Description: Permanent Lake, Temporary Lake/Pond, Marsh/Bog, Stream, Spring/Seep, Other Exc. depression			Sand/Gravel Cobble

Color: (Clear) Stained **Turbidity:** Clear (Cloudy)

% AF margin with Emergent Veg: 0 (1-25) 25-50 >50

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

Comments: Many clam shrimp, Hyla larvae & damselfly larvae. Depth gauge reads 3.35. No CTS

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date	Begin Time:	End Time:	Observer(s):	
4.14.10	1355	1410	J. Tallis M. Siemens	
Locality: Fort Ord	**County:** Monterey		**State/Province:** CA.	
MRA: East Garrison	**Aquatic Feature #:** AF67 EX 4	**UTM North** —	**UTM East** —	

Weather: (Clear) Pt. Cloudy Overcast Rain	**Wind:** Calm Strong (Light 2-5 mph)	**Water Temp:**	**Air Temp:** ~ 66°

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)	<5	—	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)	**Average Depth:** <1M (1-2 M) >2 M
Description Permanent Lake, Temporary Lake/Pond, Marsh/Bog, Stream, Spring/Seep, Other ex. depression		**Primary Substrate:** (Silt/Mud) Sand/Gravel Bedrock Cobble
Color: (Clear) Stained	**Turbidity:** Clear (Cloudy)	
% AF margin with Emergent Veg: 0 (1-25) 25-50 >50		
Fish Present: Yes (No)	**Fish Species:**	**Bullfrogs Present:** Yes (No)

Comments: Few Hyla + other organisms observed in dip-net. Depth gauge registers at 1.7'. Copious unknown clear slime material attached to emergent veg - could be egg media but this not supported by # of larvae found in net.

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date	Begin Time:	End Time:	Observer(s):	
4.14.10	1336	1352	J. Tallis M. Siemens	
Locality: Fort Ord	**County:** Monterey		**State/Province:** CA.	
MRA: East Garrison	**Aquatic Feature #:** AF67 EX3	**UTM North** —	**UTM East** —	

Weather: (Clear) Pt. Cloudy Overcast Rain	**Wind:** Calm (Light) Strong 0-2	**Water Temp:**	**Air Temp:** ~66°

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 100s	no	(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
clam shrimp	adults	Y (N)	—	—	Visual Trapped Aural Hand Collected (Dip net/Seine) Voucher Collected? Yes No

Origin: (Natural) Man-made	**Drainage** Permanent (Occasional)	**Average Depth:** <1M (1-2 M) >2 M
Description Permanent Lake, Temporary Lake/Pond, Marsh/Bog, Stream, Spring/Seep, Other exc. depression		**Primary Substrate:** (Silt/Mud), Sand/Gravel, Bedrock, Cobble
Color: (Clear) Stained	**Turbidity:** Clear (Cloudy)	
% AF margin with Emergent Veg: 0 (1-25) 25-50 >50		
Fish Present: Yes (No)	**Fish Species:**	**Bullfrogs Present:** Yes (No)

Comments: Hyla, clam shrimp, clawed caddisfly common in dip-net / A.F. registers at 2.5' depth
Looks potentially suitable for CTS but none found

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date	Begin Time:	End Time:	Observer(s):	
4.14.10	1320	1325	J. Tallis M. Siemens	
Locality: Fort Ord	**County:** Monterey		**State/Province:** CA.	
MRA: East Garrison	**Aquatic Feature #:** 66-B	**UTM North** —	**UTM East** —	

Weather: (Clear) Pt. Cloudy Overcast Rain	**Wind:** Calm Strong (Light) 2-5 mph	**Water Temp:**	**Air Temp:** ~66°

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: (Natural) Man-made	**Drainage** Permanent (Occasional)	**Average Depth:** (<1M) 1-2 M >2 M
Description Permanent Lake Temporary Lake/Pond	Marsh/Bog Spring/Seep Stream Other depression	**Primary Substrate:** (Silt/Mud) Bedrock Sand/Gravel Cobble
Color: (Clear) Stained	**Turbidity:** Clear (Cloudy)	
% AF margin with Emergent Veg:	0 1-25 (25-50) >50	
Fish Present: Yes (No)	**Fish Species:**	**Bullfrogs Present:** Yes (No)

Comments: This feature just a small extension of feature # 66-A

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date	Begin Time:	End Time:	Observer(s):	
4.14.10	1250	1325	J. Tallis M. Siemens	
Locality: Fort Ord		**County:** Monterey	**State/Province:** CA.	
MRA: East Garrison		**Aquatic Feature #:** 66-A ~~69~~	**UTM North** —	**UTM East** —

Weather: (Clear) Pt. Cloudy Overcast Rain	**Wind:** Calm (Light) Strong 2-5 mph	**Water Temp:**	**Air Temp:** ≈ 66°

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)	Many 1,000's	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
clam shrimp	adults	Y N		—	Visual Trapped Aural Hand Collected (Dip net/Seine) Voucher Collected? Yes No

Origin: (Natural) Man-made	**Drainage** Permanent (Occasional)	**Average Depth:** (<1M) 1-2 M >2 M
Description Permanent Lake Temporary Lake/Pond	Marsh/Bog Spring/Seep Stream Other exc/depression	**Primary Substrate:** (Silt/Mud) Bedrock Sand/Gravel Cobble
Color: (Clear) Stained	**Turbidity:** Clear (Cloudy)	
% AF margin with Emergent Veg:	0 1-25 (25-50) >50	
Fish Present: Yes (No)	**Fish Species:**	**Bullfrogs Present:** Yes (No)

Comments: clam shrimp, mayfly larvae, water boatman common. Feature seems perfect for CTS but none found during survey.

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date	Begin Time:	End Time:	Observer(s):
5·10·10	≈ 1240	≈ 1300	P. Lebednik, M. Siemens

Locality:	County:	State/Province:
Fort Ord	Monterey	CA.

MRA:	Aquatic Feature #:	UTM North	UTM East
East Garrison	09-1	—	—

Weather:	Wind:	Water Temp:	Air Temp:
Clear, Overcast, (Pt. Cloudy) 30% Rain	Calm, Strong, (Light) 3-12 mph ↑		≈ 59°

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	~10⁵	Y (N)	10⁵	—	(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:	Drainage	Average Depth:
Natural, (Man-made)	Permanent, (Occasional)	(<1M), 1-2 M, >2 M

Description				Primary Substrate:	
Permanent Lake	Marsh/Bog	Spring/Seep		(Silt/Mud)	Bedrock
Temporary Lake/Pond	Stream	Other excavated depression		Sand/Gravel	Cobble

Color:		Turbidity:	
(Clear)	Stained	(Clear)	Cloudy

% AF margin with Emergent Veg:	0	1-25	25-50	(>50)

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

Comments: water depth gauge reads 0.49. Very shallow clear surface water remaining with ≈ 50% of emergent aquatic veg. Waterboatman/dragonfly naiads/diving beetle larvae common.

* AF 09-13 = dry

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date	Begin Time:	End Time:	Observer(s):	
5-10-10	~1300	1302	P. Lehrdruk M. Siemens	
Locality: Fort Ord		**County:** Monterey	**State/Province:** CA.	
MRA: East Garrison		**Aquatic Feature #:** 09-2	**UTM North** —	**UTM East** —

Weather:		**Wind:**		**Water Temp:**	**Air Temp:**
Clear	Overcast	Calm	Strong		60°
Pt. Cloudy	Rain	Light			

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:	Natural	Man-made	**Drainage**	Permanent	Occasional	**Average Depth:** <1M 1-2 M >2 M
Description	Permanent Lake	Marsh/Bog	Spring/Seep			**Primary Substrate:** Silt/Mud Bedrock
	Temporary Lake/Pond	Stream	Other Exc. depression			Sand/Gravel Cobble
Color:	Clear	Stained		**Turbidity:**	Clear	Cloudy

% AF margin with Emergent Veg: 0 1-25 25-50 >50

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

Comments: Dry

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date	Begin Time:	End Time:	Observer(s):	
5.10.10	1330	~1400	P. Lebednik M. Siemens	
Locality: Fort Ord		**County:** Monterey	**State/Province:** CA.	
MRA: East Garrison		**Aquatic Feature #:** 66A	**UTM North** —	**UTM East** —

Weather:			Wind:			Water Temp:	Air Temp:
Clear	Overcast		Calm	(Strong)		—	~59°
(Pt. Cloudy)	90%	Rain	Light	10-15↑			

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	—/10	Y (N)	100s	—	(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
clam shrimp	Adults	Y N	—	—	Visual Trapped Aural Hand Collected (Dip net/Seine) Voucher Collected? Yes No

Origin:		Drainage		Average Depth:			
(Natural)		Permanent		(<1M)	1-2 M	>2 M	
Man-made		(Occasional)					
Description	Permanent Lake	Marsh/Bog	Spring/Seep	**Primary Substrate:**	(Silt/Mud)	Bedrock	
	Temporary Lake/Pond	Stream	Other depression		Sand/Gravel	Cobble	

Color: Clear Stained brown **Turbidity:** Clear (Cloudy)

% AF margin with Emergent Veg: 0 1-25 25-50 (>50)

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

Comments: 100's of H. regilla tadpoles / 1000's of clam shrimp / Water beetle larvae. Depth gauge reads 1.71'

* 66B - dry

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date	Begin Time:	End Time:	Observer(s):	
5.10.10	1030	1117	P. Lebednik / J. Tallis M. Siemens	
Locality: Fort Ord	**County:** Monterey		**State/Province:** CA.	
MRA: East Garrison	**Aquatic Feature #:** 69	**UTM North** —	**UTM East** —	

Weather: (Clear) Pt. Cloudy Overcast Rain	**Wind:** Calm (Light) Strong 5-8 mph	**Water Temp:** —	**Air Temp:** ~63°

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	—/10^s	Y (N)	100^s	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
clam shrimp	adults	Y N	—	—	Visual Trapped Aural Hand Collected (Dip net/Seine) Voucher Collected? Yes No

Origin: Natural (Man-made)	**Drainage** Permanent (Occasional)	**Average Depth:** <1M 1-2 M (>2 M)
Description Permanent Lake Marsh/Bog Spring/Seep Temporary Lake/Pond Stream Other Exc depression		**Primary** (Silt/Mud) Bedrock **Substrate:** Sand/Gravel Cobble
Color: Clear (Stained) brown	**Turbidity:** Clear (Cloudy)	
% AF margin with Emergent Veg: 0 1-25 (25-50) >50		
Fish Present: Yes (No)	**Fish Species:** —	**Bullfrogs Present:** Yes (No)

Comments: Water depth gauge reads 3.82' / H. regilla - clam shrimp - damselfly larvae present in Large #5.

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date	Begin Time:	End Time:	Observer(s):
5.11.10	0950	1020	J. Tallis / P. Lebednik M. Siemens

Locality:	County:	State/Province:
Fort Ord	Monterey	CA.

MRA:	Aquatic Feature #:	UTM North	UTM East
East Garrison	Tank Wash	—	—

Weather:	Wind:	Water Temp:	Air Temp:
(Clear) Pt. Cloudy Overcast Rain	Calm (Light) Strong 3-7 mph	—	≈ 60°

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)	100's	—	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:	Drainage	Average Depth:			
Natural (Man-made)	(Permanent) Occasional	<1M	1-2 M	(>2 M)	

Description				Primary Substrate:		
Permanent Lake	Marsh/Bog	Spring/Seep		(Silt/Mud)	Bedrock	
Temporary Lake/Pond	Stream	Other Man-made, deep, cement lined		Sand/Gravel	Cobble	

Color:		Turbidity:	
(Clear)	(Stained)	(Clear)	Cloudy

% AF margin with Emergent Veg:				
0	(1-25)	25-50	>50	

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

Comments: Depth gauge reads 3.48' / H. regilla, damselfly larvae, water boatman present in large numbers

R.W. Blackbirds nesting in cattails – chicks observed in nest

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date	Begin Time:	End Time:	Observer(s):
5.10.10	1540	1545	P. Lebednik, M. Siemens

Locality:	County:	State/Province:
Fort Ord	Monterey	CA.

MRA:	Aquatic Feature #:	UTM North	UTM East
East Garrison	68	—	—

Weather:	Wind:	Water Temp:	Air Temp:
Clear, Pt Cloudy, Overcast, Rain	Calm, Light, (Strong) 8-12 mph	—	≈57°

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:	Drainage	Average Depth:
(Natural), Man-made	Permanent, (Occasional)	(<1M), 1-2 M, >2 M

Description				Primary Substrate:	
Permanent Lake	Marsh/Bog	Spring/Seep		(Silt/Mud)	Bedrock
Temporary Lake/Pond	Stream	Other depression		Sand/Gravel	Cobble

Color:	Clear	Stained	Turbidity:	Clear	Cloudy

% AF margin with Emergent Veg:	0	1-25	25-50	>50

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

Comments: 68 A B = dry

AF 68 C with trace amounts of surface water (1.78"). Pool dimensions approx. 2.5'X 2'. These pools not suitable CTS breeding habitat

dry

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date	Begin Time:	End Time:	Observer(s):	
5.10.10	~1520	~1540	P. Lebednik M. Siemens	
Locality: Fort Ord		**County:** Monterey	**State/Province:** CA.	
MRA: East Garrison		**Aquatic Feature #:** 67 EX 1	**UTM North** —	**UTM East** —

Weather:	Wind:	Water Temp:	Air Temp:
Clear Overcast Pt Cloudy 90% Rain	Calm Strong Light 8-15 ↑		57°

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.	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
clam shrimp	adults	Y N	—	—	Visual Trapped Aural Hand Collected Dip net/Seine Voucher Collected? Yes No

Origin:	Natural (Man-made)	**Drainage**	Permanent (Occasional)	**Average Depth:**	<1M	1-2 M (>2 M)
Description	Permanent Lake / Temporary Lake/Pond	Marsh/Bog / Stream	Spring/Seep / Other	**Primary Substrate:**	(Silt/Mud)	Bedrock / Sand/Gravel Cobble
Color:	Clear	(Stained) brown		**Turbidity:**	Clear	(Cloudy)
% AF margin with Emergent Veg:		0	1-25	25-50	(>50)	
Fish Present:	Yes (No)	**Fish Species:** —		**Bullfrogs Present:**	Yes (No)	

Comments: Depth gauge at 3.70' / clam shrimp present & H. regilla tadpoles present in Large #5. / damselfly larvae present in Large #5.

* 67 Meadow is dry

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date	Begin Time:	End Time:	Observer(s):	
5.10.10	1500	1515	P. Lebeduik M. Siemens	
Locality: Fort Ord		**County:** Monterey	**State/Province:** CA.	
MRA: East Garrison		**Aquatic Feature #:** 67 EX2	**UTM North** —	**UTM East** —

Weather:			Wind:			Water Temp:	Air Temp:
Clear	Overcast		Calm	Strong			
Pt. Cloudy 100%	Rain Lite		Light	8-12mph			58°

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)	100s	—	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
clam shrimp	adults	Y N	—	—	Visual Trapped Aural Hand Collected (Dip net/Seine) Voucher Collected? Yes No

Origin:		Drainage		Average Depth:			
Natural (Man-made)		Permanent (Occasional)		<1M	1-2 M	(>2 M)	
Description	Permanent Lake	Marsh/Bog	Spring/Seep	**Primary Substrate:**	(Silt/Mud)	Bedrock	
	Temporary Lake/Pond	Stream	Other Exc depression		Sand/Gravel	Cobble	
Color:	Clear	(Stained) brown		**Turbidity:**	Clear	(Cloudy)	
% AF margin with Emergent Veg:		0	1-25	25-50	(>50)		
Fish Present:	Yes (No)	**Fish Species:** —		**Bullfrogs Present:**	Yes (No)		

Comments: Depth gauge reads 2.9' / clam shrimp & damselfly larvae present in Large #5

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date	Begin Time:	End Time:	Observer(s):	
5.10.10	1415	1455	P. Lebednik M. Siemens	
Locality: Fort Ord		**County:** Monterey	**State/Province:** CA.	
MRA: East Garrison		**Aquatic Feature #:** 67 EX3	**UTM North** —	**UTM East** —

Weather:			**Wind:**		**Water Temp:**	**Air Temp:**
Clear	Overcast		Calm	(Strong)		
100% (Pt. Cloudy)	Rain		Light	15-20 mph		~59°

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
<Lam shrimp	adults	Y N	—	—	Visual Trapped Aural Hand Collected (Dip net/Seine) Voucher Collected? Yes No

Origin:	Natural (Man-made)	**Drainage**	Permanent (Occasional)	**Average Depth:**	<1M	(1-2 M)	>2 M
Description	Permanent Lake	Marsh/Bog	Spring/Seep	**Primary Substrate:**	(Silt/Mud)	Bedrock	
	Temporary Lake/Pond	Stream	Other Exc depression		Sand/Gravel	Cobble	

Color: Clear (Stained) brown **Turbidity:** Clear (Cloudy)

% AF margin with Emergent Veg: 0 1-25 25-50 (>50)

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

Comments: Depth gauge reads 2.2' / Clam shrimps present

California Tiger Salamander Aquatic Survey Data Sheet

FORA ESCA RP

Date 5.10.10	Begin Time: 1405	End Time: ~1410	Observer(s): P. Lebednik, M. Siemens
Locality: Fort Ord		County: Monterey	State/Province: CA.
MRA: East Garrison		Aquatic Feature #: 67 EX 4	UTM North —	UTM East —

Weather: Clear / Overcast / (Pt. Cloudy) / Rain	Wind: Calm / Light / (Strong)	Water Temp: / Air Temp: ~60°

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	~12	Y (N)	10s	—	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)	Average Depth: <1M / (1-2 M) / >2 M
Description: Permanent Lake / Temporary Lake/Pond / Marsh/Bog / Stream / Spring/Seep / Other (exc/depression)		Primary Substrate: (Silt/Mud) / Bedrock / Sand/Gravel / Cobble
Color: Clear / Stained (brown)		Turbidity: Clear / (Cloudy)
% AF margin with Emergent Veg: 0 / 1-25 / (25-50) / >50		
Fish Present: Yes / (No)	Fish Species: —	Bullfrogs Present: Yes / (No)

Comments: Depth gauge reads 0.98' / clam shrimp present

APPENDIX C

Water Quality Monitoring Data Sheets

Aquatic Feature Water Quality Data

Sample Collection Date: *4/2/2010* **Collected By:** *PAL* **Analysis by:** *PAL*
Equipment Used: **Analysis Date:** 4/2/10
pH Meter: Sension 1 w/Thermo semi-micro probe
Turbdity Meter: LaMotte 2020e Turbidimeter

pH Calibration (•): 4:__• __ 7:__• __ 10.1:__• __ .
Turbidimeter blank (Y/N):___*Yes*__ .

AF	Sample Color	Opaque Y/N	pH	NTU	Comment
66 A	Light brown	Y	6.7	270	
67Ex1	Light brown	Y	6.5	207	
67Ex2	Light brown	Y	6.5	235	
67Ex3	Med. brown	Y	6.4	318	
67Ex4	Med. brown	Y	6.2	282	
69	Light brown	Y	6.4	566	
10-1	Light brown	N	6.4	1.46	

Notes:

Aquatic Feature Water Quality Data

Sample Collection Date: *4/15/2010* **Collected By:** *JTT* **Analysis by:** *CEH*
Equipment Used: **Analysis Date:** *4/21/10*
pH Meter: Sension 1 w/Thermo semi-micro probe
Turbdity Meter: LaMotte 2020e Turbidimeter

pH Calibration (•): 4:__• __ 7:__• __ 10.1:__• __ .
Turbidimeter blank (Y/N):___*Yes* **__.**

AF	Sample Color	Opaque Y/N	pH	NTU	Comment
66 A	Lt. Yellow/Brown	Y	6.87	252	Approaching translucent
66 B	Lt. Brown	Y	6.00	1190	
67Meadow	Lt. yellow/clear	N	6.35	16.1	
67Ex1	Med. Brown	Y	6.12	250	
67Ex2	Med. Brown	Y	6.38	225	More transclucent that 67Ex1,3,4
67Ex3	Med. Brown	Y	6.32	313	
67Ex4	Med. Brown	Y	6.30	300	
68 AB	Med/Dk Brown	Y	5.99	272	
68 C	Med/Dk Brown	Y	6.27	278	
69	Lt. Brown	Y	6.46	511	Creamy light brown
10-1	Lt. Yellow hint	N	6.29	2.26	Transparent, yellow/green
09-1	Fain Yellow	N	6.36	69.0	Transparent
09-1B	Lt. Yellow/Green	N	6.36	165	Transparent/translucent
09-2	Lt. Yellow/Brown	N	6.07	181	Translucent

Notes:
Data entered electronically by CEH on 4/21/10

APPENDIX D

Photolog

Photo 1. Staff gauge installation in aquatic feature AF67-EX2 on March 4, 2010.

Photo 2. Staff gauge in aquatic feature AF66-B on March 4, 2010.

Photo 3. Aquatic feature AF66-B on March 4, 2010.

Photo 4. Staff gauge installation in aquatic feature AF67-EX4 on March 4, 2010.

Photo 5. Aquatic feature AF67-Meadow on March 4, 2010.

Photo 6. Staff gauge in aquatic feature AF67-EX1 on March 4, 2010.

Photo 7. Aquatic features AF68-C (center) and AF68-AB (upper right) on March 4, 2010.

Photo 8. Aquatic feature AF09-2 on March 4, 2010.

Photo 9. Aquatic feature AF09-1B on March 4, 2010.

Photo 10. Aquatic feature AF09-1 on March 4, 2010 (near and far side of concrete rubble).

Photo 11. Seining in aquatic feature AF67-EX2 on March 17, 2010.

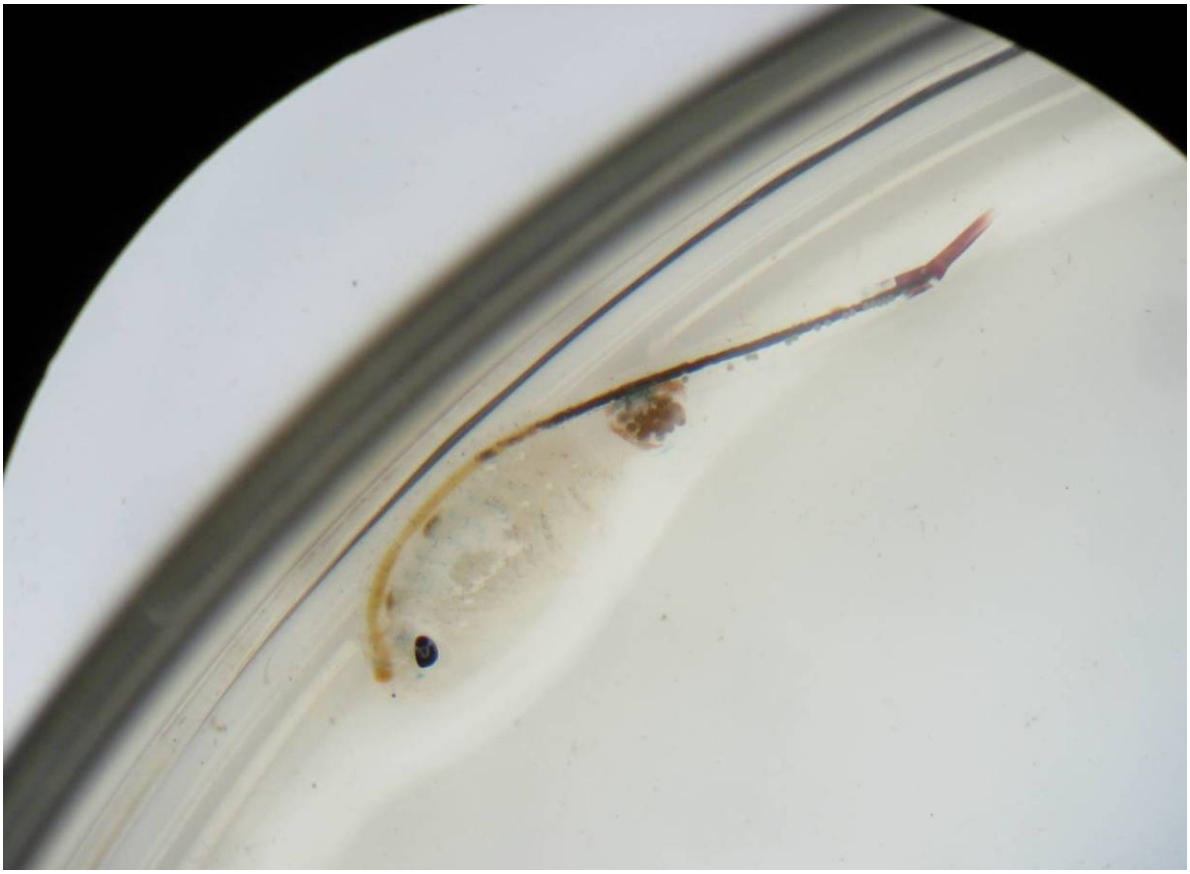

Photo 12. California fairy shrimp (*linderiella occidentalis*) in petri dish collected from aquatic feature AF67-EX1, April 15, 2010.

Photo 13. Aquatic sampling in aquatic feature AF10-1, May 11, 2010.

Photo 14. Seining in aquatic feature AF69, May 11, 2010.

Photo 15. Monitoring aquatic feature AF67-EX4 on May 10, 2010.

Photo 16. Dip netting in aquatic feature AF66-A on May 10, 2010.