

# FORA ESCA REMEDIATION PROGRAM

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## 2008 Annual Natural Resource Monitoring, Mitigation, and Management Report

County North, CSUMB Off-Campus, Future East Garrison,  
Interim Action Ranges, Parker Flats Phase II, and Seaside  
Munitions Response Areas

Former Fort Ord  
Monterey County, California

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## ACRONYMS AND ABBREVIATIONS

AOC	Administrative Order on Consent
Army	U.S. Department of the Army
BLM	Bureau of Land Management
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
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
ESL	Explosives Storage Location
FFA	Federal Facility Agreement
FORA	Fort Ord Reuse Authority
FOSET	Finding of Suitability for Early Transfer
GIS	Geographic Information System
HMP	Habitat Management Plan
km	kilometers
LFR	LFR Inc.
m	meter
MEC	munitions and explosives of concern
MRA	Munitions Response Area
MRS	Munitions Response Site
msl	mean sea level
NRMA	Natural Resources Management Area
OE	ordnance and explosives
QB	Qualified Biologist

RQA	Residential Quality Assurance
RWQCB	Regional Water Quality Control Board
SCA	Special Case Area
SEDR	Summary of Existing Data Report
SQB	Senior Qualified Biologist
SSWP	Site-Specific Work Plan
TCRA	Time-Critical Removal Action
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
UXO	unexploded ordnance

## GLOSSARY

### 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. Vegetation clearance is performed for the purpose of providing accessibility to the local ground surface for munitions and explosives of concern (MEC) clearance activities.

## 1.0 INTRODUCTION

### 1.1 Purpose and Scope

This first 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 January 1 through December 31, 2008. Most of the requirements addressed herein are described in relevant Biological Opinions (BOs) issued by U.S. Fish and Wildlife Service (USFWS) and the Habitat Management Plan (HMP; USACE 1997; see Section 2).

The ESCA RP Team implemented these requirements in coordination with the U.S. Department of the Army (Army) as the ESCA RP remediation activities for munitions and explosives of concern (MEC) proceeded at the former Fort Ord.

### 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 LFR Inc. (LFR), 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 FORA ESCA RP.

### 1.3 Site Location and Description

During 2008, ESCA habitat monitoring, mitigation, and management activities associated with natural resources requirements included fieldwork that was performed in the County North, California State University Monterey Bay (CSUMB) Off-Campus, Future East Garrison, Interim Action Ranges, Parker Flats Phase II, and Seaside Munitions Response Areas (MRAs; Figure 1).

#### 1.3.1 County North MRA

The County North MRA (previously known as 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 (Figure 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 a 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 boundary" or "borderland interface." A number of management requirements are associated with a band within both development parcels where they adjoin the interface. These requirements are referred to as the "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. Past field activities have noted the presence of poison oak in the area.

### 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 (Figure 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 habitat reserve parcels. 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 boundary” or “borderland interface.” A number of management requirements are associated with a band within the development parcel that adjoins the interface. These requirements are referred to as the “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. Poison oak (*Toxicodendron diversilobum*) is present in the area.

### 1.3.3 Future East Garrison

The Future East Garrison MRA (formerly known as the East Garrison MRA) is located in the northeastern portion of the former Fort Ord (Figure 4), 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 boundary” or “borderland interface.” A number of management requirements are associated with a band within the development parcel that adjoins the interface. These requirements are referred to as the “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 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. Past field activities have noted the presence of poison oak in various areas of the MRA.

### 1.3.4 Interim Action Ranges MRA

The Interim Action Ranges MRA is located in the north-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 (Figure 5). The Interim Action Ranges MRA is contained within the jurisdictional boundaries of the City of Seaside and Monterey County. 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 the development parcel abuts the habitat reserve parcel in the north portion of the Interim Action Ranges MRA is referred to as the “borderland boundary” or “borderland interface.” A number of management requirements are associated with a band within the development parcel that adjoins the interface. These requirements are referred to as the “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, the majority of vegetation was under 4 feet tall and much less dense than it was prior to 2003. Patches of annual grassland habitats existed in 2008 along the western and southern boundaries of the MRA. There were areas within the MRA where poison oak occurred in dense stands.

### 1.3.5 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 (Figure 6). 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 habitat reserve parcels in the middle of the Phase II portion of the Parker Flats MRA is referred to as the “borderland boundary” or “borderland interface.” A number of management requirements are associated with a band within the development parcel that adjoins the interface. These requirements are referred to as the “borderland boundary condition.”

ESCA RP fieldwork in the Parker Flats MRA is primarily associated with the Phase II area where additional MEC clearance 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 removal 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.

### 1.3.6 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 (Figure 7). 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 reuse 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. The MRS-15SEA.1–4 nomenclature will be used in this document to refer to the four MRSs within the Seaside MRA. This MRA does not include habitat reserve parcels. The eastern edge of the Seaside MRA abuts the Natural Resource Management Area (NRMA) and this boundary is referred to as the “NRMA interface” or “borderland boundary.” Development parcels such as those comprising the Seaside MRA that abut the NRMA interface have a number of management requirements associated with a band within the parcels adjoining the interface. These requirements are 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. Surface 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). Poison oak was known to be prevalent in most areas of the MRA. 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 clearance. Additional vegetation clearance occurred in support of the Non-Time-Critical Removal Action. Vegetation present in the Residential Quality Assurance (RQA) pilot study area was subjected to total vegetation clearance in 2008.

## 1.4 Overview of ESCA Program Activities

This section includes an overview of the ESCA RP activities performed in 2008. Table 1 presents an overview of acreages affected by field activities conducted by the ESCA RP Team in 2008.

### 1.4.1 County North MRA

Only minor fieldwork (installing sign posts) was conducted in the County North MRA. No MEC clearance or related activities were conducted.

### 1.4.2 CSUMB Off-Campus MRA

In response to regulatory agency concerns, a Residential Quality Assurance (RQA) pilot study was designed to provide quality assurance information related to MEC clearance in residential parcels by conducting a pilot test in portions of certain areas of the CSUMB Off-Campus MRA designated for residential use. To implement this study, the affected portions of the parcels are first subjected to total aboveground removal of vegetation (including removal of all trees) in order to allow a clear ground surface to increase the capabilities of MEC clearance instruments. The second step, following initial pass with MEC clearance instrumentation, is to remove the upper 6 to 12 inches of soil in specific portions of the RQA

pilot study area footprints (a minimum of 25 percent of the area), including all root structures present within that soil level. Pursuant to this pilot study, the first step of the RQA pilot study (i.e., total aboveground removal of vegetation) began in the CSUMB Off-Campus MRA in late 2008. The vegetation removal was still ongoing at the end of the year in the CSUMB Off-Campus MRA. Approximately 5 acres of residential use parcel in the CSUMB Off-Campus MRA were affected by this activity by the end of the year (Table 1).

#### 1.4.3 Future East Garrison MRA

Limited weed abatement work was conducted in the Future East Garrison MRA. See Section 4.6 for details.

#### 1.4.4 Interim Action Ranges MRA

Vegetation monitoring was conducted in the Interim Action Ranges MRA, as part of the assumption of monitoring efforts by the ESCA RP Team within its parcels (see Section 5). Prior to 2008, baseline monitoring had been conducted in 2000 and subsequent monitoring was conducted in 2003, 2004, and 2005. No vegetation clearance, MEC clearance, or related activities were conducted in the Interim Action Ranges MRA by the ESCA RP Team.

#### 1.4.5 Parker Flats MRA

In the Parker Flats MRA, site preparation activities for surface removal within the habitat areas began in October and continued to the end of the year. Preparatory work involved surveying boundaries and performing manual and mechanical vegetation clearance. Instrument-aided surface MEC clearance within the habitat area was initiated in December and continued to the end of the year (Figure 8).

#### 1.4.6 Seaside MRA

From 1997 to 2004, the Army performed sampling and removal investigations on the Seaside MRSs (MRS-15SEA.1–4). These actions were completed on the Seaside MRA in 2004, with the exception of several areas that were scattered throughout the Seaside MRA. The areas in which the actions were not completed are referred to by the Army as Special Case Areas (SCAs; Figure 9). Together, the total area covered by the SCAs was approximately 35 acres. SCAs were identified by the Army for a variety of reasons, such as dense metallic clutter that prevented the use of or interfered with digital detection instruments or interference due to nearby metal structures or features. SCAs included historical and current fencing; asphalt/concrete range pads, roads, and walkways; areas under existing structures (i.e., field latrines and range-related structures); berms and culverts; and areas requiring excavation by heavy equipment (i.e., scrape areas).

Prior to beginning field operations, the ESCA RP Team prepared the Phase II Removal Action Site-Specific Work Plan (SSWP) Addendum, which separated the SCAs into types as originally defined by the Army. The SSWP Addendum described each type of SCA in detail

and proposed investigation approaches for each SCA type. Subsurface MEC investigation and removal in the SCAs began in December 2007 and concluded in September 2008 (Figure 2). Additionally, total aboveground vegetation removal (including trees) was conducted on all of the 18.6 acres of the Seaside MRA RQA pilot study area. This work was completed in December 2008 in preparation for MEC clearance activities scheduled to begin early in 2009 (Figure 9).

In response to regulatory agency concerns, an RQA pilot study was designed to provide quality assurance information related to MEC clearance in residential parcels by conducting a pilot test in portions of certain areas of the Seaside MRA designated for residential use. To implement this study, the affected portions of the parcels are first subjected to total aboveground removal of vegetation (including removal of all trees) in order to allow a clear ground surface to increase the capabilities of MEC clearance instruments. The second step, following initial pass with MEC clearance instrumentation, is to remove the upper 6 to 12 inches of soil in specific portions of the RQA pilot study area footprints (a minimum of 25 percent of the area), including all root structures present within that soil level. Pursuant to this pilot study, the first step of the RQA pilot study (i.e., total aboveground removal of vegetation) began in the Seaside MRA in late 2008 and was completed at the end of the year. Approximately 18 acres of residential use parcel in the Seaside MRA were affected by this activity by the end of the year (Table 1).

## 2.0 NATURAL RESOURCE MONITORING AND MITIGATION MEASURES

Primary requirements for natural resource monitoring and mitigation associated with the ESCA RP are described in the HMP (USACE 1997; see Section 2.1) and BOs issued by the USFWS (see Section 2.2).

### 2.1 Habitat Management Plan

Most of the natural resource monitoring and mitigation requirements associated with the ESCA RP are described in HMP Chapter 3, "Ordnance and Explosives Removal." Details of vegetation monitoring procedures are presented in Sections 2.1.1 and 2.1.2 of this report.

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 selective 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. One proposed method of disposal of MEC was in situ detonation, which would increase the amount of soil disturbed. Subsurface investigation and clearance activities were planned for areas where historical record reviews and interviews

indicate the possible presence of buried ammunition or in impact areas where MEC may have penetrated the ground surface. Removal of subsurface MEC involves a greater amount of excavation and was anticipated to occasionally exceed depths of 10 feet and surface areas of tens of feet (USACE 1997).

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 tenuiflora* ssp. *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 the disturbance associated with burning and cutting may have benefits to sand gilia and Monterey spineflower because of their adaptations to a fire- and disturbance-prone habitat.

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* ssp. *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 to bring the disturbed areas back to a naturally regenerating maritime chaparral 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). Details on the monitoring protocols used to evaluate these criteria are presented in Sections 2.1.1 and 2.1.2.

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; W. Collins of the Army personal communication to P. Lebednik of LFR 2008). 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 were planned to be evaluated on a case-by-case basis.

Species of concern in the HMP 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. 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.

The County North MRA is designated for residential and nonresidential development, habitat reserve, and habitat corridor. The CSUMB Off-Campus MRA is designated for nonresidential development with a small portion for residential development. The Interim Action Ranges MRA is designated for habitat reserve and a small portion for nonresidential development. The Parker Flats MRA is designated for residential and nonresidential development, and a portion for habitat reserve. The Seaside MRA is designated for residential and nonresidential development. Detailed maps of these MRAs, including the various parcel numbers of each

portion of each MRA, can be found in the Summary of Existing Data Report (SEDR; ESCA RP Team 2008).

### 2.1.1 1995 Monitoring Protocol

Prior to 2006, vegetation monitoring of habitat reserve parcels that were disturbed as a result of cleanup activities at the former Fort Ord was conducted in accordance with the “Protocol for Conducting Vegetation Sampling at Fort Ord in Compliance with the Installation-Wide Multispecies Habitat Management Plan” prepared by Jones & Stokes Associates, Inc. (Jones & Stokes 1995). The protocol described requirements for a baseline vegetation survey to be conducted prior to MEC clearance work in the parcel and follow-up monitoring to be conducted every year thereafter for a period of five years. This protocol was employed in the vegetation surveys that were conducted in the Interim Action Ranges MRA prior to the 2008 survey described in this report.

### 2.1.2 2006 Draft Monitoring Protocol

In 2006, the “Draft Protocol for Conducting Vegetation Monitoring in Compliance with the Installation-Wide Multispecies Habitat Management Plan at Former Fort Ord” (“the 2006 Protocol”; Burleson 2006) was issued. This document updated and superceded the 1995 protocol issued by Jones & Stokes. The 2008 vegetation monitoring efforts described in this report were conducted in habitat reserve parcels of the Interim Action Ranges and Parker Flats Phase II MRAs in accordance with the then-current draft of the 2006 protocol (with some exceptions, see below), per the request of the Fort Ord Army Base Realignment and Closure (BRAC) office.

As with the 1995 protocol, the 2006 Protocol described a requirement to perform a pre-disturbance (i.e., “baseline”) survey. In contrast to the 1995 protocol, the 2006 Protocol indicates that post-disturbance (i.e., “recovery”) surveys are to be performed two, five, eight, and 13 years after disturbance activity is completed in each MRA. 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 two years after the baseline survey.

Vegetation monitoring methods include:

- 1) chaparral vegetation surveys comprised of line-intercept and quadrat sampling along transects and
- 2) focused surveys for certain herbaceous plant species targeting their respective suitable habitats.

The chaparral vegetation surveys may be conducted at any time in the growing season and are intended to document recovery of the chaparral community after MEC removal activities. The focused surveys generally are conducted during the flowering period (April through September, depending on the species) and are intended to document both spatial extent and population changes of the species after MEC removal activities.

In the 2008 ESCA RP monitoring effort performed in the Interim Action Ranges and Parker Flats Phase II MRAs, some details of sampling procedures described in the 2006 Protocol were modified at the direction of Mr. William Collins, Wildlife Biologist of the Fort Ord Army BRAC Office. Additional minor modifications of the protocol were needed to efficiently implement the monitoring objectives. For example, in 2008 the ESCA RP surveys for Monterey spineflower and sand gilia in the Parker Flats MRA Phase II habitat area included a 100 percent survey of trail corridors and other areas of potentially suitable habitat for these species, as opposed to designing the survey using 100-foot by 100-foot grid blocks. Where such modifications were needed based on ESCA RP staff evaluations, they were submitted to the Army for approval.

## 2.2 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 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 ssp. 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 10).

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 11), but that critical habitat for Contra Costa goldfields does not occur within any ESCA RP MRAs.

## 2.3 Qualified Biologists

In the 2005 BO, Term and Condition 6(a) (p. 63) stipulates that biologists may be authorized for incidental take of CTS under the BO if their credentials are submitted to USFWS for review and approval at least 30 days prior to the onset of activities that may require handling

of CTS. Information submitted to USFWS for approval of biologists for incidental take of CTS must include the following:

- 1) Organization and roles of QB personnel
- 2) Summary of education and professional background
- 3) Summary of CTS training
- 4) Resumes

On December 10, 2007, all of the then-proposed QBs attended an eight-hour workshop on CTS conducted by Dr. Peter C. Trenham, Lecturer and Research Associate, Section of Evolution and Ecology, University of California at Davis. This workshop was arranged specifically for this project to provide CTS training relevant to the QBs' responsibilities for implementing the BO requirements.

Dr. Trenham conducted his Ph.D. research on CTS and is a recognized expert on this species. He was highly recommended to conduct this workshop by Professor Brad Shaffer of University of California at Davis, who is considered the premier expert on CTS biology and conservation.

The workshop included one-half day of classroom lecture and discussion as well as one-half day visit to the Jepson Prairie Reserve in Solano County, a major site of CTS research. During the classroom instruction, live animals of CTS and a non-native species were observed and handled by the attendees. During the field visit, which occurred shortly after a rainfall event, CTS-inhabited burrows were examined and newly-laid eggs were observed. An outline of the curriculum for this training, an attendance record, and the curriculum vitae of Dr. Trenham were attached to the request for approval submitted to USFWS on December 12, 2007.

In addition to the training described above, the QBs received, prior to initiation of fieldwork, a one to two hour office training session by Dr. Phil Lebednik of LFR on CTS requirements described in the BO, including specific discussions of conservation measures. This training session took place in early January 2008.

USFWS granted approval to perform rescue handling of CTS to LFR Biologists John Grattan, Pablo Martos, Mitch Siemens, and Phil Lebednik on February 8, 2008 in a letter attached to this report as Appendix A. Mr. Siemens was approved for wetland survey work under the BO.

## 2.4 Field Manual

A Field Manual for natural resource monitoring in support of the ESCA RP is currently being prepared primarily for use by the QBs approved by the USFWS. The purpose of this Field Manual is to provide a comprehensive informational resource to the QBs. It is intended that the Field Manual will address aspects of natural resource monitoring and mitigation to be implemented during the project, including conservation measures described in relevant

USFWS BOs and the relevant portions of the HMP. This Field Manual is designed to be an evolving document to be updated as needed. The QBs performing fieldwork should thereafter retain copies of the most recent version in their possession throughout the ESCA RP field activity period.

### 3.0 SUMMARY OF ESCA RP MEC CLEARANCE ACTIVITIES

The MEC investigation and clearance activities in the Phase II area of the Parker Flats MRA and the Seaside MRA are being conducted by the ESCA RP Team to fill data gaps in order 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 remediation alternative as part of a remedial investigation/feasibility study pursuant to CERCLA.

#### 3.1 Parker Flats MRA

In the Parker Flats MRA, approximately 70 acres of vegetation cutting was completed in the habitat reserve area of Phase II using manual and mechanical methods (i.e., mowers to cut grass and brush, chainsaws to limb up trees). MEC clearance started in the habitat reserve area on December 18, 2008, and less than an acre had been investigated by the end of the year.

None of the ESCA parcels in the Parker Flats MRA received regulatory site closure.

#### 3.2 Seaside MRA

In the Seaside MRA, vegetation clearance was completed in advance of the MEC clearance on 35 acres of SCAs using hand tools, mowers, and chainsaws and on approximately 67 more acres within the new roadway alignment for General Jim Moore Boulevard using mowers and heavy equipment to remove the roots. In addition, approximately 17 acres of vegetation within the Seaside MRA RQA pilot study area (i.e., residential use parcel) was clear cut using heavy equipment and a root rake (a mechanical device used to remove the brush and roots).

None of the ESCA parcels in the Seaside MRA received regulatory site closure.

### 4.0 SUMMARY OF MONITORING AND MITIGATION MEASURES

This section summarizes the habitat monitoring, management, and mitigation activities performed by the ESCA RP Team during 2008.

Although the ESCA RP was initiated in the spring of 2007, substantial natural resource monitoring and management field activities did not begin before 2008 and, therefore, an Annual Habitat Monitoring, Mitigation, and Management Report was not prepared for 2007. However, several field-related activities were conducted toward the end of 2007 including:

- Field training regarding CTS ecology and biology of LFR staff to be proposed to USFWS for approval as Qualified Biologists;
- Site visit to the Seaside MRA sifting plant and demolition locations to identify possible erosion issues and propose mitigation measures, as appropriate;
- Site visit to assist in staking asphalt areas designated for removal in the Seaside MRA by unexploded ordnance (UXO) staff to identify extent of area to be disturbed and assess previously disturbed areas; and
- Rescue of an arboreal salamander and rattlesnake in the Seaside MRA.

Whenever feasible, the ESCA RP Team implemented additional mitigation measures beyond those required in the HMP and BOs. Typically, these measures were implemented for situations: 1) that did not meet threshold criteria but which could have resulted in permitted take, and 2) when field crews were available to implement the measures at little additional cost (e.g., silt fencing of pits within CTS habitat remaining after latrine removal that could have trapped CTS but were below the threshold for requirements associated with “open excavations”).

## 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, the ESCA RP Team has documented such evaluations via a series of technical memoranda developed by the Senior Qualified Biologist (SQB). These Qualified Biologist Memoranda (“QB Memos”) prepared for activities in 2008 are summarized in this section and the QB memos are included in Appendix B.

### 4.1.1 Seaside MRA

Three QB Memos were prepared for the Seaside MRA. The first of these was written in December 2007, and established impact minimization measures for the vehicle barrier installation along the Seaside MRA borderland boundary. The second established impact minimization measures for the Explosives Demolition Area, and was finalized on January 10, 2008. The third was written later that same month and addressed the installation and inspection of silt fences around small excavations as an additional (i.e., not required) CTS mitigation measure within the 2-kilometer (km) buffer.

### 4.1.2 Parker Flats MRA

Two QB Memos were developed for the Parker Flats MRA in 2008. One memo was finalized on September 9, 2008, regarding preliminary site activity coordination. This memo was written in part to provide additional (i.e., not required) mitigation of impacts of subsurface MEC clearance in areas known to support Monterey spineflower populations. In late 2008, a second QB Memo was drafted. Even though this memo was finalized in early 2009, it is included in this report as it was partially implemented in 2008. The second QB Memo

addressed restoration requirements for CTS within the 0.5-km radius buffer zone within the Parker Flats MRA.

#### 4.1.3 CSUMB Off-Campus MRA

In late 2008, three QB Memos were drafted for the CSUMB Off-Campus MRA. Even though these memos were finalized in early January 2009, they are included in this report as they were partially implemented in 2008. These memos addressed signage installation to inform the public of operations in the MRA, the stockpiling of soils in an area within the 2-km radius CTS buffer zone, and potential for Monterey spineflower to occur in the stockpile area.

#### 4.1.4 County North MRA

In late 2008, one QB Memo was drafted for the County North MRA. Even though this memo was finalized in early January 2009, it is included in this report as it was partially implemented in 2008. The QB Memo addressed the installation of signage to inform the public of operations in the MRA.

### 4.2 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. The most notable of these is that silt fencing was installed around latrine-related excavations in the Seaside MRA in which CTS could have been trapped. This was an additional (i.e., not required) mitigation measure as the excavation size was below the threshold for the requirement. 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, which enabled the QBs to notify the supervisors of any additional mitigation measures. Field personnel were requested to notify a QB if trapped CTS were encountered in any open pit. They were also instructed to cover the pit to prevent desiccation of the animal and to call the SQB immediately. No such encounters occurred in 2008.

On December 28, 2007, a salamander was discovered at a building demolition site in a debris pile. This individual was confirmed by an on-site QB (Mitch Siemens) to be an arboreal salamander, not a CTS. Also found in a debris pile on this date was a rattlesnake (see Section 4.3). The salamander was captured and moved away from the work site in a plastic case partially filled with moistened soil to a safe location outside the work area.

Safe containment and transport of amphibians (including CTS) for rescue and relocation included procurement of a small plastic case modified to function as a temporary habitat. Use of the habitat minimizes handling. Numerous small perforations in the lid allow air exchange while sphagnum moss, moistened with drinking water during use but kept dry while in storage, provides a humid environment and prevents desiccation. CTS are held in the habitat for the minimum period needed to transport them to a safe location. No CTS were encountered during 2008 so the habitat was used only for the salamander described above.

### 4.3 Other Wildlife

Several other encounters with wildlife were recorded by ESCA RP Team in 2008, including gopher snakes, lizards, horned toads, and a rosy boa. Most of these encounters were rescue and release events, and they are recorded in the Animal Rescue Reports maintained by the site safety officer.

As mentioned above in Section 4.2, field staff have also encountered rattlesnakes. 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. Modifications to the cooler included attaching a rope to the lid so it could be opened from a safe distance and installing a wood-covered metal floor to weigh it down enough that it could be opened or closed using the snake tongs without tipping or allowing the metal to possibly injure the snake.

### 4.4 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 established roads and paths, limiting vegetation clearance to the extent required to conduct MEC clearance, and limiting soil disturbance. As discussed in detail in Sections 5 and 6, vegetation monitoring for sensitive species and shrub habitat were conducted in the habitat reserve areas of the Interim Action Ranges and Parker Flats Phase II MRAs in spring and summer 2008.

### 4.5 Erosion Control

During the Seaside MRA investigation and clearance activities, vegetation removal and soil scraping were minimized to the extent feasible to preserve the vegetation. For example, vegetation removal but no scraping of the hillside west of General Jim Moore Boulevard was conducted so as to minimize the potential for soil erosion in that area. Clearing and grubbing and scraping/excavation activities were conducted such that soil erosion across the Natural Resources Management Area (NRMA) interface was minimized, such as grading of steeply sloped areas to minimize off-site surface runoff and construction of berms and swales downgradient from disturbed soil areas.

The sifting plant and stockpile staging area were located on the eastern side of Seaside MRS-15.SEA.1, near the NRMA interface. To prevent erosion from the stockpiles area, silt fencing was installed downgradient from the stockpile locations a minimum of 50 feet from the NRMA interface. The silt fencing was maintained until the stockpiles were moved to the roadway area for future use during roadway construction activities.

No soil disturbing activities occurred in 2008 in the Parker Flats MRA Phase II (only brush cutting/mowing and tree limbing and instrument-aided visual surface MEC remediation activities).



Within the CSUMB Off-Campus MRA, no soil disturbing activities occurred in 2008 that may have caused erosion across a borderland interface. The closest borderland interface with a habitat reserve area is located on the County North MRA, which is approximately 2,000 feet to the northwest of the CSUMB Off-Campus MRA.

To date, no soil disturbance activities have been conducted in the Interim Action Ranges or County North MRAs.

#### 4.6 Weed Abatement

Weed abatement activities in 2008 were predominately focused on the French broom on ESCA parcels. This effort was conducted by the Bureau of Land Management (BLM) on behalf of the ESCA RP Team and covered areas of the ESCA parcels where BLM had removed French broom in the past. Manual removal activities were conducted as well as a limited amount of spraying. The field effort was also spent removing seed heads. As reported by BLM, one plant was observed that had disbursed its seeds, but otherwise most seeds remained on the plants.

In the Explosives Storage Location (ESL) of the Future East Garrison MRA (Figure 1), a few small plants of pampas grass were sprayed in June.

Additional weed abatement activities performed in 2008 were not required for the ESCA RP but were voluntarily conducted by BLM. Two non-native perennial grasses were previously known to exist in the ESL: harding grass and tall fescue. During a field effort in June 2008, BLM detected one plant of harding grass and did not find any tall fescue plants. The harding grass was sprayed as it could not be manually removed without digging into the ground.

### 5.0 VEGETATION MONITORING IN THE INTERIM ACTION RANGES MRA HABITAT RESERVE AREA

Vegetation monitoring was conducted in the Interim Action Ranges MRA in 2008. Baseline and periodic annual monitoring through 2005 had previously been conducted in this MRA as part of an earlier program of work carried out under the Army. In 2008, the ESCA RP Team assumed responsibility for continuing this ongoing vegetation monitoring effort.

#### 5.1 Summary of Results

Monitoring prior to 2008 involved the Ranges 43-48 MRS, of which only a portion is the Interim Action Ranges MRA. References in this section to the results of the pre-2008 surveys are limited to information or data relevant to the Interim Action Ranges MRA.

The report on the vegetation monitoring in the Interim Action Ranges MRA is included in Appendix C. Surveys for Monterey spineflower and sand gilia were conducted in the Interim Action Ranges MRA from April 28 through May 14, 2008. The survey period was chosen to coincide with the 2008 bloom period for both species. General observations in the former

Fort Ord lands by biologists with historical knowledge of these populations indicated that 2008 populations were small and individuals were diminutive in 2008, and it was thought that this may have been caused in part by a sub-optimal wet season.

Sampling was conducted in a randomly selected 5 percent subsample of the 100-foot square grid cells monitored in the Final 2005 Annual Biological Monitoring Report, Ranges 43-48 (Parsons 2005; “the 2005 survey”). A map of the Interim Action Ranges MRA with the sampled grid cells is shown on Figure 3 of Appendix C.

The survey for seaside bird’s-beak was performed during the peak bloom period for the species in this year from July 28 through July 30, 2008. Sampling was conducted in 22 of the 93 grid cells where the species was reported in the 2005 survey. A map of the Interim Action Ranges MRA with the sampled grid cells is shown on Figure 3 of Appendix C.

The shrub transect survey included 31 transects that were sampled from July 30 through August 7, 2008. As with the sensitive annual species, this survey is a continuation of work performed previously in the larger area of which the Interim Action Ranges MRA is a portion.

## 5.2 Findings

HMP annual species Monterey spineflower, sand gilia, and seaside bird’s-beak exhibited frequency of occurrence and population increases during the 2000 to 2008 period. While sand gilia (and likely Monterey spineflower) peaked in frequency and abundance in 2005, seaside bird’s-beak reached peak frequency and abundance in 2008. Sand gilia and likely Monterey spineflower populations exhibited substantial decreases from their peaks between 2005 and 2008 (a 2005 population estimate was not available for Monterey spineflower; the likelihood of decrease for this species is based on anecdotal information). These decreases appear to be correlated with the substantially sub-optimal wet season conditions in 2008, although the concomitant seral progression of the plant communities (see below) may also have contributed to this decline. On the other hand, the populations of both species were more than twice as large in 2008 (when wet season parameters appear to have been less suitable) than those in 2000 (when wet season parameters appear to have been more suitable). Overall, the results possibly indicate that wet season conditions and community seral stage have substantial influence on the populations of sand gilia and Monterey spineflower, but there is no obvious correlation between these factors and seaside bird’s-beak populations during the period.

The most obvious disturbance in the Interim Action Ranges MRA during the period was the burn event that occurred in 2003. This disturbance, although of anthropogenic origin, is essentially identical to natural burn events that commonly occur in chaparral communities. The burn event substantially disturbed shrub communities by removing most aboveground vegetation, resulting in a successional “reset” of the entire Interim Action Ranges MRA to initial seral stage. Five years after the burn, the 2008 communities had progressed in seral development. This is evident in that some of the 2000 dominant shrub species were also dominant in 2008, and most of the 2000 dominant species were present in 2008. An important

metric of seral age for this community, shrub stature, is not included in the monitoring protocol, but the 2000 survey report indicated that 20-foot tall shrubs characterized as mature-seral were present in portions of the Interim Action Ranges MRA. The fact that shrubs of such stature were not observed in 2008 lends support to the conclusion that the 2008 vegetation in the Interim Action Ranges MRA resulted from a natural seral progression to an early-intermediate seral stage. There was no evidence of major interference by invasive exotic species (i.e., appearance as dominants on transects) in the natural successional process.

After the 2000 survey, the Army carried out MEC removal from the Interim Action Ranges MRA, an anthropogenic disturbance. The absence of detailed descriptions of these activities in previous monitoring reports precludes a detailed evaluation of their effects on HMP annuals or shrub communities. However, the fact that the three HMP annual species populations increased after these disturbances and that the shrub communities appear to be experiencing a normal successional trajectory following the 2003 burn supports the finding that removal disturbance did not have a lasting negative effect on HMP annuals or shrub communities in the Interim Action Ranges MRA.

## 6.0 VEGETATION MONITORING IN THE PARKER FLATS MRA PHASE II HABITAT RESERVE AREA

The 2008 monitoring effort in the Parker Flats MRA Phase II comprised the baseline survey in anticipation of vegetation and MEC clearance activities beginning in late 2008. The full report on the vegetation monitoring in the Parker Flats MRA Phase II habitat reserve area is included in Appendix D.

### 6.1 Summary of Results

The Parker Flats MRA Phase II survey for sand gilia and Monterey spineflower was performed from May 15 through 23, 2008. Areas of potentially suitable habitat were surveyed, as well as a representative sample of marginal, or potentially adequate, habitat areas. Because of doubts regarding sand gilia's presence in the MRA, as well as the lateness in the flowering period of the species (flowering condition is essential for field identification), field staff confirmed daily that sand gilia was still in flower at a known high-density area in the Interim Action Ranges MRA before beginning work in the Parker Flats MRA Phase II.

The Parker Flats MRA Phase II survey for seaside bird's-beak was performed on August 8, 2008. Because this species is larger than sand gilia and Monterey spineflower, occurs in similar types of habitat, and is easily visible, this survey was completed in a single day. Areas of potentially suitable habitat were surveyed, as well as a representative sample of marginal, or potentially adequate, habitat areas.

The shrub transect survey was conducted from August 12 through 14, 2008. Because this was a baseline study, the transect locations at the Parker Flats MRA Phase II had to be established prior to data collection, and the same transects will be occupied in future years. The

biological monitoring program required this survey to be located where vegetation would later be disturbed by mowing, brush cutting, limb-up of trees, etc., to facilitate munitions investigation and clearance actions, in the non-oak woodlands of the MRA, in an area of maritime chaparral habitat on the eastern end of the habitat reserve parcel (the top of parcel E19a.4), and in a small patch at the base of the western portion (E19a.2; see Figure 3 of Appendix D).

## 6.2 Findings

The 2008 Parker Flats MRA Phase II vegetation survey provides the “baseline” condition, which will be compared with post-clearance habitat monitoring survey results.

Ten populations of Monterey spineflower occupying a small portion of the survey area were detected. No populations of sand gilia or seaside bird’s-beak were detected. Because the 2008 wet season was considered to have been sub-optimal, it is possible that Monterey spineflower populations may be larger and sand gilia may occur in the area in future years when more optimal wet seasons occur.

Two shrub community types were identified and sampled: coastal sage scrub and maritime chaparral. The maritime chaparral community in the survey area was relatively dense and mature, indicating late seral stage. The coastal sage scrub association may represent either a stable ecotone or an intermediate seral stage between the maritime chaparral and coastal coast live oak woodland communities. Herbaceous plant associations were absent or minor in abundance in the sampled shrub communities.

## 7.0 REFERENCES

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