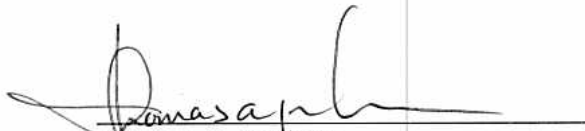


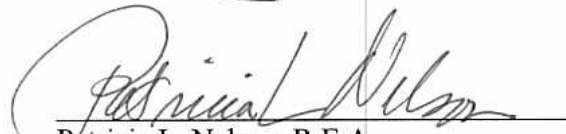
**2004 Annual Monitoring Report  
Biological Baseline Studies and  
Follow-up Monitoring  
Former Fort Ord  
Monterey, California**

Prepared for

**U.S. Department of the Army**  
Sacramento District Corps of Engineers  
1325 J Street  
Sacramento, California 95814-2922

MACTEC Project No. 4087040804.13

  
Thomas A. Graham  
Staff Environmental Scientist

  
Patricia L. Nelson, R.E.A.  
Principal Environmental Scientist

April 5, 2005



Engineering and Consulting, Inc.  
5341 Old Redwood Highway, Suite 300  
Petaluma, CA. 94954 (707) 793-3800

2004 Annual Monitoring Report  
Biological Baseline Studies and Follow-up Monitoring  
Former Fort Ord  
Monterey, California

MACTEC Project No. 4087040804.13

This document was prepared by MACTEC Engineering & Consulting, Inc. (MACTEC) at the direction of the U.S. Army Corps of Engineers (USACE) for the sole use of the USACE and the U.S. Department of the Army (Army), the only intended beneficiaries of this work. No other party should rely on the information contained herein without the prior written consent of MACTEC, USACE, and the Army. This report and the interpretations, conclusions, and recommendations contained within are based, in part, on information presented in other documents that are cited in the text and listed in the references. Therefore, this report is subject to the limitations and qualifications presented in the referenced documents.

# CONTENTS

1.0	INTRODUCTION .....	1
1.1	Habitats and Species Considered for Habitat Monitoring .....	1
1.2	Critical Habitat for HMP Species .....	2
1.3	Baseline and Follow-up Monitoring Surveys .....	2
1.3.1	Previous Baseline Monitoring Surveys.....	3
1.3.2	Previous Follow-up Monitoring Surveys.....	3
1.4	2004 Surveys.....	3
1.4.1	HMP Annual Species Surveys .....	4
1.4.2	Waterbody Monitoring .....	4
1.4.3	Vernal Pool Buffer Zones .....	4
1.5	Future Baseline Studies and Monitoring Activities .....	5
2.0	METHODS .....	6
2.1	HMP Annual Species Surveys .....	6
2.1.1	Monterey Spineflower, Sand Gilia, Seaside Bird's-Beak Surveys .....	6
2.1.2	UC/NRS-FONR.....	7
2.2	Waterbody Monitoring .....	7
2.2.1	Waterbody Vegetation Sampling.....	7
2.2.2	Waterbody Fauna.....	7
2.2.3	Waterbody Physical and Hydrologic Characteristics.....	9
3.0	RESULTS .....	10
3.1	HMP Annual Species Surveys .....	10
3.1.1	MEC Sites .....	10
3.1.2	UC/NRS FONR Groundwater Remediation Sites .....	11
3.2	Waterbody Monitoring .....	11
3.2.1	Waterbody Vegetation Sampling.....	11
3.2.2	Fauna.....	12
3.2.3	Physical and Hydrological Characteristics .....	13
4.0	DISCUSSION .....	14
4.1	HMP Annual Species Surveys .....	14
4.1.1	Prescribed Burn Area.....	14
4.1.2	UC/NRS FONR .....	15
4.2	Waterbody Monitoring .....	16
4.3	Anticipated Future Monitoring .....	17
5.0	REFERENCES .....	18

## TABLES

- 1 Special Status Species Found at the Former Fort Ord
- 2 Habitat Monitoring Sites 1994-2004
- 3 Summary of Wetland Survey Dates
- 4 Summary of Wetland Monitoring Transects
- 5 Flora Observed During Wetland Monitoring
- 6 Percent Vegetative Cover by Species in Seasonal Wetland Habitat – Waterbody 54
- 7 Special-Status Vertebrate Species Observed
- 8 Observed Vertebrate Fauna at Wetland Monitoring Sites
- 9 Summary of California Linderiella Monitoring Results
- 10 Summary of Physical Parameters of Wetland Monitoring Sites

## FIGURES

- 1 Representative Photographs of Prescribed Burn (Range 43)
- 2 Representative Photographs of Prescribed Burn (Range 48)
- 3 Representative Photograph at Wetland Monitoring Sites - Waterbody 54
- 4 Representative Photograph at Wetland Monitoring Sites - Waterbody 54
- 5 Percent Vegetative Cover by Species Quadrat Sampling in Seasonal Wetland Habitat - Waterbody 54

## PLATES

- 1 Locations of Habitat Monitoring Activities - 1994-2003
- 2 Locations of Habitat Monitoring Activities - 2004
- 3 Monterey Spineflower Population Density
- 4 Sand Gilia Population Density - Prescribed Burn Area
- 5 Sand Gilia Population Density - Impact Area Burn
- 6 Seaside Bird's Beak Population Density
- 7 Historical Sampling of HMP Annual Species Populations - UC/NRS-FONR
- 8 Wetland Monitoring - Waterbody 54

## APPENDIX

### A WATERSHED ANALYSIS OF VERNAL POOLS

## DISTRIBUTION

## 1.0 INTRODUCTION

This report was prepared to address the United States Department of the Army (Army) and United States Fish and Wildlife Service (USFWS) biological resources monitoring requirements, as identified in the *Installation-Wide Multispecies Habitat Management Plan for Former Fort Ord, California* (HMP; USACE, 1997a) and the Biological and Conference Opinions (BO/BC) issued by the USFWS, for sites where removal of Munitions and Explosives of Concern (MEC) or lead and chemical remediation have taken place. The HMP identifies flora species, fauna species, and habitats of concern within the Former Fort Ord and specifies mitigation measures to monitor the regeneration of these species and habitats following base closure and reuse activities. Base closure and reuse activities conducted at the Former Fort Ord are required to follow specific protocols approved by the USFWS, as detailed in the BO/BC on the Closure and Reuse of Fort Ord, Monterey County, California (USFWS, 1997).

In 1998, formal consultation with USFWS was reinitiated based on a memorandum (Willison, 1998) to address issues not identified in the HMP and BO/BC (USFWS, 1997). The issues identified in the memorandum were 1) the impacts of groundwater remediation at the University of California Natural Reserve System (UC/NRS) Fort Ord Natural Reserve (FONR) to two HMP species, sand gilia (*Gilia tenuiflora arenaria*) and Monterey spineflower (*Chorizanthe pungens pungens*), and 2) the effects of MEC removal activities to the federally-Endangered Contra Costa goldfields (*Lasthenia conjugens*). Contra Costa goldfields had not been identified as occurring at the Former Fort Ord until 1997.

At the request of the Army, MACTEC Engineering and Consulting, Inc. (MACTEC; formerly Harding Lawson and Associates [HLA]) identified the potential effects groundwater remediation activates at the UC/NRS FONR and developed HMP species-specific guidelines and general mitigation measures (HLA, 1998) to be used at UN/NRS FONR. Species-specific guidelines and general mitigation measures to be used at UC/NRS FONR and for Contra Costa goldfields are identified in the subsequent BO/BC on the Closure and Reuse of Fort Ord, Monterey County, California (USFWS, 1999).

### 1.1 Habitats and Species Considered for Habitat Monitoring

Two HMP habitats of concern, central maritime chaparral and vernal pool (waterbody), occur in areas where MEC removal and/or other remediation occurs. The listing status for federal, state, and California Native Plant Society (CNSP) for these species that occur in these habitats are presented in Table 1. These habitats possess many of the special-status plants and animals identified in the HMP, as summarized below.

Central maritime chaparral HMP species associated with MEC removal and other remediation projects include: Hooker's manzanita (*Arctostaphylos hookeri hookeri*), Toro manzanita (*Arctostaphylos montereyensis*), sandmat manzanita (*Arctostaphylos pumila*), Monterey ceanothus (*Ceanothus cuneatus rigidus*), Monterey spineflower, Seaside bird's-beak (*Cordylanthus rigidus littoralis*), Eastwood's goldenbush (*Ericameria fasciculata*), coast wallflower (*Erysimum ammophilum*), sand gilia, Contra Costa goldfields, and California black legless lizard (*Anniella pulchra nigra*).

Waterbody HMP species associated with MEC removal and remediation projects include: California tiger salamander (CTS [*Ambystoma californiense*]), California red-legged frog (CRLF [*Rana aurora draytonii*]), and California linderiella (*Linderiella occidentalis*). Additional species of concern that are associated with wetland habitats and have the potential to occur at the Former Fort Ord were identified in the Wetland Restoration Plan for Unexploded Ordnance Removal Activities at Former Fort Ord (USACE, 1997b) and include tricolored blackbird (*Agelaius tricolor*) and southwestern pond turtle (*Emys [Clemmys] marmorata pallida*).

The listing of two HMP wildlife species, California linderiella and CTS, has changed since the inception of the HMP. In 1994, the USFWS determined that the California linderiella did not qualify for listing under the Federal Endangered Species Act (59:48136). The CTS remains classified as a state Species of Special Concern. In 2004, the federal listing status of CTS changed from a federal Candidate Species to federally-Threatened (69:149 47212).

## 1.2 Critical Habitat for HMP Species

The USFWS has designated or proposed portions of the Former Fort Ord as critical habitat for the following four HMP species since the implementation of the HMP and related BO/BCs: Monterey spineflower, Contra Costa goldfields, Western snowy plover, and CTS. Critical habitats for a listed species require protection and special management considerations for the conservation and recovery of the species. Brief descriptions of critical habitat for these species are provided below.

### Monterey Spineflower

Approximately 9,870 acres of the Former Fort Ord is designated as critical habitat for the Monterey spineflower. Habitat and map boundaries of the area designated as critical habitat for this species are described under Unit H of the Designation of Critical Habitat for *Chorizanthe pungens* var. *pungens* (Monterey spineflower); Final Rule (67:37498).

### Contra Costa Goldfields

Approximately 6,878 acres of the Former Fort Ord has is designated as critical habitat for Contra Costa goldfields. Habitat and map boundaries of area designated as critical habitat for this species are described under Unit 9 of the Final Designation of Critical Habitat for Four Vernal Pool Crustaceans and Eleven Plants in California and Southern Oregon; Final Rule (68:46648).

### Western Snowy Plover

Approximately 10 acres of the Former Fort Ord has been proposed as critical habitat for the Western snowy plover. Habitat and map boundaries of the area proposed as critical habitat for this species are described under Unit CA 12.C of the Proposed Designation of Critical Habitat for the Western snowy plover; Proposed Rule (69:75607). Monitoring for Western snowy plover is conducted by the U.S. National Park Service and is not included in this report. This information is provided for reference only.

### California Tiger Salamander

Approximately 8,200 acres of the Former Fort Ord has been proposed as critical habitat for the CTS. Habitat and map boundaries of the area proposed has critical habitat for this species are described under Unit 2 of the Proposed Designation of Critical Habitat for the CTS; Proposed Rule (69:58570).

## 1.3 Baseline and Follow-up Monitoring Surveys

Since the inception of the MEC removal program, the Army has elected to augment the monitoring program, where feasible, to include the collection of baseline data prior to MEC removal. The baseline surveys are conducted to characterize the composition of these habitats to establish an information database identifying current biological resources. Follow-up monitoring is required for five years following MEC removal or lead and chemical remediation and for three years following groundwater investigation/remediation (USFWS, 1999).

### 1.3.1 Previous Baseline Monitoring Surveys

Over the last 10 years, baseline surveys have been conducted at sites where MEC removal and remediation activities were anticipated. These sites are located in areas proposed to become habitat reserves that contain either central maritime chaparral known to support, or potentially support, species of concern identified in the HMP. Baseline surveys have been conducted at the following sites:

- In 1994 at OE-10A, OE-10B (HMP annuals<sup>1</sup>), OE-11 (HMP annuals), OE-12 (HMP annuals), OE-19, and Blackline;
- In 1996 at OE-10B (Chaparral<sup>2</sup>), OE-11 (Chaparral), and OE-16 (Chaparral);
- In 1997 for OE-10A (HMP annuals) and MRA West (Chaparral);
- In 1998 at OE-19, OE-16 (HMP annual), OE-48 (Chaparral), and OE-53 (Chaparral)
- In 1999 at MRA North (Chaparral);
- In 2000 at OE-9 (Chaparral), Ranges 18, 19, 21, 24, 25, 26 MRA North (HMP annual), MRA West (HMP annual), and Prescribed Burn Area (Ranges 43-48);
- In 2001 at OE-9 (HMP annual); and
- In 2003 at Range 30A.

### 1.3.2 Previous Follow-up Monitoring Surveys

Follow-up monitoring for HMP species in central maritime chaparral is required for a period of five years upon completions of MEC removal and other activities at the Former Fort Ord. Follow-up monitoring surveys have been discontinued or completed at the following sites:

- In 1996 at OE-12 (discontinued); and
- In 2002 at OE-10A, OE-10B, OE-11, and OE-19 (completed).

The locations of baseline and follow-up monitoring surveys conducted through 2003 appear on Plate 1.

## 1.4 2004 Surveys

This section summarizes the vegetative and waterbody surveys conducted in 2004. Baseline and Follow-up Monitoring surveys conducted in 2004 at the Former Fort Ord included:

- Baseline waterbody monitoring at Waterbody 54;
- Follow-up monitoring for HMP annual species at the Prescribed Burn Area (Ranges 43-48); and
- Follow-up monitoring for HMP annual plant species in two areas at the groundwater remediation site UC/NRS FONR.

The histories of monitoring and analysis activities conducted at the sites identified above are summarized in Table 2. Plate 2 shows the locations of monitoring activities conducted in 2004.

<sup>1</sup> “HMP Annuals” refers to annual species of concern identified in the HMP.

<sup>2</sup> “Chaparral” refers to shrub species of concern identified in the HMP.

#### 1.4.1 HMP Annual Species Surveys

Prescribed burns have been identified as the preferred vegetation clearance method prior to the start of MEC removal activities. The prescribed burn for Ranges 43-48 was conducted in Fall 2003. This prescribed burn eradicated approximately 500 acres central maritime chaparral and grassland habitats. The prescribed burn crossed the fire line and resulted in the consumption of an additional 1,000 acres or so of central maritime chaparral, grassland, and coast live oak woodland habitats.

In April and May 2004, MACTEC conducted the first year of follow-up monitoring surveys in the prescribed burn area (Ranges 43-48) for the population size and location of three HMP annual species: Monterey spineflower, sand gilia, and seaside bird's-beak. Parson's conducted surveys for sand gilia in portions of burnt habitat located outside of the Prescribed Burn Area (Ranges 43-38).

Specimens of sand gilia were collected in the Former Fort Ord, and Monterey area as part of the 2004 *Gilia tenuiflora* Collection Project on Former Fort Ord. The purpose of this collection was to clarify the taxonomy and range of morphological variations of *Gilia tenuiflora arenaria* as it occurs on Former Fort Ord and the surrounding area of Monterey Bay, Monterey County, California. These sand gilia collections were collected under the California Department of Fish and Game (CDFG) Permit (Research Permit No. 04-08-RP) and USFWS Recovery Permit (Subpermit No. FWSVFWO-13) on file at the USFWS office in Ventura, California. Collected samples of *Gilia tenuiflora arenaria* were sent to the Ranch Santa Ana Botanic Garden for analysis.

In April 2004, follow-up monitoring surveys were completed at two sites (Areas 6 and 9) that were identified in the 2003 Annual Monitoring Report (MACTEC, 2003) as requiring monitoring in 2004. Further monitoring of Area 6 was required to document a noticeable decrease in the population of Monterey spineflower in comparison to the larger total number of this species observed in the baseline survey. Further monitoring in Area 9 was required to fulfill HMP guidelines that require three years of follow-up monitoring surveys for areas where groundwater was investigated or remediated.

#### 1.4.2 Waterbody Monitoring

Baseline data for at Waterbody 54 were collected to enable the characterization of wetland vegetation; the potential occurrence of waterbody associated HMP special-status species; the physical characteristics of the waterbody; and the parameters of each seasonal waterbody. Surveys were conducted according to protocol identified in the HMP and follow-up monitoring requirements identified in the Wetland Restoration Plan for Unexploded Ordnance Removal Activities at Former Fort Ord (WRP; USACE, 1997c).

#### 1.4.3 Vernal Pool Buffer Zones

Vernal pool habitat is a requirement for two HMP species with designated and proposed critical habitat on the Former Fort Ord; namely Contra Costa goldfields and CTS. The USFWS has identified two primary constituent elements (habitat features) considered essential to the conservation of Contra Costa goldfields:

- 1) Vernal pools, swales, moist flats, ephemeral wetlands, and depressions of appropriate sizes and depths, including adjacent upland margins of these depressions that sustain Contra Costa goldfields' germination, growth, and reproduction; and
- 2) Associated watershed(s) and hydrologic features that contribute to the filling and drying of the vernal pool or ephemeral wetland. Other features to conserve include the maintenance of



suitable pool inundation periods; water quality; and soil moisture for Contra Costa goldfields germination, growth, reproduction, and dispersal.

Based upon these criteria, vernal pools identified in previous studies and their associated watersheds at the Former Fort Ord were reviewed to define the leading edge of a vernal pool and its associated watershed for all vernal pools in Contra Costa goldfields critical habitat. The watershed of a vernal pool was defined as the Contra Costa goldfields buffer zone for that vernal pool because impacts in the watershed could influence constituent elements considered essential for Contra Costa goldfields. The result and methodology used for the watershed analysis is contained in Appendix A.

In addition to the Contra Costa goldfields buffer zone, two CTS buffer zones, 1 kilometer and 2 kilometers have been established around each vernal pool based on established travel limits of CTS from vernal pools (68:13497).

## 1.5 Future Baseline Studies and Monitoring Activities

The MEC removal activities have not yet been completed in the Prescribed Burn Area (Ranges 43-48). Follow-up monitoring of HMP annuals and shrub species found in central maritime chaparral habitat is expected to occur at the Prescribed Burn Area (Ranges 43-48) in 2005, providing the growth of central maritime chaparral seedlings has begun.

MEC removal or remediation activities at sites identified in Section 1.3.1 have not been initiated. Therefore, follow-up monitoring or evaluation is not required at these sites. Lead remediation activities are based upon guidelines developed by the U.S. Environmental Protection Agency (USEPA). Soil containing high levels of lead will require excavation. The size of plots requiring soil removal has not been determined. In areas with small plots to be remediated (less than 100 square feet), baseline vegetation surveys will consist of identifying the percentage of cover provided by individual species. In areas where larger remediation (greater than 100 square feet) are expected, baseline vegetation surveys will consist of establishing 50-meter transects. The number of transects established in these plots will be based upon the size and diversity of habitat that occur therein.

## 2.0 METHODS

Methods used to collect data during the 2004 monitoring year are described in Protocol for Conducting Vegetation Sampling at Fort Ord in Compliance with the Installation-Wide Multispecies Habitat Management Plan (HMP Sampling Protocol) (USACE, 1995a). Reports from previous monitoring years (USACE, 1994, 1995b, 1996a, 1996b, 1997b, 1998, 1999, 2000, 2001, 2002, 2003) and the WRP (USACE, 1997a) were reviewed and, in turn, the survey methods were implemented to maintain consistency in sampling.

The survey methods used were designed for HMP annuals and wetland habitats. Central maritime chaparral surveys are characterized in terms of flora species composition and dominance; the location and extent of HMP species; and the location and extent of special-status animals observed at remediation sites. Survey methods for HMP annual monitoring require a visual survey in suitable habitat to map the distribution of HMP annual species. Wetland habitats, such as vernal pools and ponds (collectively termed “waterbodies”) are surveyed to characterize percent vegetative cover and the potential occurrence of special-status fauna. Environmental parameters such as surface area, water depth, pH, and turbidity are also recorded monthly during the rainy season within the water bodies. As data amasses for HMP species and mitigation at these sites, the methods used to minimize adverse effects on those species identified in the HMP may be refined.

### 2.1 HMP Annual Species Surveys

Monterey spineflower, sand gilia, and Seaside bird’s-beak are found in sandy openings of central maritime chaparral, coastal scrub, and grassland habitat. Monterey spineflower and sand gilia annual species have often been observed on disturbed soil sites such as sandy roads, road crossings, and firebreaks. Seaside bird’s-beak has also been observed at in openings and along the edges of coast live oak woodlands. Monterey spineflower and sand gilia are annual herbs that bloom in spring from April through June. Seaside bird’s-beak is an annual herb that blooms from late spring (May) through early autumn (October). Visual HMP annual surveys were conducted at monitoring sites to verify the continued presence of previously recorded locations of HMP annuals and/or to identify new locations.

#### 2.1.1 Monterey Spineflower, Sand Gilia, Seaside Bird’s-Beak Surveys

Prior to conducting visual surveys for HMP annual species, aerial photographs or maps showing previously recorded locations are reviewed to identify suitable or potential habitat. The HMP annual surveys are conducted by inspecting areas of known or potential habitat by walking species-specific habitats at approximately 25-foot intervals. The locations and population of observed HMP annual species are recorded using a Global Positioning System (GPS) datalogger.

Estimates for the number of individuals in low-density populations of HMP annuals are based upon direct counts. At locations supporting relatively large numbers or high densities of HMP annuals, estimates of HMP annuals are based upon direct counts of representative sample areas. These sample counts are then used to estimate the number of HMP annuals individuals throughout a given location. Results of Monterey spineflower surveys indicate density of Monterey spineflower populations. Estimates for the population of Monterey spineflower are categorized as follows:

- Low density populations contain between 1 – 100 individuals per acre;
- Medium density populations host between 101 – 1,000 individuals per acre; and

- High density populations constitute more than 1,001 individuals per acre.

### 2.1.2 UC/NRS-FONR

Population estimates for sand gilia on the UC/NRS FONR site are obtained by direct visual count surveys. Estimates for Monterey spineflower at low and medium density populations are obtained by direct counts. Estimates for high-density populations are obtained by sub-sampling and calculating population based upon the area measured. Surveys were conducted at existing groundwater monitoring well sites and along approved access routes. Areas supporting sand gilia and Monterey spineflower are identified, flagged, and delineated using a GPS datalogger.

## 2.2 Waterbody Monitoring

The WRP (*USACE, 1997c*) specifies that the level of effort for monitoring be based on the degree of disturbance that occurred during MEC removal. Methods used to collect baseline and monitoring data for special-status fauna, physical parameters and wetland vegetation were developed in accordance with guidelines specified in the HMP and WRP, and are described in the sections below.

### 2.2.1 Waterbody Vegetation Sampling

Waterbody vegetation sampling is conducted using a modified quadrant-transect method designed for central maritime chaparral surveys (*USACE, 1995a*). This modified version of the sampling protocol employs different interval sizes among quadrats and is described in the HMP. The original protocols were developed for vegetation sampling in chaparral habitat where the vegetation tended to be monotypic. The quadrat transects for waterbody habitat monitoring are placed every ten feet to capture abrupt vegetation changes, such as intermittent patches of bare ground and open water. The number of transects established at waterbody sites are based upon the size and variability of habitat.

According to the WRP (*USACE, 1997c*), the waterbody monitoring periods adhere to the assumption that performance functions of a waterbody will be successfully achieved within five years following the completion of disturbance (MEC removal and/or soil remediation) activities. At least three monitoring events are required within that five-year period. The requirement for any additional follow-up monitoring is typically based on these results of these surveys.

### 2.2.2 Waterbody Fauna

Faunal monitoring consists of conducting visual surveys to document the presence or absence of wildlife species identified in the HMP, or other potentially occurring special-status species as identified in the WRP; the HMP and WRP species include California linderiella, CTS, CRLF, tricolored blackbird, and southwestern pond turtle. In addition, vertebrate species observed during fauna surveys are recorded in field logs.

#### **California linderiella (*Linderiella occidentalis*)**

To assess the presence or absence of California linderiella and other vernal pool branchiopod species, a dip net is used to sample representative portions of the water bodies on the site. Vernal pool branchiopod species detected are identified to genus with the aid of a field-magnifying lens. Samples are collected from each waterbody until habitat is represented. The abundance of vernal pool branchiopods is estimated by collecting 10 and 20 samples from each waterbody (depending on the size and complexity of each waterbody). The number of vernal pool branchiopods in each sample is totaled and the relative abundance defined as follows:

- Low abundance: 1 to 10 vernal pool branchiopods;
- Moderate abundance: 11 to 100 vernal pool branchiopods;
- High abundance: 101 to 300 vernal pool branchiopods; and
- Very high abundance: more than 300 vernal pool branchiopods.

Although California linderiella is neither state nor federally listed, surveys continue to monitor the health of this wetland species subsequent to cleanup activities.

### **California tiger salamander (*Ambystoma californiense*)**

The CTS is a federally-threatened species, are commonly associated with grasslands in rolling terrain or foothills that contain suitable underground retreats, such as burrows of the California ground squirrel (*Spermophilus beecheyi*) and Botta's pocket gopher (*Thomomys bottae*). However, CTS have been found in areas with no apparent underground retreats. In these areas, CTS may utilize cracks in the ground or may burrow into loose soil, or seek refuge in and under rotting logs or fallen branches. In captivity, CTS sometimes burrow into loose substrate, such as decomposed oak leaves. The CTS typically use vernal pools or other small, temporary waters that fill during winter rains and are dry by mid-summer as breeding ponds. CTS can utilize artificial impoundments (farm ponds), even permanent ones, if they do not contain fish or bullfrogs (*Rana catesbeiana*).

To assess the presence or absence of CTS, representative portions of each waterbody at the site are sampled using a dip-net and examined for the presence of CTS larvae. Dip-net samples are collected from each water body at the site until habitat is adequately represented. In addition to the dip net surveys for larvae, upland habitat is surveyed for the presence of adult CTS. Upland surveys consist of walking transects from the edge of the water body into upland habitat and looking underneath downed tree branches and rocks; in burrow entrances; and within soil fissures under tree canopies where suitable upland refugia exist (6813497). These observations are then recorded.

### **California red-legged frog (*Rana aurora draytonii*)**

The CRLF, a federally-threatened species, can be encountered in and around freshwater within permanent to semi-permanent water bodies, such as springs creeks, and naturally or artificially created ponds containing thick emergent vegetation such as bullrush (*Scirpus* spp.) or cattails (*Typha* spp.) or both. The CRLF requires fresh water of at least two feet in depth with suitable emergent vegetation to provide escape cover from predators, allow for thermo-regulation during summer months, and allow for metamorphosis of the young. The CRLF may move up to one mile away from their resident drainages at the onset of the first winter rains and have been known to move away from creeks and into riparian woodlands and adjacent grasslands.

To assess the presence or absence of CRLF, representative portions of each waterbody at the site are sampled using a dipnet, and samples examined for presence of CRLF tadpoles. Samples are collected systematically from each waterbody at the site until the habitat was adequately represented. In addition to the dipnet surveys for tadpoles, the perimeter of each waterbody is visually assessed for the presence or absence of adult CRLF and the observations are recorded. In addition, habitat features are noted, such as duration of ponding, the presence of submergent and emergent vegetation, and the presence of adequate upland estivation habitat.

### **Tricolored blackbird (*Agelaius tricolor*)**

The tricolored blackbird (TCBB), listed by the state as a Species of Special Concern, is commonly found throughout the Central Valley and in coastal districts from Sonoma County and southward. The TCBB is typically found near fresh water, preferably in emergent wetland with tall, dense cattails or tules, but also in thickets of willow, blackberry, wild rose, and tall herbs. The TCBB is a summer resident in northeastern California and feed primarily on seeds in grassland and cropland habitats. Dense breeding colonies of up to 500 TCBBs are vulnerable to massive nest destruction by mammalian and avian predators, including Swainson's hawks and other buteos. Walking surveys are conducted to determine the presence or absence of TCBBs by searching for the bird; listening for its presence; locating its nesting materials. Observations of its presence or absence are then recorded.

### **Southwestern pond turtle (*Emys [Clemmys] marmorata*)**

The southwestern pond turtle (SWPT), listed by the state as a Species of Special Concern, originally inhabited many of the Pacific drainage basins in California (Stebbins, 2003). Primary habits for SWPT include permanent water sources such as ponds, streams, and rivers. The SWPT is often seen basking on logs, mud banks, or mats of vegetation, although wild populations are wary and individuals will often plunge for cover after detecting movement from a considerable distance. Although it is an aquatic species, it can move across land in response to fluctuating water levels, an apparent adaptation to the variable rainfall and unpredictable flows that occur in many coastal California drainage basins (Rathbun, et al. 1992). In addition, the SWPT can over-winter on land and water or remain active in the winter, depending on environmental conditions (Jennings and Hayes, 1994). Walking surveys are conducted to determine the presence or absence of SWPTs by searching for physical evidence of the species and recording observations.

## 2.2.3 Waterbody Physical and Hydrologic Characteristics

Generally, waterbodies require hydrologic monitoring where MEC removal activities have resulted in excavations greater than four feet in depth or those containing soil conditions other than a thick deep clay horizon. Hydrological monitoring assesses waterbody functions and values, including variables such as pH, maximum water depth, duration of ponding, and surface area. The physical characteristics of water bodies are also recorded to identify factors that could potentially affect the continuing presence or absence of special-status species fauna. Waterbodies requiring hydrological monitoring are defined in Table 3 of the WRP.

Measurements of pH and turbidity are collected during each monitoring event at the waterbodies prior to other survey activities that could affect data accuracy (e.g., gathering depth measurements, vegetation sampling, and/or dipnetting). A portable pH field meter and turbidity FTU meter is calibrated prior to each field monitoring visit. Measurements are taken no sooner than 24-hours after a storm event, as required by protocol specified in the WRP.

Maximum water depth is measured during each monitoring event by locating the center or deepest portion of the waterbody. This depth is measured by placing a staff gauge into the deepest portion of the waterbody and, in turn, recording the depth on field forms. The area of ponding at water bodies is calculated using a GPS datalogger to measure the perimeter of the ponded area.

## 3.0 RESULTS

This section presents survey data collected during 2004 monitoring activities. The results are presented according to the types of monitoring conducted: HMP annual species and waterbody.

### 3.1 HMP Annual Species Surveys

MACTEC conducted focused visual surveys for three HMP annual species in the Prescribed Burn Area (Ranges 43-48) and the UC/NRS-FONR. The following sections summarize results of HMP annual species monitoring at these locations.

#### 3.1.1 MEC Sites

The first year of follow-up monitoring for HMP annual species surveys was conducted in 2004 at the Prescribed Burn Area (Ranges 43-48). Results for 2004 are detailed below.

**Prescribed Burn Area:** The Prescribed Burn Area (Ranges 43-48) is approximately 480 acres in size. High-density populations of Monterey spineflower were observed on 28.70 acres of the Prescribed Burn Area (Ranges 43-48). Medium density populations of this species occupied 224.09 acres and low-density populations of Monterey spineflower occupied 228.75 acres of the Prescribed Burn Area (Ranges 43-48). Plate 3 illustrates the population densities of Monterey spineflower found in the Prescribed Burn Area.

A total of 66,328 individuals of sand gilia on 207.30 acres were observed in the Prescribed Burn Area (Ranges 43-48). The breakdown of sand gilia observed in the Prescribed Burn Area (Ranges 43-48) is as follows:

- 1 - 50 individuals – 147.15 acres;
- 51 - 100 individuals – 23.42 acres; and
- More than 500 individuals – 3.67 acres.

Fourteen specimens of *Gilia tenuiflora* ssp. *arenaria* and/or ssp. *tenuiflora* were collected from the Prescribed Burn Area (Ranges 43-48) as part of an effort to clarify the taxonomy and range of morphological variation of *Gilia tenuiflora arenaria*. When this report was written, the results of the collected specimens were not available. Plate 4 illustrates the population densities of sand gilia found in the Prescribed Burn Area (Ranges 43 to 48) and where sand gilia specimens were collected.

Approximately 1,000 extra acres of this habitat burned as an unintended result of the prescribed burn crossing the fire line. A Parson's biologist, Shirley Tudor, performed sand gilia surveys in portions of burnt central maritime chaparral habitat outside of the Prescribed Burn Area. Surveys for sand gilia conducted by Parson's were located outside of the Prescribed Burn Area (Ranges 43 to 48) centered around Range 18. The Parson's biologist observed 266 sand gilia. Plate 5 illustrates the location of sand gilia found outside of the Prescribed Burn Area (Ranges 43 to 38).

A total of 3,317 individuals of Seaside bird's-beak on Plate 6 illustrates the population densities of Seaside bird's-beak found in the Prescribed Burn Area.

Figures 1 and 2 represent site photographs of the Prescribed Burn Area (Ranges 43-48) during HMP annual surveys.

### 3.1.2 UC/NRS FONR Groundwater Remediation Sites

MACTEC conducted follow-up surveys at two sites (Area 6 and Area 9) identified in the 2003 Annual Report (*MACTEC, 2003*) as requiring further monitoring. Plate 7 illustrates the locations and extent of Monterey spineflower and sand gilia along these two access roads. Follow-up monitoring surveys were not conducted at the remaining ground water monitoring well sites and along their respective access roads because three years of follow-up monitoring surveys have been conducted at the UC/NRS FONR.

#### **Area 6**

Approximately 817 individuals of Monterey spineflower were observed in Area 6. The population of Monterey spineflower comprised six small populations and three medium (more than 100 individuals) populations in Area 6. The largest population (approximately 368 individuals) was observed in and around a well site.

Approximately 125 individuals of sand gilia were observed in Area 6. The sand gilia population was comprised of seven small populations (fewer than 100 individuals) in Area 6. Two larger populations (53 and 36 individuals) were observed at a well site and access road found at the start of Area 6.

#### **Area 9**

Approximately 1,458 individuals of Monterey spineflower were observed in Area 9. The population of Monterey spineflower is comprised of three small populations and three medium populations in Area 9. The largest population (approximately 984 individuals) was observed at the start of the access road in Area 9.

Approximately 138 individuals of sand gilia were observed in Area 9. The sand gilia population was comprised of five small populations in Area 9. Sand gilia was observed in small, randomly scattered populations along the access route in Area 9.

### 3.2 Waterbody Monitoring

A summary of waterbody survey dates and the type of survey conducted at Waterbody 54 is presented in Table 3. Photographs were taken to record the vegetative condition at Waterbody 54 throughout the survey period and are contained in Figures 3 and 4. Results of the waterbody monitoring are discussed below.

#### 3.2.1 Waterbody Vegetation Sampling

Two survey transects were established at Waterbody 54 based upon the limited size and habitat variability at the project site. The number, location, and length of each selected transect provides a representative sampling of the transitional and emergent habitats at each waterbody. Transect lengths, number of quadrats and total area sampled on each transect are summarized in Table 4. Transect lengths ranged from 50 to 53 feet. Transect start and endpoint locations were mapped using a GPS datalogger during baseline studies.

Vegetative monitoring surveys were conducted at Waterbody 54 in May 2004. This sampling characterized wetland-influenced vegetation and associated transitional herbaceous species. Sampling was conducted along each transect by placing a 0.25-meter square quadrat at the starting point. In turn, sampling was repeated at each succeeding 10-foot interval while alternating from right to left. Plant species present within each quadrat were identified, percent cover was estimated for each species, and

compositional data were recorded. Plant species observed during 2004 wetland monitoring surveys and their Wetland Indicator Status are listed in Table 5.

### **Vegetative Species Composition at Waterbody 54**

Species composition and estimated percent cover at Waterbody 54 are presented in Table 6 and Figure 5. Plate 7 illustrates the transect locations surveyed at Waterbody 54 in 2003. Twelve plant species were observed at Waterbody 54. Rat-tail fescue (*Vulpia m. myuros*) at 47.50 percent and yerba buena (*Satureja douglasii*) at 10.42 percent were the dominant plant species, comprising 57.92 percent of the combined average plant cover at this waterbody. Agoseris (*Agoseris* spp.), small quaking grass (*Briza minor*), soft chess (*Bromus hordeaceus*), bugle-hedge nettle (*Stachys ajugoides*), and clover (*Trifolium* spp.) were present between 7.92 and 2.92 percent of the combined average cover. Most other plant species were two percent or less of the combined average percent cover.

Approximately 15.80 percent of the species encountered during this monitoring period are wetland dependent, including small quaking grass at 7.92 percent, bugle hedge nettle at 6.67 percent, grass poly (*Lythrum hyssopifolia*) at 0.83 percent, and coast erylngo (*Eryngium armatum*) at 0.42 percent.

Approximately 69.17 percent of the species encountered at Waterbody 54 were exotic, rat-tail fescue at 47.50 percent, small quaking grass, at 7.92 percent, soft chess at 7.50 percent, cheeseweed (*Malva parviflora*) at 2.08 percent, Carolina geranium (*Geranium carolinianum*) at 1.67 percent, campion (*Silene gallica*) at 1.67 percent, and grass poly at 0.83 percent. Of the 12 species observed during sampling, seven are native species.

### 3.2.2 Fauna

Wildlife monitoring was conducted at Waterbody 54 from January through May 2004. California linderiella were not observed during wetland monitoring at Waterbody 54. Special-status vertebrate species listed as threatened or endangered were not observed at these sites during the 2004 surveys. Table 7 represents the list of special-status vertebrate species observed at wetland monitoring sites in 2004. Table 8 represents the list of vertebrate fauna observed during 2004 wetland monitoring surveys.

### **California linderiella**

Surveys for California linderiella and other potentially present vernal pool brachiopods were conducted monthly from January through March at Waterbody 54. California linderiella were not observed at Waterbody 54 during the January through March monitoring visits. No vernal pool brachiopods surveys were conducted at Waterbody 54 from April and May due to the absence of standing water. Table 9 presents a summary of California linderiella data collected each month at Waterbody 54.

### **California tiger salamander**

Surveys to determine the presence of CTS at Waterbody 54 were conducted by searching for evidence of this species on a monthly basis from January through March. No individuals in any age class were detected nor were eggs or larvae observed. Surveys for CTS at Waterbody 54 were limited to upland surveys in April and May due to the absence of standing water at this site. CTS were not observed at Waterbody 54 during 2004 monitoring events.

### **California red-legged frog**

Surveys to determine the presence of CRLF at Waterbody 54 were conducted by searching for evidence of this species on a monthly basis from January through March. No individuals in any age class were



detected nor were eggs or larvae observed. Dip net surveys for CRLF at Waterbody 54 were not conducted in April through May due to the absence of standing water at this site during this period of time. CRLF was not observed at Waterbody 54 during 2004 monitoring events.

### **Southwestern pond turtle**

Surveys to determine the presence of SWPT at Waterbody 54 were conducted by searching for evidence of this species on a monthly basis from January through May. Evidence of this species' potential presence – basking sights, for example – was not present at Waterbody 54. In addition, no individuals in any age class were detected.

### **Tricolored blackbird**

Surveys to determine the presence of TCBB at Waterbody 54 were conducted by searching for evidence of this species on a monthly basis from January through May. Individuals were neither seen nor were their vocalizations heard. In addition, no nests of this species were found.

## 3.2.3 Physical and Hydrological Characteristics

Physical data were collected at Waterbody 54 to characterize the functions and values of these waterbodies. Although it was not specified in the WRP, physical characteristics were collected at Waterbody 54 to assess its functions and values. Collected data included pH, maximum water depth, duration of ponding, and surface area. Disturbance to the wetland habitat during data collection was minimized by limiting survey data collection in each waterbody to the minimum necessary to satisfy dipnet sampling procedures and to obtain physical characteristics.

The physical parameters measured monthly in Waterbody 54 during the 2004 Wetland Monitoring activities include water depth, area of ponding, and pH level. A summary of physical parameters at Waterbody 54 is presented in Table 10.

Ponding of water in January and March at Waterbody 54 was limited to three small ponds totaling 0.03 acres or less. In February, one 1.37-acre pond was observed at Waterbody 54. The maximum water depth (nine inches) at Waterbody 54 was recorded in February. Turbidity measurements at Waterbody 54 were 120 Formazine Turbidity Unit (FTU) in January, and 143 FTU in February. In March, ponded water at two of three ponds was too cloudy to obtain a turbidity reading. At the third small pond, the turbidity measurement was 246 FTU. Turbidity and pH measurements were not taken in April and May due to the absence of water.

## 4.0 DISCUSSION

The HMP habitats of concern within MEC removal or lead, chemical, and groundwater remediation sites on the Former Fort Ord, include central maritime chaparral and wetland habitats. These habitats possess many of the special-status plants and animals identified in the HMP in which the success criteria for habitats of concern and special-status species are defined. The success criterion at groundwater remediation sites is defined in the BO/BC on the Closure and Reuse of Fort Ord, Monterey County, California (*USFWS, 1999*).

### 4.1 HMP Annual Species Surveys

This section identifies which MEC removal, lead, chemical, and groundwater remediation sites have correctly met the success criteria defined in the HMP. The HMP annual species associated with MEC removal, lead, chemical and groundwater remediation sites include: sand gilia, Monterey spineflower, Contra Costa goldfields, coast wallflower, and Seaside bird's-beak. The success criteria for HMP annual species states that restoration at these sites will be considered successful "if after five monitoring years, population sizes are observed to vary over time within a range that includes annual populations similar in size to those estimated for these species in 1992."

#### 4.1.1 Prescribed Burn Area

##### Monterey Spineflower

The density of Monterey spineflower populations observed in the first year of follow-up monitoring, 2004 was larger than density populations observed in the 2000 baseline survey. For example, the Monterey spineflower was observed on 84.20 acres during the first year of follow-up monitoring compared to its presence on approximately 30 acres in the 2000 baseline survey. This increase in the size of land occupied by Monterey spineflower may be attributed to the indirect effects of fire (loss of competition for nutrients and water) between shrubs and annual species. This hypothesis is supported by a study in 1995 examined the importance of three factors that contribute to postfire seedling establishment in maritime chaparral (*Claudia M. Tyler, 1995*). The study examined the direct effects of fire (changing soil structure, nutrient levels, or volatilizing allelochemicals) on scrub, subscrub, and annual herbs seed germination. The study also examined the indirect effects (competition for light and water) of fire in these three vegetative communities. This study found that the indirect effects of fire (shrub removal) improved the survivorship of annual herbs. The study also found that a reduction of herbivory play a role in the increase of density of annual herbs in burned areas.

##### Sand Gilia

More than 66,000 sand gilia individuals were detected in 2004 monitoring surveys compared to fewer than 2,000 in the 2000 baseline survey. This increase could be due to the lack of shrub cover or competition for water and nutrients, and higher than normal precipitation levels in the study area.

Research on sand gilia suggests this species is highly sensitive to soil moisture at both the seed germination and seedling stage (*ESA, 2002*). This research has also shown that sand gilia does not tolerate water-logged soils. Precipitation levels in February 2004 were higher than normal, as precipitation totaled 4.44 inches compared to the 50-year norm of 3.26 inches (*National Weather Service Climate Station, 2004*). However, precipitation levels in March 2004 were low, at 0.65 compared to the 50-year norm of 3.02 inches, perhaps creating an optimum condition for germination.

The increase in sand gilia could also be due to the loss of competition with shrub species for nutrients and water (*Claudia M. Tyler, 1995*). Sand gilia seeds may remain viable in the seedbank for many years until specific winter conditions occur and initiate germination (*ESA, 2002*).

#### Seaside Bird's-Beak

Seaside bird's-beak populations observed in the first year of follow-up monitoring (approximately 3,300 individuals) were approximately 30 percent lower than the total observed in the 2000 baseline survey (approximately 4,800 individuals). The decrease in Seaside bird's-beak may be attributed the period of the survey. The bloom period for Seaside bird's-beak is May through April. Surveys for HMP annuals were conducted in mid-April due to the notable observance of sand gilia bloom in early April. The decrease in Seaside bird's-beak may be attributed normal population fluctuations. Follow-up surveys conducted for HMP annuals at the Former Fort Ord have shown that populations of HMP annuals have fluctuated by as much as fifty percent.

The first follow-up surveys for HMP annual species were performed at the Prescribed Burn Area (Ranges 43 to 48) in 2004. Monitoring of HMP annual species and the count of HMP shrub species is planned to occur in 2005.

#### 4.1.2 UC/NRS FONR

Surveys conducted in 2004 at two areas in the UC/NRS FONR for sand gilia and Monterey spineflower comprise the fifth year of monitoring activities at Area 6 and the third year of monitoring activities at Area 9. Plate 6 illustrates the historical sampling of HMP annual species populations present at the two areas along access roads at the UC/NRS-FONR.

#### **Area 6:**

##### Monterey Spineflower

The population of Monterey spineflower at Area 6 in 2003 was 600 and increased by one-third to 800 in 2004. These two totals are lower than the number of spineflower individuals observed in the 1999 baseline survey (approximately 1,600); in the 2001 survey (approximately 2,100) and in the 2002 survey (approximately 1,216). The reasons for the decrease in Monterey spineflower in Area 6 is not attributable to any one condition and may reflect a natural fluxuation in the population as it is currently increasing. It is not believed to be the result of vehicle access as that is limited on this road.

##### Sand Gilia

The population of sand gilia observed at Area 6 has remained consistent (300 to 600 individuals) during annual follow-up monitoring surveys. A notable exception occurred in 2002, when sand gilia numbers totaled only 21 individuals that was attributed to a marked decrease in precipitation (*Harding ESE, 2002*). Precipitation levels in 2002 in the Monterey area were at 76 percent of the 50-year normal. As stated in Section 4.1.1, sand gilia is highly sensitive to soil moisture during seed germination and seedling stage.

Five years of follow-up monitoring surveys have been conducted at Area 6. Therefore, no further HMP annual monitoring is planned in this area.

## **Area 9**

### **Monterey Spineflower**

Populations of Monterey spineflower observed in 2002, 2003, and 2004 (more than 1,400 individuals) have been greater than total individuals observed in the 2001 baseline survey (approximately 500 individuals). The increase in the populations of Monterey spineflower at Area 9 could be attributed to an increase in the intensity of survey for HMP annuals at the UC/NRS FONR.

### **Sand Gilia**

The population of sand gilia observed at Area 9 has remained consistent (100 to 150 individuals) during annual follow-up monitoring surveys. The exception was the low number of sand gilia observed in 2002 (54 individuals). As stated earlier, the small population size of sand gilia noted in 2002 may be the result of reduced precipitation levels in 2002.

The requirement for three years of follow-up monitoring at groundwater remediation sites has now occurred in Area 9. No further HMP annual monitoring is planned in this area.

## 4.2 Waterbody Monitoring

The data collected at Waterbody 54 represents the baseline study for this waterbody.

### **Waterbody 54**

California linderiella were not observed at Waterbody 54 during the 2004 baseline study survey. Given pools at Waterbody 54 were small in January and March, this species may not have been observed because they tend to live in large, clear vernal pools. However, they have also occasionally been found in small-undisturbed vernal pools. While Waterbody 54 was large in February, the lack of California linderiella observed in March is probably due to predation. Mortality may have likely been the cause and effect result of approximately 100 Pacific tree frog (*Hyla regilla*) tadpoles' presence in three small ponds during the March monitoring event.

### **California tiger salamander**

The data collected at Waterbody 54 represents the baseline study for CTS. The CTS was not observed during the survey. Although CTS were not observed in Waterbody 54, suitable habitat exists for this species.

### **California red-legged frog**

The data collected at Waterbody 54 represent the baseline study for CRLF at this waterbody. CRLF was not observed during the survey at this water body. CRLF larvae require ponded water for at least three to five months or longer. It does not appear that water ponded long enough to sustain California red-legged frog larvae in 2004.

### **Tricolored blackbird**

The data collected at Waterbody 54 represents the baseline study for TCBB at this waterbody and TCBB was not observed during the survey. While nesting habitat for TCBB was not observed at Waterbody 54, suitable foraging habitat was observed. Foraging for TCBB can occur up to four miles from nesting habitat.

### **Southwestern pond turtles**

The data collected at Waterbody 54 represent the baseline study for SWPT at this waterbody. The SWPT was not observed during the surveys. The SWPT tends to be found near permanent or nearly permanent waterbodies; however, they have sometimes been observed at small ponds. In all situations, basking sites are usually an important condition to help them maintain internal body temperature optimal for survival. For this reason, it is not surprising that this species is absent from Waterbody 54 due to the absence of basking surfaces such logs, rocks, and mats of floating vegetation.

#### 4.3 Anticipated Future Monitoring

Pursuant to HMP monitoring and success criteria requirements, habitat monitoring activities recommended for the 2005 annual monitoring report include:

- Follow-up monitoring of HMP annuals at the prescribed area (Range 43-48);
- Follow-up chaparral seedling monitoring at the Prescribed Burn Area (Range 43-48) upon completion of MEC removal activities;
- Follow-up monitoring of chaparral seedlings at Range 30A, OE-9, OE-16, MRA North, and MRA West upon completion of OE removal activities, if a prescribed burn occurs in these areas;
- Follow-up monitoring of annual HMP annuals at Range 30A, OE-9, MRA North, and MRA West upon completion of MEC removal activities, if a prescribed burn occurs in these areas;
- Follow-up wetland monitoring at waterbodies 43, 44, and 53 if MEC removal occurs; and
- Follow-up monitoring at Waterbody 54 if remediation is complete.

Community regeneration is an important success criteria parameter for the restoration of habitats at the project sites and is characterized during the follow-up monitoring activities. Successful regeneration of central maritime chaparral is defined in the HMP as a habitat consisting of “healthy, high-diversity maritime chaparral habitat 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.”

## 5.0 REFERENCES

- California Department of Fish and Game, 1988. *California's Wildlife, Volume I: Amphibians and Reptiles*. May 2.
- Fox, Laurel, 2002. Contrasting demography of rare plants and the role of environmental variation. Ecological Society of America 2002 Annual Meeting.
- Reed, P.B., Jr., 1988. *National List of Plant Species That Occur in Wetlands: California (Region 0)*. May. United States Fish and Wildlife Service Biological Report. 88 (26.10).
- United States Army Corps of Engineers, Sacramento District, 1992. *Flora and Fauna Baseline Study of Fort Ord, California*. December. With technical assistance from Jones and Stokes Associates (JSA-90-214), Sacramento, California.
- \_\_\_\_\_, 1994. *Fort Ord 1994 Annual Monitoring Report for Biological Baseline Studies at Unexploded Ordnance Sites*. January 1995. With technical assistance from Jones and Stokes Associates (JSA 94-090), Sacramento, California.
- \_\_\_\_\_, 1995a. *Protocol for Conducting Vegetation Sampling at Fort Ord in Compliance with the Installation-Wide Multispecies Habitat Management Plan*. September 1995. With technical assistance from Jones and Stokes Associates, Sacramento, California.
- \_\_\_\_\_, 1995b. *1995 Annual Biological Monitoring Report for Unexploded Ordnance Removal Sites at Former Fort Ord*. September. With technical assistance from Jones and Stokes Associates, Sacramento, California.
- \_\_\_\_\_, 1996a. *Annual Monitoring Report, Biological Baseline Studies and Follow-up Monitoring at Unexploded Ordnance Sites 10 East, 10 West, 11, 12, and 16, Former Fort Ord, Monterey, California*. December 12. With technical assistance from Harding Lawson Associates.
- \_\_\_\_\_, 1996b. *Annual Wetland Monitoring Report for UXO Removal at Former Fort Ord*. December. With technical assistance from Jones and Stokes Associates, Sacramento, California.
- \_\_\_\_\_, 1997a. *Installation-Wide Multi-Species Habitat Management Plan for Former Fort Ord, California*. April. With technical assistance from Jones and Stokes Associates, Sacramento, California.
- \_\_\_\_\_, 1997b. *Annual Habitat Monitoring Report, Former Fort Ord, Monterey, California*. December 24. With technical assistance from Harding Lawson Associates.
- \_\_\_\_\_, 1997c. *Wetland Restoration Plan for Unexploded Ordnance Removal Activities at Former Fort Ord*. May. With technical assistance from Jones and Stokes Associates, Sacramento, California.
- \_\_\_\_\_, 1998. *Annual Monitoring Report, Biological Baseline Studies and Follow-up Monitoring at Unexploded Ordnance Sites on Former Fort Ord, Former Fort Ord, Monterey, California*. December 10. With technical assistance from Harding Lawson Associates.
- \_\_\_\_\_, 1999. *Annual Monitoring Report, Biological Baseline Studies and Follow-up Monitoring at Unexploded Ordnance Sites on Former Fort Ord, Former Fort Ord, Monterey, California*. December 2. With technical assistance from Harding Lawson Associates.

- \_\_\_\_\_, 2000. *Annual Monitoring Report, Biological Baseline Studies and Follow-up Monitoring at Unexploded Ordnance Sites on Former Fort Ord, Former Fort Ord, Monterey, California*. January 19. With technical assistance from Harding Lawson Associates.
- \_\_\_\_\_, 2001. *Annual Monitoring Report, Biological Baseline Studies and Follow-up Monitoring at Unexploded Ordnance Sites on Former Fort Ord, Former Fort Ord, Monterey, California*. January 22. With technical assistance from Harding ESE.
- \_\_\_\_\_, 2002. *Annual Monitoring Report, Biological Baseline Studies and Follow-up Monitoring at Unexploded Ordnance Sites on Former Fort Ord, Former Fort Ord, Monterey, California*. January 28. With technical assistance from MACTEC Engineering and Consulting, Inc.
- \_\_\_\_\_, 2003. *Journal of Ecology. Annual Monitoring Report, Biological Baseline Studies and Follow-up Monitoring at Unexploded Ordnance Sites on Former Fort Ord, Former Fort Ord, Monterey, California*. January 28. With technical assistance from MACTEC Engineering and Consulting, Inc.
- Tyler, Claudia M., 1995. *Relative Importance of Factors Contributing to Postfire Seedling Establishment in Maritime Chaparral*. January.
- United States Fish and Wildlife Service, 1997. *Biological and Conference Opinion on the Closure and Reuse of Fort Ord, Monterey County, California. (I-8-97-F/C-23R)*. April 11.
- \_\_\_\_\_, 1999. *Biological and Conference Opinion on the Closure and Reuse of Fort Ord, Monterey County, California. (I-8-99-F/C-39R)*. March 30.
- \_\_\_\_\_, 2002. *Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for *Chorizanthe pungens* var. *pungens* (Monterey spineflower); Final Rule*. (Federal Register Volume 67, Number 103). May 6.
- \_\_\_\_\_, 2003. *Determination of Endangered Status for the Sonoma County Distinct Population Segment of The California Tiger Salamander; Final Rule*. (Federal Register/Volume 68, Number 53). March 19.
- \_\_\_\_\_, 2004. *Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for Four Vernal Pool Crustaceans and Eleven Vernal Pool Plants in California and Southern Oregon: Final Rule*. (Federal Register Volume 66, Number 151). August 6.
- \_\_\_\_\_, 2004. *Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the California Tiger Salamander, Central Population*. (Federal Register Volume 69, Number 153). August 10.
- \_\_\_\_\_, 2004. *Endangered and Threatened Wildlife and Plants; Proposed Designation of Critical Habitat for the Pacific Coast Population of the Western Snowy Plover; Proposed Rule*. (Federal Register Volume 69, Number 242). December 17.
- Willison, James M., 1998. Director Environmental and Natural Resources Management. Letter to Ms. Diane Noda. U.S. Fish and Wildlife Service. November 11.